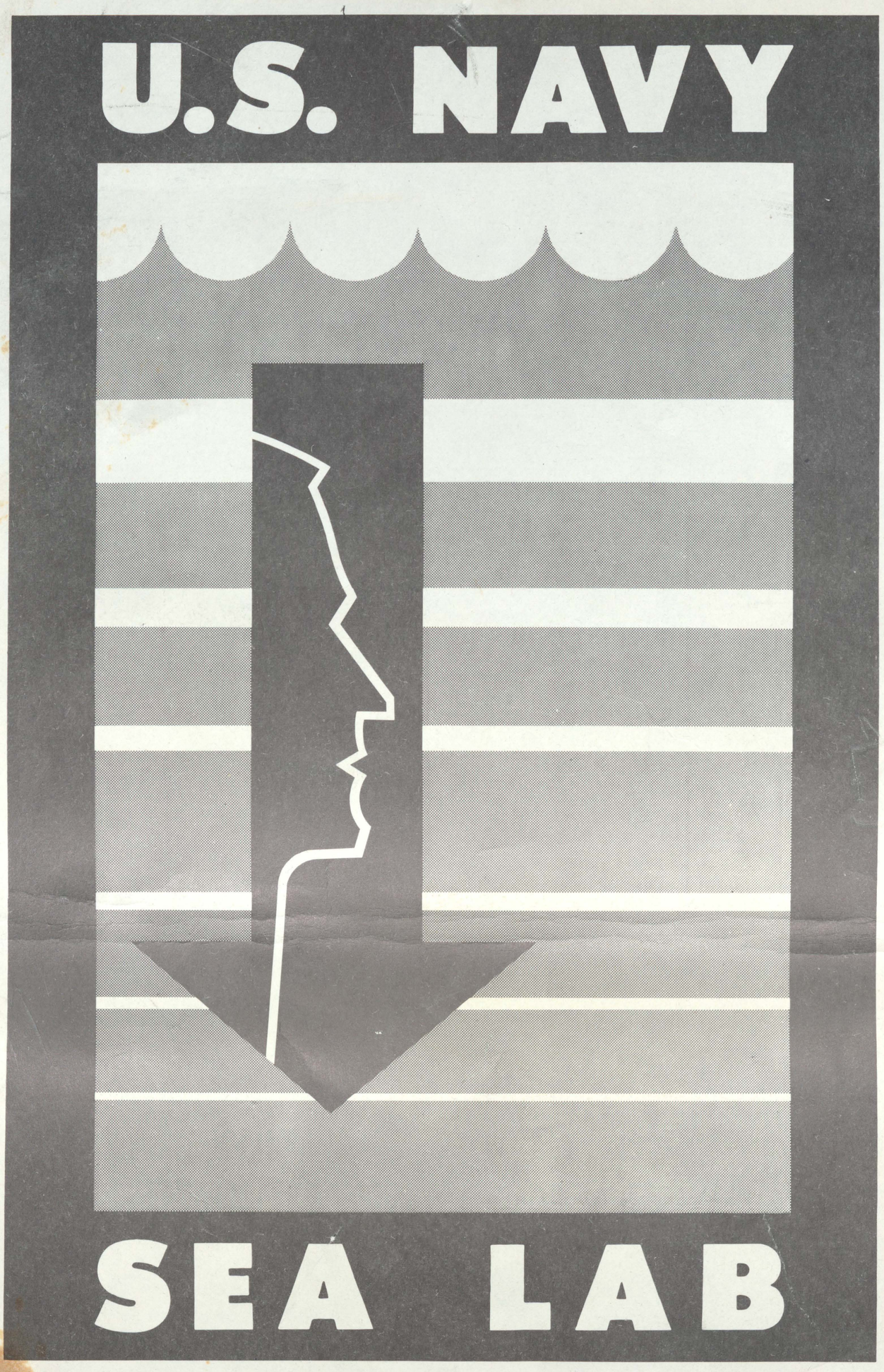
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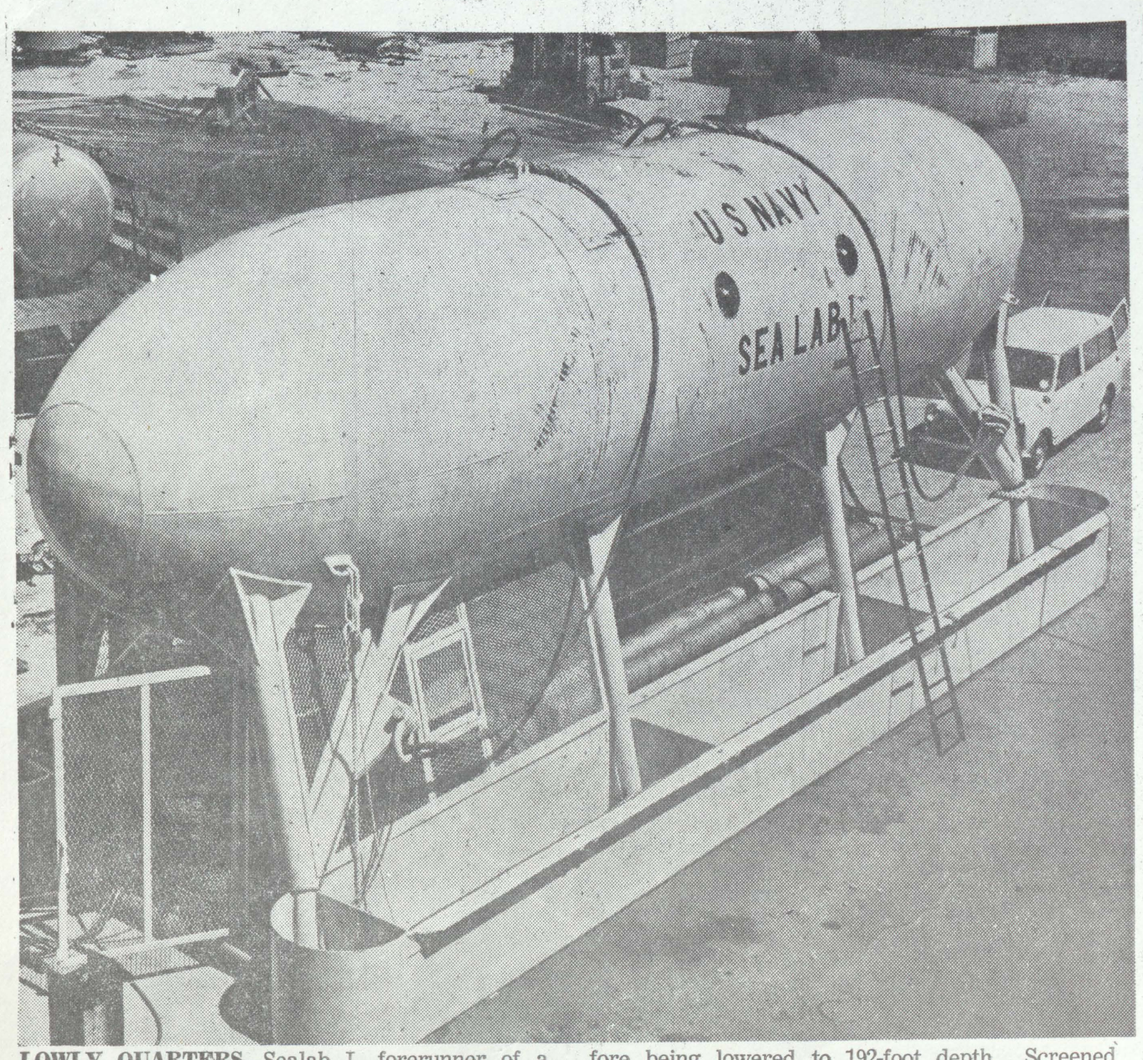
UNITED STATES NAVAL
UNDERSEA
MUSEUM



THIS COMPILATION OF NEWS COVERAGE OF SEALAB II IS DEDICATED TO THE 28 PIONEERING AQUANAUTS WHO MADE IT ALL POSSIBLE

NUM.2013.002.001

Navy Divers to Spend Month Below Sea Here



LOWLY QUARTERS—Sealab I, forerunner of a Navy life-underwater experiment to be conducted off La Jolla this summer, sits on Bermuda pier before being lowered to 192-foot depth. Screened section at left is where four divers watched undersea life in safety during last year's experiment.

10-Man Teams Will Live in Special Lab

Underwater Test To Be Conducted Near Scripps Pier

Scientists and navy divers will live and work on the bottom of the sea off La Jolla for a month this summer, the Navy said today in Washington.

Two teams of 10 men each will participate in the experiment, part of the Navy's program to adapt men to the undersea environment.

The program is called Sealab II and is an extension of experiments conducted off Bermuda last year.

Steel House Planned

A steel house for the men will be lowered 250 feet to the sea bottom a mile off the Scripps Institution of Oceanography pier. The men will live, sleep, and eat in the house, and don diving apparatus each day to emerge from the house and work on the ocean floor.

Some of the men to take part in the experiment will be Navy divers. Others will be scientists specializing in biology, geology, mechanical and electrical engineering, oceanography, and other sciences related to undersea living. Some of the men are expected to be civilians.

Names Withheld

They will undergo a four-month training course in Florida before the experiment starts. No names have been released by the Navy.

While underwater, the men will breathe a special mixture of helium, nitrogen and oxygen. The same mixture will be used whether they are in the house or outside in the ocean.

A helium speech converter will be used in the house when the men talk to each other or to scientists on the surface by telephone. The Navy explained that the use of helium for breathing affects speech and it has to be converted to make it intelligible.

TV Link to Be Used

The only connection with the surface will be through electronics. Closed-circuit television will be used for communication with the men and for monitoring the experiment. A headquarters will be set up on shore for monitoring, and a ship will hover overhead for the same purpose.

The house, a 12-by-50 foot steel cylinder, was designed by the Mine Defense Laboratory in Florida and built by the San Francisco Naval Yard. The project is supervisored jointly by the Office of Naval Research and the Naval Special Projects Office.

Conditions Controlled

The men will live under a pressure of 100 pounds per square inch both in and out of the house. The temperature inside the house will be maintained between 80 and 90 degrees and the humidity will be kept at 60 per cent. Temperature outside in the sea is expected to be about 50 degrees.

The house will contain sleeping and working quarters and a kitchen. Power will be supplied by a line from the shore.

A team of scientists will monitor the condition of the men constantly. It will be directed by scientists from the Naval Medical Research Institute at Bethesda, Md., the Navy Experimental Diving Unit in Washington, D.C., and the Submarine Medical Center in New London, Conn.

S. D. Units to Help

The Scripps Institution and the Navy Electronics Laboratory here are expected to take part in the experiment, although the Navy did not announce how they would participate.

No cost for the project was given.

Four divers lived for 10 days last year at a depth of 192 feet during Sealab I. They had planned to stay down three weeks, but the test was shortened when one man collapsed outside the chamber after his oxygen supply was cut off accidentally.

20 to Live Under Sea In Second Navy Test

Wash Star 2/6/65

By the Associated Press

The Navy will conduct a second, larger experiment this summer in which men will live 250 feet deep for periods up to one month in an underwater "house" in the Pacific Ocean off the coast of La Jolla, Calif.

It announced yesterday that in project "Sealab II" two diving teams of 10 men each will conduct tests in and around the underwater laboratory at the edge of Scripps Canyon, a mile off the pier of the Scripps Institute of Oceanography.

Last year, a similar but smaller scale test was conducted by the Office of Naval Research off Bermuda. Four divers lived and worked for 11 days at a depth of 193 feet.

The laboratory to be used in the La Jolla experiment, built at the San Francisco Navy Yard, is a cylindrical structure 50 by 12 feet. An atmospheric pressure of 100 pounds a square inch, balancing the pressure of the surrounding water, will be maintained.

Temperature within the structure will be kept at between 80 and 90 degrees, with 60 percent humidity. The water temperature will be 50 degrees, visibility between 20 and 100 feet.

Monitors on the shore will keep an eye on the divers both inside and outside of the structure through closed circuit television. Food, fresh water and air breathing mixture sufficient for at least six weeks will be maintained.

About two thirds of the teams will be qualified Navy diving personnel, with the others either military or civilian scientists.

The San Diego Union

SAN DIEGO, CALIFORNIA, SUNDAY MORNING, FEBRUARY 28, 1965

AQUANAUTS MAY SPEND MONTH . . . *. . . 250 FEET DOWN OFF LA JOLLA*

Life Under The Sea As Strange As Outer Space

By BRYANT EVANS
The San Diego Union's Science Writer

Aquanauts who will inhabit Sealab II on the brink of Scripps submarine canyon north of La Jolla this summer will be in an environment as strange as outer space.

Their artificial environment will be just as sophisticated as the astronauts' capsule, but a sight more comfortable.

The Sealab experiments are aimed at finding out how men can live and work under the pressure of the sea. For many years Scuba divers have been going down and coming up but the Sealab crewmen stay down. In this summer's experiment they may stay down for as long as 30 days. They will be 250 feet below the sea surface.

Whereas the astronauts will live in one atmosphere or less of pressure, the aquanauts will have more than seven atmospheres to live with.

An insight into what life is like under the water was given recently by Lt. Cmdr. Robert E. Thompson (MC) USN in a lecture to Naval Reserve Research Company 11-5. Thompson was the medical officer aboard Sealab I which was submerged near Bermuda last summer. He is now a radiologist at the Naval Hospital.

Life in Sealab I, according to Thompson, was not too rugged but it was not like home.

There was the matter of the soda pop and the bottle corks. The pop did not bubble and instead of being refreshing it burned all the way down. The corks were sucked into the bottles.

Both these strange phenomena were the results of pressure. Carbon dioxide bubbles under pressure do not form and the gas makes carbonic acid that stings. The exterior bottle pressure was greater than the interior and hence the corks went inward.

But yet the human bodies performed well. In this experiment four men lived in a cylinder for 11 days without noticeable physical harm. They were not uncomfortable.

They could go and come from the lab without hinderance. They did not even have to open a hatch to go in and out. Their portal was a well in the bottom of the lab. Water did not flood the lab through the portal because the internal pressure of the lab was equal to that of the water outside.

The men went in and out to make observations. They made friends with the fish which they could actually pet as they and the fish swam side by side. When they went out, the men wore Scuba gear or just face plates. They found they could stay out for 4 or 5 minutes by just holding their breaths.

One strange effect of the environment was a change of pitch in the human voice. The men sounded like chipmunks. After a while they grew accustomed to the new pitch and could understand each other without trouble.

This pitch change was not the result of pressure but of the artificial atmosphere which they breathed. The fact that they could live under the pressure was also the effect of the atmosphere.

This atmosphere was mostly helium, the second lightest of all the gases. The "air" contained 3 or 4 per cent of oxygen and a little nitrogen.

This atmosphere was tailor-made for the aquanauts. A long series of animal tests had shown that spending 35 hours under seven atmospheres of air pressure was fatal because of destruction of lung tissue. Even with the oxygen content reduced, heavy pressure of nitrogen would cause narcosis. But this effect was avoided with the lighter gas. At still greater depths it is expected that an atmosphere of hydrogen, the lightest gas, and still less oxygen will be used.

The Sealab III experiment here will be a repetition and an extension of Sealab I. The cylinder will be 50 feet long and [illegible]eet in diameter. It will be 250 feet under water instead of 193. The pressure will be 100 pounds a square inch or about 7 atmospheres.

One great difference in living off La Jolla and in the Bahama waters will be temperature. In the Bahamas it was about 70. Off La Jolla it will be about 50.

Another difference will be visibility. The Bahama water is clear and the Pacific is murky.

In these experiments no pains are spared to safeguard the aquanauts. They will be in constant communication with a topside ship. They will be monitored at all times by television cameras. They will be lowered and raised to the surface in pressure chambers to avoid bends. They will be examined daily by a medical officer to make sure that health is not being endangered.

Although Scuba divers can come from the surface to pay brief visits to the Sealab crew, the aquanauts cannot rise more than 50 feet from their station for fear of bends. Dropping weight and popping quickly to the surface would be fatal, because their internal body pressure is equal to that of the sea around them.

Although oceanographic observations will be made by the crew they will not be made primarily to learn about the sea but about men.

Dr. Per Sholander, professor of physiology at the Scripps Institution, has pointed out that it takes work just to breathe under the heavy pressure these men will endure. Headway against a 2-knot current is impossible. The purpose of the experiment is to learn how men may work underwater to exploit a new frontier.

It is expected that the work preparatory to the Sealab II experiment will start in July at La Jolla. Next month members of the Sealab crew will start rigorous training at Panama City, Fla. They will use the Sealab I in 65 feet of water.

Navy Plans 'Sealab' Test Off La Jolla

Divers To Live, Work Under Sea For 15-30 Days

By LESTER BELL
Copley News Service

WASHINGTON—The Navy will repeat its live-at-the-bottom-of-the-sea experiments this summer off La Jolla. A team of aquanauts will live and work under the Pacific for 15 to 30 days.

The undersea test will be called Sealab II. The Pentagon is withholding many details.

(Both the Navy Electronics Laboratory and the Scripps Institution of Oceanography have been requested to participate in the Sealab II project.)

It is known, however, that a big steel cylinder will be lowered some 250 feet into the Pacific about a mile off the Scripps Institution of Oceanography.

TO SEEK RECORD

A team of Scuba divers, numbering perhaps three or more enlisted men and headed by a Navy doctor, will try to remain submerged for at least 10 days, perhaps for a month.

This would beat records set by Sealab I divers last year.

Sealab I saw four divers live at a depth of 190 feet off Bermuda last summer. The men stayed down 10 days. It has been planned that they remain three weeks.

A near fatal accident to one diver shortened the test. The man collapsed outside the steel chamber when his oxygen flow was accidentally cut off.

LABORATORY-HOME

Like the first sea chamber used off Bermuda, Sealab II will be a combination laboratory and home for the aquanauts. The cylinder will open to the sea through an escape hatch. A pressure of perhaps 100 pounds per square inch inside the hull will permit the sea to rise about halfway in the open hatch.

The divers, wearing Scuba gear, will be able to go in and out of the capsule at will. Past experience indicates that they should be able to work outside the capsule for between four and six hours at a time.

This is all possible through the development of a pressurized synthetic atmosphere, a mixture of helium, oxygen and nitrogen. The atmosphere is the same in the capsule as it is in the Scuba tanks. This enables the men to go to and from the sea without spending time in a decompression chamger.

LARGER CHAMBER

Sealab I was a jury-rig diving chamber. Some 10 feet in diameter and 40 feet long, it was adapted from two floats originally used to support mine detection equipment. In its final form it resembled a small submarine on stilts.

Sealab II will be a larger and improved version, specially made for the experiments. It is understood that it will be put together at the Navy Mine Defense Laboratory, Panama City, Fla., where the first one was built.

Like the pioneer Sealab I, the new chamber will be connected to the surface by an "umbilical cord" carrying power, communications, emergency gas and fresh water from a "mother" ship on the surface.

Similar experiments have been conducted by the French.

2

EVENING TRIBUNE

FINAL
HOME

Evening Tribune-Established 1895 San Diego Sun-Established 1881 San Diego Daily Journal-Established 1944

UNDERSEA DRAMA REVEALED

Thumb in Leak Saves 4 Aquanauts

By FRANK HOGAN
EVENING TRIBUNE Military Writer

A Navy doctor told today for the first time of plugging a leak in an underwater chamber with his thumb to save himself and three other men from death.

He is LCdr. Robert E. Thompson of 444 Tyrone St., El Cajon.

The dramatic episode climaxed frantic efforts by Navy men on a surface ship to save the aquanauts before a hurricane struck.

Thompson and the others had lived 11 days last July in a 10x40-foot cylinder called Sealab I which rested 193 feet on the ocean floor off Bermuda. He may participate in a more elaborate experiment with Sealab II next summer off La Jolla.

On the 11th day of the aquanauts' stay in Sealab I, a hurricane was brewing on the Atlantic above them. Their temporary home would become their tomb if they weren't rescued before the storm struck.

For seven hours, while an overloaded crane shook with the effort of trying to haul the underwater laboratory to the surface, no one knew if they would make it.

The men were ordered to abandon the laboratory. Thompson said they held their breath and swam to a tiny, cramped compression chamber for the trip to the surface.

Just before the chamber cleared the water, it sprang a leak. The internal pressure was equal to that of the ocean at 200 feet. In minutes, the four would die painfully of the bends.

Thompson said he found the leak and jammed in his thumb.

The flesh gave with a spurt of blood but the bone held and the leak stopped, according to Navy Capt. G. F. Bond, the project chief.

Thompson minimized his injury, saying his thumb wasn't really hurt that badly.

Minutes later, the chamber, dangling from the end of a wire rope, was lifted to safety — in the nick of time. Technicians discovered a metal pin to which the rope was attached had been bent and almost sheared.

Thompson, who is assigned to Naval Hospital here, said he kept his bloody thumb in the hole for 10 minutes while workers repaired the leak from the outside.

Bond said the four men showed no ill effects from their long underwater adventure — except for Thompson's thumb.

Thompson was not able to tell about the mishap until today, after Bond released details at an electronics convention in Los Angeles.

Despite the harrowing experience, Thompson said he would like to live underwater again in Sealab II. Unfortunately, his radiology training schedule at the hospital won't give him the necessary time to prepare for another adventure at the bottom of the sea.

However, he has been asked to be part of the surface support crew and do some diving in connection with the most extensive test yet of man's ability to live and work deep underwater for long periods.

Sealab II will be lowered to 250 feet, one mile off the Scripps Institution of Oceanography pier to become the residence of two diving teams of 10 men each. The teams, which may include some civilian scientists as well as Navy divers, will stay submerged for 15 to 30 days.

Thompson, 36, father of six, called Sealab I "an enjoyable, interesting and educational experience."

"Initially, we were somewhat apprehensive because of the change in environment," he said. "But after we adjusted, life down there was fairly normal for us."

Thompson said it took almost four days for him and the others to regain normal feelings of equilibrium and movement. Until they adjusted to the helium-oxygen breathing mixture, even a small amount of work was fatiguing. (Helium replaced nitrogen, which is poisonous at great pressure.)

"We were constantly monitored by the people topside by closed circuit TV and they said we moved for several days like a slow motion film," the doctor said. "Later, we were able to go outside the compartment into the ocean and stay out for several hours without tiring."

Thompson said the aquanauts were picked for Sealab I because of their backgrounds. He not only is a diver and doctor but has had training in marine biology.

"Our biggest problems living underwater were not with the personnel, diving principles or medical aspects, but with the engineering," he said. "They are being worked out now for Sealab II."

Thompson's main tasks were making psychological and physiological tests of his fellow divers and himself. He also led the worship service on the Sunday they spent on the ocean floor atop an old volcano.



LCDR. R. E. THOMPSON
Wants to aid La Jolla dive

Project 'Sealab II'

By the Associated Press

Washington

The Navy will conduct a second, larger experiment this summer in which men will live 250 feet deep for periods up to one month in an underwater "house" in the Pacific Ocean off the coast of La Jolla, Calif.

The Navy announced that in project "Sealab II" (sea laboratory) two diving teams of 10 men each will conduct tests in and around the underwater laboratory at the edge of Scripps Canyon, a mile off the pier of the Scripps Institute of Oceanography.

Last year, a similar but smaller scale test was conducted by the Office of Naval Research off Bermuda. Four divers lived and worked for 11 days at a depth of 193 feet.

The laboratory to be used in the La Jolla experiment, built at the San Francisco Navy Yard, is a cylindrical structure 50 by 12 feet. An atmospheric pressure of 100 pounds a square inch, balancing the pressure of the surrounding water, will be maintained.

The men will breathe a special air mixture which includes helium.

Temperature within the structure will be kept at between 80 and 90 degrees, with 60 percent humidity. The water temperature will be 50 degrees, visibility between 20 and 100 feet.

Monitors on the shore will keep an eye on the divers both inside and outside of the structure through closed circuit television. Food, fresh water and air breathing mixture sufficient for at least six weeks will be maintained.

About two-thirds of the teams will be qualified Navy diving personnel, with the others either military or civilian scientists.

The team will begin training next month at the mine defense laboratory near Panama City, Fla.

WEDNESDAY, FEBRUARY 10, 1965
THE CHRISTIAN SCIENCE MONITOR,

RESEARCH NOTEBOOK

World Beneath the Waves

By Robert C. Cowen
Natural Science Editor of The Christian Science Monitor 2/11/65

WHAT HAPPENS TO MEN WHO master an alien environment so that they literally live in another world? Does their native world become so unreal that they begin mentally to separate themselves from it?

This question undoubtedly will arise with those future astronauts who set up a base on the moon. But meanwhile it has already become one of the problems in learning to live beneath the sea.

Capt. George Bond of the United States Navy's Medical Research laboratory noted this recently in outlining the Navy's future plans for undersea living. He was in charge of an experiment last summer in which four men lived for 11 days on the sea bed.

He explained that the men had only been below a short time when he felt that he was in some sense "losing" them. They began to ignore some commands and regulations. They soon were acting in an independent manner that was both dangerous and puzzling. It was as though the men were mentally leaving the world above the water surface for a new world to which they now belonged.

* * *

The experiment was that of the famous Sealab 1. This was a steel chamber that became home for the four men 192 feet beneath the sea. It contained an atmosphere of oxygen and helium at the same pressure as the surrounding water.

It was an American counterpart of European experiments carried out under Captain Jacques-Eves Cousteau.

Ordinarily, divers can remain at such a depth for only a short period. Much of their time in the water is taken up in slowly decompressing to release nitrogen that their bodies absorb under the pressure at depth.

Captain Cousteau proved that, by adjusting the breathing atmosphere and by living constantly under pressure, men could remain below indefinitely. They only have to decompress when they eventually return to the surface.

The American Navy experiment confirmed the safety and value of the technique. But it raised the puzzling question of mental perspective.

Captain Bond said this was quite different from dealing with men in a Polaris submarine or astronauts in an orbiting space capsule. In these cases, too, the men have only an electronic link with their homeland. But they are still tied to it closely enough to act as part of a team.

* * *

In the Sealab experiment, the four men involved literally lived in a world that except for short dives was barred to those on the surface. The men later explained some of their independence as a response to confusion and conflicting commands from above.

Captain Bond acknowledges the confusion. But he thinks the problem goes beyond that. He recalled the nickname he, the commander, was given. "Within an hour," he said, "I was told I was no longer 'Captain' but 'Pappa Topside' and so I remained for the experiment. It was partly good fun but I also felt it was part of the process of somehow losing the men."

* * *

"When a man is in an environment he really enjoys," he explained, "and when he feels he's really a first in the Navy, he feels independent. He beats himself on the chest. He feels he knows best what to do. This is dangerous for command and for him if he forgets that he is really in a very hostile environment."

Captain Bond said this may someday be a problem with lunar explorers. However, he hopes to have it solved fairly soon for his aquanauts because the Navy is expanding the program.

Tests with Sealab 2, a 10-man chamber, are to be held at a depth of 250 feet off southern California this summer. The Navy hopes to have some 50 men living on the continental shelf at all times within four years. By then, it may have a nuclear submarine whose forward part will be a variable pressure chamber. Aquanauts could then operate in many offshore parts of the world.

Two Are Chosen to Make 7-Day Gemini Flight

Cooper Will Be Commander for 3d Voyage of Series— Conrad to Be Companion

By RICHARD WITKIN

Maj. L. Gordon Cooper Jr., whose 34-hour space flight was the longest of the Project Mercury missions, was named yesterday to be spacecraft commander for the seven-day Gemini flight late this year.

His companion in the cramped, two-man capsule will be Lieut. Comdr. Charles Conrad Jr. He is the smallest of the astronauts and the only Ivy-Leaguer. He graduated from Princeton in 1953.

The flight will be the third in the Gemini series, which is expected to get under way in late March or in April. The first flight will last three orbits.

The longest Soviet space flight to date was the five-day flight of Lieut. Col. Valery F. Bykovskyin June, 1963.

The announcement of the crew for the seven-day trip was made at the Manned Spaceflight Center near Houston.

It coincided with word that Lieut. Comdr. M. Scott Carpenter, who flew a three-orbit Mercury mission in May, 1962, and broke his arm last summer in a motorbike accident, would be loaned back to the Navy until October at least.

He will be a member of a 10-man aquanaut team that will spend about 15 days in the Sealab II vessel at a depth of about 240 feet off Southern California in the fall.

Many in the space-flight community doubt that Commander Carpenter will ever return to the astronaut program.

This is because he will be 40 in May. Also, he must undergo surgery on his arm Feb. 18, and he has been doing little astronaut training.

All in all, the original seven-man astronaut team has been subjected to steady attrition.

The first to be barred from space flight was Maj. Donald K. Slayton. This came about early in 1962 after doctors discovered a heart irregularity. He has since resigned his Air Force commission and is serving as the center's assistant director for flight-crew operations.

Next came the decision of John H. Glenn Jr., then a Marine lieutenant colonel, to give up space flight for politics. His plans were spoiled by a bathroom fall that badly injured his inner ear. He recently retired as a colonel to serve as a consultant to the Federal space agency and work for the Royal Crown Cola Company.

Comdr. Alan B. Shepard Jr. was the third to be hit by medical troubles. He developed an inner-ear infection almost two years ago.

It has been mending slowly, but the astronaut still has hopes of making another space flight. He is 42 years old, however, and, for that sort of activity, time is running out on him. Meanwhile, he is working as chief of the astronaut-activities office.

Finally, last summer came Commander Carpenter's accident in Bermuda, where he was preparing for the Sealab I expedition.

With all this attrition, it was virtually a foregone conclusion that Major Cooper would be picked for the seven-day Gemini flight.

Only two others, of the original seven, are currently eligible for space trips.

One, Maj. Virgil I. Grissom, will be spacecraft commander for the first Gemini flight. The other, Lieut. Comdr. Walter M Schirra Jr., will be commander of the stand-by crew.

The second Gemini flight, a four-day trip this summer, will have as crewmen two members of the second astronaut group to be picked—Capt. James A. McDivitt and Cpat. Edward H. White 2d.

Two of their colleagues in the second group were named yesterday as the back-up crew for the seven-day Gemini trip —Neil A. Armstrong and Elliot M. See Jr. They are civilians.

The seven-day Gemini flight is considered one of the most critical in the nation's space-flight program.

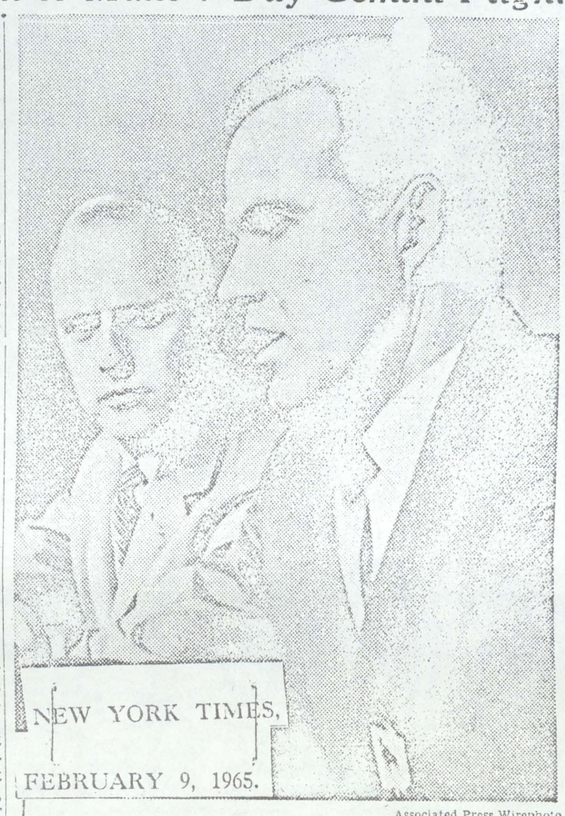
It will be the first flight scheduled to last about as long as a Project Apollo round trip to the moon.

Officials want to verify that humans can tolerate weightlessness for that long so this will be one problem they will not have to worry about on the much more hazardous lunar trip.

There are two other important features of the seven-day flight.

First, the crewmen will open their hatch and lean halfway out into the void of space to retrieve scientific experiments attached to the outside of their craft. Crewmen on the four-day flight will merely open their hatch and stand up.

Second, a pod with a flashing light will be released and the astronauts will maneuver away from and back toward it to test rendezvous procedures that are vital to the moon flight.



NEW YORK TIMES,
FEBRUARY 9, 1965.

Associated Press Wirephoto

Maj. L. Gordon Cooper Jr., at right, with Lieut. Comdr. Charles Conrad Jr. yesterday at conference in Houston.

MISSILE/SPACE DAILY - 5
1001 Vermont Ave., N.W. D
Washington, D.C. 20005

JUN 23 '65

ONR PLANS SEALAB II FOR AUGUST

Sealab II which was described as having some interesting "physiological" similarities to the proposed AF Manned Orbiting Laboratory program has been scheduled to begin the middle of August by the Office of Naval Research.

At a Pentagon briefing last Friday, Capt. Lewis B. Melson, director of the naval applications group in ONR and Henry B. O'Neal, director of ONR's engineering applications group described the Sealab II experiment in which two men are scheduled to remain at a depth of 210 feet for 30 days, one half miles off LaJolle, Calif. These two men will be taken from two diving teams of ten men each which will alternately occupy a 57-ft. undersea habitat during the 30-day experiment.

It is anticipated by ONR that Cmdr. Scott Carpenter will be the leader of the first team. Carpenter, presently on loan from NASA, is directing the training of "acquanaut" candidates at the U.S. Navy Mine Defense Laboratory, Panama City, Fla.

Melson told M/S DAILY after the briefing that while there may not be a strict comparison between the atmosphere and pressure of the Sealab II and those contemplated for MOL, there is a physiological relationship. Melson said that Carpenter likes the Sealab experiment "because both this and MOL involve very hostile environments."

3

THE NORTH ISLANDER

'Sea Lab II' Will Be Conducted Here Soon

1/1965

In the most extensive test yet of man's ability to live and work in the ocean depths for long periods of time, project SEA LAB II has been scheduled for late next summer when an underwater residence will be established at a depth of 250 feet, one mile off La Jolla, California.

Two diving teams of 10 men each, which may include civilian scientists as well as Navy divers, will occupy the under sea house for periods of 15 to 30 days.

A major objective will be to determine how much useful work can be accomplished by divers in the ocean environment at that depth. The experiment, which will be conducted by the Office of Naval Research in collaboration with the Navy's Special Projects Office, is part of the Man in the Sea Project under the deep submergence systems program.

Sea Lab I was conducted last July by the Office of Naval Research 30 miles off Bermuda when four Navy divers lived and worked comfortably and safely at a depth of 193 feet for a period of 11 days.

The Sea Lab II structure will be a cylindrical house 50 feet by 12 feet designed to provide easy access to the sea. The atmospheric pressure will be 100 pounds per square inch, which will be equal to that of the surrounding water.

The aquanauts will breathe a specially formulated gas mixture consisting of rigidly controlled percentages of helium, oxygen and nitrogen, with helium the major component. There will be living and berthing facilities for 10 men plus space for the necessary laboratory equipment to be used during the test.

The house will be self sufficient with respect to food, water and breathing gas mixture for at least six weeks. Power will come from the shore, backed up with an alternate source aboard the surface support vessel.

In addition to power, the shore connection will provide water supply, breathing gas supply and sampling tubes, channels for relaying underwater television, communications circuits and data links.

The team will be constantly monitored with television while they are in and around the structure. A helium speech converter designed to make intelligible the "Donald Duck" speech of subjects breathing helium will be provided by the Bureau of Ships' Applied Science Laboratory, Brooklyn, New York.

The environment within Sea Lab II will be maintained at between 80 and 90 degrees fahrenheit and 60 per cent humidity, which is comfortable for the high helium atmosphere inside the structure. Conventional galley equipment will be installed for food service except that no fried foods will be prepared.

The Sea Lab II structure was designated by the U.S. Navy Mine Defense Laboratory, Panama City, Florida, and will be built by the San Francisco Naval Shipyard.

About two thirds of the Sea Lab II crews will be highly qualified Navy diving officers and enlisted personnel. The remaining aquanauts to be chosen may be either military or civilians depending upon the abilities and background of the volunteers.

In selecting the latter, an effort will be made to vary the skills so that biologists, geologists, mechanical and electrical engineers, oceanographers and other scientists interested in working on the ocean floor, will be represented.

Sea Lab II will be placed on the north edge of the Scripps Canyon, one mile off the end of the pier at the Scripps Institution of Oceanography of the University of California at La Jolla, where the bottom is a compacted sedimentary material.

The temperature of the water in which the men will work will be 50 degrees fahrenheit with visibility between 20 and 100 feet. These are considered typical of the conditions under which routine fleet operations would be conducted.

Three principal types of equipment will be used by the aquanauts, the standard Navy Scuba, the Mark VI, and the Hookah, a closed circuit pumping system extending from the habitat. Hot fresh water showers will be available to enable the divers returning from the ocean to regain normal body temperatures.

The Mine Defense Lab[illegible] which will provide supervisory engineering services for the project, will supply and maintain the diving equipment for the test.

Physiology and diving personnel will be under the supervision of the deep submergence systems program of the Special Projects Office.

Scripps will assist in the physiological and oceanographic research of their institute laboratory facilities.

The surface support vessel which will service and monitor the Sea Lab structure will be a large Catamaran craft which has been employed on the San Clemente range for Polaris tests. It will be provided by the Naval Ordnance Test Station, Pasadena, California, which will also furnish the personnel to man the craft and a portion of the surface support diving team. The Catamaran will have administrative laboratory control and berthing space for project personnel. Assisting with the preparation of the surface support vessel will be the Long Beach Naval Shipyard. A special system for transporting personnel and equipment between the surface support vessel and Sea Lab II has been devised. Diving bells and submerged decompression chambers will be used for this purpose with special fittings to couple with a large double lock decompression chamber to be installed on the surface craft.

If the Sea Lab house has to be evacuated for any reason, the aquanauts will be brought to the surface under pressure in the same helium-oxygen atmosphere in which they have been existing and transferred to the large chamber without having to change pressure during the transfer process.

This experimental technique of versital personnel transfer is expected to contribute to the offgoing deep submergence systems program of developing salvage and submarine rescue facilities. In addition to this equipment a surface diving unit will stand by to maintain communications with the Sea Lab team and perform liaison functions.

The team members will report to the Mine Defense Laboratory in Panama City, Florida, in March to begin four months of training. The rigorous training program will include many hours of work with the most advanced systems of underwater navigation, communications, propulsion and diving apparatus. Included in the program will be intensive classroom training, featuring addresses by leading figures in all fields of oceanology.

Toward the end of the training the selected aquanauts will work out of Sea Lab 1, which has been transferred to Panama City, to be submerged in 65 feet of water. This will permit a realistic rehearsal of the Sea Lab II exercise.

Physiological data and diving safety will be a constant concern during the test. A Navy physiological group will monitor the team personnel constantly. Collaborating on this aspect of the test will be the Naval Medical Research Institute, Bethesda, Maryland, the Navy Experimental Diving Unit, Washington, D.C., and the Submarine Medical Center, New London Connecticut. Physiological research by the University of Pennsylvania, University of Buffalo, and the University of California at Santa Barbara will also play an important role in the project.

'MAN IN THE SEA' PROJECT

Sea Lab II Men Assigned Three Tasks

By AL COSTELLO

WASHINGTON—Sea Lab I last summer off Bermuda proved men can live and work in the depths of the sea.

Sea Lab II, scheduled to start August 15 one mile off La Jolla, Calif., will reveal, scientists are certain, what sort of work men can do and, to a large extent, what sort of tools are needed.

Sea Lab III, which will follow in 1966, will endeavor to discover how far men can go with the equipment Sea Lab II indicates may be applicable at known, and even unknown, depths.

* * *

THIS IS the Navy's deliberate half-crawl in its program of putting the "Man in the Sea,"—painstakingly precise steps leading to a full-scale invasion of "inner space."

The careful approach to the project, Navy scientists insist, is entirely necessary. They say hard and cold facts must be absorbed with such exactness that margin for error does not exist. Time is not nearly so important as knowledge in exploring what amounts to a new world. This knowledge takes time to learn and for that reason alone, they concur, the more facts they have the less chances there are for a tragedy.

Capt. Lewis B. Melson, director of the Naval Applications Group, whose Office of Naval Research is collaborating with the Navy Special Projects Office in the program, says the Sea Lab II experiment will give the "men in the sea" three separate and distinct chores. The success, or results, of these three things, he says, will determine how far Sea Lab III can expect to progress next summer.

* * *

THESE THINGS will the men of Sea Lab II be asked to do:

- To orient themselves to such an extent that they can chart the bottom with accuracy. This will include establishing "landmarks" so that from these familiar spots they will know know instantly their exact locations. They will be confined to two vertical zones of 33 feet each above the sea lab and a horizontal distance of about 500 feet.
- To perform individual projects. Biologists will take samples of one inch of the bottom. Geologists will record the movement of the bottom and its levelness. Geologists also will be asked to determine how rapidly the bottom shifts and why. In addition, the men will study the feasibility of establishing a weather station on the bottom.
- To complete a construction project—a four-foot-square "house" away from the sea lab in case of an emergency. The house will contain air in event of a sea lab malfunction. It will be a team job, with all members participating in relays, one hour in the morning and one hour in afternoons.

* * *

HOW WELL these things are performed will reveal how far the "man in the sea" has come and how far he may be expected to go in Sea Lab III.

Sea Lab I, which proved men could live and work in the depths, put four Navy divers at a depth of 193 feet for 11 days. They left and returned to their lab in pursuit of what could be called menial tasks compared to the more difficult things the men of Sea Lab II will be asked.

In contrast, Sea Lab II will house two 10-man teams for a 30-day period. Eight men will spend between 12 and 15 days followed by another eight-man team for another 12-15 days. Two men, one whom earlier had been reported to be astronaut Comdr. Scott Carpenter, will remain in the lab for the entire 30 days, as team captains.

They will live 250 feet below the surface under 100 pounds of atmospheric pressure, in a 50-by-12-foot cylindrical steel structure which will have two pontoon feet to set it squarely on the bottom. Ports will permit the divers visibility. It will be completed about August 1 at San Francisco Naval Shipyard.

In contrast, the Bermuda tests of Sea Lab I at 193 feet was at 83 pounds of atmosphere pressure. (Surface pressure is 15 pounds.)

* * *

ALTHOUGH scheduled for only 30 days on the bottom, Sea Lab II will be completely self-sufficient in all ways for at least six weeks, including food, water, and breathing gas mixture. A catamaran barge will maintain 24-hour vigilance with equipment for any possible emergency. A supply of food also will be stashed away in the "house" the aquanauts will build, just in case.

The catamaran barge, as well as a shore installation, will be in constant communication with the aquanauts. They will be observed day and night by television monitors. At such a depth special speech convertors are necessary for the pressure changes man's voice into something resembling the squawkings of an aroused Donald Duck. The convertor "slows down" the voice to normal tones.

Temperature in the lab will be maintained at between 80-90 degrees and at 60 percent humidity, entirely comfortable. Food will be prepared as normally except for fried foods, which produce excess amounts of annoying hydrocarbons.

* * *

THE BREATHING mixture will be 4 percent oxygen, 16 percent hydrogen (the lightest gas) and 80 percent helium (second lightest gas). A medical staff will be on duty round-the-clock in the surface barge. The lab will contain its own decompression chamber as will the surface barge, also just in case.

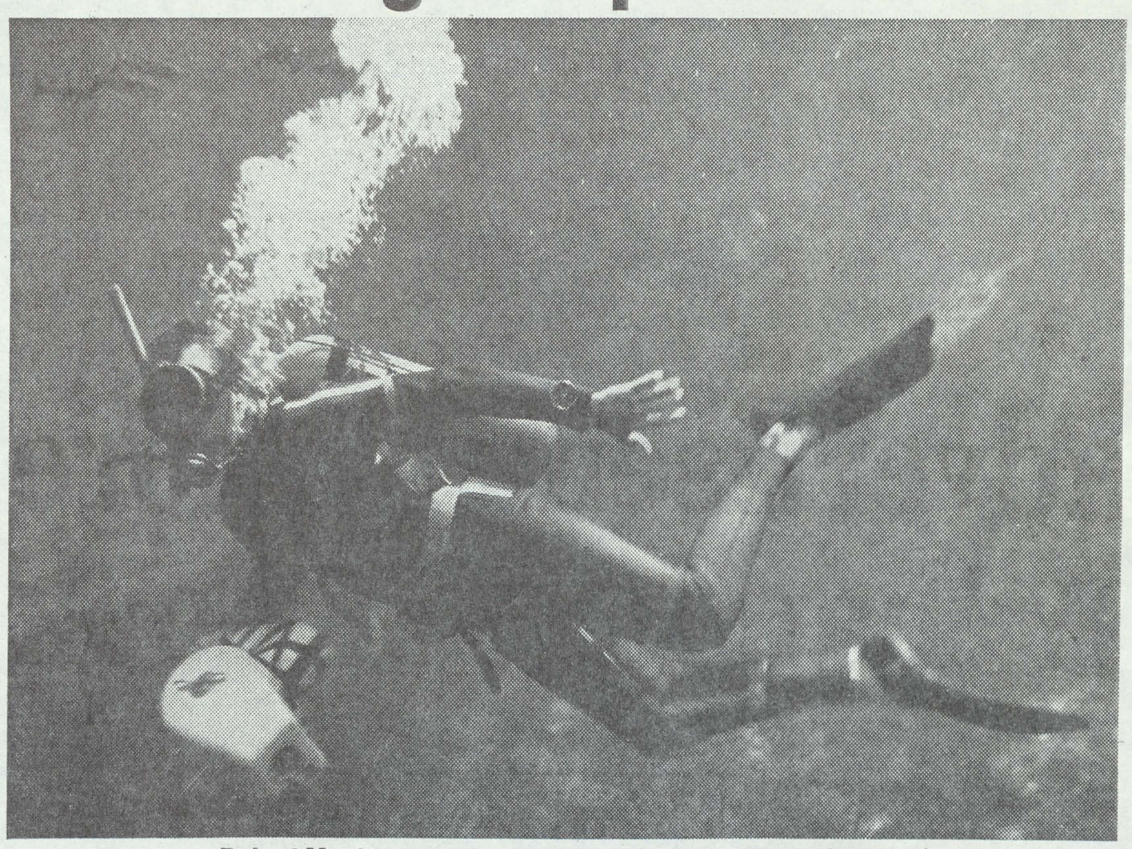
Every aquanaut will be a volunteer. Twenty-six of them are undergoing training at the Mine Defense Laboratory, Panama City, Fla., using the old Sea Lab I as a vehicle. While 20 actually are to live underwater will not be announced until a few days before the August 15 take-off date.

26 MAY 1965

NAVY TIMES

1/9/1965 3/15/65

...and the sea shall give up its secrets



Robert Montgomery narrates the fascinating story of man's assault on the last of the earth's great frontiers—the incredible world beneath the sea. Famed underwater explorer Jacques-Yves Cousteau, Capt. George Bond and the U. S. Navy Aquanauts of Project SeaLab, leading oceanographic scientists and remarkable underwater experiments show man's progress in the conquest of "inner space." Produced by ABC News and sponsored by The B. F. Goodrich Company.

"Man Invades the Sea"

abc Tonight 10:00-11:00

4

Undersea Instrumentation for Photographic and Video Documentation

By JAMES F. SELVIDIO

Photoinstrumentation in undersea exploration is discussed with particular reference to the U.S. Navy's recent success with Project Sealab I. Photographic equipments used in the experiment are described and recommendations based on observations made during the experiment are outlined.

MAN AND HIS descendants, the inhabitants of Planet Earth, have quite thoroughly explored even the most remote parts of its land mass, covering approximately 30% of Earth's surface. Seventy per cent, covered by the water of the oceans, remains virtually unknown and unexplored. Understandably, man has turned his attention to the limitless space outside his immediate world and has made tremendous strides in developing knowledge of its vastness. It appears likely that it is only a matter of time before man will be able to travel to the moon and beyond. Even so, mankind is now forced by increasing population to pause and take a more serious look at his own back yard — the 70% of his world covered by water that we call the *inner* space of Planet Earth.

Earth may be the only planet with so much water, but, for thousands of years, man's need for life-sustaining oxygen has barred him from exploring the depths of the seas. He has ventured over them to a great extent, but his adventures under the surface of the seas, due to lack of knowledge, have been restricted to time-limited and dangerous dives which have carried him just a few feet below the surface and have left most of the remaining depths a mystery.

Presented on September 28, 1964, at the Society's Technical Conference in New York by James F. Selvidio, U.S. Navy Underwater Sound Laboratory, Fort Trumbull, New London, Conn. (This paper was received on September 28, 1964.)

At the U.S. Navy Underwater Sound Laboratory, one of our main interests is, and has been for the past 25 years, this realm beneath the surface of the sea. In our daily work we consider this area our "hydrospace" challenge.

Our interest arises from a demand for knowledge of this area in which we must work in the research and development of underwater acoustical equipment and systems. Soon after any object goes very far below the surface, man becomes relatively blind to its further subsurface penetration. To overcome this condition, he has used cameras and video systems, separately or in combination. This "marriage" of camera and video has provided him with eyes to see at practically any depth where sufficient illumination is available or can be provided. He is then able to retain the desired images at will by supplementary photographic means.

Man's exploration of the vast ocean depths presents one of the most exciting areas of applied research. It offers considerable promise for results, which will be applicable, not only to the U.S. Navy, to strengthen its operational capability for the future, but to the world and to mankind's continuing existence. The question then is: to what extent can man himself adapt to an oceanic environment?

Underwater swimmer-divers represent an important capability for performing specialized tasks which can be accomplished most quickly and economically by man himself. However, depth and duration limitations, manifested primarily by the requirements for extended periods of decompression after only brief working periods at relatively shallow depths, have led to a radically different concept. Studies by Capt. George Bond, USN, (Principal Investigator on the Sealab) at the Naval Medical Research Laboratory, New London, Conn., have demonstrated that man can live in an artificial helium-oxygen atmosphere at a depth of 200 ft for prolonged periods and apparently not be subject to harmful after-effects.

The Sealab I Experiment

Project Sealab I (Fig. 1) was the first exploratory attempt to apply in practice the results of the exhaustive laboratory studies of Project Genesis. These studies involved placing men in an underwater environment for extended periods, where they lived at ambient pressures equal to a depth of 200 ft beneath the ocean surface and made excursions at will into the water to accomplish scientific tasks. It is believed that man can accomplish useful work at 1000-ft depths, or perhaps greater, with this technique of integrating the swimmer-diver more fully with his undersea environment. Otherwise, the diver is limited to brief, expensive undersea forays.

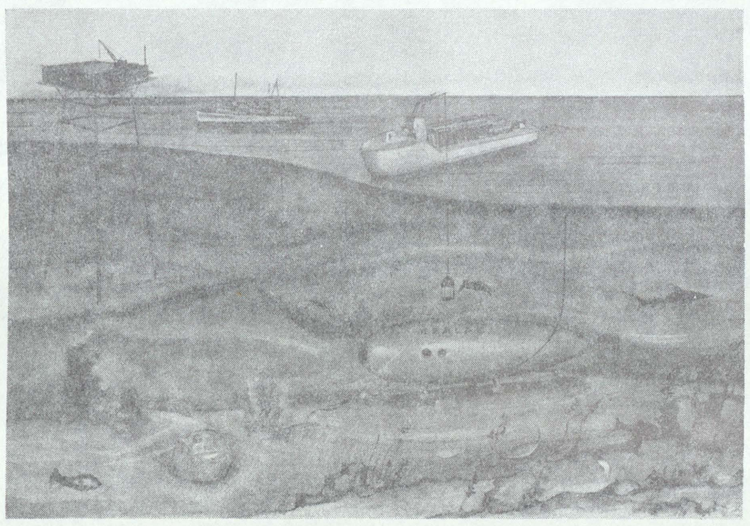


Fig. 1. Artist's conception of the Sealab and support facilities.

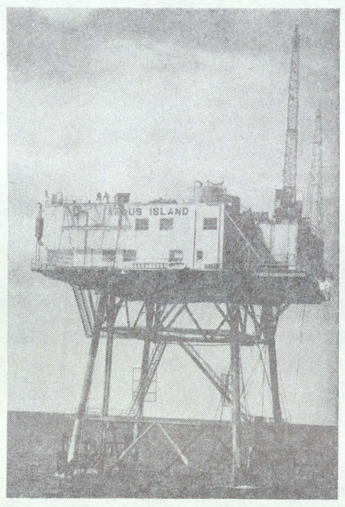


Fig. 2. Navy Research Tower "Argus Island."

In the Sealab experiment it was planned that Navy Scuba divers would live and work 192 ft under the surface, to test man's ability to work under high pressures for fairly long periods of time, the personnel to include one Navy doctor and three enlisted men.

During the time underwater, they would undergo numerous physical and physiological tests, to determine man's ability to work and live at these depths on a continuing basis.

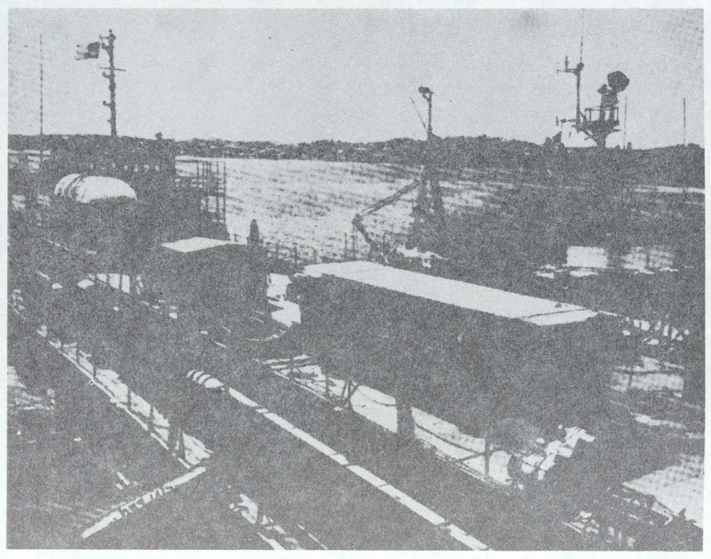


Fig. 3. Sealab 1 (cylindrical object at upper left of photograph), auxiliary power plant (center) and communications trailer.

Experiment Completed

Recently, Project Sealab I, sponsored by the Office of Naval Research in collaboration with the Bureau of Ships and the Medical Research Laboratory at New London, was carried to a successful conclusion in the vicinity of the Navy Research Tower on Argus Island, in the ocean, 26 miles southwest of Bermuda (Fig. 2). This site was chosen because the ocean bottom there is flat and affords excellent visibility. The time of year chosen was June and July, because the weather is at its best there during these months.

The Sealab Project facilities (Fig. 3) consisted of Sealab I, an auxiliary power plant, and a communications trailer; also a submersible decompression chamber (Fig. 4) and the surface support vessel YFNB-12, which provided necessary services.

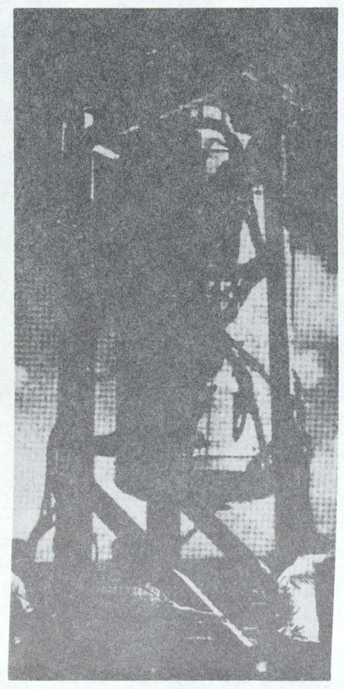


Fig. 4. Submersible decompression chamber.

The Sealab I capsule is a modification of a large cylindrical experimental minesweeping float, 9 ft in diameter and 40 ft long (Fig. 5). This capsule is divided into two sections, separated by a bulkhead.

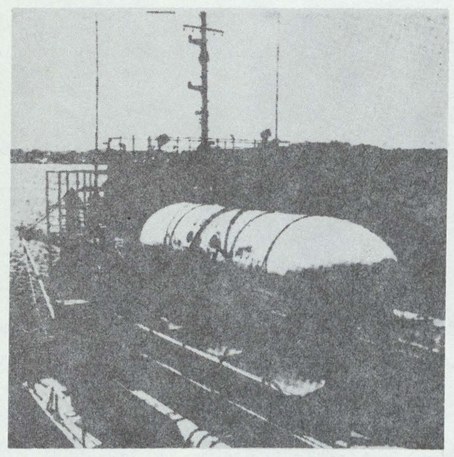


Fig. 5. Sealab I capsule.

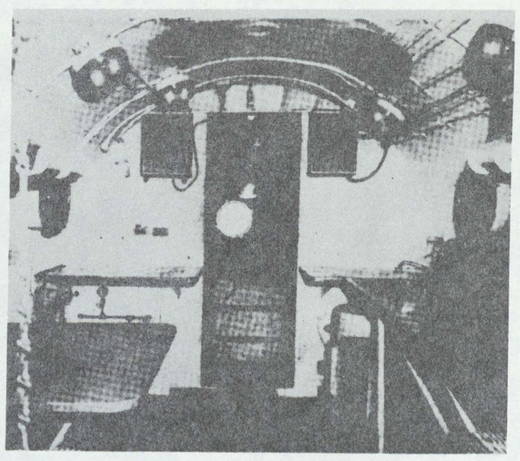


Fig. 6. Forward view of portion of laboratory and living space section.

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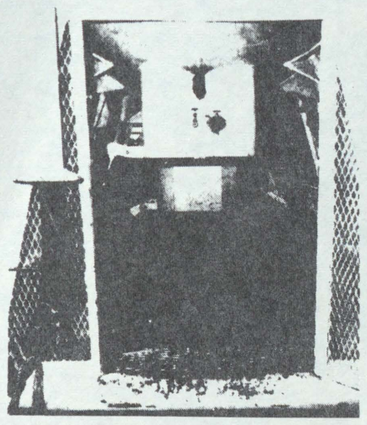


Fig. 7. Doorless hatch providing access to the water.

Sealab Facilities and Equipment

The laboratory and living space section (forward view) is shown in Fig. 6. It occupies 30 ft of the overall length and contains the synthetic atmosphere breathed by the "hydronauts." This atmosphere consists of approximately 4% oxygen; the remainder is mostly helium, with some nitrogen. The nitrogen was introduced to improve voice communication intelligibility from Sealab dwellers because the high helium content makes normal speech unintelligible. This mixture was maintained at the same pressure as the water outside. Thus, free access was provided between the chamber and the water via a separate doorless hatch for each area, descending, one behind the other, into the caged area from Sealab, (Fig. 7).

The other section, occupying 10 ft, was utilized as a communication, stowage area and contained compressed normal air, also equal to the outside pressure. This area housed the electrical power transformers, bulk supplies, Scuba equipment, and equipment for voice communications with the surface.

The Sealab is equipped with electric lights, bunks, lavatory facilities, work bench, heaters, dehumidifiers, emergency water tanks, fresh-water shower and cooking facilities, and several semi-closed underwater breathing systems and conventional Scuba apparatus used by the divers.

The Sealab I capsule was connected by an "umbilical" cord carrying power leads, communication circuits, fresh-water hose, and breathing gas hoses to the YFNB-12, moored overhead, which served as a surface tender.

A trailer was lashed to the top deck of the YFNB-12. This trailer was divided into three sections — an area for communication between topside control and Sealab (normally manned by Dr. Bond, Principal Investigator); living space for two; and laboratory space which housed medical research apparatus as well as video system monitors.

The physical condition of each man was continuously checked, and environmental conditions, such as breathing gas pressures, temperature and humidity, internal pressure, compressed air condition, water condensate measurements, and condition of electric circuits, were sampled and/or recorded.

A submersible decompression chamber was provided, and operated from Argus Island, to be used to evacuate the Sealab crew if the necessity should arise. It was also utilized as an underwater elevator in transporting support divers and material down to and up from Sealab.

Navy Underwater Sound Laboratory, because of its past experience and available subsurface instrumentation, was asked to participate with underwater vision and specialized photographic equipment. It was determined that in order to meet the requirements of the project, three video cameras would be used. Video camera No. 1 (a General Electric P9 with Zoomar 13 mm lens), installed inside Sealab, was placed in a fixed position to cover the laboratory work space and the entrance hatch to the Sealab work and living area (Fig. 8).

Video camera No. 2 (Norden Model 186-1000) a portable unit with electrical connections terminating in the compressed-air chamber, was placed in the open sea, outside, looking forward at Sealab, to permit topside personnel to view the exit or entrance excursions from Sealab and to provide a general view of the fish and any external activity (Fig. 9).

Video camera No. 3 (Oceangraphic Engineering Corp., Model 11A) a completely portable unit (Fig. 10), including its own Model 1A monitor and battery-operated power supply (Fig. 11), was used in various locations. It was completely independent of the others and was an invaluable aid in the survey of the bottom, and in the placement of the Sealab and its anchors, and many other functions where eyes below the surface were required.

In these respects, it is estimated that underwater video systems saved approximately 75% of bottom diving time. Bottom time for a surface diver is five minutes absolute for a no-decompression dive, and divers are severely limited as to the number of dives per day which they can make from the surface. Thus, the equipment added greatly to the overall success of the project.

One (Kintell) viewing monitor was installed in the trailer communications area for continual observation of key personnel during communications, at work, or relaxing.

One General Electric Model monitor for visual observations and two kinescope recording units were installed in the trailer laboratory area. The two units used were: (1) a USL-assembled unit utilizing an Arriflex camera and a Conrac CWA-10 monitor (Fig. 12), and a Vare Industries kinescope recording unit (Fig. 13). These units were able to record both inside and outside action simultaneously, when required, and to provide a backup unit during film-loading functions or in case of failure of one of the two units.

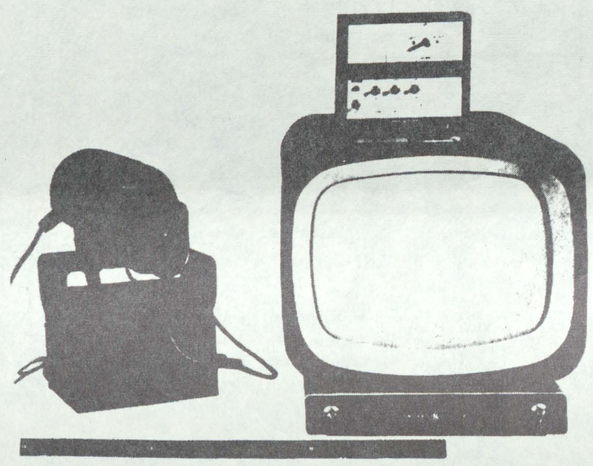


Fig. 8. General Electric video system.

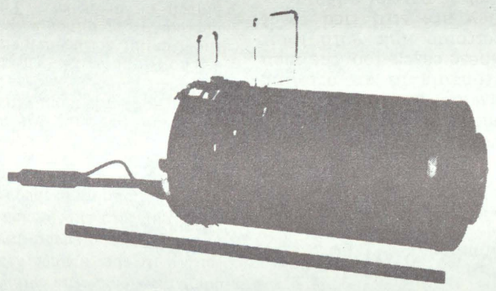


Fig. 9. Aluminum hand-held Norden underwater video unit.

Monitor No. 3 (a General Electric unit) and a speaker, connected to the communications set, provided a one-way visual and audio link. This unit was installed in the crew's mess, to minimize visitations in the trailer and for topside morale purposes. All monitors were equipped with a switching control to change from Camera No. 1 to Camera No. 2.

Photographic Equipment

The Underwater Sound Laboratory designed and built an underwater housing (Fig. 14) for use with the Eastman Kodak K-100 camera. This camera, which has a 100-ft film capacity, has a spring capable of running 40 ft on one wind, with features for rewinding the spring-motor underwater. Photographic equipment also included a 35mm, Pracktina FX with a 450-exposure magazine capacity, electrically driven still camera, installed in an Underwater Sound Laboratory-designed housing (Fig. 15); a 50-ft capacity Fenjohn (Fenmore Johnson, Ardmore, Pa.) electric-drive motion-picture camera (Fig. 16); the two 16mm kinescope recording cameras; a motion-picture camera (Arriflex); and a still camera (4×5 Speed Graphic) for project documentation.

Because of differences in pressure, all underwater cameras, whether loaded in Sealab while on the bottom or in the trailer on the surface, had to be returned to their respective areas for unloading and removal of film.

Underwater Sound Laboratory manpower contributions consisted of one mechanical engineer who is also a qualified Scuba diver, one electronic technician, and two photographers. This combination of talent provided sufficient capability to take care of all problems involved in the installation, operation, maintenance and documentation, both video and photographic, of the USL equipment on a continuous basis, as well as to assist in many other functions, such as the recording of fish noises and other unusual sounds.

Summary

Now that Sealab has returned to port, our experience with this project points out the need for the following:

(1) combined video photographic systems of good design, capable of long periods of continuous operation;

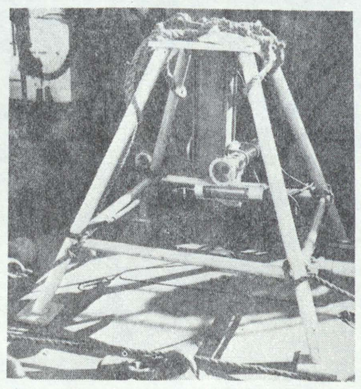


Fig. 10. Oceangraphic Engineering Corp. video unit.

(2) more ruggedly built equipment;

(3) improved reliability of video tubes and components;

(4) underwater tripods with pan-and-tilt mechanisms;

(5) video units operable by separate battery supply to eliminate shipboard or generator power interference problems;

(6) need for all operating controls topside, such as zoom lens, focus and iris, azimuth and elevation;

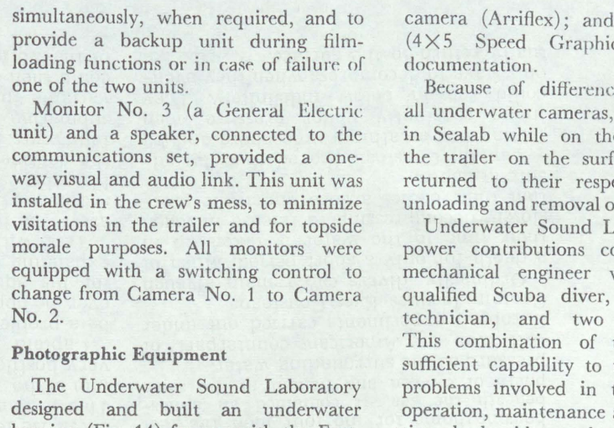


Fig. 11. OEC video camera No. 3, including monitor and power supply.

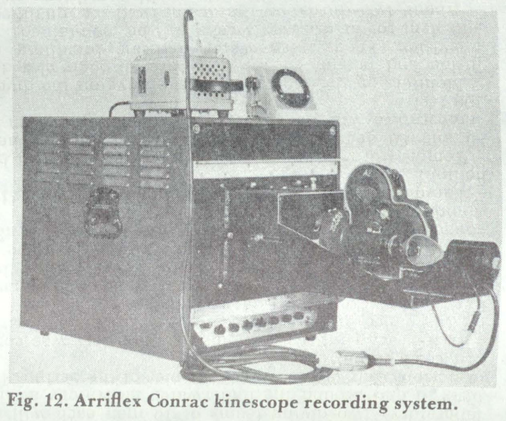


Fig. 12. Arriflex Conrac kinescope recording system.

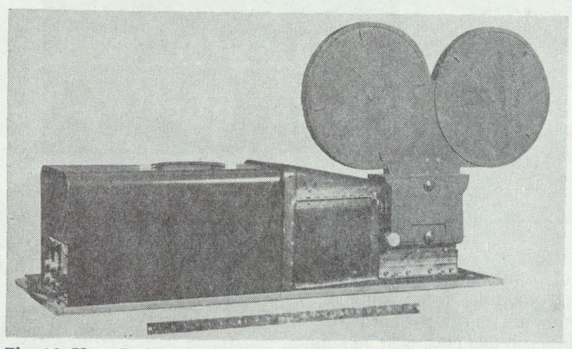


Fig. 13. Vare Industries kinescope recording system.

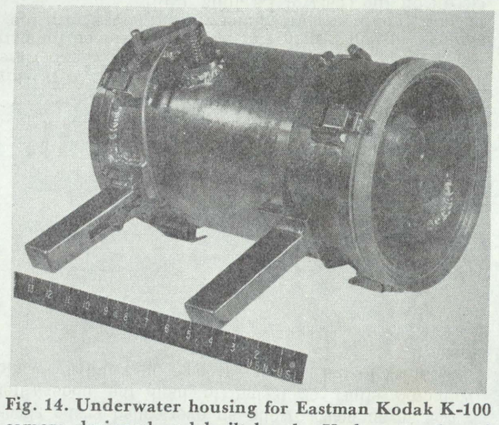


Fig. 14. Underwater housing for Eastman Kodak K-100 camera designed and built by the Underwater Sound Laboratory.

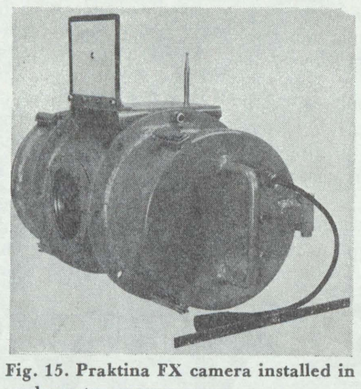


Fig. 15. Praktina FX camera installed in underwater camera case.

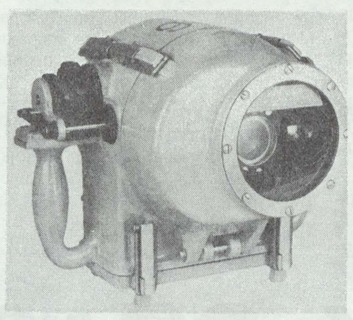


Fig. 16. Fenjohn underwater camera.

(7) viewing monitors to be in pressurized housings for use in underwater aboratory space; and

(8) study of effects and capability of equipment to operate under new environmental conditions of helium, oxygen and nitrogen, and at various pressures.

With the exception of minor difficulties, all equipment gave satisfactory performance. I believe that video coverage added greatly to the success of the whole project. The complete documentation of the life of the men living beneath the surface of the open sea will enable careful and detailed study of this first experiment so that better plans for future work can be made.

Acknowledgments: The four hydronauts who were involved in Project Sealab are Lt. Comdr. (Dr.) Robert Thompson, Chief Quartermaster Robert A. Barth, Gunner's Mate First Class Lester Anderson, and Chief Hospital Corpsman Sanders Manning.

All photographs are official U.S. Navy Underwater Sound Laboratory photographs.

Two S. D. Undersea Projects May Be Linked

Sealab II Divers Seen as Miners

Editor's Note—Two important steps in man's drive to harvest the sea will take place this summer off San Diego. They will be the latest of many San Diego accomplishments in oceanography. Here is the fourth in a series.

By LEO BOWLER
EVENING TRIBUNE Staff Writer

Ten men will slip beneath the blue Pacific off La Jolla this summer and some of them will not come back to the surface for a month.

They will live in a steel house and emerge daily to swim along the bottom to perform a variety of tasks assigned to them by the Navy.

In a seemingly unrelated event, the vessel Perspicacity will enter San Diego waters while the Navy divers are on the bottom. The Perspicacity will be searching for mineral wealth on the sea bottom and seeking a means of bringing it to the surface in an economical operation.

Each of these adventures in oceanography is a story in its own right.

But now, scientists and engineers are attempting to link the two. They want to anchor the Perspicacity above Sealab II, the Navy's "Man in the Sea" experiment.

Then they want to lower their mining devices to the sea floor. The men in the steel house then will emerge and begin operating mining machinery and coring devices.

San Diego Continues Growth as Center of Oceanography, an editorial, Page B-2.

The object of the experiment is two-fold. First, it will test man's ability to live on the sea floor and operate complicated mechanical mining equipment. Second, it will give the men on the surface a better idea of what equipment is needed and how efficient present equipment is.

The Navy has said it is considering the experiment, as well as one in which the divers would work with oil well drilling equipment.

The Perspicacity is operated by the U.S. Bureau of Mines, the Lockheed Missile and Space Co., and the International Minerals and Chemical Corp. Officals of the organizations say they will have the Perspicacity here whether it works with Sealab or not.

If the Sealab-Perspicacity link is forged, the men involved will not be operating an actual mine. But they will be practicing for the day when other divers will live on the sea floor and do so.

Naval and civilian scientists say that day is between 5 and 15 years away. But they are now busy developing the techniques they will need when it arrives.

The link between Sealab and the prospecting and mining experiment is a good example of how San Diego's previous accomplishments in oceanography, in a large degree military in nature, are turning into civilian benefits.

This, says Finn Claudi-Magnussen, head of the Chamber of Commerce Oceanographic Development Committee, is one of the reasons San Diego should push itself as a world oceanographic center.

Claudi-Magnussen, Scripps Institution of Oceanography and Navy Electronic Laboratory scientists, and others interested in the field, point to many other successful marriages between the military and civilian uses of oceanography that have been accomplished here.

One of the most successful is FLIP, the floating instrument platform which was developed by the Marine Physical Laboratory at Scripps and used by the Navy in underwater sound and other types of research, both military and civilian.

FLIP, a revolutionary concept in instrument design, is really a ship without a motor which can be towed to sea in a horizontal position, then ballasted so that it stands on end.

When standing on end, Flip exposes only 50 feet of its 355 foot length. The length of the underwater section gives the vessel great stability.

While operating in the gulf of Alaska, measurements showed that 35 foot waves forced the vessel to move up and down less than three inches.

During the three years scientists here have been operating it, Flip has been on 24 expeditions and has completed the transition from horizontal to vertical 67 times.

Dr. Fred N. Speiss, who developed the concept, received the John Price Wetherill medal for his accomplishment.

THE NEW YORK TIMES, SATURDAY, JULY 24, 1965.

Divers to Live and Work in Ocean Depths

Three American and French Projects to Be Started Soon

By HANSON W. BALDWIN

The novelistic fantasies of Jules Verne will come to life in the next few weeks when Navy divers and French and American scientists begin to live, swim and work for periods of two to 30 days on the ocean bottom, 215 to 600 feet beneath the surface.

Three experiemtns will be conducted by the United States Navy; Jacques-Yves Cousteau, the French undersea explorer, and Edwin A. Link, a leading oceanographer.

A test conducted by the Navy in a big cylinder called Sealab II will be the largest of the three. Sealab II was dedicated yesterday at Long Beach, Calif.

Last year off Bermuda, four Navy divers spent eleven days in Sealab I, a steel shelter 193 feet beneath the surface, and in the waters around it. The test this year, conducted by the Office of Naval Research and the Navy's Special Projects Office, will be more extensive.

Carpenter to Lead Team

About Aug. 16 off La Jolla, Calif., Comdr. M. Scott Carpenter, the astronaut, who is an enthusiastic scuba diver, will lead a team of 10 aquanauts to a "house," complete with hot showers, food, bunks and electric light, 215 feet beneath the sea.

For 15 days Navy divers and scientists will live in the 57-by-12-foot cylindrical shelter and will swim in the dark waters around it. A second team of 10 men will replace the first team, if all goes well, for another 15 days.

Two of the aquanauts, probably including Commander Carpenter, may remain for the full 30 days. A third team may extend the test for 15 days more.

About the same time, Mr. Cousteau will send a team of six men to a habitation on the bottom of the Mediterranean for a planned 10-day stay. The French dwelling will be at a depth of 330 feet off Cape Ferrat, Villefranche, France.

600-Foot Dive Planned

Later, possibly in October, Jon Lindbergh, son of the flier, and a companion, possibly Robert Stenuit, are expected to dive to 550 to 600 feet for 48 hours off Santa Barbara, Calif. Last year they made a record dive to 430 feet for 49 hours. This time they will live in an inflatable shelter, or igloo, devised by Mr. Link, and may descend and return to the bottom in a special transfer capsule.

The Navy and Mr. Link describe these developmental tests, which are now past the experimental stage, as the "man-in-the-sea" program, part of a broader phase of the exploitation of the oceans that is now described by many in Washington as ocean engineering.

The Navy believes that, like the astronaut in space, the aquanaut in the sea will be required to do useful work and to provide the intelligence and judgment for which no machine can substitute.

The free-swimming aquanaut, operating on the continental shelf and down to eventual depths of perhaps 1,000 feet, should be of material help in rescue and salvage operations, in recovery of nose cones or other objects on the sea's floor, in charting and exploration, in capping undersea oil wells, and in developing and exploiting the mineral and fish wealth of the ocean.

Much Time Was Lost

The new free-diving, prolonged submergence techniques now under development make the old "hard-hat," inflated-suit diver, tethered to the surface by lifeline and air hose, almost obsolete.

The deeper the hard-hat diver went, the less working time he had on the botton because he spent time dangling in the water undergoing decompression as he returned to the surface. He was always confronted with the dread danger of the "bends," the formation of nitrogen bubbles in the blood stream by the rapid release of pressure, which can cause agony and death.

Even the free diver, who carried breathing gases in tanks til a few years ago to maximum practical depths of 160 to 200 feet. He was dependent upon normal air, and at considerable depths air breathed under pressure could result in the "bends" or in the so-called "rapture of the depths," an oxygen toxicity. Now divers can use a gas mixture that includes helium, which appears in normal air only in minute amounts.

Helium and oxygen mixes had been known for years, and diving tables of the United States and other navies had pointed the way, but until recently there had been relatively little concentrated development work in breathing such gas mixtures for great depths.

Experiments With Mice

Mr. Link showed in laboratory experiments that mice could be subjected, if they breathed the proper mixture of gases, to 3,000-foot-depth pressures without ill effects. Later experimenters carried his work down to 4,000 feet. Men followed, in the laboratory and in the open sea, but so far at far shallower depths.

The present techniques are based upon the concept that the diver will stay down until his work is finished. He will remain during hs stay at about the same depth and at about the same pressure, breathing a carefully proportioned mixture of helium, nitrogen and oxygen through his face mask. He will return to his sea-bottom shelter for food, rest and warmth.

Personnel transfer capsules, or mobile decompression chambers, serve as elevators to move the diver to and from the surface. Thus, the diver has only one decompression to undergo when he returns to the surface after his work is finished, and this decompression can be accomplished in his elevator or on a surface vessel.

Many Nations Involved

Instead of spending three hours of decompression time for every 20 minutes of useful work time at 400 feet, he will spend all his time working on the bottom and can be brought to the surface, dry and warm, in less than five minutes.

The new techniques have been developed by men from many nations.

Mr. Link, inventor of the Link trainer for aircraft pilots, who is a leading marine inventor, joined last January with the Union Carbide Corporation and the General Precision Equipment Corporation to form Ocean Systems, Inc. which is developing the techniques for commercial and scientific purposes. Mr. Lindbergh, a scientist and underwater engineer, and Mr. Stenuit, who have been working with Mr. Link, are with Oceans Systems.

Capt. George F. Bond, Medical Corps of the Navy, and his assomiates, and Mr. Sousteau are other pioneers in the underwater world.

on his back, was limited un-

So far the deepest free dive made by man was that of Hans Keller, a Swiss mathematician of the University of Zurich. He descended to 1,027 feet off the West Coast. But he used a special rig, did no useful work and spent very little time on the bottom. The experience almost cost him his life and did result in the deaths of two of his supporting group.

Men, clad in heavily armored suits, using mechanical hands and depedent upon surface support, have also descended to 1,000 feet or more. But these armored diving suits are expensive and the mobility of the wearers is slight.

The Navy is aiming at a practical working depth of about 600 feet, for fairly prolonged periods, then depths of 1,000 feet. It believes that 1,000 feet is about the practical limit for unarmored man. At 1,700 feet, it is estimated, the sea pressure of 800 pounds a square inch would collapse man's bone structure.

The Navy's 30-day Sealab project will take place on the north edge of the Scripps Canyon, a mile off the end of the pier at the Scripps Institution of Oceanography of the University of California at La Jolla.

Hatch May Stay Open

The men will work in 50-degree water with estimated visibilities of 20 to 100 feet, believed to be typical of conditions under which most naval deep-diving operations would occur. Their shelter, designed by the Navy Mine Defense Laboratory, Panama City, Fla., and built by the San Francisco Naval Shipyard, will have easy access to the sea. In fact, its bottom hatch will probably be left open, since the atmospheric pressure in it will be about the same as, or slightly higher than, that of the outside water—about 100 pounds a square inch, compared with 14.3 pounds on the surface.

The divers will breathe both in and outside the shelter, a mixture of 84 per cent helium, 12 per cent nitrogen and 4 per cent oxygen. At the 215-foot depth, the diver will receive as much oxygen, in quantitiy as he would get at the surface if the earth's air contained about 24 per cent oxygen, as compared with the normal 21 per cent.

Power Cable to Shore

The high helium content provides little insulation. Because body heat dissipates, heating elements in the shelter will keep the temperature at 80 to 90 degrees. Because helium also makes human speech sound like Donald Duck squawks, a speech converter will be used.

The Navy aquanauts will use three principal types of diving equipment with mouthpiece and face mask, and will try out a variety of suits.

Power will be supplied to the shelter from a shore-connected cable, with an alternate source aboard a surface support vessel.

The divers will be constantly watched by television. One diver will be a Navy medical officer, Lieut. Robert Eric Sonnenburg, and the men will be continuously monitored by telemetered electrocardiograms and other means.

The men will be permitted to make brief dives down to 360 feet, but generally they will work between the 180-foot and 240-foot levels.

There will be two emergency, gas-filled huts in which a swimmer can take refuge.

Both scientific and military experiments will be carried out. An experimental salvage procedure, utilizing a plastic foaming technique, will be tested in attempts to float a Navy figher plane tb the surface. Various other salvage and underwater jobs will be performed, and Marine biologists will make a census of ocean life on the sea bottom, collect specimens and perform other research.

But most important will be the physiological and psychological studies of the human being under great depths of water for prolonged periods.

$185-Million Plans Center Around Pt. Loma Command

By LEO BOWLER
EVENING TRIBUNE Science Writer

The heart of a $185-million program to upgrade the Navy's ability to find and rescue submariners in trouble has been established in a little known command on Point Loma.

The command will train a new breed of Naval officer who will operate thousands of feet under the sea.

The Navy is calling these officers hydronauts.

Testing Due in S.D.

The command also will test newly developed deep submersible vehicles, most of which are still on the drawing board, and develop a means on navigating these vehicles on the ocean floor.

"As fast as the vehicles are developed and built, they will be brought to San Diego and tested, said LCdr. Brad Mooney Jr., the officer in charge of the Deep Submergence School here.

"Crews will be trained here and 'married' to the vehicles, and prototype equipment for the vehicles will be tested at the school."

2nd Being Built

The Navy has only one operational deep submergence vehicle, the Trieste II, a bathyscaph around which the Deep Submergence School is being built. Trieste I is not being used.

A second vehicle is under construction at Mare Island Naval Shipyard. It has not been named yet, but officers at the school refer to it as Trieste III.

The push in the Navy to get vehicles to carry men thousands of feet under the sea is under the Office of Special Projects. It arose from the loss in the Atlantic in April, 1963, of the submarine Thresher with all hands.

Objectives Pointed Out

Trieste I was used in the search for the Thresher, then was relpaced by Trieste II. The tragedy convinced the Navy that it needed deep water capability.

A five-year, five-point program was launched. It has three objectives:

First — Develop techniques by which divers can operate for prolonged periods as deep as 1,000 feet. Sealab II, which will be conducted off La Jolla next month, is a part of this.

Second — Invent vehicles to search the floor of the ocean at any depth.

Third—Build vehicles to rescue men trapped in a disabled submarine at any depth where a submarine is capable of going without collapsing from the pressure of the sea.

Fourth — Develop vehicles which can recover small objects from the sea floor at great depths.

Fifth — Establish the capability of recovering large objects up to the size of a submarine.

The last program has been pushed into the background, but the Navy plans to spend $185-million over the next five years on the other four.

The school here has little to do with the development of new techniques for divers, but it is the nucleus of the other three programs.

It is presently operating from Navy Electronic Laboratory buildings and docks, but the Navy plans to move it to Ballst Point, also on Point Loma, as soon as a permanent facility there can be established.

To Train Others

In addition to hydronauts, who must be submarine officers to be selected for the program, the school will train other officers and enlisted men in the operation and maintenance of the vehicle being developed.

Mooney explained that the school was started first so the crews could be ready to take over and test the vehicles when they are delivered here.

He expects to have an enrollment of 208 when the school is in full operation.

Mooney and his assistant, Lt. John Howland, were part of the Trieste II crew when it found the wreckage of the Thresher. The crew is being expanded to form the school.

Larger Than First

Trieste II, at 67 feet, is one third larger than Trieste I. It uses on of two 6-foot diameter steel spheres developed for Trieste I to carry its crew. It also uses much of the internal gear which was removed from Trieste I.

"When Trieste I first arrivec it was dubbed the "elevator" by scientists because they used it primarily as a means of going to the bottom and coming up again after observations," Mooney said.

"But Trieste II is another matter. It can maneuver at two knots underwater, and can be towed at 10 knots on the surface. This compares with one knot and four knots for the old model.

20,000-Pound Load

"And it can take a payload of 20,000 pounds to a depth of 20,000 feet. It has a motor in the bow to change direction, making it more maneuverable."

Trieste II, is capable of going to 20,000 feet under the sea. The steel sphere used in the record dive of Trieste I to 35,800 feet is in storage at the school.

Howland explained that only 2 per cent of the world's oceans are deeper than 20,000 feet, and there is little need to go deeper, so the sphere with which the record was broken was replaced with a lighter model.

Depth Capability Cited

Mooney said the maneuverability of smaller submersibles developed in recent years when compared to Trieste II has been exaggerated.

"You've got to remember that we have a depth capability that none of these other vehicles approach, and we have that tremendous payload," he said. "If most of these other vehicles went down with more than 300 pounds aboard, they wouldn't come up."

Howland characterizes Trieste II as the safest submersible afloat.

Safety Measures

"All of her systems are operated on a fail safe principle," he said. "If anything goes wrong, she comes to the surface automatically. You wouldn't have to turn a valve or push a button to bring her up."

Mooney said the program getting under way at the school will have a big impact on oceanography in San Diego. Trieste II will provide support for any scientific research which will not interfere with the prime mission of training crews and developing underwater techniques.

The vessel will carry any oceanographic instrumentation that is compatible with the program.

The research done at the school will increase as more vehicles become available, he said.

Sea Study Lag Charged

COPLEY NEWS SERVICE

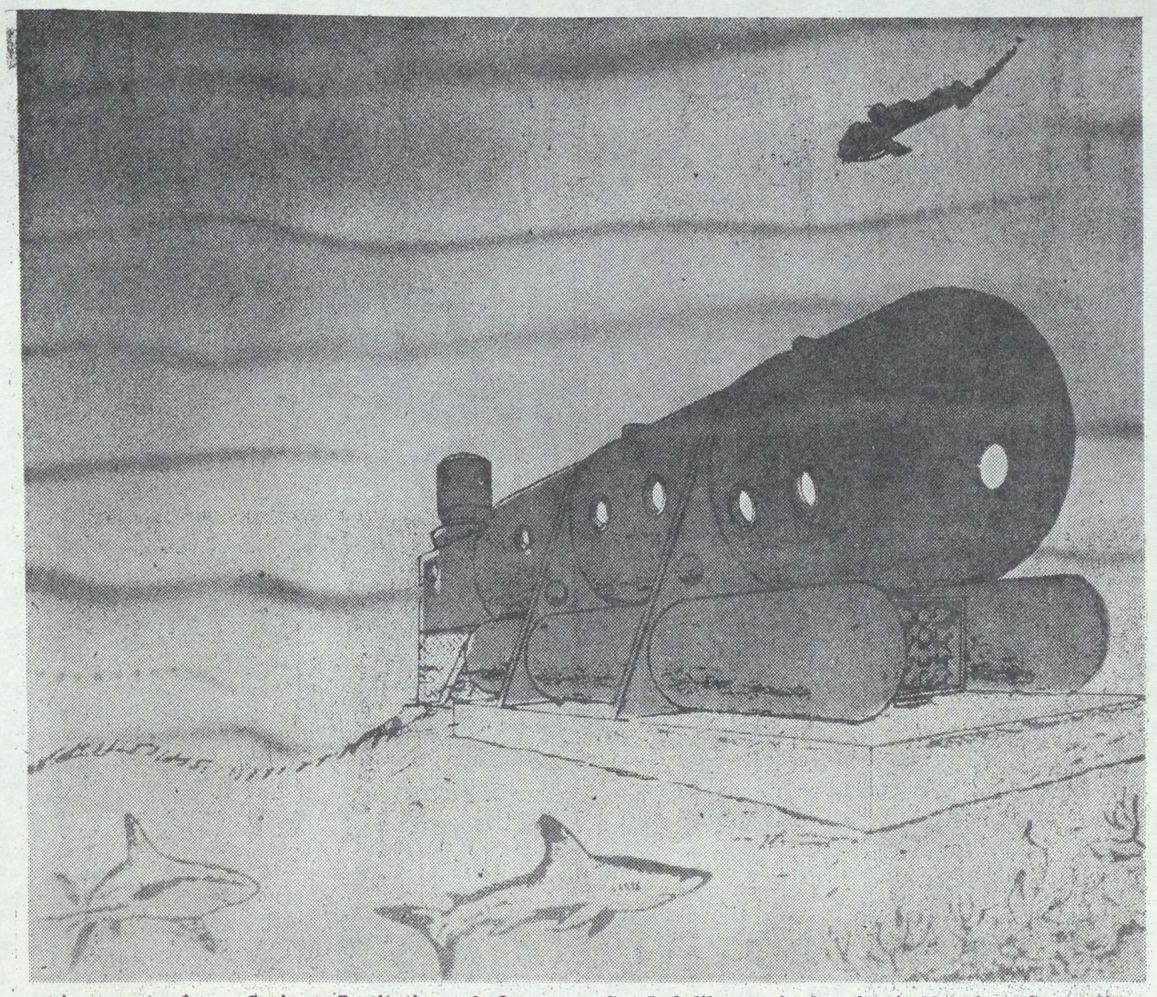
WASHINGTON — The House subcommittee on oceanography was told yesterday that the Johnson administration is not doing enough to foster the marine sciences.

The subcommittee opened hearings on a bill introduced by Rep. Bob. Wilson, R-San Diego, to establish an independent national oceanography agency; a measure by Rep. Paul G. Rogers, D-Fla., to establish a presidential commission on oceanography; one by Rep. Dante Fascell, D-Fla., to set up a national oceanographic council, and a fourth measure by Rep. Alton Lennon, D-N.C., to make the President directly responsible for the national oceanographic effort.

"It is up to us in Congress to give oceanography the push that is needed," Wilson told the subcommittee.

Other witnesses said Russia is pulling ahead of the United States in oceanographic research.

7



Aquanauts from Scripps Institution of Oceanography will work, eat and sleep in and around Sea Lab like one in drawing in Navy's undersea living experiment. Note diver heading for lab's hatch.

UNDERSEA LIVING SLATED

5 San Diegans Back Home After Training As Aquanauts



—San Diego Union Staff Photo

Aquanauts discuss undersea living experiment after returning to La Jolla from month-long training. From left are Morgan Wells, Earl Murray, Rick Grigg, Tom Clarke and Arthur Flechsig. They will live aboard Sea Lab.

Five San Diegans, who may spend most of August under water here, returned yesterday from a month-long aquanaut training course in Florida.

The men are scientists from the Scripps Institution of Oceanography who have volunteered for the Navy's Sea Lab II undersea living experiment.

Some of the men may spend as long as 30 days living, working, sleeping, eating and even watching television at the bottom of the seas. The project is to begin around Aug. 15, 3,000 feet out to sea from Scripps Pier and 215 feet below the surface.

The Navy plans to send two teams of 10 men for 15 days each under the sea. Two members of the first team would remain a full 30 days.

If the weather is good, the aquanauts said, the experiment could last 40 to 45 days.

5 VOLUNTEERS

The volunteers are Arthur Flechsig, Thomas A. Clarke, Richard Grigg, Morgan Wells and Earl Murray.

They worked with former astronaut Scott Carpenter during the intensive training phase in Florida.

The training in Panama City, Fla., was a combination of lectures and diving, Grigg said.

The men were up at 4:30 or 5:30 a.m. each day and had a half hour of physical training at 6 or 7 a.m. Grigg said the first week was spent in lectures and the last three weeks in deep dives.

"We had to go 40 miles off shore to get in deep enough water," Clarke said. "The last four days we stayed out on a mine sweeper and made dives in 200 feet of water."

The men tested the 68-pound self-contained breathing apparatus they will wear for breathing a special mixture of oxygen and helium vital because of depth pressures.

'HIGH SQUEAK'

Grigg said that breathing helium distorts the voice. "Unscrambling" machines are necessary to understand divers sometimes.

"Our first few words after surfacing came out in a high squeak," he said. "By the end of a sentence we were back to normal."

The low amount of oxygen in a 12-foot-wide cigar-shaped sea house will make smoking impossible during the experiment.

A Navy official said it is impossible to light a match at that oxygen level so cooking will be done with electricity.

"We're not sure what we will eat," Clarke said. "We have heard everything from gourmet food to C rations."

FIRST TEAM

Capt. George Bond of the Navy Medical Corps, head of the man-in-the-sea project, has said that normal meals would be served and light wines might be part of dinner.

The aquanauts will be working in specially-designed, 57-foot-long quarters about 210 feet below the surface.

Astronaut Is Leader

Navy Comdr. M. Scott Carpenter, the astronaut who orbited the earth three times May 24, 1962, is directing the training activity at Panama City, Fla., and is expected to lead the first diving team.

One of the reasons the navy selected Carpenter is his special training to combat the hostile environments of space, which in some ways are not unlike the hostile forces at work against man at great water depths.

Those from Chicagoland among 32 aquanauts training in the program are Lester E. Anderson, gunners mate 1-C, Weldon, Ill.; Howard L. Buckner, chief steelworker, East Alton, Ill.; Charles M. Coggeshall, chief gunners mate [missiles], Ft. Wayne, Ind.; Kenneth J. Conda, torpedoman 1-C, Phoenix, Mich.; and Glen L. Iley, chief hospitalman, La Crosse, Wis.

Will Be Tested

If selected for the actual diving test, the aquanauts will carry out experimental salvage techniques [on a plane], engage in oceanographic and marine biological research, and undergo a series of physiological and human performance tests.

Their underwater home, about 12 feet in diameter, will be divided into a laboratory, a galley, and a bunkroom, with 11 viewing ports. A radiant heating cable will keep the interior temperature at between 80 and 90 degrees, and an air conditioning unit will maintain the humidity at 60 per cent.

Power will be supplied from shore half a mile away, and hot, fresh water showers will be available to the aquanauts returning from two-hour swims on the ocean floor. The ocean water temperature is expected to be 50 degrees.

Second Such Project

The divers will enter the sealab thru an anti - shark cage and special hatch at the bottom of the quarters. A transport capsule, looking something like an elevator on a cable, will raise and lower them from an anchored barge on the surface.

The project, costing $850,000, is the second for the navy. Four divers lived for 11 days 193 feet beneath the surface off Bermuda last summer in the first navy experiment in warmer water.

UNDERSEA LIVING SLATED

5 San Diegans Return After Aquanaut Training

(Continued from a-17)

ing outside the 50-foot-long tube.

Clarke, a graduate student in ecology, and Murray, a biology laboratory assistant and diver, expect to be on the first team to descend. They will be followed after 15 days by Flechsig, an oceanographer specialist; Grigg, a graduate student in ecology, and Wells, a graduate student in physiology.

ORGANISM STUDY

The men will be studying fish distribution, species and behavior patterns in the area of La Jolla's submarine canyons.

The Sea Lab house will rest about 100 feet from the canyons' edge.

Grigg said ropes will limit the horizontal and vertical wanderings of the aquanauts but explorations 165 feet down the canyon walls will be part of the program.

"We will descend on a line from Sea Lab and study the organisms on the canyon walls," he said.

The chance of getting lost in the dark depths is a real danger, Grigg said.

"When the sand on the ocean bottom is kicked up by divers it's really murky," he said. "If we have red tides it's bad."

Murray said he was diving at 200 feet in the area recently and visibility was limited to 25 feet.

"The bottom where Sea Lab will rest is sandy," Murray said. "It looks like a desert."

Grigg said each diver would have a compass and be working with another man so the chances of getting lost would be minimized.

"It could be bad," he said. "If a diver were separated he would either stay down and drown or start for the surface and blow up from the pressure change."

It will take the aquanauts between 35 and 36 hours to descend and ascend because of depth pressures.

FOOD, GEAR

Murray said the Navy would film a documentary of the experiment and each Scripps man will take still photographs of his work with the sea life and ocean floor formations.

All food, equipment and sports clothes for wearing inside the capsule will be lowered with the main unit.

The divers and anything they can carry through water probably will descend in a separate capsule, then walk into Sea Lab on the ocean floor.

MANY VARIATIONS

Training will resume in La Jolla in mid-July when Navy aquanauts join civilian scientists for lectures and practice using one-man undersea vehicles for traveling around the roped off area. Also the men will get a first glimpse of their undersea home at that time.

On-the-site training will include many variations from the Florida program.

To begin with the water in Florida was 68 degrees and in La Jolla it will be 48 degrees.

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Astronaut Carpenter Leads SEALAB Test

The Navy has named a ten man team to make the first 15-day run in Project SEALAB II scheduled to be conducted off the coast of LaJolla, California, at a depth of approximately 210 feet, beginning in mid-August.

Captain of the first team to submerge is Cdr M. Scott Carpenter on loan to the program from NASA.

SEALAB II will be the longest Man-in-the-Sea experiment yet attempted and is planned to continue for at least 30 days. At the end of the first 15 day run eight of the men will be replaced and two will continue for the full time of the experiment. The men have been selected from 35 who have been training since May at the U. S. Naval Mine Defense Laboratory, Panama City, Florida.

The 57 foot undersea habitat will be christened today at the Long Beach Naval Shipyard, California, by Miss Heidi Nitze, daughter of Secretary of the Navy Paul Nitze.

Medical officer is Lt Robert E. Sonnenberg. He will check the health of the men and also conduct physiological tests.

Other Navy team members on the first 15 day submergence are Cyril J. Tuckerfield, Chief Engineman; Wilbur H. Eaton, Gunner's Mate, 1st Class; Frederick J. Johler, Chief Engineman; J. D. Skidmore, Chief Photographer; Billie L. Koffman, Torpedoman's Mate 1st Class, Tucson, Arizona.

Civilian team members are Berry L. Cannon, an electronics engineer at the Mine Defense Laboratory, Panama City, Florida; Earl A. Murry, and Thomas A. Clarke, both from the Scripps Institute of Oceanography, LaJolla, Calif.

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TV Sitter *

Undersea Stay Scheduled

Network pool coverage of the Gemini-Titan 5 space shot, scheduled to begin Aug. 19, will include a camera-eye view of a related project some 250 feet below the ocean. Ten United States Navy men, headed by Comdr. Scott Carpenter, the astronaut, will live at that depth in a cylindrical structure measuring 50 feet by 12 feet. Their mission will be to determine if men can live and work at such depths for 30 days and to establish and maintain contact with the Gemini-Titan 5 mission.

Project Sea Lab II, as it is called, is under the supervision of the Navy's Mine Defense Laboratory in Panama City, Fla., and the Scripps Institution of Oceanography at La Jolla, Calif. The National Broadcasting Company will be coordinator for the networks.

The undersea house, which will maintain a temperature of 80 to 90 degrees, will be sunk in a spot designated as Scripps Canyon about one mile off the La Jolla coast. The Navy men will try to lead relatively normal lives, eating everything except fried foods and working outside at such projects as raising aircraft sunk by the Navy. Two television cameras will be intalled, inside and outside the structure.

*

SeaLab II christening in Long Beach Shipyard today

Sea Lab II, the Navy's newest vehicle for underwater study, will be unveiled to the public today at 2:30 P.M. at the U.S. Naval Shipyard in Long Beach.

The research vehicle will be christened by Miss Heidi Nitze, daughter of the Secretary of the Navy. The Honorable Robert W. Morse, Assistant Secretary of the Navy for Research and Development will make the main address at the ceremonies.

In a prelude to the ceremony at the shipyard, Long Beach city officials will host a luncheon at the Lafayette Hotel with Miss Nitze and Dr. Morse as honored guests.

SeaLab II will begin it's first dive to ocean depths in mid-August when Cdr. Scott Carpenter, normally concerned with space exploration, will guide the vehicle to a depth of 120 feet. Cdr. Carpenter and teams of military and civilian divers will spend 30 days in the water off the San Diego shoreline.

20 AQUANAUTS TO TRY LIVING ON SEA FLOOR

Five from Chicagoland Among Trainees

BY WILLIAM ANDERSON
(Chicago Tribune Press Service)

Washington, June 25 — Five persons from Chicagoland are participating in a training program to prepare them to live under the sea for periods as long as 30 days.

The navy said here today it is part of a long-range project to determine how effectively man can work under the sea. Sometime next August two diving teams of 10 men each will descend to the cold Pacific ocean bottom off La Jolla, Cal., as a further test of the experiment, dubbed Sealab II.

Two of the divers — called aquanauts by the navy — are expected to stay on the bottom for 30 days, living and sleep-



Malcom S. Carpenter

SEA PROBES DUE

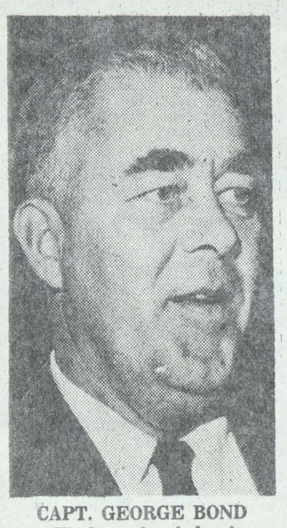
Navy Looks Downward

By LEO BOWLER
EVENING TRIBUNE Staff Writer

The Navy will have 100 men living and working full time under the sea within five years, the director of Sealab II predicts.

The men will operate on the continental shelf in depths greater than 200 feet. That is one of the goals of the Navy's "Man in the Sea Program," of which Sealab is a part.

Capt. George Bond, USN, a medical officer and former practicing physician, made the prediction in a speech yesterday before a group of doctors and engineers at the Biomedical Engineering Symposium which ended last night in OceanHouse.



CAPT. GEORGE BOND
'Work on the shelves'

Ex-Astronaut Attends

Bond was accompanied by Cdr. Scott Carpenter, the astronaut turned aquanaut who is training officer for Sealab II. Carpenter told the group a little about Sealab and obliged a horde of autograph hunters.

Bond said that Sealab is designed to give man a capability to explore and exploit the continental shelf, an area of the coast of the United States with depths up to 600 feet. In Sealab I Navy divers lived in a steel shell 192 feet under the sea off Bermuda for nine days.

Long Stay Planned

In Sealab II, divers will stay down as much as a month in 210 feet of water off Scripps Pier in La Jolla. They will begin their stint about Aug. 16. They will live in the steel chamber and will work outside it daily. The atmosphere they will breathe will be composed mostly of helium.

By using helium and a small percentage of oxygen in the artificial atmosphere, and by keeping the men on the bottom instead of bringing them to the surface after dives, the men will avoid oxygen and nitrogen poisoning which they would get from using air under the pressure of great depths, and avoid the decompression periods necessary while coming to the surface.

Tests Started in '57

The Sealab experiment was made possible by five years of experimentation on animals and humans which began in 1957. The experiments turned up the artificial atmosphere needed for long periods of existence at great depths, but before useful work could be done two other problems had to be solved.

The helium atmosphere makes the human voice sound "like a frightened chipmunk," Bond said. An electronic unscrambler which changes the voice to a normal tone was the breakthrough needed.

Heat Loss Avoided

The other problem was loss of body heat through the artificial atmosphere. This can be avoided, Bond said, by heating the house in which the aquanauts live and by using heavy suits while operating outside the house.

Bond said the area of the continental shelf produces enough protein in fish life found there to furnish 85 per cent of the world's requirement, and has as least as much petroleum and mineral products as dry land.

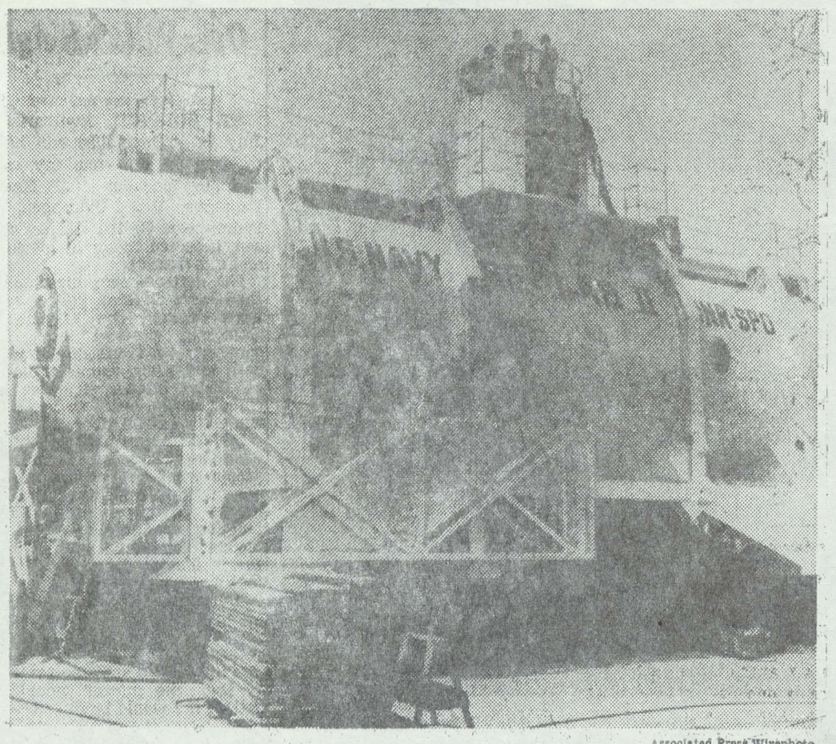
Vast Mass Submerged

The shelves of the world form a land mass as big as the continent of Africa. The "Man in the Sea" program is designed to allow men to operate anywhere on these shelves.

Sealab I cost $148,000 and had about 10 men working on it. Sealab II will cost $2.6 million and will utilize 300 men.

Carpenter said the next two weeks will be spent in intensive training of divers and other personnel in use of the equipment.

SAN DIEGO
EVENING TRIBUNE
JUL 9 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California



Associated Press Wirephoto
The Navy's Sealab II, which will begin underwater test next month, at Long Beach, Calif.



Marc St. Gil—Black Star
Six new astronauts at a news conference: At home in space or on the campus

Moonbound Scholars

Now that spacemen are settling down in orbit and will soon be studying the moon in leisurely fashion, a new breed of scientist-astronaut is coming aboard the U.S. space program. NASA last week introduced six of them, chosen for the Apollo moon landings which could begin as early as 1969.

To qualify for the new program, the six had to be under 35, in superb physical condition and science Ph.D.'s or M.D.'s. And, as demonstrated by the questionnaires sent to friends and colleagues of the prospects, they had to have the cool of a James Bond. (Samples: "Have you observed the applicant in situations that required genuine courage?" "Have you ever observed him in arduous field or laboratory situations . . . involving fatigue, strain and/or danger? If yes, how did he perform?")

Of the 1,492—an accidental but appropriate number—males and females who answered NASA's call for volunteers last year, only 422 met the "simple" requirements such as 20/20 vision and perfect health. The names of the 422, including four women, were then forwarded to a committee of the National Academy of Sciences. Only sixteen names came back to NASA for the final series of tests.

New Image: At their introductory news conference, the six who prevailed looked as if they would be at home in space or on the campus. Most are physical-fitness enthusiasts. Owen K. Garriott, 34, a Stanford physics professor, and Edward G. Gibson, 28, of Philco's Aeronutronic division, run 2 miles a day. Duane E. Graveline, 34, former Air Force flight surgeon and specialist in bioastronautics, runs 3 miles. F. Curtis Michel, 31, professor of space sciences at Rice University, is less methodical, but admitted: "At irregular intervals, I can be seen gasping around Rice Stadium." Astrogeologist Harrison Schmitt, 30, of the U.S. Geological Survey, Flagstaff, Ariz., keeps in shape tramping up and down mountains. Only naval aviator and flight surgeon Joseph Kerwin, 33, could offer no reason for his evident good health: "I mostly fly," he said.

Beyond good condition, the six bring considerable professional ability to the program that up to now has by necessity concentrated on test-pilot and engineering skills. Three were already involved in the space program. Five years ago, while a captain in the Air Force, Graveline spent a week floating motionless in a tub full of water. His object was to reveal possible medical effects of prolonged weightlessness on the circulatory system, muscles and bone tissue (Newsweek, Feb. 15, 1960). But it was the flight of Soviet physician Boris B. Yegorov in Voskhod I last fall that encouraged him into the astronaut program. "The minute I got word of it," he said, "I sent my application in."

Specialists: Schmitt, who is the only bachelor in the group, has spent the last year in Flagstaff working with the 17,267 moon photos relayed to earth by the Ranger space vehicles. And Michel (pronounced Michael) has been teaching space science at Rice since mid-1963, specializing in such matters as the interaction of the solar atmosphere with the moon. He also logged 500 hours in jet fighters while in the Air Force.

Garriott has been teaching electronics and ionospheric physics at Stanford since 1961. Gibson, youngest of the six, qualified because of the research on jet propulsion and atmospheric physics he did while earning his doctorate at Cal Tech.

Kerwin, a seven-year Navy veteran, is a flight surgeon who looks forward to in-flight medical studies of his crew.

The select six will soon begin three years of intensive training. For their efforts, they will earn $14,170 as civil servants with a GS-14 rating—roughly the same as the other 28 astronauts, who are almost all field-grade military men.

The astronomers, M.D.'s and geologists represent a necessary broadening of the program. But the pacification of space by team effort signals the end of the older drama of the lone pilot challenging the unknown. Some of the Mercury astronauts are part of the new space program. Some are behind desks. One, Scott Carpenter, has turned, literally, to a new world to explore. He is now a team member of Project Sealab, and next month will spend weeks living in a steel house 250 feet below the surface of the Pacific off California.

Carpenter's detachment is not all self-imposed. His superiors at NASA apparently have ruled him out of the flight program; for the past two years, Carpenter has been allowed extended leaves for assignments like Sealab. Events also seem to conspire against him; last year, he fell off a motorbike in Bermuda and broke an arm; last week, he fell asleep in his car and hit another car. Carpenter welcomes the new arrivals—"It's time to begin exploring space as well as flying in it," he says. It is an appropriate exit line as the old pilots depart and the younger men move in.



Newsweek—Tony Rollo
Carpenter: Down to the sea

Newsweek, July 12, 1965

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Eleventh Naval District
San Diego, California

THE SAN DIEGO UNION
A44 Thurs., July 1, 1965
SAN DIEGO, CALIFORNIA

NEL Worker Designs New Sea Camera

William J. Bunton of the Navy Electronics Laboratory has designed a diver's underwater self-contained still camera to record laboratory sea floor research activities.

Bunton, an experimental test mechanic with the Deep Submergence Group began the camera design more than a year ago to eliminate problems encountered with existing underwater cameras.

The camera's automatic film advance utilizes a 100-foot roll of 70mm film, allowing 400 consecutive 2¼ x 2¼ exposures. Existing 70mm cameras used in underwater photography have a capacity of 12.

The camera can be focused on objects from 18 inches to infinity. Its batteries, good for 500 exposures, can be recharged overnight. The cycle time between exposures is about four seconds.

Bunton tested the camera at depths of 200 feet in Florida. It is built for depths of 500 feet without further pressurizing.

Expert Tells Ways to Solve Sea's Secrets

Methods Outlined By Oceanographer In SDSC Talk

Dr. Eugene C. LaFond, supervisory research oceanographer of the Marine Environment Division of the Navy Electronics Laboratory, yesterday explained some of the modern methods being used in oceanographic exploration.

Dr. LaFond, speaking at San Diego State College, explained four aspects of modern oceanographic research.

Example Given

The first method, he said, is the exploration of the ocean from moving ships. Dr. LaFond said the International Indian Ocean Expedition is the largest example of this kind of work.

More than 20 countries are working together in the Indian Ocean, he said.

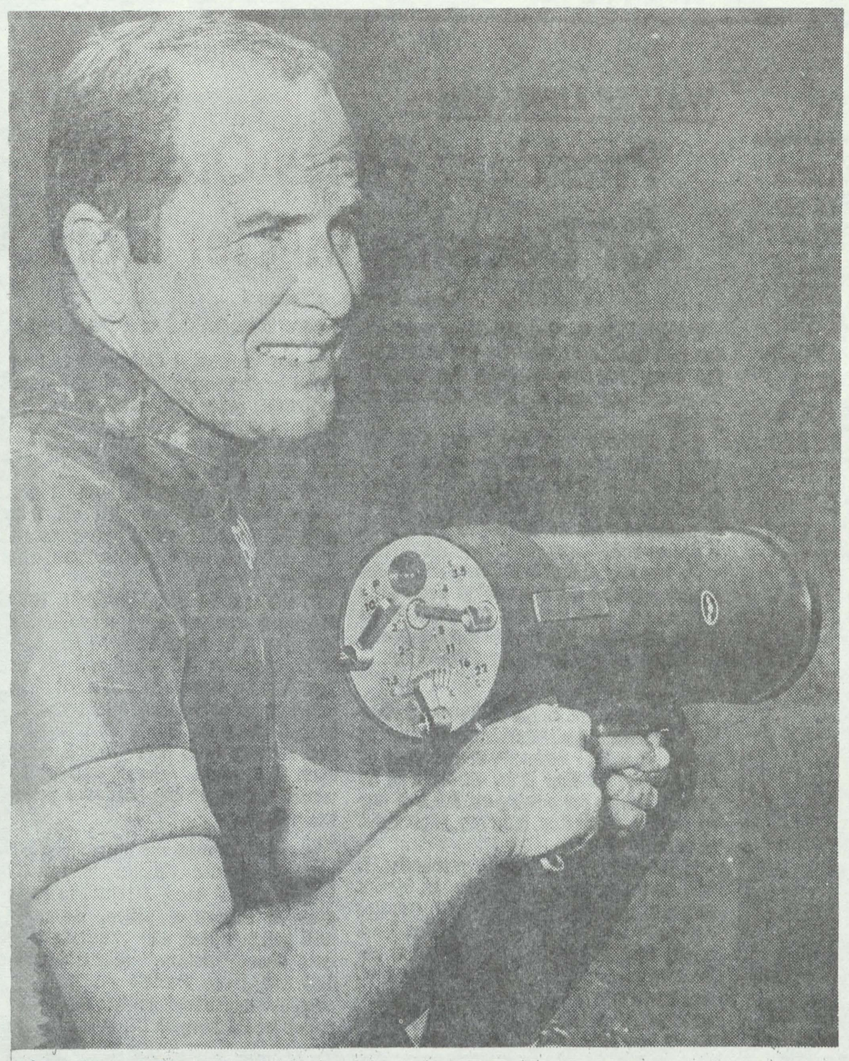
The second method, LaFond said, is the use of towers in the ocean. He said towers, like the one off Mission Beach, are able to work more economically than ships, and can test some aspects the ships can not.

Sensors Used

Another modern method in searching out the ocean's secrets, Dr. LaFond said, is the use of sensors lowered into the ocean.

They record the water temperature, its current and other oceanographic data, he said.

The last research method LaFond spoke of is use of deep submersibles. These submarines can carry men to ocean depths that were before considered inaccessible, he said.



UNDERWATER PHOTOS — Diver William J. Bunton holds newly developed undersea camera which will be used off La Jolla this summer during Sealab, the Navy's Man in the Sea experiment. All controls are on back of camera toward Bunton. Lens is in the other end.—Staff Photo by Ed Neil

(9)

THE AMERICAN TRADITION: In America, it is not only a portion of the people who try to improve the state of society, but the whole community is engaged in the task.—Alexis de Tocqueville.

San Diego Continues Growth As Center of Oceanography

San Diego is steadily gaining its rightful place as a leading center of oceanography.

An Evening Tribune series this week is telling of the progress being made in this "Cinderella science."

The San Diego Chamber of Commerce, in its official publication, recently listed some of the new additions to the growing community of ocean science and research here.

Three more firms interested in oceanography have set up operations in San Diego.

General Dynamics Corp. is planning to conduct operations relating to ocean sciences and engineering from a new Marine Technology Center to be established here on Harbor Drive.

The parent company of Convair is the second major aerospace firm to set up a San Diego ocean center. It follows Lockheed Aircraft Co., which has purchased the former Institute of Aerospace Sciences building on Harbor Drive for an Ocean Science Center.

Ocean Resources, Inc., with headquarters in La Jolla, will offer technical services in ocean mining and exploration.

Dr. John L. Mero, a leader in probing the economic and technical aspects of deep-sea mining, and head of Ocean Resources, Inc., is convinced that nodules strewn at the bottom of the sea are rich in manganese, copper, cobalt and nickel.

If these are developed, the United States very likely could be independent of outside sources of these metals in peace and war.

Kennecott Copper Corp. has established a special projects office here. It will be managed by the Bear Creek Mining Co., a wholly owned exploration subsidiary of the corporation.

According to the Chamber of Commerce, the company will conduct geological, engineering, economic and financial studies and surveys of mineral products for use by Bear Creek Mining and Kennecott in planning and orienting a continuing worldwide program of exploration.

The company will contract with other oceanographic firms in much of its research work. This should be an added stimulus to the oceanographic activity in this area.

Another firm entering the field here is Westinghouse Electric Corp. It will base its Deep Star oceanographic submarine in rented space at the B Street Pier and will berth a "mother ship" at Broadway Pier.

Deep Star is the successor to the Cousteau Diving Saucer, and is being co-developed by Capt. Jacques Cousteau, French diver of the original saucer fame.

The 10,000-pound Deep Star will be flown to San Diego after present testing is completed in the Mediterranean.

Westinghouse will not undertake oceanographic research itself, but will make the submarine available to others interested in using it for scientific and commercial enterprises.

One of the most important and spectacular activities of the summer in the oceanic field will be the second phase of the Navy's "Man-in-the-Sea" program.

Sealab II is scheduled to start its experimental work in mid-August one-half mile off Scripps Institution of Oceanography in La Jolla.

If all goes according to plan, San Diego and the nation may be able to see and hear regular televised broadcasts from the 210-foot-deep headquarters for civilian scientists and Navy divers.

Truly significant things are happening in this exciting field of oceanography.

The fact that they are happening in San Diego is acknowledgment of many attributes — natural, in our location and climate; man-made, in our cultural and scientific institutions.

And by no means least, this significant and desirable development is due to the tireless efforts of individuals and organizations working to build a better San Diego.

18 to Live in Lab Beneath Ocean

Home's 210 Feet Below Surface of Pacific

[Continued from first page]

planned to about 150 feet below the housing compartment.

"Some cooking can be done in the galley, but there can be no frying because the vapors would cause contamination.

"The aquanauts will not be allowed to smoke. Actually, cigarets won't burn in that atmosphere of low oxygen. A malfunctioning in electrical equipment would not cause a fire, but the smoke would be a hazard.

And No Martinis

"Ethyl alcohol is one solvent which is tolerable in the Sealab atmosphere, for alcohol does not give off toxic fumes. The alcohol will be there for medical purposes, not for martinis."

Two of the aquanauts, members of the Scripps staff, were interviewed by THE CHICAGO TRIBUNE.

They are Flechsig and Earl A. Murray, 37, Del Mar, Cal., both members of the Scripps staff. Flechsig once had a delivery route for THE TRIBUNE in Chicago. He attended Calumet High school and Wilson Junior college.

Murray will be in the Sealab the first 15 days, Flechsig in the second period. Both have completed training at Panama City, Fla., in a program directed by Carpenter.

"My job will be to set up an underwater weather station based on a concrete block set 240 feet below the surface,"



Earl A. Murray

Murray explained. "Apparatus from there will record velocities and directions of currents and pressure changes, and will measure waves and analyze the ambient light."

Plan Study of Animals

Flechsig, a biologist, will study marine animals, ranging from tiny organisms up to crabs and snails and varieties of fish.

"I will collect sand samples and various other items of underwater composition," he said.

"I am pleased with the mixed breathing gas system, which we tried out in Florida and which will enable us to be in the water so long.

"An inert gas like helium helps to keep the mind clear."

There are few sharks in the area where the aquanauts will be working. No mermaids around, either.

Carpenter, long a skin diving enthusiast, volunteered for the Sealab II project. The ocean researchers are pleased that he is in the experiment. They are eager to compare his reactions and physiological data in living under water with the information recorded about him in space travel.

In salvaging the sunken plane, the aquanauts will use a new plastic foaming technique to lift the craft to the surface. The foaming method has been successful in laboratory and limited sea tests but has not yet had a full scale application.

Other tasks being considered for the aquanauts are ore mining and building the underwater portion of an offshore oil drilling rig. The continental shelf, with its oil prospects, is of importance to the navy.

Jacques-Yves Cousteau, French oceanographer, has said that the ultimate goal of experiments like Sealab II and his own submersions is occupation of the ocean floor by man.

Many oceanographers hope that eventually the food and mineral and energy resources of the deep can be used. In that connection, Cousteau has warned:

"We have described the sea as a powerful element raging with storms, frightening fishermen and navigators. But it is an unstable and fragile medium.

"We are describing it as an inexhaustible reservoir of wealth. Let us be cautious because we must not waste its very limited resources. Liquid state seems to be very rare in the universe, especially water. Water is as beautiful but much more precious than diamonds because it is the delicate support of life."

Use Called Inevitable

Anderson says that the exploitation of the sea is inevitable.

"The ocean occupies nearly 80 per cent of the exposed surface of the globe," he said, "so at present we are using only 20 per cent of the surface on which the sun beats. The rest of the sun power is going into the water.

"The cost of getting to the sea's mineral resources is still high; such utilization will become feasible when the need becomes great enough.

"Some marine biological organisms have worked for us, doing refining of rich ores, such as manganese, coming to us out of sea water."

Anderson envisions a future when cities may float on the surface of the sea.

"As land continues to get more expensive, it looks practical to build large floating islands," he said. "The power source could come from the lower depths. The submerged mountains of the sea could be used for mooring those islands."

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EVENING TRIBUNE
JUL 15 1965
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Eleventh Naval District
San Diego, California

Sea Camera To Keep Tabs On Aquanauts

By LEO BOWLER
EVENING TRIBUNE Staff Writer

A new underwater camera which a group of San Diegans spent a year developing will go to the bottom of the sea this summer to help record the activities of aquanauts living and working there.

The camera, which looks like a short, fat bazooka, was designed and developed by personnel from the Navy Electronics Laboratory on Point Loma working with experts from Oceanographic Engineering Corp. of Del Mar.

It has been tested at depths of 750 feet. When it is used in Sealab II, it will be operated by divers living at 210 feet under the surface.

To Start in August

Sealab II is the second phase of the Navy's Man in the Sea program, scheduled to start in the middle of August.

Specially trained divers will live on the bottom half a mile off Scripps Pier in La Jolla in a steel house from which they will emerge to carry out experiments designed to tell how a man can function for long periods under water.

Two men in the Sealab experiment are expected to stay down for 30 days.

The camera, called the PC-770 is built by Oceanographic Engineering and is expected to cost about $3,500 when it is put into production. The current model, built to test the design, cost $9,000.

William J. Bunton, of the NEL deep submergence group, and John Pflaum of the NEL photo lab, started designing the camera more than a year ago. They were unhappy with other cameras available for underwater work.

The camera will take 400 consecutive pictures on 70-mm film. Other underwater 70-mm cameras make only 12 exposures before they have to be reloaded.

Trigger for Photos

The diver operating the camera holds it by two pistol grips and presses a trigger when he wants to make a photograph. The film is advanced by an electrical mechanism. It can shoot a picture every four seconds.

All the controls are on the back of the camera where adjustments can be made quickly by the diver. The camera weighs 16 pounds out of the water, but almost nothing under water.

Bunton tested the camera in Florida while training for Sealab. In recent weeks he has been using it to photograph the area where Sealab will be conducted.

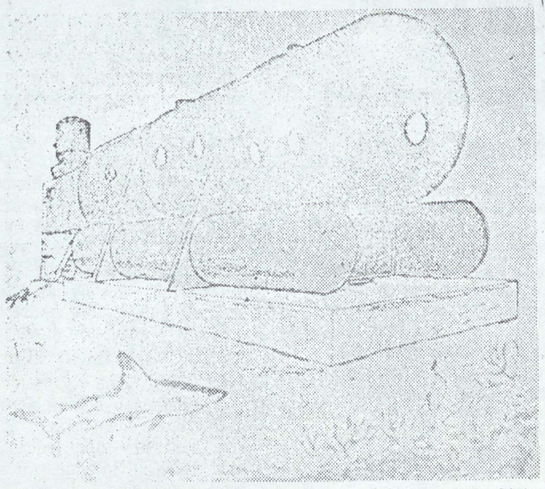
CHICAGO TRIBUNE
SUNDAY, JULY 11, 1965
Chicago Tribune

They'll Live Under Sea in Monster with 11 Eyes

It's Snug 'Home,' but No Smoking, No Fried Food

BY SEYMOUR KORMAN
[Chicago Tribune Press Service]

La Jolla, Cal., July 10—"The sea never changes," wrote Joseph Conrad, "and its works, for all the talk of men, are wrapped in mystery."



Artist's conception of the 57-foot-long laboratory which will be anchored 210 feet below the surface of the Pacific ocean. It will be the headquarters for 18 men in the project.



Anderson

An ambitious attempt to pierce that cloak of mystery is to begin here Aug. 16. A diving team of 10 men will descend 210 feet to a Pacific ocean bottom 4,000 feet offshore.

Fifteen days later 8 of those men will come up, and 8 others will go down for another 15 days. Two of the men from the first dive will remain below the full 30 days. One of them is expected to be Navy Comdr. M. Scott Carpenter, the astronaut who orbited the earth three times on May 24, 1962.



M. Scott Carpenter



Arthur O. Flechsig

Diver Ex-Chicagoan

Another aquanaut, Arthur O. Flechsig, 40, of Encinitas, Cal., is a native of Chicago.

The experiment is called Sealab II. It is a phase of a long range navy project to learn how effectively men can work on the ocean floor.

The Sealab I experiment was conducted 30 miles off Bermuda in the summer of 1964. Four navy divers lived and worked in comfort and safety at a depth of 193 feet for 11 days.

The aquanauts of Sealab II will study marine life, current velocities, and pressure changes. They will use salvage procedures in recovering a navy fighter plane being sunk for that purpose. And they will be tested to provide data on physiological performance.

School Aids Project

The Scripps Institution of Oceanography—situated on the La Jolla shore — is working with the navy on the project and providing some of the aquanauts. Scripps is part of the University of California at San Diego.

The divers will live, sleep, record their data, and communicate in a craft 57 feet long. It is specially designed for the experiment, and its 11 viewing ports make it look something like a glaring sea monster. The mooring site is an underwater shelf. A few yards away is a canyon drop to a level 400 feet deeper.

The living compartment, 12 feet in diameter, contains a laboratory, a galley, and a bunkroom. The interior temperature will be kept at 80 to 90 degrees thru a radiant heating cable, and air conditioning equipment will maintain 60 per cent humidity. Power will be provided by lines from the shore. There will be food and breathing gas supplies sufficient for at least six weeks. Helium is a constituent of this gas, and there is a smaller amount of oxygen in the mixture than in earlier experiments.

Lab Has Hot Showers

There will be hot showers for the aquanauts when they return to this undersea home from their swims in the ocean.

These swims will last as long as two hours. The average water temperature is about 50 degrees. The aquanauts will wear standard diving wet suits most of the time in the water. A few thermally heated suits will also be tested.

The divers will enter their sea home thru an anti-shark cage and an access hatch at the bottom.

For their safety the aquanauts will operate under precise rules. Dr. Victor C. Anderson, acting director of the university marine physical laboratory, described some of these.

Pressure Change a Peril

"The divers can swim up to 30 feet above Sealab but no higher because pressure changes would be dangerous," he said. "If one of the aquanauts accidentally surfaced it could be fatal. The decompression process after a man has been living underwater for 15 to 30 days will require about a day and a half.

"Most of the time the aquanauts will not go more than 30 feet below Sealab [in the nearby canyon]. There are some brief 'bounce' dives

[Continued on page 3, col. 6]

WASH POST 7/24/65

WASH POST 7/24/65



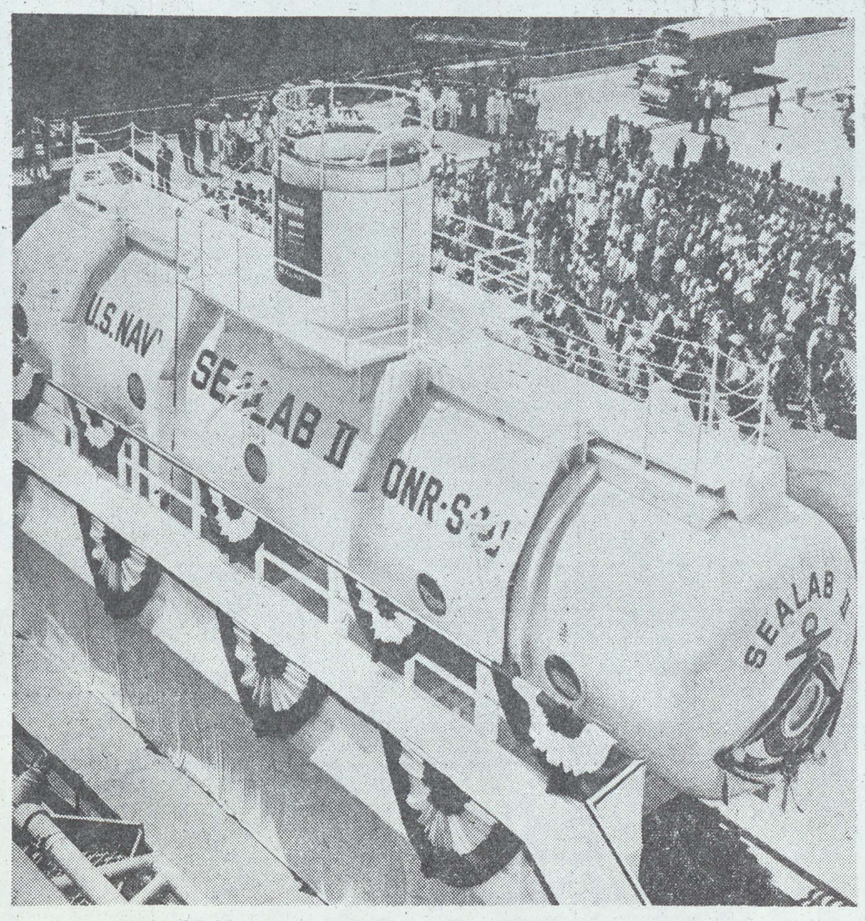
Associated Press

Navy's Undersea Laboratory Ready

Astronaut M. Scott Carpenter, now working as an aquanaut, stands in front of the Sealab II. The 12x57-foot cylinder, which will serve as an underwater home for 20 divers, including Carpenter, was christened at Long Beach, Calif., yesterday. The cylinder will be sunk at La Jolla, Calif., next month and the men who will use it will remain at a depth of about 200 feet for up to 30 days. The $850,000 project is the second step in the Navy's "Man in the Sea" program to provide ocean bases from which divers can roam around the seas freely.

10

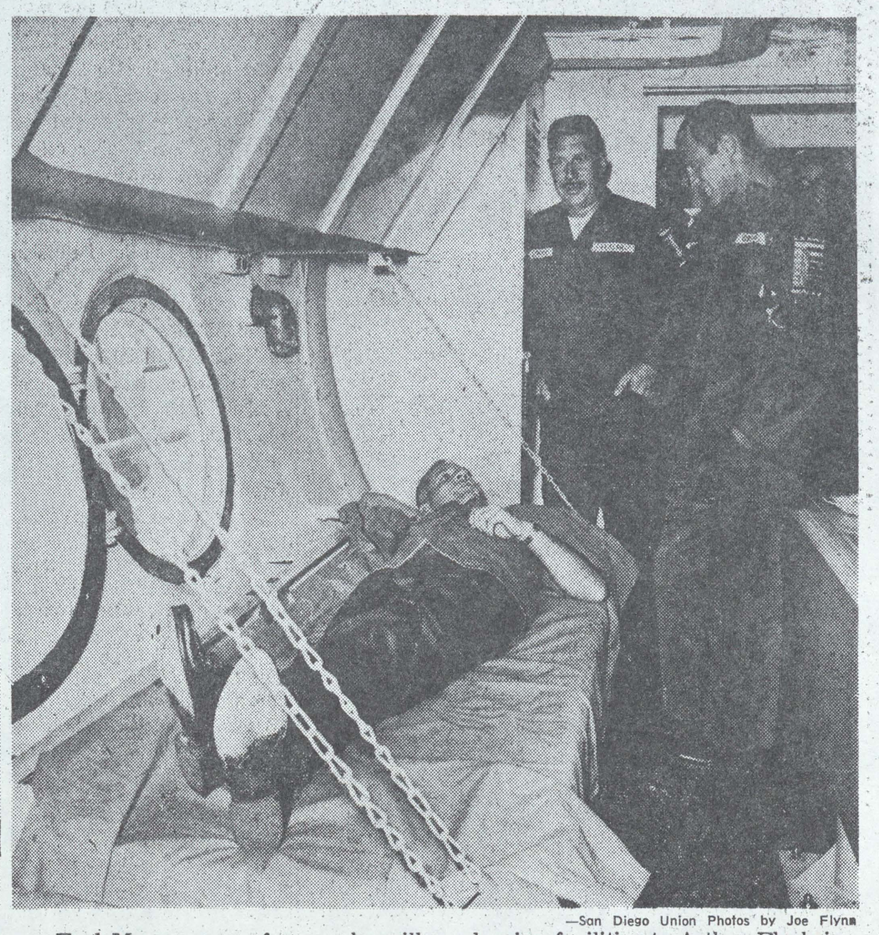
Research Vessel Makes Debut



Looking more like oversize railroad tank car than ultramodern underwater research vessel, Sealab II makes debut at Long Beach shipyard.



Heidi Nitze, daughter of Navy Secy. Paul Nitze, christens Sealab. Capt. Jamie Adair watches.



Earl Murray, one of men who will live aboard Sealab, voices approval of sleeping facilities to Arthur Flechsig, center, and Rick Grigg. (Story, a-1)

—San Diego Union Photos by Joe Flynn

Oceanography Family Growing

The announcement by General Dynamics Corp. that it plans to establish a substantial oceanography research-facility in San Diego is an exciting development in an important field.

General Dynamics is an established and highly respected name in San Diego and in the entire United States. Its new oceanography unit here will undoubtedly be of the same high standard as all of its other facilities. Its Convair division long was a leader in hydrodynamics.

The significance of the announcement, however, also includes the fact that the new facility will join the growing ranks of institutions and private developments that give San Diego its status as the oceanographic center of the world.

The announcement by General Dynamics followed closely revelation of another major oceanographic installation recently by Lockheed Aircraft Co.

As important as they are, the two announcements are only the highly visible portion of the dramatic surge of oceanographic development in San Diego in which many companies participated in recent years.

Kennecott Copper Co. also has announced it will establish an oceanography research office here to survey mineral potentials of the ocean floor.

The Westinghouse Electric Corp. has rented space at the B Street Pier to berth the Deep Star — an advanced diving saucer — and a mother ship.

These important firms have joined the ranks of more than two score excellent firms already in San Diego that are active in oceanography research or complementary services.

And eyes of the entire world will focus on San Diego in August when the Office of Naval Research conducts its Sea Lab II program off La Jolla. Under the program men will live 210 feet under the sea for a month.

The excellence and reputations of the Scripps Institution of Oceanography and the Naval Electronic Laboratory are a major factor in attracting new oceanography firms. Excellent colleges and the growing community of interests is another factor. Not the least important are the natural advantages and resident interest.

San Diego welcomes the new members of the oceanography family. Our goals will increase in proportion to their success.

4 From S.D. Area Named 'Aquanauts'

House Unit To Consider Ocean Bills

COPLEY NEWS SERVICE

WASHINGTON — A comprehensive study of several bills concerning oceanography will be made by a House subcommittee next month. Beginning Aug. 2, the oceanography subcommittee will devote two weeks to hearings.

Four basic measures, some pending several years, will be taken under study. All are aimed at concentrating oceanographic studies under one agency, instead of the divided authority now spread through 22 separate agencies.

John M. Drewry, committee counsel, said the study should wrap up the problem. He said the major proposals to be studied include:

First — A bill by Rep. Bob Wilson, R-San Diego, to create a national oceanographic agency, patterned after National Aeronautics and Space Administration, to concentrate on "inner space."

Second — A bill by Rep. Alton Lennon, D-N.C., subcommittee chairman, to assign responsibility for oceanographic study directly to the President, who would report annually to Congress on progress in marine studies. He would have an advisory committee, including scientists outside the government.

Third — A bill by Rep. Dante Fascell, D-Fla., to establish a national oceanographic council. It would consist of Cabinet-level officials, and report directly to the President. Sen. Warren G. Magnuson, D-Wash., is pushing identical legislation in the Senate.

Fourth — A bill by Rep. Paul Rogers, D-Fla., to establish a temporary commission to prepare oceanographic policy recommendations for Congress and the White House.

10 Will Spend 15 Days on Ocean Floor

U.S. Astronaut Also Chosen for Test Off La Jolla

By LEO BOWLER
EVENING TRIBUNE Science Writer

LONG BEACH — Four San Diego area men are among the first 10 aquanauts who will spend at least 15 days on the ocean floor off La Jolla.

Names of the aquanauts were announced today at the official unveiling of Sealab II at the naval shipyard here. The four San Diego area men are:

Thomas A. Clarke, 24, of 7726 Fay Ave., La Jolla; Earl A. Murray, 37, of 1252 Luneta Drive, Del Mar; Navy Chief J. D. Skidmore, 36, of 1089 Woodlawn Ave., Chula Vista, and Dr. Robert E. Sonnenberg, 27, a Navy lieutenant, 4367 Adams Ave.

Others Named

Clarke and Murray were the only two civilians among the 10 selected.

The other aquanauts are Berry L. Cannon, 30 of Williston, Fla.; M. Scott Carpenter, 40, of Boulder, Colo.; Billie L. Coffman, 36, of Tucson; Wilbur H. Eaton, 39, of Ft. Lauderdale, Fla.; Frederick J. Johler, 39, of Buffalo, and Cyril J. Tuckfield, 43, of Miami.

Carpenter, a Navy commander, is an astronaut as well as an aquanaut. He is on loan from the manned space program to the Man-in-the-Sea program. He has taken temporary residence in La Jolla for the duration of the Sealab experiment.

Scheduled for Aug. 15

Sealab, a part of the Navy's Man-in-the-Sea program, is to begin off La Jolla Aug. 15. A 57-foot, 200-ton steel house will be lowered to the sea bottom in 210 feet of water, 3,000 feet from the end of Scripps Pier.

The 10 men will be lowered to the house in a special capsule. They will live in the house 15 days, emerging every day to swim on the sea bottom and do scientific experiments.

Clarke Not Married

Clarke, the only single man from San Diego, is a graduate student at Scripps Institution of Oceanography, specializing in marine ecology and biology. He expects to complete his studies for a doctor of philosophy degree at Scripps in two to three years.

Murray, a widower, has lived in the San Diego area since 1952. He has two daughters, 18 and 13, one enrolled in Palomar College, the other in a Del Mar elementary school.

Sealab House Opened

Skidmore and his wife operate a nursery school in Chula Vista. They have two children, 10 and 13.

Sonnenberg is married and he has three children, all preschoolers.

All the San Diego area men seemed jubilant at their selection.

After announcing the names of the 10 aquanauts, Navy officers opened the Sealab house to newsmen. The house, which is a steel cylinder 12 feet in diameter, is divided into three rooms, a scientific laboratory, a galley and sleeping quarters.

The interior of the house is spacious, decorated with draperies, covers for couches and beds, and has wall-to-wall carpeting. There are fresh water showers, an electric stove, a refrigerator and other conveniences to keep the aquanauts comfortable on their long stay at the bottom of the sea.

Melson outlined extensive safety precautions which are being taken to ensure the safety of the men.

Capt. Lewis B. Melson, project director and Capt. George Bond, medical director of Sealab, explained that a special atmosphere containing only 4 per cent oxygen will be breathed by the aquanauts during their stay.

Melson said that after 24 hours in Sealab, the men will become "creatures of their environment" and to bring them to the surface without elaborate precautions so that they can readjust to normal living would kill them.

SAN DIEGO EVENING TRIBUNE
JUL 23 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

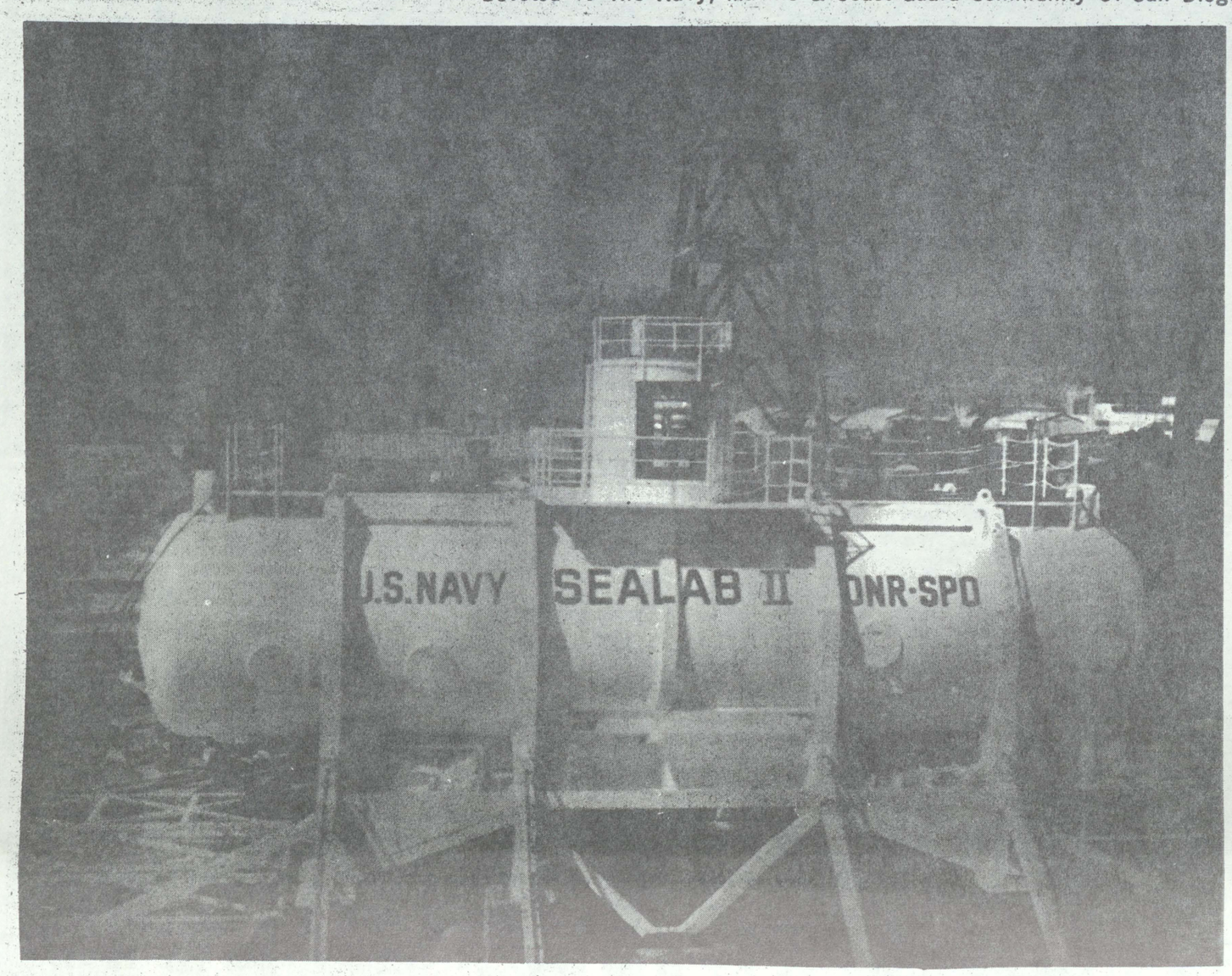
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SEA LAB II CHRISTENING

Astronaut Speaks On Sealab Project

By BRYANT EVANS
The San Diego Union's Science Writer

"Come on down and rap on the door, but we can't let you in" was the invitation that astronaut Scott Carpenter, training officer for Sealab II, gave to an audience yesterday.

The Navy commander's invitation to those attending a luncheon of the San Diego Symposium on Biomedical Engineering at OceanHouse was for a visit to the front yard of Sealab II. It will be a mile off La Jolla and 210 feet deep.

GOALS OUTLINED

Capt. George Bond, director of the Navy's Man-in-the-Sea program described the objectives and problems of the program and introduced Carpenter, who arrived from Long Beach too late for lunch.

Bond said Sealab II will represent an effort 10 times as great as that of Sealab I, in which four men lived for 13 days off Bermuda at a depth of 160 feet last year. Both Sealabs are cylindrical metal houses in which internal pressure is equal to the surrounding sea pressure at the same depth.

The Sealab I experiment cost $148,000, but this year's Sealab II will operate on a budget of $1.6 million, Bond said.

The laboratory is being fitted in the Naval Shipyard at Long Beach and will be brought to San Diego Aug. 1 or soon after. It is to be lowered into the ocean for the beginning of the experiment "hopefully on Aug. 15," Bond said. Carpenter is to be one of the aquanauts aboard.

Bond explained that the man-in-the-sea program is designed to make it possible for men to work in exploring and exploiting the continental shelves of the world—an area as large as Africa and capable of producing 85 per cent of the protein needs of the world population.

Divers, he said, cannot do useful work at depths lower than 180 feet and can remain submerged only for limited times.

GREAT DEPTHS

Sealab aquanauts, on the other hand, are able to stay at greater depths indefinitely.

"We are planning to have men work on the sea floor for months at a time, not minutes," Bond said.

The aquanauts can remain so long on the bottom because they breath a special atmosphere under heavy pressure. At the same pressure Bond explained, ordinary air would be fatal. It would damage their lungs and their nervous systems. The technique for the Sealabs was worked out in six years of animal and then human experimentation under pressure on land.

MOSTLY HELIUM

The special atmosphere is mostly made up of helium and only 4 per cent is oxygen, but under the heavy pressure the men still get about as much oxygen to breathe as they would under normal pressure in air.

The experiment here will be marked by elaborate monitoring methods through which scientists can ascertain the effects of the abnormal environment on the men's minds and bodies.

When Carpenter spoke he told the audience that the aquanauts represented the "most outstanding group of people" he ever had known.

"Before long we can live in the sea," he said, "and we will owe this ability to George Bond and others who have developed the man-in-the-sea program. There are great things planned in San Diego in the next three months. We need your support."

In papers delivered prior to the luncheon, speakers described devices to substitute for the action of the human heart.

A blood pump without any moving parts may aid in heart operations of the future, Dr. H. F. Poppendiek, president of Geosciences, Ltd., of La Jolla, said.

He reported on research he has conducted over the last several years to develop a pump that will move blood by using an electric current at right angles to a magnetic field.

PUMP BUILT

Poppendiek said he had built the first electromagnetic pump that would work on an electrolyte—a salt-containing solution. The advantage of using an electromagnetic pump would be to decrease damage to blood cells.

An artificial heart in which a hydraulic system does the work was described by R. J. Loubier of the Magnavox Corp. in Fort Wayne, Ind.

It is intended to develop a heart that will fit into a patient's chest and be powered by a source outside the body, using radio-frequency current and no wires penetrating the skin.

From Astronaut To Diver

Ten Men To Live Under Sea

Balto Sun 7/20/65

By Ernest Imhoff

Astronaut-diver M. Scott Carpenter will lead a Navy underseas team of inner spacemen down into the Pacific Ocean next month in an orange sea taxi built in Baltimore.

From a barge off La Jolla, Cal., the ten scuba divers will climb through a hatch into the 10-foot-tall cramped cyclinder. The 300-pound door will close.

Some of the men squeezing into benches on two levels may not be outside again for 30 days.

Cabin To Be Pressurized

In two to three minutes, the cabin will become pressurized to a depth of 210 feet. The divers will start breathing a helium-oxygen mixture which will soon change the pitch of their voices so that they sound like giggling teen-age girls.

Their "pressurized transfer capsule" will be lowered by a crane into the deep. It will take about twenty minutes to descend 210 feet to the lip of the famed La Jolla Trench.

Home For Divers

The capsule is kept from spinning by three "water wings running along the side. Once down, the hatch is opened. From their air bubble, the divers plunge in and swim to Sealab II.

This 50-foot-long cylinder will be home for these Navy and civilian divers taking part in one of the most ambitious underwater "colonizing" projects to date.

Sealab II, scheduled to start in the middle of August, will have alternating teams living, working and sleeping on the ocean floor for up to 30 days.

Extends Mission

The men will practice undersea salvage, check currents, trap marine life and perform other experiments.

Essentially, the Sealab II exercise is a colder, deeper, longer and more complicated version of last year's Sealab I mission off Bermuda and is designed to test man in the strange marine environment.

Squatting inside his ocean taxi for Sealab II in a West Baltimore factory the other day, Russell C. Wolfe said the 9-ton cyclinder "will have all the basic accoutrements of life" for the r[illegible] down.

Mr. Wolfe managed a little grin. He pointed to three tiny round windows, pressure and other gauges, narrow circular seats and very little room to do much more than look straight ahead.

Finished Soon

In less than two months, the Dixie Manufacturing Company, of 1501 West Patapsco avenue, had virtually finished its $80,000 Sealah work for the Navy.

"We've made two chambers," said the Dixie vice president and Sealab project manager. "The taxi will take men up and down. It may be used as an emergency vehicle if doctors are needed below.

"We also fabricated a deck decompression chamber. When the Sealab divers come up, they will be transferred to the DDC for the gradual change to earth environment. They are in there five days."

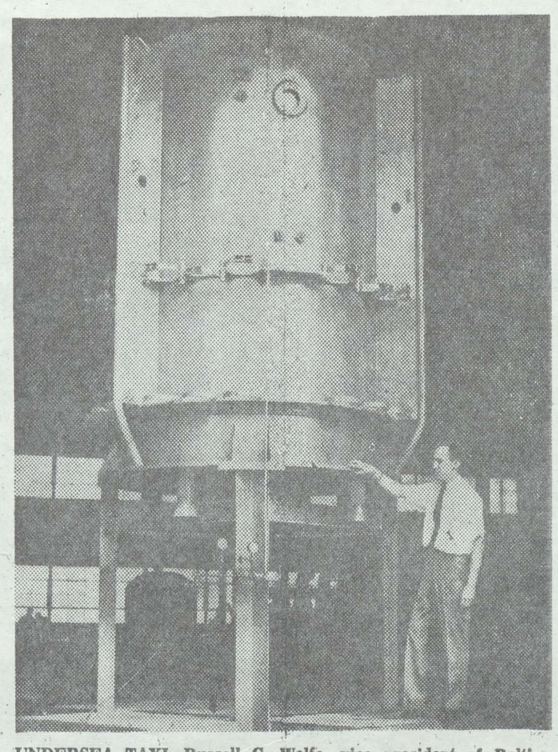
Host Factors

Navy and civilian scientists are looking into the sea in such projects as Sealab because of a host of factors including: scientific curiosity, the need for better undersea rescue techniques, the quest to exploit the vast undersea mineral wealth, and salvage.

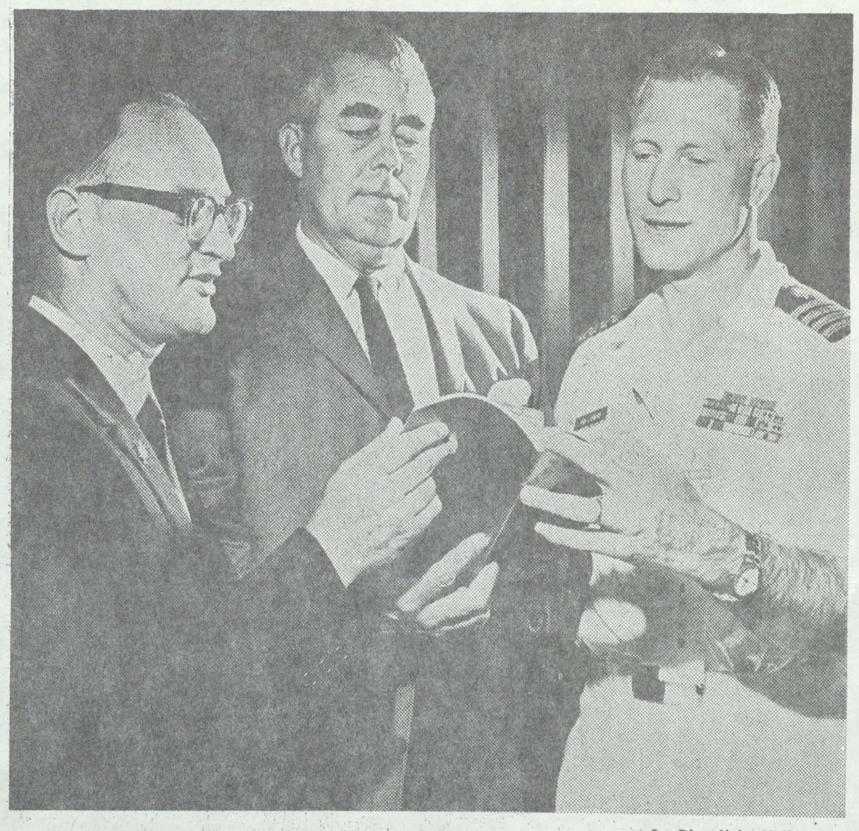
Two other marine living experiments are planned this year.

The old man of the sea, Jacques-Yves Cousteau, is leading one near Toulon, France. Six divers will live 300 feet down for two weeks in a 40-foot ball.

Then in the fall, an industry project will submerge six men way down to 600 feet depth for up to 1½ days to practice fixing offshore oil well equipment. The project is planned near Santa Barbara, Cal.



UNDERSEA TAXI—Russell C. Wolfe, vice president of Baltimore's Dixie Manufacturing Company, Inc., reviews progress on the pressurized underwater capsule built for Sealab project.



—San Diego Union Staff Photo

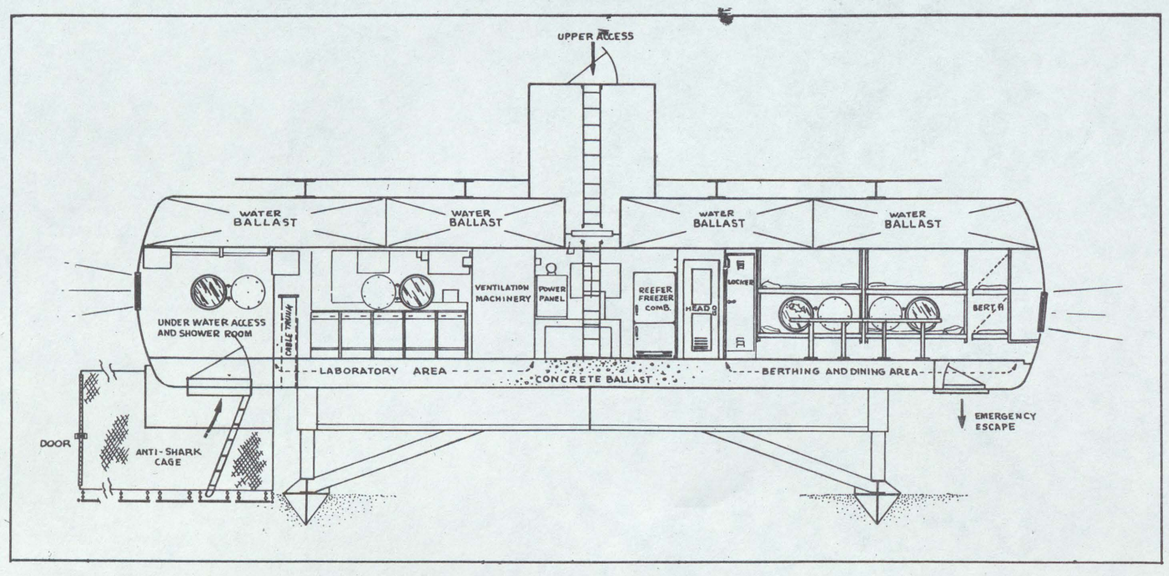
Capt. George Bond, USN, center, is being shown program of the Symposium on Biomedical Engineering by Eric Herz, chairman, left, and Capt. Charles K. Holloway, USN, program chairman.

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Pioneering "Inner Space"—

SEALAB II

By Ralph G. Platt

PATTERN FOR THE FUTURE

America's most ambitious attempt to date to learn how life can be sustained in a marine environment is now underway. SEALAB II, which may set the pattern for thousands of underwater habitations of the future, is now resting 215 feet deep on the Pacific Ocean bed, a half-mile off La Jolla, Calif., and in it the first of three teams of 10 aquanauts each are living, working and being subjected to innumerable physiological, and psychological tests. The results of the 45-day program may be every bit as important to the future of mankind as the forays made to date into "outer space."

SEALAB II is the second phase of the Navy's "Man-In-The-Sea" program, and is being conducted by the Office of Naval Research (ONR) in collaboration with the Navy's Special Projects Office, as part of the Deep Submergence Systems Program. SEALAB I was conducted last year 30 miles off Bermuda, when four Navy divers lived and worked successfully at a depth of 193 feet for 11 days.

The SEALAB II Team

Leader of the first team, which submerged on August 25 , is Commander M. Scott Carpenter, astronaut on loan to the program from NASA. Carpenter will stay down for 30 days--through both the first and second team schedules. The others are to be replaced after 15 days by a new team. Additional Navy members of the first team are: Lt. Robert E. Sonnenberg, medical officer; Cyril J. Tuckfield, Chief Engineman; Wilbur H. Eaton, Gunner's Mate, 1st Class; Frederick J. Johler, Chief Engineman; Jay Dee Skidmore, Chief Photographer; Billie L. Coffman, Torpedoman's Mate, 1st Class Civilian team members are Berry L. Cannon, an electronics engineer at the Mine Defense Laboratory, Panama City, Fla.; Earl "A" Murray and Thomas A. Clarke, technicians from the Scripps Institution of Oceanography. As GMT went to press the Navy had not disclosed the makeup of the second and third teams. However, members were to be selected from the group of trainees who have been under rigorous training.

Topside Group

Topside, the action and reaction of the divers are supervised and monitored closely by a group of Navy and civilian scientists and technicians headed by Capt. Lewis B. Melson, overall commander. Others are Capt. George F. Bond, Navy medical officer; Cdr. Thomas N. Blockwick, deputy on-scene commander; Capt. Walter F. Mazzone, physiological measurements and atmosphere control officer; Henry A. O'Neal, civilian in ONR and program director of SEALAB. Four scientists from Scripps Institution and one from the University of California also are part of this supervisory group. The Scripps personnel are Dr. William A. Nierenberg, director of the institution; Dr. Fred Noel Spiess, professor of oceanography and director of the Scripps Marine Physical Laboratory; Dr. Per F. Scholander, director of the Scripps Physiological Research Laboratory, and Dr. Edward W. Frager, professor at the Scripps Institution. The University of California representative is James R. Stewart, diving officer and biological collector.

The SEALAB Habitat

The SEALAB II vehicle, or habitat, was lowered to a spot on the south side of Scripps Canyon, 1,000 yards off the end of the Scripps Institution of Oceanography pier, after having been towed from its building site at the San Francisco Naval Shipyard. Although non-propelled, it is a sea-going craft designed and built along submarine principles, and has positive stability on the surface, while submerging, and while surfacing. It has variable water ballast tanks to attain positive or negative buoyancy. Atmospheric pressure within the living quarters is regulated to equal sea water pressure. The teams of aquanauts breathe a rigidly controlled mixture of helium, oxygen and nitrogen.

While on the bottom the capsule and its temporary residents are serviced both from a shore station and from a staging vessel moored overhead. A primary power cable laid underwater from shore provides power to SEALAB, and a supply hose married to the power cable provides fresh water. An umbilical between the staging vessel and the emplaced SEALAB contains a secondary power cable, a communication cable, an atmospheric gas supply hose, a gas sampling hose, and a compressed air hose for power tools.

Staging Vessel
Mooring System

The staging vessel, incidentally, is a modified POLARIS "Pop-up" catamaran held in position by five mooring lines, each consisting of a 13,000-pound anchor, two-inch chain, and a 1-1/2-inch wire. These moorings range from 800 feet to 1,500 feet in length, and each leg is capable of resisting a force of 50,000 pounds. Two of the legs span the Scripps Canyon, while two others are positioned to the southwest--the direction from which maximum winds prevail. The moor is capable of positioning the staging vessel within 10 feet of the desired location. A tensionometer is connected to each mooring leg so that tension can be ascertained at all times.

After being pressurized on the surface, the SEALAB habitat was lowered into position by the staging vessel's crane. All personnel transfers and decompression are made from the staging vessel via a complex Personnel Transfer Chamber (PTC)/Deck Decompression Chamber (DDC) designed and built by Dixie Manufacturing, Inc., Baltimore, Md. The PTC provides the means of transferring aquanauts from the SEALAB habitat depth to the surface while holding the depth pressure. The PTC is then mated to the DDC to which the aquanauts are transferred and decompressed.

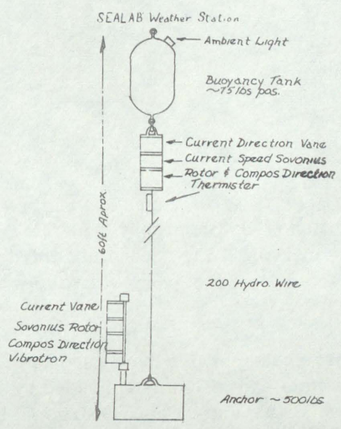
Living Quarters

The SEALAB living compartment is a cylinder 12 feet in diameter and 57 feet long, designed for a working pressure of 125 pounds per square inch, but tested hydrostatically to withstand 188 psi. When submerged, access is gained through an anti-shark cage suspended below the hull. The aquanaut swims into the cage and ascends into a four-foot-diameter access hatch, removes his diving gear,

climbs a ladder and emerges into the living compartment. The living compartment is separated from the entryway by a dam fitted with a dutch door. Function of the dam is to provide a water trap in which the water level may vary due to changes in tide or barometric pressure. In the event of an emergency, and the main access door is blocked, the aquanauts can emerge via a 30-inch forward escape hatch in the deck.

Proceeding from the entryway, the living compartment is divided into a laboratory, galley and bunkroom. The deck is solid concrete and is part of the fixed ballast. Gutters on each side of the deck drain off any water, and imbedded in the surface of the deck is a radiant heating cable. The atmosphere in the living compartment is maintained at 112 psi (corresponding to 250-foot water depth). It is made up of approximately 85 per cent helium, 11-1/2 per cent nitrogen, and four per cent oxygen. Replenishment gas is provided via pressure connections in the hull and the umbilical from the support ship, but a partial replacement supply is stowed in bottles within the living compartment. A scrubber containing Lithium Hydroxide removes carbon dioxide, while charcoal is used to remove odors. Both these chemicals are expendable and are replaced periodically. Four electric dehumidifiers control the humidity at 60 per cent, and convection heaters and the radiant heating system control the temperature at between 80 and 90°F.

Delineation of Programs



The SEALAB II project encompasses three separate and distinct programs--a Human Performance Program, an Oceanographic Program, and a Salvage Program. The Human Performance program is designed to gain an over-all estimate of man's capabilities in the undersea environment. Three different types of performance are under study--Specific Tests, such as the amount of force a diver can exert against a tool handle and the manipulative skill and coordination necessary to assemble underwater structures; Assigned Tasks, designed to assess efficiency in achieving a definite goal or end product, such as laying out a swimmer navigational grid, installation of an optical measurement range, construction of an oil well and well head assembly, and construction of a fish cage; and General Activities, including geological and biological bottom inspection, bounce dives to as low as 350 feet, specimen collection and equipment evaluation. The Human Performance Program also entails virtually constant observation of in-capsule behavior of the aquanauts to assess the reaction of team members to their unusual environment and to each other. Space in the capsule is restricted. The high pressure and exotic gas mix of the atmosphere are unique, and the world outside is forbidding--dark, cold and wet. Although only 215 feet from the surface, each man is two or more days removed from a normal environment because of the decompression requirements. Consequently, a team psychologists are observing behavior such as eating, sleeping, work within the capsule, use of free time and group interaction.

Oceanographic Program

The Oceanographic Program is being carried out primarily by four aquanauts who are also oceanographers--two each from the Navy Mine Defense Laboratory and from the Scripps Institution of Oceanography--and covers several aspects of physical and biological oceanography. The physical oceanography schedule includes installation of an underwater weather station to measure temperature, speed and direction of underwater currents, and variations of pressure; installation of a grid of stakes for bottom topology charge studies; placement of fluorescent sands to study the transport of sediment, and the placement of zero-buoyancy bottom trailers to study near-bottom water motion. The biological phase of this program entails study of marine organisms ranging from the smallest to the largest, and includes installation and stocking of two fish cages, construction of two pyramid-shape concrete block structures for fish habitation studies, a census of the fish population in the area, fish tagging, fish gas-bladder studies, and plankton sampling.

Salvage Program

Four projects make up the Salvage Program of SEALAB II. They are (1) foam-in salvage project, in which six individual 55-gallon weighted oil drums and one jet aircraft hulk are to be raised by pumping into them liquid chemicals which foam and harden into a rigid buoyant material, (2) salvage stud driver project, in which a patch is placed on a piece of steel rolled to simulate the shape of a submarine, (2) salvage lift pad project, in which a lifting pad is secured to a simulated submarine hull, and (4) a collapsible salvage pontoon project to evaluate the usefulness of a Sealbin collapsible rubber shipping container as a ship salvage lifting pontoon.

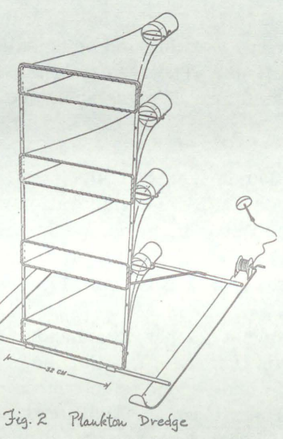
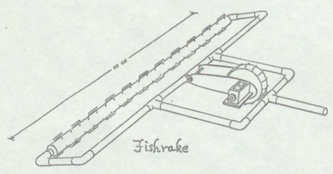


Fig. 2 Plankton Dredge



Special Features of Project

One of the special features of the SEALAB II operation is an undersea telemetry station contained in a concrete beehive structure about six feet in diameter and located about 100 feet from the habitat. Known as a Benthic Laboratory, it serves as the "central switchboard" for communications and data sampling channels. Four television channels make possible constant monitoring of the aquanauts' activities both inside and outside their undersea house, 20 channels handle audio communications, and 120 channels are used for the transmission of data. The Benthic Laboratory, designed and built by the Scripps Institution, is equipped with special manipulator arms for making its own repairs. If a component becomes defective the arms, operated by remote control from the shore, removes the components and replaces it with a stowed spare part. Both the Benthic Laboratory and the "weather station" mentioned earlier will remain in operation after completion of the SEALAB II program.

Another "special" of the project is the use and evaluation of the Pegasus, a "winged sea horse" to provide transportation for the aquanauts and also serve as a mobile platform for underwater photography and exploration. Resembling a torpedo with wings, the nine-foot long Pegasus has airplane type controls and maneuvers like an aircraft. Its 1-1/2-horsepower electric motor propels the vehicle at 3-1/2 knots and has a range of up to 14 nautical miles.

One of the major problems of the aquanauts while working in water with an average temperature of 50°F is keeping warm. A number of thermally heated experimental suits are scheduled for testing, but for the most part the divers are using standard diving wet suits. However, relief from the numbing cold is provided in a small emergency way-station equipped with an isotope-radiation heating unit supplied by the Atomic Energy Commission. The station, which contains emergency breathing gas as well as the heater, is big enough for one man.

To a man, the submergence teams--living literally under a microscope--and the hundreds of scientists, technicians and service personnel who comprise the support group, are and will continue to be extremely busy people for the duration of the SEALAB program. And let us not forget the Information types. From a special Command Information Bureau set up at the Scripps Institution, a corps of specialists is virtually working around the clock grinding out copy, servicing radio, TV and newsmen, developing and distributing photographs and setting up and conducting press briefings and interviews.

DAY-BY-DAY AQUANAUT SCHEDULE

Numbers in ( ) are approximate outside man-hours required.

DAY 1 - TEAM 1 proceed to bottom in PTC. Two team members leave PTC wearing MK-VI and utilizing MK-16 pinger receiver, home on 37 KC. pinger placed at SEALAB entrance trunk. Two swimmers also carry line from PTC to SEALAB. Upon arriving at SEALAB, swimmers equalize pressure in SEALAB, open hatch, and enter. The two swimmers then hook up basic wire communications and check life support operation. When system is in operable condition, all members of TEAM 1 enter SEALAB and proceed with preprogrammed system checkout. Spend most of the day with this checkout, internal organization and familiarization. Set the watch and carry out daily routines.

DAY 2 - Make a complete checkout of SCUBA and Hookah equipment and report -- (4). Begin layout of swimmer navigation grid in conjunction with initial survey of surroundings -- (10). Keep in mind the selection of sites for the weather and biological stations. Include familiarization with the immediate area around SEALAB, including the Benthic Lab, cable runs, and the PTC -- (2). Start setting up underwater weather station when a suitable site is found -- (4). Carry out daily routines. Conduct human engineering tasks and and activities as scheduled from topside. Conduct public information activities.

DAY 3 - Sorties not to exceed area covered by grid. Complete the layout of the swimmer navigation grid -- (10). Complete installation of underwater weather

station--(2). Receive PEGASUS vehicle and utilize for determining usage and adaptability as a transportation item--(4). Carry out daily routines--(4). Conduct human engineering tasks and activities as schedule from topside. Conduct public information activities.

DAY 4 - Sorties to limit of grid. Begin placing way-stations at predetermined points on grid and evaluation tools used in the way-station placing--(10). Commence installation of the optical measurements range--(4). Complete PEGASUS evaluation--(4). Report on adaptability of vehicle to include instrumentation operability. Carry out daily routines--(2). Conduct routine scientific checks and investigations as necessary. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities.

DAY 5 - Sorties to limit of grid. Complete way-station placing and tool evaluation for TEAM 1--(12). Finish installation of optical measurement range--(2). Select site for placement of test foundation--(4). Carry out daily routines--(2). Conduct routine scientific checks and investigations. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities.

DAY 6 - Sorties to limit of grid. Start photo survey of area according to navigational grid--(4). Construct/install large fish cage near SEALAB for behavioral studies--(4). Start work on 5-foot deep by 5-foot square excavation for test foundation--(10). Carry out daily routines--(2). Conduct additional scientific studies as time permits. Conduct routine scientific checks and investigations. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities.

DAY 7 - Free day. Sorties to limit of grid if desired. Holiday routine. Pursue work of own or collective choice--(18). Carry out daily routines--(2). Conduct routine scientific checks and investigations.

DAY 8 - Sorties to limit of grid. Additional psychophysiological tests. Start installation of stakes for bottom topology change studies--(4). Complete 5-foot deep by 5-foot square excavation for test foundation--(12). Carry out daily routines--(4). Conduct routine scientific studies as time permits. Conduct routine scientific checks and investigations. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities.

DAY 9 - Sorties to limit of grid. Make inspection of grid perimeter for marine growth and fouling--(4). Place mine cases for marine life attraction studies--(4). Install core pipes in excavation for anchoring test foundation--(8). Four members of TEAM II practice construction of "Christmas Tree" on the beach in preparation for this task during the second 15-day period. Carry out daily routines--(4). Conduct scientific studies as time permits. Conduct routine scientific checks and investigations as necessary. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities as scheduled.

DAY 10 - Sorties to limit of grid. Place fluorescent sands for sediment transport studies--(4). Complete the photographic survey of grid area--(4). Continue work on test foundation, installation of core pipes, filling of core pipes with cement using Halliburton cement pump etc.--(8). Four members of TEAM II continue construction of "Christmas Tree" on the beach under supervision of Socony-Mobile Engineer. Carry out daily routines--(4). Conduct scientific studies as time permits. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities.

DAY 11 - Sorties to limit of grid. Prepare for isolation drill--(4). Continue work on test foundation. Lay reinforcing rods and level form--(12). Four men from TEAM II disassemble "Christmas Tree" on beach in preparation for reconstruction on bottom during second 15-day period. Carry out daily routines--(4). Conduct scientific studies as time permits. Conduct routine scientific checks and investigations. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities.

DAY 12 - Local sorties only. Isolation drill for 24 hours. Simulate umbilical cord failure. Power and compressed air off for 24 hours. Only emergency communications maintained--(4). Continue work on test foundation--(12). Daily press interview limited to topside personnel concerning drill in progress. Carry out daily routines--(4). Conduct routine scientific checks and investigations.

DAY 13 - Sorties to limit of grid. Conduct bounce dives to deeper levels as prescribed from topside--(8). Complete work on test foundation. Set round bar U-eye and "Christmas Tree" spool connection, fill excavation with cement--(4). Start preparation for securing any instrumentation that will not be used by TEAM II--(4). Carry out daily routines--(4). Conduct scientific studies as time permits. Conduct routine scientific checks and investigations as necessary. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities.

DAY 14 - Sorties to limit of grid. Morning free. Pursue activities of own or collective choice--(8). In afternoon continue bounce dives as prescribed from topside--(4). Carry out daily routines--(4). Conduct scientific studies as time permits. Conduct routine scientific checks and investigations. Conduct public information activities.

DAY 15 - Sorties to limit of grid. Make complete inspection of exterior of SEALAB and report--(4). Secure and stow all instrumentation that will not be used by TEAM II--(8). Make all necessary preparation for transfer and decompression--(4). Carry out daily routines--(4). Conduct routine scientific checks and investigations. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities.

DAY 16 - No sorties except those necessary to effect personnel transfer. Eight subjects enter PTC, proceed to surface and transfer to DDC for decompression. Eight new subjects in DDC transfer to PTC, and proceed to SEALAB. Two remaining subjects continue to carry out daily routines and indoctrinate new team. Live TV coverage of first team of aquanauts leaving SEALAB and entering PTC. Press coverage of topside activities on surface vessel during transfer. Live coverage of two subjects remaining in SEALAB.

DAY 17 - Sorties to limit of grid. Continue indoctrination of new team to include familiarization with the immediate area around SEALAB, including the Benthic Lab, cable runs and the PTC--(16). Complete decompression of TEAM 1. Press coverage on surface support vessel of aquanauts emerging from decompression chamber. Press conference at Scripps Hospital after completion of medical examination and debriefing. Carry out daily routines--(4). Conduct additional scientific studies as time permits. Conduct routine scientific checks and investigations as necessary.

DAY 18 - Sorties to limit of grid. Make inspection of grid perimeter for marine growth and fouling--(4). Conduct evaluation of underwater high velocity power tool for installing lifting devices on simulated submarine hull--(12). Carry out daily routines--(4). Conduct additional scientific studies as time permits. Conduct routine scientific checks and investigations. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities.

DAY 19 - Sorties to limit of grid. Conduct evaluation of salvage buoyancy pontoons in conjunction with simulated submarine hull and installed lifting devices--(12). Make preparation for evaluation of foamed-in-place lifting materials to raise A-4 type aircraft--(4). Carry out daily routine--(4). Conduct scientific studies as time permits. Conduct routine scientific checks and investigations. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities.

DAY 20 - Sorties to limit of grid. Evaluate foamed-in-place lifting material in conjunction with raising A-4 type aircraft--(14). Carry out daily routine--(6). Conduct routine scientific checks and investigations. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information.

DAY 21 - Sorties to limit of grid if desired. Free day. Conduct Holiday routine. Pursue work of own or collective choice--(16). Carry out daily routine--(4). Conduct daily routine scientific checks and investigations as necessary.

DAY 22 - Local sorties only. Additional physiological testing as prescribed from topside. Continue evaluation of foamed-in-place lifting material for raising A-4 type aircraft--(12). Make preparation for construction and testing of "Christmas Tree" on test foundation--(4). Carry out daily routine--(4). Conduct routine scientific checks and investigations. Conduct public information activities as scheduled. Conduct additional scientific studies as time permits.

DAY 23 - Sorties to limit of grid. Prepare for the next day's bounce dives--(2). Start "Christmas Tree" construction with installation of blow-out preventer on spool connection. Place master valve, couble block for flow lines, and quick-change connection as time permits--(14). Carry out daily routines--(4). Conduct routine scientific checks and investigations. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities. Conduct additional scientific studies as time permits.

DAY 24 - Sorties to limit of grid. Conduct bounce dives to deeper levels as prescribed from topside--(8). Test oral communications of long reports topside. Continue construction of "Christmas Tree". Evaluate different types of flange connections during construction--(8). Carry out daily routines--(4). Conduct scientific checks and investigations as necessary. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities. Conduct additional scientific studies as time permits.

DAY 25 - Sorties in local area only. Additional psychophysiological tests as prescribed from topside. Complete bounce dives if required--(6). Continue work on "Christmas Tree" construction. Install lubricator sections; one with clamp, one with bloted flanges. Install 30-inch stuffing box at top of tree and prepare for testing--(10). Carry out daily routines--(4). Conduct routine scientific checks and investigations. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities. Conduct additional scientific studies as time permits.

DAY 26 - Local sorties only. Isolation drill for 24 hours. Simulate umbilical cord failure, power and compressed air off for 24 hours. Only emergency communications maintained--(4). Test "Christmas Tree" with compressed gas to not more than 1000 psi over-pressure--(12). Daily press interviews limited to topside personnel concerning drill in progress. Carry out daily routine--(4). Conduct routine scientific checks and investigations.

DAY 27 - Sorties to limit of grid. Begin disassembly of way-stations in conjunction with evaluation of underwater tools--(10). Begin instrument pick-up and stowage in preparation for ending test--(4). Start final inspection of external gas bottles, fittings, and equipment with emphasis on corrosion and integrity--(2). Carry out daily routine--(4). Conduct routine scientific checks and investigations. Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities. Conduct additional scientific studies as time permits or as specified.

DAY 28 - Sorties to limit of grid. Morning free. Pursue activities of own or collective choice--(8). In afternoon complete disassembly of way-stations in connection with evaluation of underwater tools--(6). Work on instrument pick-up and stowage in preparation for ending test--(4). Carry out daily routine--(4). Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities.

DAY 29 - Sorties to limit of grid. Continue instrument clean up and stowage in preparation for ending test--(12). Make final inspection of Benthic Lab and PTC--(4). Carry out daily routines--(4). Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities.

DAY 30 - Sorties to limit of grid. Complete instrument clean up and stowage in preparation for ending test--(14). Complete final inspection of Benthic Lab and PTC in preparation for personnel top-side--(4). Carry out daily routine--(2). Conduct human engineering tasks and activities as scheduled from topside. Conduct public information activities.

DAY 31 - No sorties except as necessary to close habitat and effect transfer. Complete the securing of equipment. Eight subjects enter PTC, two remaining subjects disconnect water, shore power, Benthic Lab connections and close SEALAB hatch. Two remaining subjects enter PTC and all subjects transfer to surface for decompression. Completion of decompression. Prepare for press conference, debriefing, etc.

Note: The day-to-day schedule for the third 15-day period has not yet been finalized, but in the main it will provide for completion, repetition, or expansion, of functions listed above.

Sealab II — The Challenge of the Sea



Sealab II, the Navy's undersea habitat, readied to be placed at a depth of 210 feet off the California coast at La Jolla, will house teams of Navy aquanauts who will work in the sea around their ocean bottom quarters.

By "PAT" POLAKOWSKI,
Editor, NEL "Calendar"

Man is extending his efforts to break the barriers of the sea. An insatiable thirst for knowledge of the ocean and its environment has led the Navy to a site one-half mile off La Jolla to conduct one of the most sophisticated underwater study programs ever attempted.

The study is Sealab II, the second phase of the 'Man-in-the Sea' program conducted by the Office of Naval Research (ONR) in collaboration with the Navy's Special Projects Office as part of the Deep Submergence Systems Program.

"We want to challenge the members of the diving teams and the challenge is here," Captain L. B. Melson, USN, told members of the press Wednesday. Capt. Melson, director of the Sealab project, is from ONR.

"At the conclusion of Sealab II, we'll have the greatest collection of information on diving over long periods of time that anyone has been able to obtain," Capt. Melson continued.

The first of three diving teams of ten men each descended Saturday, August 27, as soon as all systems were throughly checked out to the Sealab habitat located on the bottom of the Pacific Ocean (La Jolla Canyon) at a depth of 210 feet.

These divers, termed 'aquanauts,' will immediately begin operations. They will occupy the 57-foot long undersea house for 15 days. Participating aquanauts include civilian scientists as well as Navy divers.

Bill Bunton, a diver with the Laboratory's Deep Submergence Program, is scheduled to be a member of the third team of divers who will descend for the final 15 day period at Sealab. Bunton, like all other participating divers, trained for the program in Panama City, Fla., in May and June. Bunton is expected to conduct gorgonian ecology study, part of a Laboratory program under the direction of Dr. Eric Barham, Marine Environment Division.

The Sealab program, scheduled for 45 days, is composed of three parts: human performance, oceanographic, and salvage.

Purpose of the human performance program is to gain an overall estimate of man's capabilities under the conditions encountered in Sealab II. The estimates will be in relation to the state and condition of man; environmental conditions; test or task undertaken; and equipment, tools, and materials used.

Of interest to NEL personnel is the Sealab II oceanographic program to be carried out primarily by four aquanauts who are oceanographers. This program will cover several aspects of physical and biological oceanography.

Physical oceanography will include the installation of an underwater weather station which will consist of a taut line moored near the Sealab site. The station will measure temperature, the speed and direction of underwater currents, and variations in pressure on the bottom and 30 feet above the bottom. A grid of stakes will be installed for bottom topology change studies. The physical oceanography program includes, additionally, the placing of flourescent sands for studying the transport of sediment and the placing of zero-buoyancy bottom trailers to study near-bottom water motion.

The biological oceanography program is designed to describe the biological activities in, on, and just above the sea floor in the habitat area. Two large fish cages will be lowered from the surface and installed; the aquanauts will stock the cages. Blocks will be lowered to construct structures for fish habitation studies. Also, a census of fish population in the area will be taken. Plankton sampling will be conducted. Also, fish, crabs, starfish and other such organisms will be tagged to record their numbers and abundance.

One of the salvage jobs slated during the Sealab II program will be the recovery of a Navy fighter aircraft to be sunk for this purpose. The aquanauts will use a new plastic foaming technique to attempt to float the aircraft to the surface.

Sealab II, a non-propelled, seagoing craft, will be lowered into the ocean and emplaced on the floor. The craft closely resembles the float of NEL's TRIESTE I.

Sealab's living compartment has a pressurized atmosphere equal to sea water pressure. The compartment is 12 feet in diameter and is divided into a laboratory, galley, and bunkroom. Imbedded in the surface of the concrete deck is radiant heating cable.

The atmosphere components and gas mixture to be breathed by aquanauts are 80 percent helium, 16 percent oxygen, and 4 percent nitrogen. The undersea habitat will be self-contained with respect to food and breathing gas. Electric power and water will be provided by lines from shore. Emergency breathing gas supply and emergency electric power will be provided by an umbilical cable from the special catamaran surface support vessel. A personnel transport capsule and a standard diving bell will be used by the aquanauts to descend to the bottom. They will then swim about 10 yards to enter the habitat through an anti-shark cage and the access hatch on the bottom of Sealab. They will return to the surface in the transport capsule under pressure. Then, they will be transferred to a decompression chamber for about 40 hours.

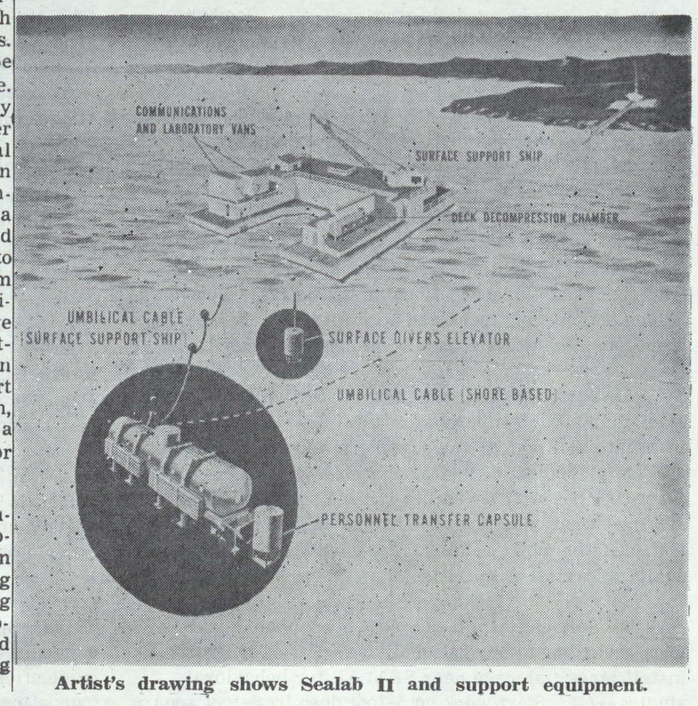
Sealab staging vessel is essentially two YFN barges joined together. It will be held in position by five mooring legs. The staging vessel will provide the lowering capability as well as surface support such as surface divers and emergency supplies including power and breathing gas.

Personnel of YFU-45, a district auxiliary craft based at NEL, will lay the power packages, fresh water lines, benthic labobratory, and communications lines between Scripps pier and Sealab II. Christ F. Thompson, BMCS, USN, is petty officer in charge of the craft and the 12 crew members.

The benthic lab is an unmanned laboratory which will attempt to maintain complex instrumentation for sea floor study.

Commander Scott Carpenter, USN (NASA), an astronaut as well as an aquanaut, is team leader for the first group of divers.

NEL Providing Personnel, Logistic Support For Extensive Underwater Operations



Artist's drawing shows Sealab II and support equipment.

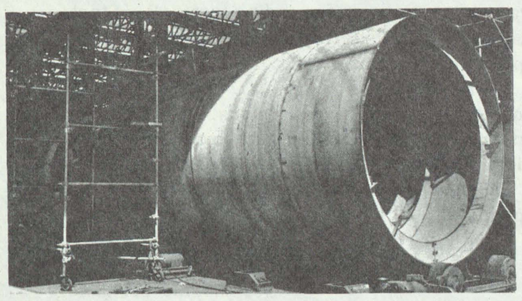
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Sea Lab II Under Construction

Sea Lab II, a 50- by 12-foot steel, cylindrical undersea dwelling in which divers will live on the ocean floor, is being designed and built by Hunters Point Division, San Francisco Bay Naval Shipyard to plans and specifications prepared by the U. S. Navy Mine Defense Laboratory (MDL).

Sea Lab II is being built as part of the Navy's Man-in-the-Sea program, a long-range experimental program which is expected to make it possible eventually for divers to work and live at a depth of 1,000 feet and, conceivably, at even greater depths.

Sea Lab II is the second phase of a program which last year saw four divers living and working for 11 days at a depth of 193 feet off Bermuda.



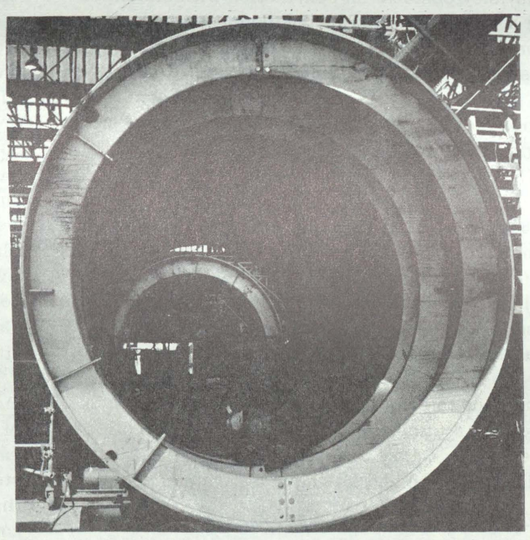
Part of the cylindrical-shaped Sea Lab II under construction in the Structural Shop of San Francisco Bay Naval Shipyard.

Major object of Project Sea Lab, which is being conducted by the Office of Naval Research, is to determine man's capabilities to perform useful work in the undersea environment. At the present time such work is restricted by the fact that a diver working at depths below 100 feet for just a few minutes requires long periods of decompression. This, plus the limited amount of breathing gas carried in his scuba tank, means that only a small amount of work can be done in one day.

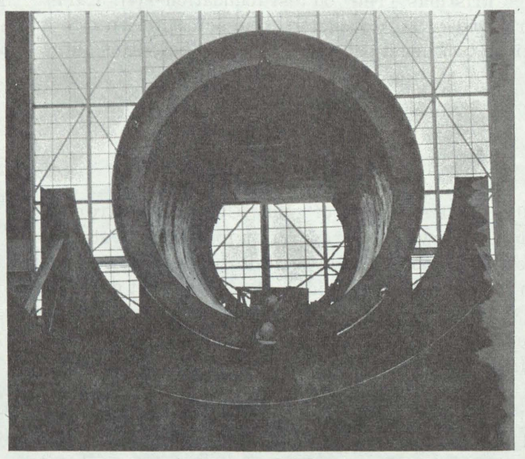
In the Sea Lab concept the diver lives in a home placed at the depth at which the work is to be performed. This allows him to draw on an unlimited supply of breathing gas; he does not have to be concerned with decompression until the job is completed.

Atmospheric pressure inside Sea Lab II will be 100 pounds per square inch, since it is open, at the bottom to the pressure of the surrounding water.

Sea Lab II will contain living and berthing facilities for 10 men plus space for the necessary laboratory equipment to be used during the test. The "house" will be self-sufficient with respect to food, water, and breathing gas for at least six weeks.



Interior view of a section of the cylindrical undersea dwelling being constructed for the Navy's Project Sea Lab.



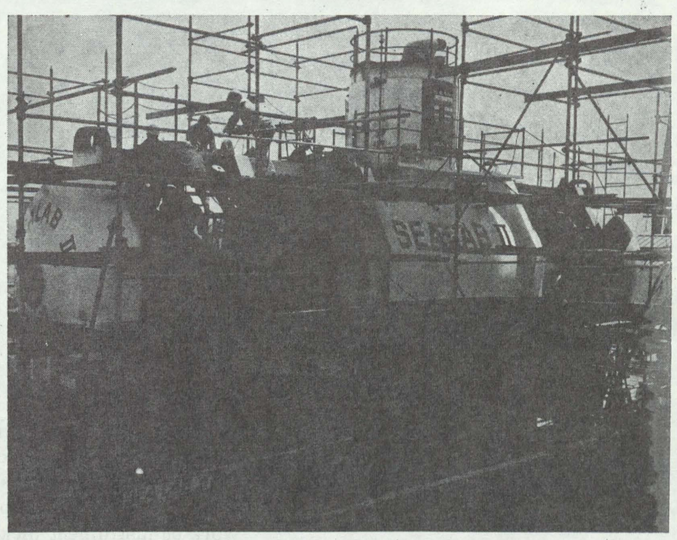
An interior view of Sea Lab II during construction.

Power will be provided from the shore, backed up with an alternate source aboard the surface support ship. Shore connections will provide water supplies, breathing gas supply, channels for relaying underwater television, and communications circuits.

Sea Lab II was completed during June 1965. It was then towed to a spot in the ocean floor off La Jolla, California, where, during August and September, two diving teams of ten aquanauts each will live for 15 to 30 days in Sea Lab at a depth of 250 feet.

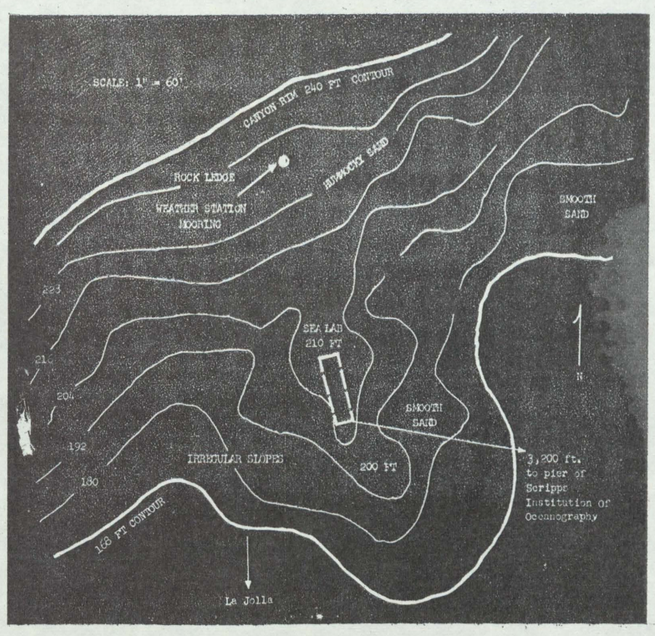
SEALAB II



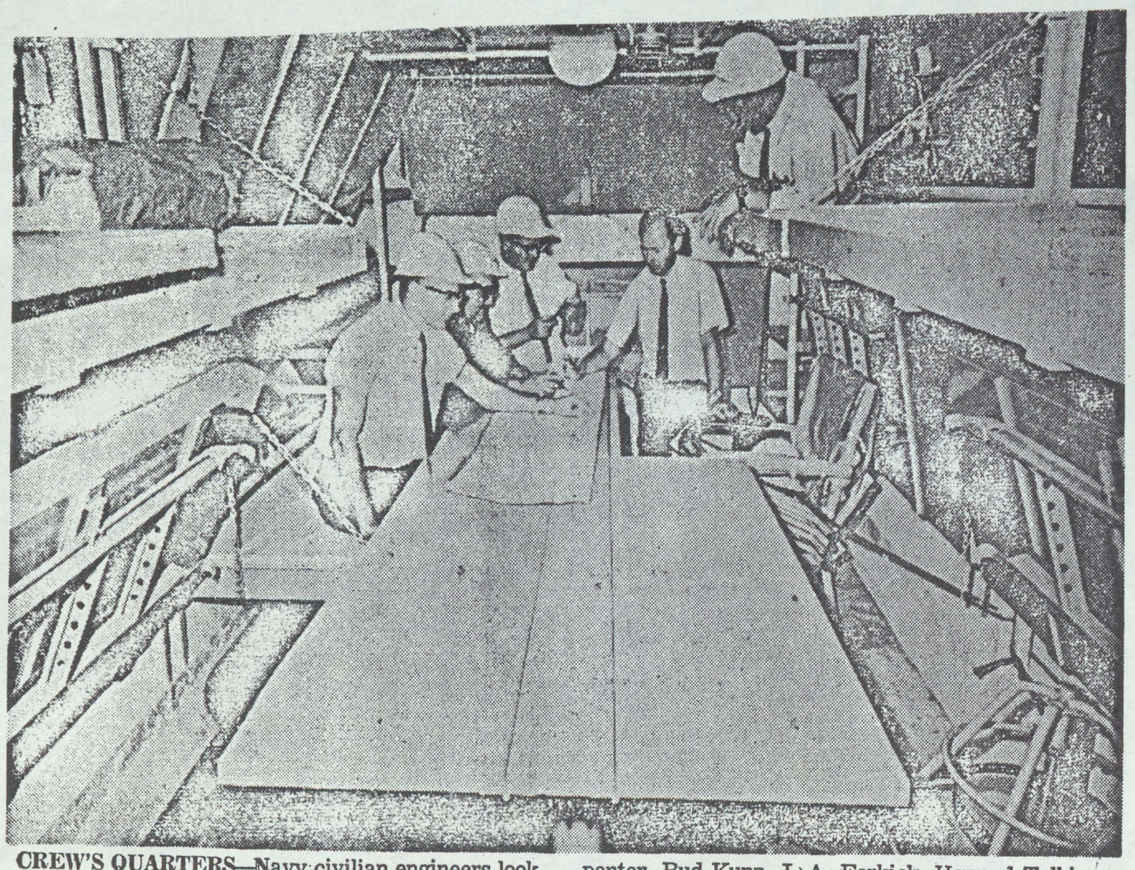


Illustrating the accelerated pace of training for the Navy's Sealab II project, Aquanauts, upper right, practice with wet suits under the leadership of Astronaut Cdr. M. Scott Carpenter, right. Of 35 trainees 23 have been chosen for the project. Ten men, led by Carpenter, will descend to 210 ft. off La Jolla (San Diego) Cal. and will live and work under pressure for 15 days. Eight more men will descend for the second 15 day period along with two holdovers from the first group. Civilians are included and three are on team number one.

Medical officer of the team is Lt. Robert E. Sonnenburg (MC). Another member is a veteran of Sealab I, held off Bermuda last year, Gunner's Mate First Class Lester E. Anderson. Three surface support divers of Sealab I are on the team: Chief Engineman Cyril J. Tuckfield; Gunner's Mate First Class Wilbur H. Eaton, Chief Engineman Frederick J. Johler. The fifth enlisted man is Chief Photographer (Diver) J. D. Skidmore. The civilians are Berry L. Cannon, an electronics engineer, and two oceanographers from the Scripps Institution of Oceanography, Earl A. Murray and Thomas A. Clarke.



Above, Sealab II is shown under construction at the San Francisco Naval Shipyard. It was fitted out at the Long Beach Naval Shipyard. From there it will be towed to La Jolla early this month. It is 57 ft. long and 12 ft. in diameter. At left the site of the project is shown in relation La Jolla and the Scripps pier. San Diego is to the South. Water temperature at this site ranges from 48°F to 52°F compared with 60°F at Bermuda. Heated wet suits will be used by the men.



CREW'S QUARTERS—Navy civilian engineers look over plans in the eating and sleeping quarters of the Navy's Sealab II. Clockwise are Edward Carpenter, Bud Kunz, J. A. Ferkick, Howard Talkington and T. B. Wheeler. Sealab II will be towed from Long Beach to La Jolla for experiments.—(AP)

Sealab Program to Explore Potential of Submerged Lands

By LEO BOWLER
EVENING TRIBUNE Science Writer

LONG BEACH — The United States is faced with the task of exploring more than a million square miles of completely unknown submerged land, an assistant secretary of the Navy says.

Robert W. Morse, speaking for Navy Secretary Paul H. Nitze, told an audience of 500 here yesterday that Sealab II, part of the Navy's Man-in-the-Sea program, will be a step in that exploration.

Morse was the main speaker at the dedication of Sealab at the Naval Shipyard here.

He said that the U.S. acquired in 1964 sovereign rights to more than a million miles of submerged lands off its coasts. The acquisition came with the signing of the International Treaty on the Continental Shelf.

Offshore Exploration

He compared the magnitude of the acquisition with the Louisiana Purchase, and said this country is no better prepared today to explore and exploit these lands than it was to explore the Louisiana Purchase when it was made.

Sealab, when coupled with the rest of the Navy's deep submergence program, will help make exploration of the offshore lands possible, he said.

Prime purpose of the deep submergence program is to give the Navy a military capability in the depths of the sea and to make it possible to rescue submariners when they run into trouble.

But it will have other effects, he said.

"It will point the way toward an exploitation of the mineral, geological, geophysical, piscatorial and agricultural potential of the sea and toward an enlargement of the recreational potential in submarine canyons of exquisite beauty," Morse said.

Non-military Interests

"A capability will be created to foster the nonmilitary interests involved in such matters as tending pipelines, cables and underwater installations; extraction of oil and minerals; culture of fish and marine life; extension of geophysical exploration, and the general advancement of the earth sciences."

Sealab is a program to put 10 men on the bottom of the sea off La Jolla next month. The divers, four of them from the San Diego area, will live in the steel house dedicated yesterday, emerging each day to swim freely and perform work and scientific experiments. They will breathe a special mixture of oxygen, helium and nitrogen, and expect to stay down 15 days. Some of the men may remain in the house on the bottom for as long as 30 days.

Aquanauts Identified

Miss Heidi Nitze, daughter of the Navy secretary, cracked a bottle of champagne on Sealab to christen it. The ceremony was attended by Navy and civic dignitaries, and friends and families of the divers who will participate in the experiment.

Earlier yesterday, the Navy announced the names of the first 10 aquanauts who will live on the bottom.

The four from the San Diego area are Thomas A. Clarke, 24, a Scripps Institution of Oceanography graduate student; Earl A. Murray, 37, a Scripps lab assistant and diver; J. D. Skidmore, 36, a Navy chief, and Lt. Robert E. Sonnenberg, 27, a physician.

Morse compared the Man in the Sea program to the early stages of aviation.

He predicted the day when "an excursion to an advanced sea habitation 600 to 1000 feet below the sea will be an experience as commonplace as jet air travel is today."

Nitze, who was scheduled to speak at the ceremony could not attend and sent Morse in his place.

Pacific Beach
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AND THE NORTH SHORES SENTINEL
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CONTRACT AWARDED TO AREA CORPORATION

Navy Tries S.D. First For Ocean Study in Depth

By NOLAN DAVIS
EVENING TRIBUNE Staff Writer

The Navy is trying San Diego first as it moves to perfect its ability to predict undersea "weather."

The Navy's Oceanographic Office in Washington has just awarded a $422,000 contract to the local division of Bissett-Berman Corp. for 12 precision measuring instrument systems to study the ocean's interior environment. The parent company is in Santa Monica.

The San Diego division, located at Harbor Drive and G St., will produce the systems during the next year, plant manager Vern Bogardus said.

Undersea 'Weather' Observed

Navy studies using the firm's Salinity-Temperature-Depth systems will be part of the service's ASWEPS (Anti-Submarine Warfare Environmental Prediction System) program, Bogardus announced.

"This program is to study undersea 'weather,' " he said. "It's like sending up a balloon to study atmospheric conditions, only scientists will be sending our 'fish' down in the ocean instead."

Bissett-Berman's fish is a metal frame that will contain electronic sensors to measure salt concentration and temperatures. A deck unit, to be placed aboard Navy vessels conducting the research, will power the sensors and record their findings on a graph.

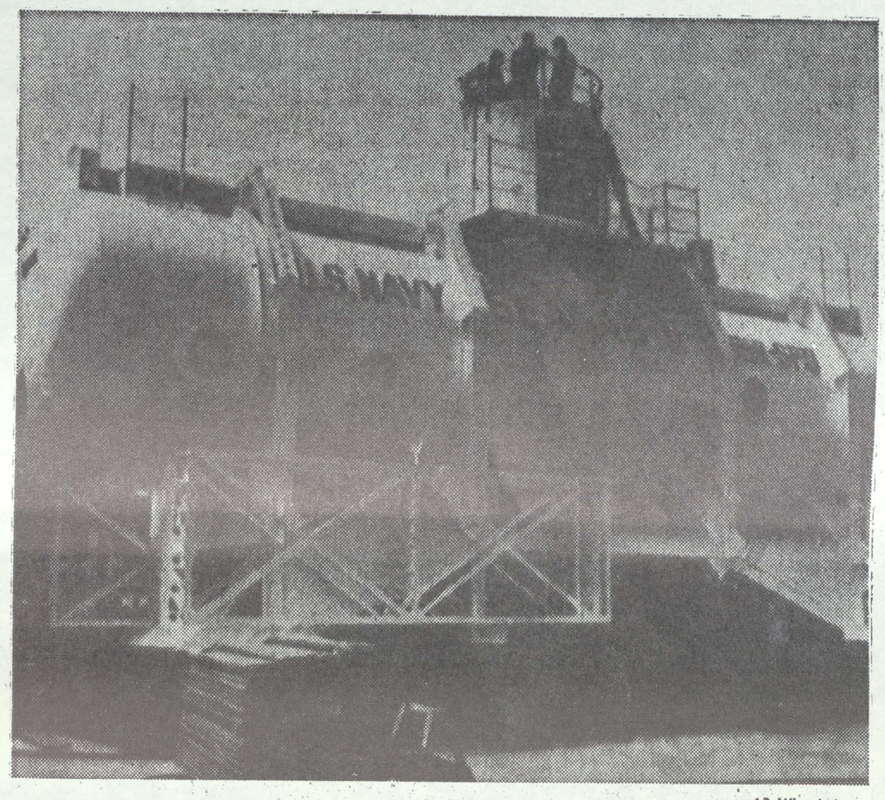
Bogardus said the fish will be lowered to depths of up to a mile in the tests. The sensors are highly accurate.

On the single graph aboard the ship, the salinity and temperature coordinates will be recorded horizontally; the depth vertically.

Other Bissett-Berman instrument systems already furnished the Navy for ASWEPS are similar to the ones to be produced, Bogardus said.

With continuous data profiles of the three ocean conditions, oceanographers can note minute changes in the inner space environment — even nuder rugged sailing and over miles of sea cable.

Bissett-Berman's San Diego division began operation in 1961 with about seven employes. Today the firm employs 90 persons at its 25,000-square-foot plant and is planning further expansion here, said Don Peck, manager of administration.



AP Wirephoto

Underwater Home for 20

This is the Navy's Sealab II, now at Long Beach, Calif., which will be sunk off La Jolla, Calif., in mid-August as an underwater home for 20 divers, including astronaut M. Scott Carpenter, who will live and work at a depth of about 200 feet for as long as 30 days. The $850,000 project is a second stop in the Navy's "Man in the sea" program.

Local Divers Sign-Up For Sea Lab Duty

Two North Shores men, both employed by Scripps Institution of Oceanography, will serve as aquanauts in the Navy's SeaLab II program off the La Jolla coast.

Thomas A. Clarke and Earl Murray, who have been assigned as divers to the project, will live 210 feet down for about 15 days beginning in the middle of August. The 57-foot long SeaLab II undersea home will be anchored 4,000 feet off Scripps Pier.

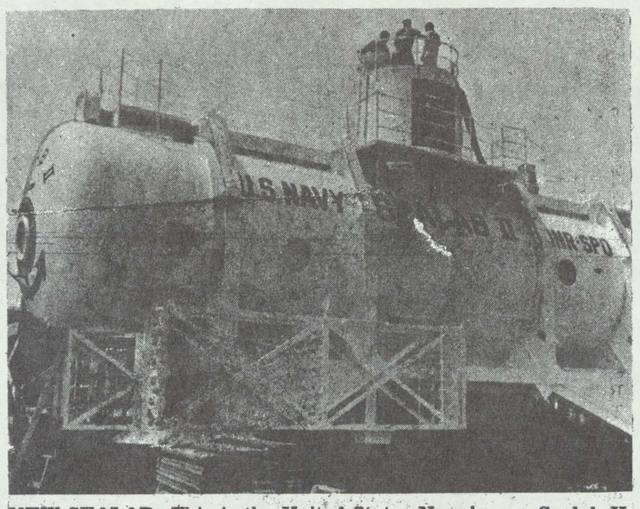
Clarke, a native of Peoria, Ill., lives at 7726 Fay Ave. He attended the University of Chicago where he received a BS in zoology in 1962. Murray is a lab assistant at Scripps and lives at 1252 Luneta Dr., Del Mar.

The men, along with Astronaut Scott Carpenter, two other San Diegans and five others, will participate in the first phase of the program. They will be relieved midway by a second team of aquanauts, yet to be announced.

A major objective of the experiment is to determine how much useful work can be accomplished by divers in the ocean environment at that depth.

The experiment is being conducted by the Office of Naval Research in collaboration with the Navy's Special Projects Office. A SeaLab I program was conducted last summer off Bermuda. It lasted nine days and had a $148,000 budget. The current SeaLab II, a much more sophisticated effort, has $2.3 million earmarked.

The undersea house will be self-sufficient with respect to food, water, and breathing gas mixture for at least six weeks. Power will come from the shore backed up with an alternate source aboard the surface support vessel. In addition to power, the shore connection will provide water supplies, breathing gas supply and sampling tubes, channels for relaying underwater television, communications circuits, and data links.



NEW SEALAB: This is the United States Navy's new Sealab II, built at Long Beach, Calif., at a cost of $850,000. The 12x57-foot steel cylinder will be sunk off La Jolla, Calif., as an underwater home for divers, including Astronaut M. Scott Carpenter.

Carpenter Will Lead Divers On Long Stay Deep in Ocean

One of America's pioneer space explorers is about to lead an expedition to another element—a dramatic exploration of ocean depths.

In a few days, M. Scott Carpenter, who in May, 1962, flew three orbits of the earth in a Mercury capsule, will lead a team of 10 aquanauts into a chamber 215 feet beneath the surface of the Pacific Ocean off La Jolla, Calif. The team will remain 15 days and then will be replaced by a second team on a second 15-day assignment. Carpenter, however, hopes to remain under the surface for the entire 30 days of the experiment.

The chamber, named the Sealab II, is owned by the United States Navy. It is a complete "home," including hot showers, food, bunks, and electric lights. It is 57 feet long and 12 feet wide.

Carpenter and his teams of navy divers and scientists will live in the chamber but emerge from it to make scientific observations in the water.

The divers will breathe, both inside and outside the chamber, a mixture of 84 per cent helium, 12 per cent nitrogen, and 4 per cent oxygen. There will be two emergency gas-filled huts in which swimmers in distress can take refuge.

Tasks planned for the explorers are designed to demonstrate that the aquanaut in the sea can do useful work and apply intelligence and judgment for which no machine can substitute. Similar experiments have been carried out on manned space flights.

Variety of Tasks

The jobs of Carpenter and his associates will be varied. Divers will try techniques for rescue and salvage operations in deep water, charting and mapping, and procedures for developing and using the mineral and fish wealth of the ocean. Scientists will make a census of life on the ocean bottom, collect specimens, and perform other research. Medical experts will observe the reactions of human beings to remaining under great depths of water for prolonged periods.

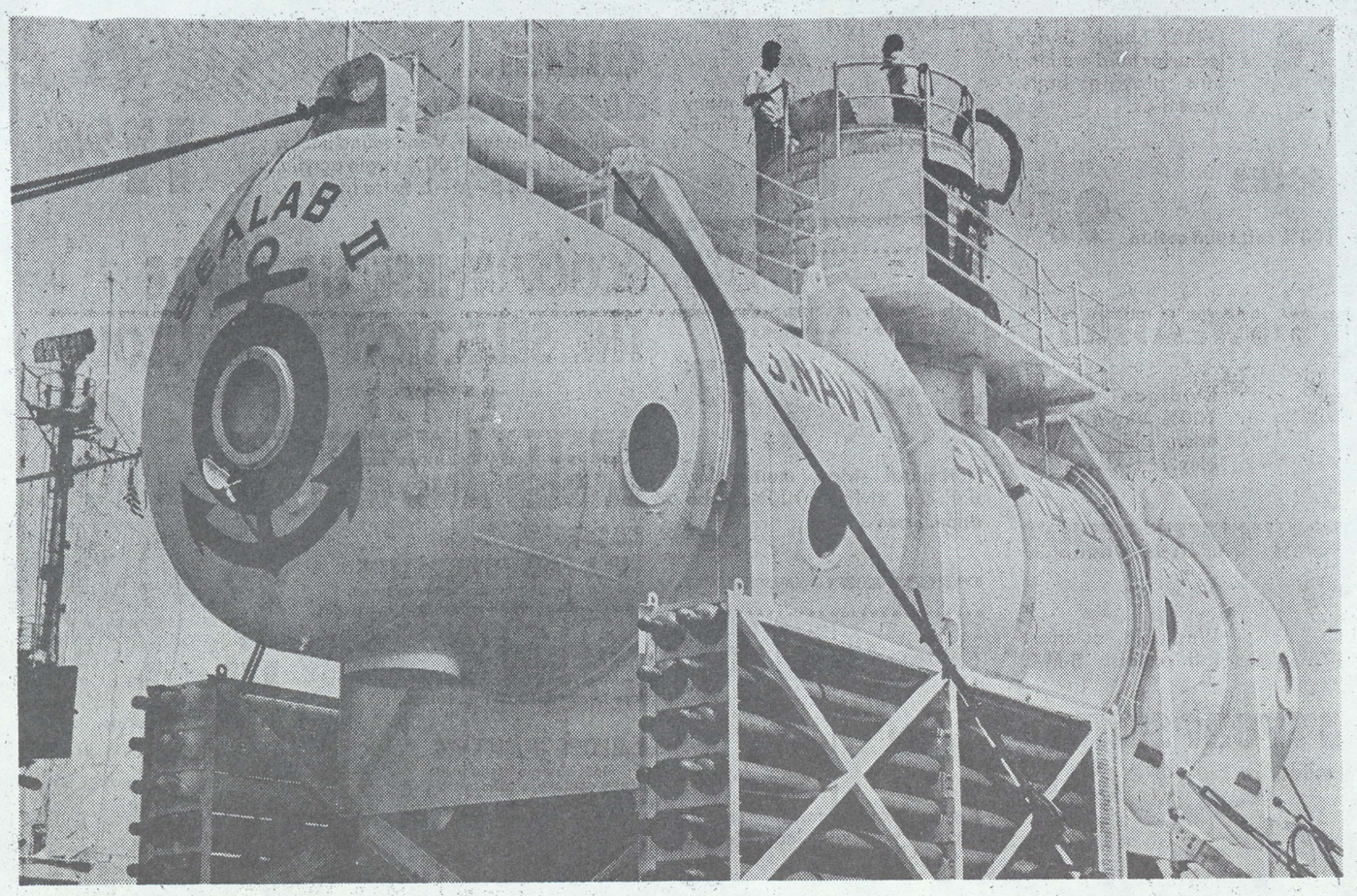
At about the same time the exploration is under way off the California shore, Jacques Yves Cousteau, a French underseas explorer, will lead a team of six Frenchmen on a 10-day stay in a large diving chamber in 330 feet of water in the Mediterranean Sea off France.

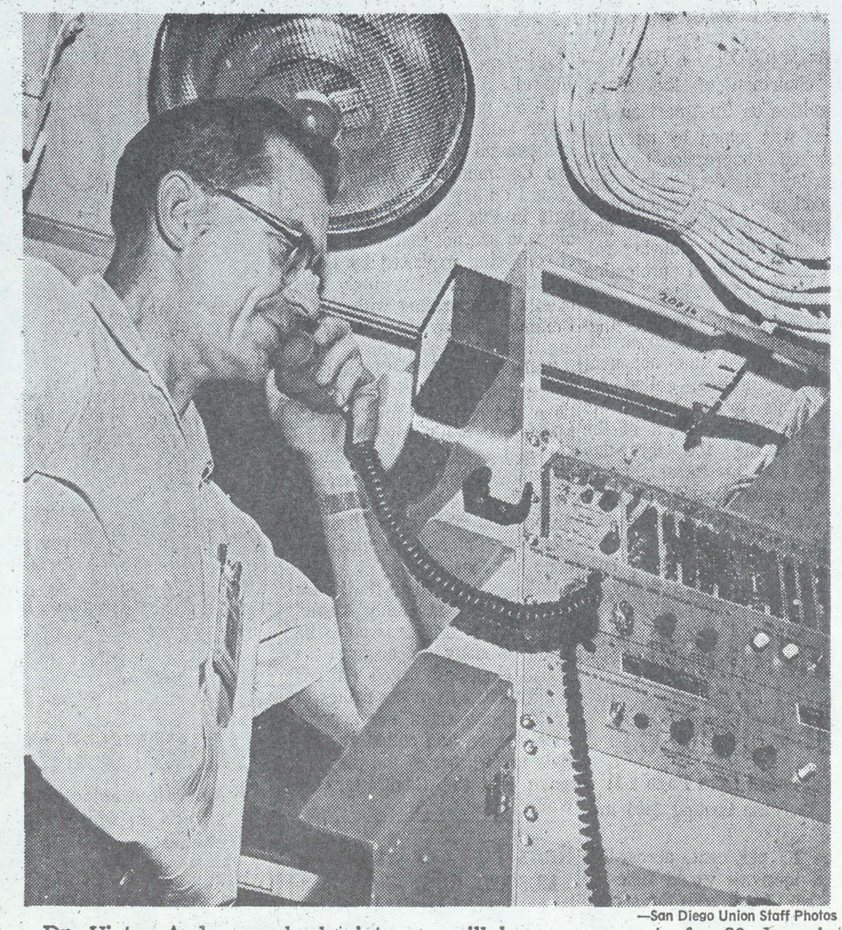
Later this year, possibly in October, Jon Lindbergh, son of the famed flier, and a companion, Robert Stenuit, plan to dive to a depth of 550 to 600 feet in the Pacific Ocean off Santa Barbara, Calif., and to remain for 48 hours. They will test a deep-diving chamber being developed by Ocean Systems, Inc., for ocean work. The chief engineer on this project is Edwin A. Link, who developed the Link trainer for aircraft pilots and who in recent years has become an authority on ocean exploration.

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Sealab Arrives For Experiment Off La Jolla





—San Diego Union Staff Photos

Sealab II sits on barge awaiting installation of electronic gear after arrival yesterday from Long Beach. Deep-sea chamber will be equipped with help of Navy Electronics Laboratory. Tentative plans call for lowering chamber off La Jolla, Aug. 15.

Dr. Victor Anderson checks intercom system in Sealab II. Chamber will house aquanauts for 30 days in survival experiment. (Story, a-21)

Sealab II Here For Pre-Dive Equipping

Pictures — Page a-3

By BILL PARRY

Sealab II arrived in San Diego yesterday and scientists said no steaks will be allowed on board.

The deep sea chamber, looking like a big white watermelon with windows, tied up the Navy Electronics Laboratory dock after being towed from Long Beach on a barge.

It was the first visit here of Sealab II which will be sunk in 208 feet of water on the rim of the undersea La Jolla Canyon where aquanauts will learn how humans perform under deepsea pressure for extended periods.

SHARK PROTECTION

Yesterday as soon as the craft arrived, technicians began installing television and other electronic equipment inside. Sealab II, built at San Francisco Bay Naval Shipyards, weighs 298 tons, is 60 feet long and 12 feet in diameter.

It stands on a heavy steel frame and the entry hatch is protected against the possibility of sharks by a heavy wire hinged cage. The inch-thick steel walls of the chamber can withstand 200 pounds of pressure per square inch.

It could safely go more than 400 feet deep.

Aquanauts will breath a mixture of 80 per cent helium, 10 per cent nitrogen and 10 per cent oxygen, said Robert Haines, one of the scientists equipping the unit.

COMFORTS OF HOME

Smoking will be impossible on board because a cigarette will not burn in that atmosphere. Aquanauts will live on concentrated foods and pre-cooked frozen dinners and may occasionally get treats such as fresh fruit via a dumb waiter that will be lowered from the surface daily.

"But there won't be any steak dinners," said Dr. Victor Anderson of the University of California Marine Physical Laboratory. "They couldn't fry a steak because it would foul the atmosphere. They will heat their food in a pressure cooker. They won't boil anything either because it would take 237 degrees to bring it to a boil at that depth."

The watermelon will sleep 10 and contains restrooms, showers and even a tub bath.

The tentative schedule calls for the chamber to return to Long Beach over the weekend. There it will receive more equipment and be lowered into the water. It will be towed down the coast at speeds up to 2.5 miles an hour before being lowered to the bottom 1,000 feet off the Scripps Institution of Oceanography pier.

About Aug. 15, the first 10 aquanauts will begin two weeks of life inside the chamber. They will be relieved by another 10 men, who also will stay for two weeks. Two of the first group will remain down the entire 30 days. The teams have not been announced, but 30 volunteers have been trained for the project.

Technicians next week will begin laying 3,000 feet of power, water and telephone lines to the canyonside site from the beach.

SAN DIEGO
EVENING TRIBUNE
AUG 3 1965
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San Diego, California



Civilian engineers employed by the Navy check over construction plans in the eating and sleeping quarters of Sealab II, the Navy's newest undersea laboratory.

The navy's 30-day SeaLab project will take place on the North end of the Scripps Canyon, a mile off the end of the pier at the Scripps Institution of Oceanography at the University of California at La Jolla.

The Navy aquanauts will use three principal types of diving equipment with mouthpiece and facemask, and will try out a variety of suits. Power will be supplied to the shelter from a shore connected cable, with an alternate source aboard a surface support vessel.

The divers will be constantly watched on television and the men will be continuously monitored by telemetered electrocardiograms and other means.

The aquanauts will be permitted to make brief dives down to 360 feet, but in general, they will work between the 180-foot and 240-foot levels.

Both scientific and military experiments will be carried out. An experimental salvage procedure, utilizing a plastic foaming technique, will be tested in attempts to float a Navy fighter plane to the surface. Various other salvage and underwater jobs will be performed, and Marine biologists will make a census of ocean life on the bottom, collect specimens and perform other research.

But most important will be the physiological and pyschological effects on human beings under great depths of water for prolonged times.



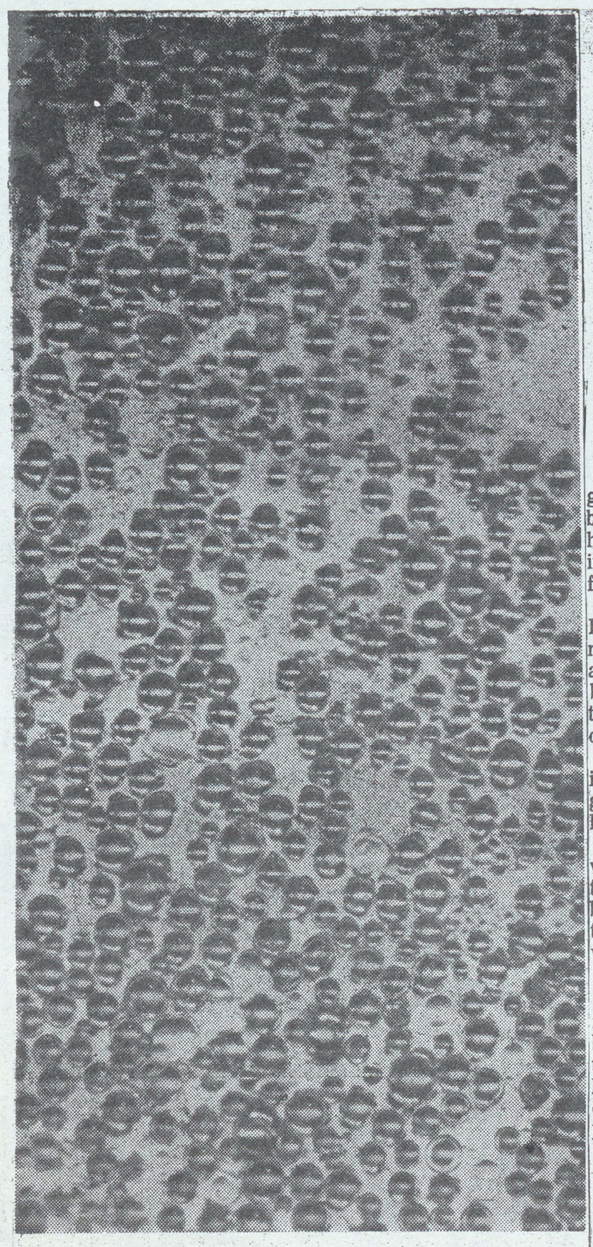
OLD AND NEW—Robert K. Logan, of Navy Electronics Laboratory, left, puts sack of spheres made of new material into retired Navy gun where pressures equal to the deepest point in the ocean can be developed. Joseph C. Thompson, right, lays out the spheres after the test. The one in his left hand cracked under the pressure.—Staff Photos by Roger Wrenn

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SEAFARERS' LOG - 101
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SLICED—Cross section of newly developed material, which can be sent to the deepest part of the ocean without losing buoyancy, shows tiny glass spheres which are main ingredient. Picture was taken through microscope with 100 power.

NEL Checks Foam Made of Glass, Plastic

Gun Barrel Acts As Pressure Unit For Experiments

By LEO BOWLER
EVENING TRIBUNE Science Writer

Space-age technology and a gun barrel out of the age of battleships are being combined here to make man's adventures in the sea safer and more comfortable.

Scientists at Navy Electronics Laborator are using the technology to develop a new material which will bring men safely back to the surface after trips to the bottom of the deepest ocean.

They are testing the material in the barrel of a giant Navy gun which has been made obsolete by missiles and rockets.

The material they are developing must have two properties. It must be light enough to be buoyant and it must be able to withstand the crushing weight of eight miles of water.

Trip Down 'Easy'

Scientists don't find it too difficult to send a man to the bottom of the deepest part of the sea. They simply enclose him in a steel sphere thick enough to withstand the intense pressures.

But bringing him back is another matter. Something buoyant enough to float the capsule to the surface must be attached to it.

Flotation materials used on the surface like cork, wood or plastic foam would be compressed into uselessness in the pressure of extreme depths.

Submarines use tanks of air, but they operate in relatively shallow depths. If the air tanks were made strong enough to resist the compressing action of the sea in its deepest points, they would be too heavy to be useful.

The bathyscaph Trieste, which dove to 35,800 feet, used gasoline as a buoyant material. Gasoline does not compress, so it can be stored in a thin-walled, steel tank for the dive.

Weight is put aboard the bathyscaph to force it to the bottom. Then the weight is dropped and the buoyant gasoline lifts the Trieste back to the surface.

New Material Tested

But gasoline, being a liquid, cannot be allowed to leak out or the bathyscaph would be disabled on the bottom. And it is dangerous to handle because it is inflammable.

Scientists want a better material. They think they have it in a combination of plastic and glass being tested here.

The tests are being conducted by Joseph C. Thompson, supervisory materials engineer, and Robert K. Logan, his assistant.

The basic ingredient they use is a glass balloon so small it has to be measured in thousands of an inch. The balloons are made by two Midwest firms who won't reveal how they do it.

Thompson and Logan buy their balloons by the gallon. To the naked eye, the material looks like sugar or salt, but under a microscope the individual balloons can be seen. The material then looks like an unending mass of soap bubbles.

The material is mixed up in a batch of plastic, allowed to harden into balls five inches in diameter, then tested.

Temperatures Recorded

"You can tell to within plus or minus 20 feet where (at what depth) the fish is," he said. "The temperature device is accurate to within .05 degree Centigrade and the salinity sensor can measure down to 1-1,000ths (one part salts in 1,000 units — gallons or drops — of water)."

Though the depth-measuring capability sounds less accurate than the temperature or salinity capabilities, it's not so when you compare 20 feet with a mile, or 5,280 feet, Bogardus pointed out.

The salinity sensor will tell scientists how many salts are at various levels of water by measuring the amount of electric current the water will pass, Bogardus said. As a diaphram is moved by the pressure of the water, it will alter resistances in an electrical circuit to tell the oceanographers the intensity of pressure, he said. The temperature will be measured by a platinum wire thermometer which will change its resistance values with changes in the water's "weather."

Thousands of Tests

Dozens of varieties of plastics have been tried in thousands of tests. Variations are also made in the number of balloons to the cubic inch of plastic.

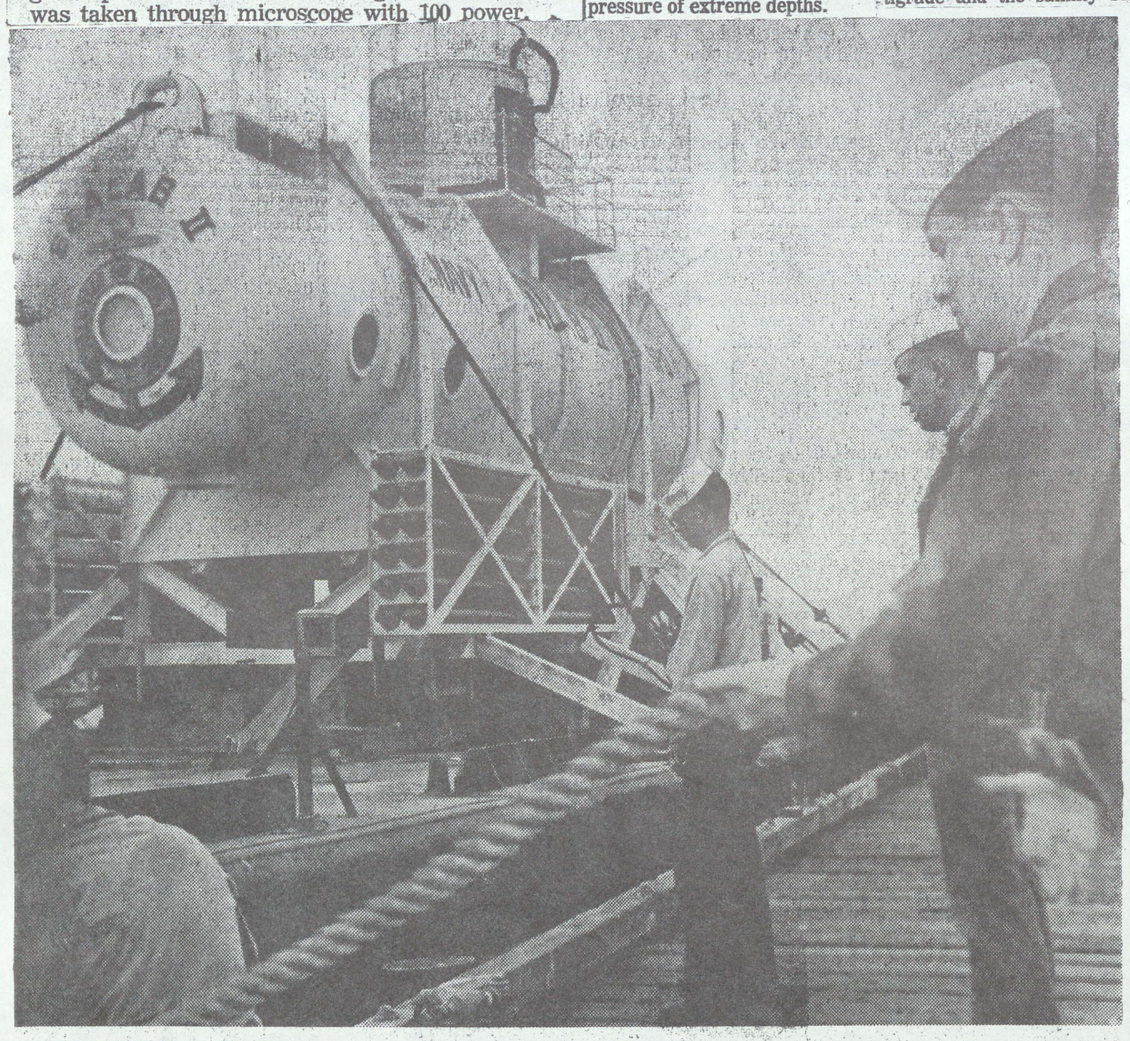
For the test, the scientists use a pressure chamber made from an old gun barrel. The muzzle has been plugged. The plastic balls are put into gunny sacks and stuffed into the gun, and the breach is closed.

Then water under pressure is pumped into the barrel. Pressures equal to the deepest part of the ocean can by attained. When the balls are removed, they are examined, measured and weighed.

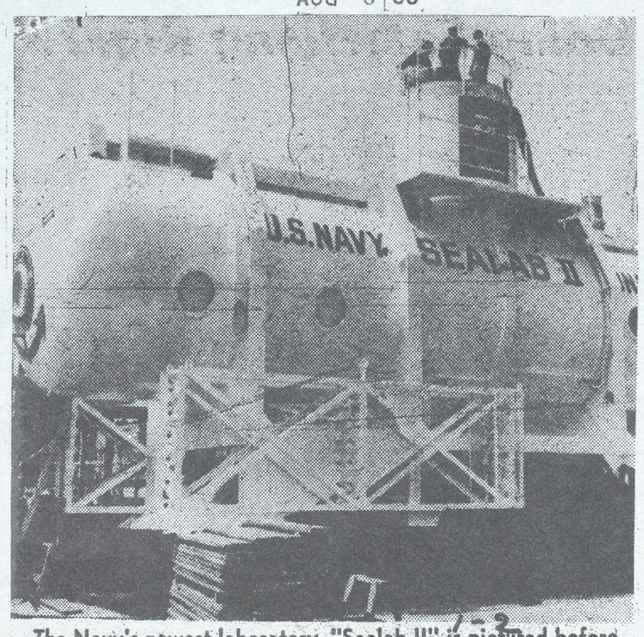
When the mix fails, the balls have deep cracks, one side is caved in, or they show a marked gain in weight. The latter means the water has penetrated the material, the glass balloons have broken inside and the unit has absorbed water like a sponge. Buoyancy is lost in cases like this.

Several batches of material, however, have withstood the equivalent of 39,000 feet of depth.

Thompson calls the finished product syntactic foam.



EXPERIMENTAL HOUSE—Sealab II, which will house divers 210 feet under the sea off La Jolla this month, is brought into dock at Navy Electronics Laboratory today. It was towed here from Long Beach on a Navy barge. Navy and civilian workers are installing electronic gear, preparing for the experiment in living under the sea. — Staff Photo by Roger Wrenn



The Navy's newest laboratory, "Sealab II" is pictured before christening ceremonies at Long Beach, Calif. The 12x57 foot steel cylinder will be taken to La Jolla, Calif. where it will be sunk about 215 feet deep to serve as an underwater home for a team of 20 Navy divers and scientists, including astronaut M. Scott Carpenter. The Navy researchers will conduct a series of experiments, including a communications test with a Gemini-Titan 5 spacecraft which will be orbiting the earth at the same time.

'Sealab' To Operate 215 Feet Down

Navy Undersea Lab To Make TV Debut

Television viewers, sitting high and dry in the middle of the country, may get a chance this month to see live pictures of what life is like some 215 feet beneath the surface of the ocean. The TV pictures will be broadcast from an undersea laboratory maintained by the U.S. Navy over 35 fathoms beneath the Pacific.

Inside the laboratory, which will be known as "Sealab 2," will be U.S. astronaut Commander Scott Carpenter and nine other men, who will be spending 30 days beneath the ocean. The Sealab project will be in conjunction with an eight-day flight by a Gemini-Titan 5 spacecraft. Blast-off time for the flight has been tentatively set for Aug. 19. The TV broadcast, which will include voice reports, will take place during the flight period.

The team of 10 aquanauts will descend 215 feet below the surface of the ocean enclosed in a "house" complete with hot showers, food, bunks, and electric lights.

For 15 days, Navy divers and scientists will live in the 57 x 12 foot "SeaLab II," and they will emerge from the shelter from time to time to swim in the surrounding waters on experimental ventures. Two of the aquanauts may remain for a full thirty days. A third team may extend the test for 15 days more.

The tests are a broader phase of the exploitation of the oceans that is now described by many in Washington as ocean engineering.

The Navy believes that like the astrounaut in space, the aquanaut in the sea will be required to do useful work and to provide the intelligence and judgment for which no machine can substitute.

The free swiming aquanauts, operating on the continental shelf and down to eventual depths of perhaps 1,000 feet, should be material help in rescue and salvage operations, in the recovery of nose cones or other objects on the sea floor, in charting and exploration, in capping undersea oil wells and in developing and exploiting the mineral and fish wealth of the ocean.

Sen. Murphy Salutes City's Leadership In Oceanography

Exhibits at Chamber of Commerce meeting—Page a-17

Copley News Service

WASHINGTON — Sen. George Murphy, R-Calif., took the Senate floor yesterday to salute San Diego's world leadership in the field of oceanography.

The senator prefaced his remarks by announcing that the San Diego Chamber of Commerce, at its 95th annual meeting today, will focus on oceanography.

"The city of San Diego and the Chamber of Commerce are to be congratulated on the outstanding contribution they have made to our nation's exploration of the seas," Murphy said.

"A combination of hard work by community leaders in promoting the city's natural advantages for such work and the efforts of private enterprise to attract industries interested in studying oceanography has made San Diego a leader of this important industry of the future."

Murphy also praised Rep. Bob Wilson, R-San Diego, as "the prime mover" in San Diego's development as an oceanographic research capital.

He noted that Wilson is the author of a bill now being considered in the House which would accelerate the federal government's oceanographic effort and consolidate it under a single national oceanographic agency. Presently 22 agenices are engaged in ocean research.

Murphy detailed some of the oceanographic research being done at the Scripps Institution of Oceanography, the Navy electronics Laboratory and the Bureau of Commercial Fisheries' marine biology laboratory in La Jolla.

He mentioned the launching of Sealab II, from which Navy aquanauts will begin underwater living experiments later this month off La Jolla.

"The same pioneering and foresight which San Diego applied to help man far into space is now being used to tap the wonders of our world's vast oceans," Murphy said.

SAN DIEGO
EVENING TRIBUNE
AUG 4 1965
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Eleventh Naval District
San Diego, California

Navy's Sealab Arrives Here Prior to Plunge Into Research

By LEO BOWLER
EVENING TRIBUNE Science Writer

Sealab II arrived in San Diego today for its first visit.

The 298-ton house rested on a barge. It was towed down the coast from Long Beach overnight. Early today it passed La Jolla, where it will serve as home, workshop and laboratory under the sea for its aquanauts.

The gleaming white steel cylinder was met by a crowd of scientists, divers, Navy personnel and workers at a Navy Electronics Laboratory dock.

It was towed into the harbor through early morning fog by a submarine rescue ship, then handed to a tug for the last quarter mile. It tied up at 9:40 a.m.

Workers immediately swarmed aboard to install electronic and other devices.

Later this month Sealab will be sunk in 210 feet of water off Scripps Pier in La Jolla. Ten aquanauts will descend in a special capsule, swim to the steel house, and take up residence there.

Most of them will stay under the sea for 15 days, but two will remain for 30 days. When the short timers come to the surface after their stay, other aquanauts will replace them.

Purpose of the experiment is to develop techniques whereby men may live for long periods deep in the ocean. The aquanauts will swim freely outside the house for about two hours a day. They will breathe a special mixture of oxygen, nitrogen and helium to enable them to remain on the bottom for the long stay.

But before the experiment begins, Sealab must be towed back to Long Beach on the barge and put into the water there. There is no crane in San Diego strong enough to lift it off the barge, according to naval officials.

Then it will be towed back to NEL floating on the sea, to get still more equipment. Finally it will be towed to the site off La Jolla.

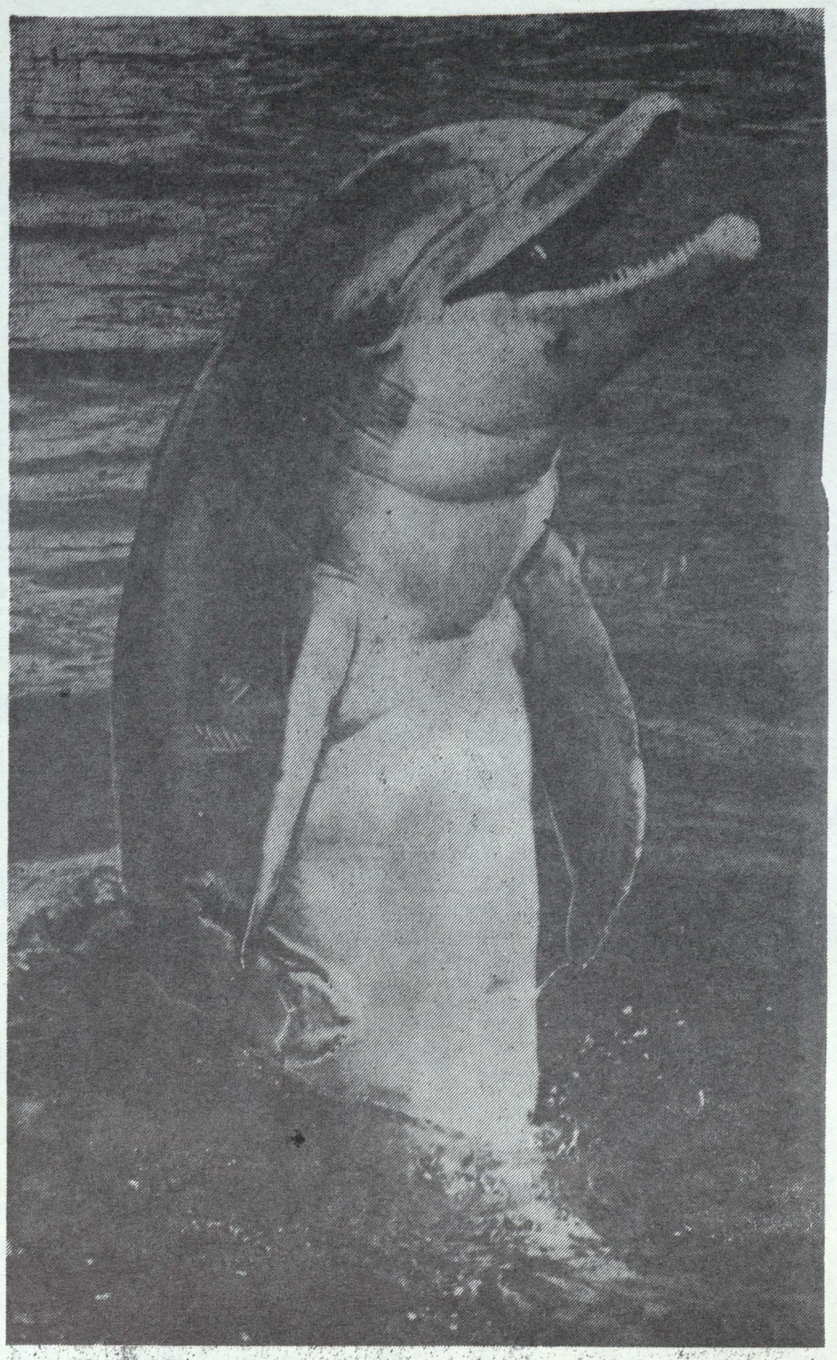
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San Diego, California

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Training Toughens Tuffy For Sealab Experiment



Trainer Wally Ross attaches harness to Tuffy, an Atlantic bottlenose porpoise being trained at Point Mugu Naval Missile Center for participation in Sealab II experiment off La Jolla. Tuffy will arrive here early next month. (Story on Page a-1)



NO FISH STORY—Tuffy the porpoise shows off scars at Point Mugu. He will be brought to La Jolla to help divers in Sealab. He has scars on sides from encounters with sharks before capture.

CHULA VISTA

B-4—THE STAR-NEWS — Thursday, August 5, 1965

CV NAVYMAN

He'll Live on Ocean Floor

Ever wonder what it would be like to set up housekeeping 210 feet below the ocean's surface?

A Chula Vista Navyman will soon be able to give you the answer.

He's Chief Photographers Mate J. D. Skidmore, who lives with his wife and two children at 1089 Woodlawn Ave.

Skidmore is a member of the Pacific Fleet Mobile Photographic Unit at North Island and has been named as one of the 10 aquanauts who will spend 30 days on the ocean floor off La Jolla from Aug. 15 to Sept. 10.



J. D. SKIDMORE
On Sea Lab team

THEY WILL be aboard the Navy's Sea Lab II, just unveiled at the Navy Shipyard in Long Beach and soon to be transported to La Jolla for the tests.

Also aboard will be astronaut Scott Carpenter, a Navy commander who has been "loaned" from the manned space program to the man in the sea program.

Skidmore and other crew members of Sea Lab II have just concluded rigorous training for their 30 days at the bottom of the sea. Earlier this year they underwent extensive underwater training and tests to help prepare them for the Sea Lab II program.

SKIDMORE, a qualified Navy diver and underwater photographer, has been trained to operate every switch, valve and fitting on the Sea Lab II and be ready for any emergency in the underwater capsule, the Navy said. He has also been thoroughly trained in underwater navigation, communications, propulsion and the operation of diving equipment.

Sea Lab II personnel will live in their steel home of watery surroundings for a full 30 days. They will leave their quarters daily to swim and working underwater without surfacing for long periods of time.

The underwater lab is a cylinder, 12 feet in diameter, divided into a galley, laboratory and bunkroom. When in use the atmosphere inside will consist of a breathing mixture of oxygen, nitrogen and helium. Pressure inside the structure will be the same as that of the surrounding sea.

THE UNIT also contains a heating system, fresh water showers, an electric stove, refrigerator, air conditioning and is all carpeted.

Sea Lab II has many of the characteristics of a submarine and was designed and built from the keel up especially for the ocean floor tests. Sea Lab II is a follow-up to Sea Lab I, in which Navy divers spent 11 days at depths up to 193 feet in the ocean off Bermuda last year.

THE ULTIMATE aim of the man in the sea program, according to the Navy, is to make man relatively free and independent of the surface for longer and longer periods of time. The Navy envisions men capable of functioning at 800 feet and more for periods of up to 90 days.

The efforts of Sea Lab II aquanauts will help toward that end.

PORPOISE SET TO AID DIVERS

Trained To Be Bodyguard At Sealab In Ocean

Point Mugu, Cal., Aug. 8 (AP)—A pugnacious porpoise named Tuffy will get a chance soon to play bodyguard, shark-fighter and rescuer for divers in the navy's underwater hut, Sealab II.

The 7-foot, 270-pound sea mammal, bearing scars from numerous encounters with sharks, has been in training at the Point Mugu naval missile center for more than a year to take guide lines to lost divers and carry packages between divers on the bottom and between divers and men on the surface.

If a shark appears on the scene after Sealab II is lowered 210 feet to the ocean floor off La Jolla, Cal., later this month, officials say, Tuffy will be released into the water immediately to see if he can protect the divers from attack.

Porpoises have been known to beat off and even kill sharks by ramming them with their noses.

The first of two 10-man teams of scientists and navy divers will begin a 15-day residence Aug. 15 in Sealab II, a 12x57-foot vessel shaped like an oil-tankcar. They will sleep, eat and work in the steel chamber, spending at least two hours a day outside in the 50-degree water.

Tuffy, an Atlantic bottlenose porpoise, will join them early in September.

F. G. Wood, head of the Marine Sciences Division here, where Tuffy was trained, calls it the first practical test of whether sea mammals can work with men under water.

Now about 10 years old, the shark-scarred Tuffy was captured in the Atlantic three years ago and spent two years in oceanariums. Brought here in April, 1964, he frequently attacked trainers and earned the nickname Tuf Guy, later shortened to Tuffy.

He was trained to wear a harness and to fetch objects over distances up to 550 yards in response to a sound signal while working in the open sea two miles offshore.

Tuffy will be flown by helicopter to the Sealab II site and, when not working with the divers, will be kept in a floating pen on the surface. His trainer, Wally Ross, will be with him during the week-long experiment.

Officials credit Deborah Duffield, a Stanford University student who worked here last summer, with improving Tuffy's temper. She taught him to retrieve objects and swim through hoops in his tank while blindfolded in demonstrations of the natural sonar of his breed.

Mascot Training For Mission Here

By LEO BOWLER
EVENING TRIBUNE Science Writer

A battle-scarred porpoise will become the underwater mascot of Sealab divers here next month to carry messages, hunt for lost divers and chase away sharks.

The porpoise, named Tuffy because of his delinquent past and his many successful encounters with sharks, is under special training at Point Mugu for the Sealab job.

The purpose of his participation is to determine if trained porpoises can assist men in the scientific exploration of the sea.

Part of Program

Tuffy's participation in the project was announced today by F. G. Wood, head of the Naval Missile Center's Marine Sciences division at Point Mugu.

Sealab is a part of the Navy's "man in the sea" program. It is set up to develop tenchiques with which men can live at the bottom of the ocean. Specially trained divers will live in a steel house at a depth of 210 feet off Scripps Pier in La Jolla for up to 30 days. They will be able to leave the house and swim freely nearby.

Dr. Sam H. Ridgway, research veterinarian at the Marine Sciences Division, said the 270-pound Tuffy will function as a combined watchdog of the sea and message carrier.

Pen Will Be Home

He will be kept in a pen on the surface above Sealab when not working. Scientists have taught him to dive on command and he has attained depths of 300 feet in free dives off Point Mugu.

He has learned to return to his pen when called by special accoustical devices.

Some of the Sealab divers will receive special training in controlling Tuffy. They will have the devices needed to call him.

Tuffy can stay down only about 5 minutes, but it only takes him about 20 seconds to return to the surface for a breath of air. After a breath, he could then return to the bottom.

To Carry Lifeline

Ridgway said Tuffy will be used to carry messages and small packages from the surface to the men in Sealab. His training will also teach him to carry a lifeline to a lost diver, and he will practice this during the Sealab project with one of the aquanauts pretending to be lost.

"If a shark comes around, we will turn him loose to see what he will do," Ridgway said.

"There are a lot of stories about porpoises chasing sharks who have attacked humans. And we have seen porpoises attack sharks in captivity. But we really don't know much about porpoise behavior in this field.

"Maybe he will attack the shark or at least chase it."

A special harness has been developed for Tuffy. It is used to carry instruments, not to tether him.

He has made many forays into the open sea and has always returned when called, Ridgway said.

Tuffy was captured in the Atlantic in 1962. He bears the scars of many encounters with sharks. He was brought to Point Magu in 1964.

Trainers found him hard to handle in the beginning because of his combative disposition, so they called him Tut Guy. He often attacked them.

But after he was placed under the tutelage of Deborah Duffield a student at Stanford University, he became gentle. Miss Duffield taught him to wear blindfolds, retrieve objects and swim through hoops.

Later, Wallace G. Ross, another trainer, took over and changed the propoise's name to Tuffy. Wallace taught Tuffy to swim in the open sea and return on command.

Tuffy will be flown here in a helicopter. It will pick him up directly from the water at Point Mugu and deposit him in the water off La Jolla sometime in September. Ross will remain with him during the experiments here which will take about a week.

SAN DIEGO UN
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San Diego, Californ

PORPOISE GETS JOB

This May Sound Fishy, But...

Picture—Page a-3

By CAROL OLTEN

A 270-pound porpoise named Tuffy will act as messenger, guard and rescuer for the Sealab II divers, who will spend 15 or more days working and living on the ocean bottom off the La Jolla coast.

Tuffy will be chauffered to La Jolla on a foam rubber mattress aboard a Marine helicopter next month.

"Tuffy travels quite comfortably on the mattress — he's capable of warm air breathing and doesn't need to be in the water all the time," Dr. Sam H. Ridgway said yesterday.

Ridgway is research veterinarian of the Naval Missile Center's marine sciences division at Point Mugu, where Tuffy is undergoing training. Tuffy will make his luxury flight from there.

Tuffy has learned to act as a kind of water-logged pony express carrying packages from divers to the ocean surface, and to deliver life lines to divers simulated lost in dark, murky water. He also may serve as shark protection in the Sealab experiment.

"Actually, we don't know if any porpoise would attack a shark to protect a diver," Ridgway said. "If an emergency arises, we hope Tuffy proves he would."

Tuffy himself is an old man of the sea bearing scars of many shark encounters. The scars and his unpleasant disposition earned him the name of Tough Guy when he was captured in 1962 for the Marine Life Oceanarium in Gulfport, Miss. The name later was shortened to Tuffy.

"He still gets mad easily, although his disposition has improved some," Ridgway said. "Instead of biting he only hits people with his flukes. Then he hides his head in the corner and sulks for five minutes."

The Atlantic bottlenose porpoise, an easy double for television's Flipper, has made dives off Point Mugu to 300 feet.

The Sealab experiments will be 210 feet below the surface. The first of two 10-man teams will move to the ocean bottom Aug. 15.

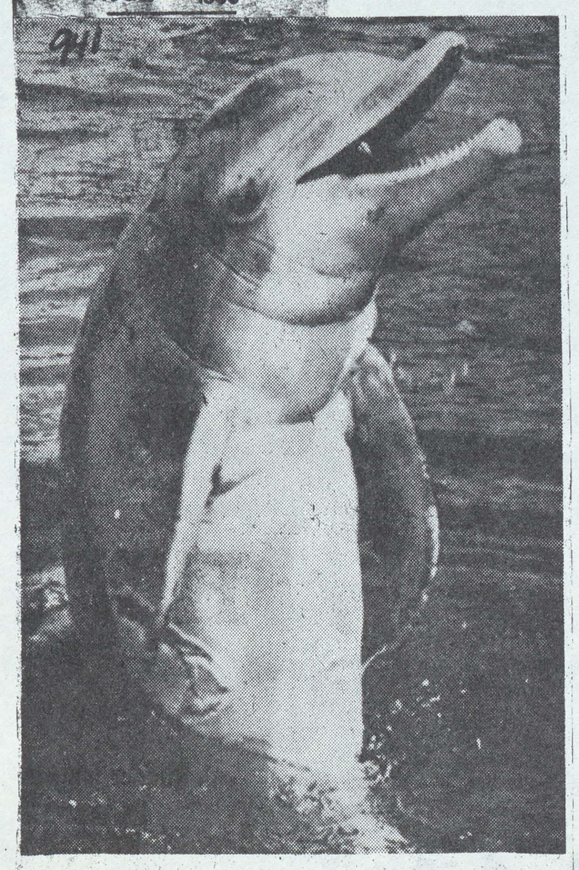
Tuffy will be kept in a pen on the surface above Salab when he is not working. The purpose of Tuffy's participation is to see if trained porpoises can assist men in the scientific exploration of the sea.

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Diego, California

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Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)
AUG 9 - 1965

Navy Trains Porpoise as Aide



THIS PORPOISE, seven feet long and named Tuffy, is Navy-trained to participate with Navy divers in this month's Sealab II test off Southern California coast. Here Tuffy leaps in his home pool at Point Mugu, Calif., as part of keeping fit (AP).

TUFFY SHOWS PROMISE

Pugnacious Porpoise To Help Navy Divers

POINT MUGU, Calif. (AP) — A pugnacious porpoise named Tuffy will get a chance soon to play bodyguard, shark-fighter and rescuer for divers in the Navy's underwater hut, Sealab II.

The 7-foot, 270-pound sea mammal, bearing scars from numerous encounters with sharks, has been in training at the Point Mugu Naval Missile Center for more than a year to take guide lines to lost divers and carry packages between divers on the bottom and between divers and men on the surface.

If a shark appears on the scene after Sealab II is lowered 210 feet to the ocean floor off La Jolla, Calif., later this month, officials say, Tuffy will be released into the water immediately to see if he can protect the divers from attack.

Porpoises have been known to beat off and even kill sharks by ramming them with their noses.

The first of two 10-man teams of scientists and Navy divers will begin a 15-day residence Aug. 15 in Sealab II, a 12X57-foot vessel shaped like an oil-tankcar. They will sleep, eat and work in the steel chamber, spending at least two hours a day outside in the 50-degree water.

Tuffy, an Atlantic bottlenose porpoise, will join them early in September.

F. G. Wood, head of the marine sciences division here, where Tuffy was trained, calls it the first practical test of whether sea mammals can work with men under water.

Now about 10 years old, the shark-scarred Tuffy was captured in the Atlantic three years ago and spent two years in oceanariums. Brought here in April 1964, he frequently attacked trainers and earned the nickname Tuf Guy, later shortened to Tuffy.

He was trained to wear a harness and to fetch objects over distances up to 550 yards in response to a sound signal while working in the open sea two miles offshore.

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Officials credit Deborah Duffield, a Stanford University student who worked here last summer, with improving Tuffy's temper. She taught him to retrieve objects and swim through hoops in his tank while blindfolded in demonstrations of the natural sonar of his breed.

Navy Trains Porpoise to Guard Divers

POINT MUGU, Calif., Aug. 8 (AP)—A porpoise named Tuffy is being trained to work with divers in a Navy experiment in underwater living, which will get under way next Sunday.

F. G. Wood, head of the Marine Sciences Division here, at which Tuffy is being trained, calls it the first practical test of whether sea mammals can work with men under water.

The 7-foot, 270-pound sea mammal, bearing scars from numerous encounters with sharks, has been in training at the Point Mugu Naval Missile Center for more than a year.

Tuffy is being taught to take guide lines to lost divers and carry packages between divers on the bottom and between divers and men on the surface.

If a shark appears on the scene after the divers' underwater vessel, Sealab II, is lowered 210 feet to the ocean floor off La Jolla, Calif., Tuffy will be released immediately to see if he can protect the divers.

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Tuffy, an Atlantic bottlenose porpoise, will join them early in September.

Object of Frequent Studies

Porpoises have been much studied in recent years because of their intelligence, ability to communicate through the use of high-pitched sounds and their ability to detect obstacles by echoes from sound waves.

NAVY TIMES - 52
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Washington, D.C. 20037
Circ. 60,821
AUG 11 '65

Carpenter Leads 10 Selected Men To Depths in Sealab Experiment

WASHINGTON — The first 10 men to go underwater for 15 to 30 days when Sealab II gets underway August 16 have been named. As predicted, Comdr. M. Scott Carpenter, the Navy astronaut who was injured on land after his earth-orbiting exploits, will head the first crew.

Carpenter may be one of the two men who will stay underwater the whole 30 days. The rest of the team will be relieved after 15 days by a second team, still to be filled out.

Sealab II involves some 28 men in a program of living and performing useful work 15 to 30 days 210 feet underwater off the coast of La Jolla, Calif., and is a follow-on to last summer's Sealab I when four men stayed for 11 days at 193 feet off Bermuda. It is being conducted by the Office of Naval Research in cooperation with the Special Projects Office.

As team leader, Carpenter will supervise the aquanauts who will engage in oceanographic research, experimental salvage, tasks, geological investigation, and undergo a series of physiological and psychological tests.

* * *

THE DIVING medical officer on the team will be Lt. Robert E. Sonnenberg, who will check the health of the men and also conduct physiological tests in the cold, murky waters. He studied medicine at Chicago University and UCLA, is trained in submarine medicine, and has served on Polaris submarines.

There are three civilians on the first team: Berry L. Cannon, 30, an electronics engineer at the Mine Defense Laboratory; Earl A. Murry, 38, and Thomas A. Clarke, 24, both from the Scripps Institute of Oceanography, La Jolla.

The other five selected for the first team are Navy men: Cyril J. Tuckerfield, 43, chief engineman; Wilbur H. Eaton, 39, gunner's mate first; Frederick J. Johler, 30, chief engineman; J. D. Skidmore, 36, chief photographer; and Billie L. Koffman, 36, torpedoman's mate first. Eaton, Johler, and Tuckerfield took part in Sealab I as surface support divers. Tuckerfield, a World War II submariner, accompanied Capt. George F. Bond in his famous 1959 experiment of escaping from a submarine at a depth of 302 feet.

While selection of the second team of eight men is still being made, it is known that three other Mine Defense Laboratory civilians are included: George Dowling and William Tolbert, both 39-year-old research oceanographers; and Wallace Jenkins, 30, an equipment specialist.

* * *

THE 57-FOOT undersea home for the Sealab II aquanauts was just christened at the Long Beach, Calif., Naval Shipyard by Heidi Nitze, daughter of Navy Secretary Paul Nitze "Not since the Louisiana Purchase has there been such an acquisition so rich with promise and yet so completely unknown," said Nitze, as the more than one million square miles of undersea lands of the continental shelf out to a depth of 200 meters, "or to a depth which admits of practicable exploitation," recently gained by treaty.

SAN DIEGO
EVENING TRIBUNE
AUG 10 1965

PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

Sea Lab Leaves S.D. For Long Beach Visit

The Sea Lab II, the 57-foot long tank to provide a home under the sea for aquanauts later this month, was in Long Beach last night after being brought here for fitting.

The lab was brought here and taken back aboard a barge. It left at 10 p.m. Sunday night and arrived at the Long Beach Naval Shipyard at 11:50 a.m. yesterday.

Sea Lab II will be brought back to San Diego and lowered to the sea bottom about a mile off the Scripps Pier, La Jolla, next Tuesday, according to present plans. Ten divers are expected to move into the lab in position 210 feet below the surface on Aug. 18.

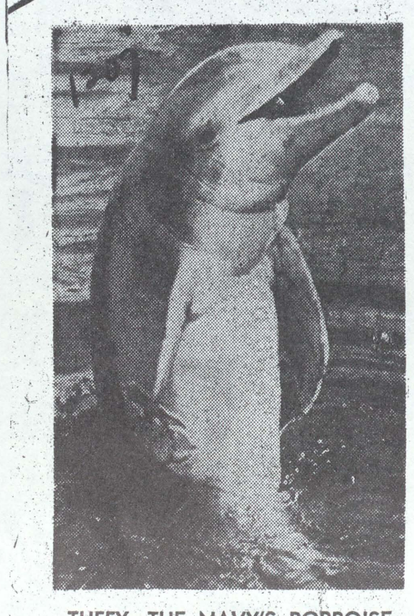
On its return from Long Beach the lab will be towed as it is supported in the water by its own buoyancy. The lack of a large enough marine crane in San Diego made it impossible to transfer the lab from a barge to the water here.

Meanwhile the class of Sea Lab II aquanauts was continuing training at Long Beach. Also at Long Beach are Capt. Lewis B. Melson, USN, director of the Sea Lab project, and Capt. George F. Bond, (MC) USN, head of the Navy's Man-in-the-Sea program.

Lt. Cdr. H. H. Golightly, USN, yesterday set up an information bureau for the project on the Scripps Institution of Oceanography campus.

The project, designed to determine how men can live and work under the sea, is expected to go on for at least 30 days. Two or more teams of 10 men each are expected to participate in the underwater phase of the project.

San Francisco Calif.
Examiner
AUG D - 1965



TUFFY, THE NAVY'S PORPOISE

From AUG 9 - 1965
POST-DISPATCH
St. Louis, Mo.

Porpoise to Be Shark Fighter For Men in Hut on Sea Floor

POINT MUGU, Calif., Aug. 9 (AP)—A porpoise named Tuffy will get a chance soon to play bodyguard, shark fighter and rescuer for divers in the Navy's underwater hut, Sealab II.

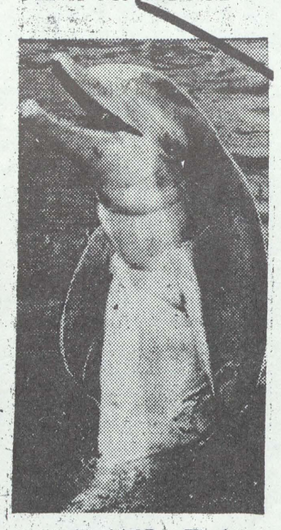
The 7-foot, 270-pound sea mammal, bearing scars from numerous encounters with sharks, has been in training at the Point Mugu Naval Missile Center for more than a year to take guide lines to lost divers and carry packages between divers on the bottom and between divers and men on the surface.

If a shark appears on the scene after Sealab II is lowered 210 feet to the ocean floor off La Jolla, Calif., lates this month, officials say, Tuffy will be released to see if he can protect the divers from attack.

Porpoises have been known to beat off and even kill sharks by ramming them with their noses.

The first of two 10-man teams of scientists and Navy divers will begin a 15-day residence Aug. 15 in Sealab II, a 12-by-57-foot vessel shaped like a tank car. They will sleep, eat and work in the steel chamber, spending at least two hours a day outside in the 50-degree water.

Tuffy, an Atlantic bottlenose porpoise, will join them early in September. F. G. Wood, head of the marine sciences division here, where Tuffy was trained, calls it the first practical test of whether sea mammals can work with men under water.



Associated Press Wirephoto

Tuffy the porpoise training in his tank at Point Mugu, Calif.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)
AUG 10 1965

TUFFY SHOWS PROMISE

Porpoise To Help Navy Divers

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FIGHTING ERRAND BOY

Porpoise to Work With Aquanauts

By RALPH DIGHTON

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* * * *

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* * * *

F. G. WOOD, head of the Marine Sciences division here, where Tuffy was trained, calls it the first practical test of whether sea mammals can work with men under water.

Now about 10 years old, the shark-scarred Tuffy was captured in the Atlantic three years ago and spent two years in oceanariums. Brought here in April 1964, he frequently attacked trainers and earned the nickname Tuf Guy, later shortened to Tuffy.

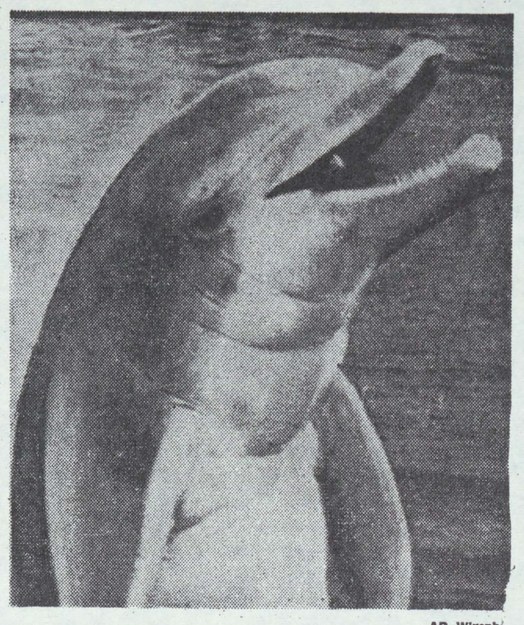
He was trained to wear a harness and to fetch objects over distances up to 550 yards in response to a sound signal while working in the open sea two miles offshore.

* * * *

TUFFY WILL be flown by helicopter to the Sealab II site and, when not working with the divers, will be kept in a floating pen on the surface. His trainer, Wally Ross, will be with him during the week-long experiment.

Officials credit Deborah Duffield, a Stanford University student who worked here last summer, with improving Tuffy's temper. She taught him to retrieve objects and swim through hoops in his tank while blindfolded in demonstrations of the natural sonar of his breed.

Scientists believe the creaky squeaks porpoises make enable them to spot food even in murky water. Their "eco-ranging" system appears to be more accurate over short distances than the best man-made sonar yet developed.



—AP Wirephoto

TUFFY TRAINED TO HELP SEALAB CREW
Porpoise Will Drive Off Sharks, Carry Tools

Carpenter Selected For Stay in Sealab

By LEO BOWLER
EVENING TRIBUNE Science Writer

Navy Cdr. Scott Carpenter, astronaut turned aquanaut, will remain under the sea for 30 days during the Sealab II experiment which gets under way here next week.

Carpenter will be the only aquanaut in the Sealab vessel for more than 15 days at a time.

The announcement of Carpenter's selection came today at Sealab headquarters which is being set up at Scripps Institution of Oceanography. Officials also announced that the total time Sealab will be occupied has been extended from 30 to 45 days.

They said there is no possibility that Carpenter will remain in Sealab for the full 45-day period because of the dangers involved.

Sealab is a part of the Navy's "man - in - the - sea" program which is designed to give divers the ability to operate underwater for long periods.

It will take place in 210 feet of water about 3,000 yards off the end of Scripps pier in La Jolla.

Earlier, the Navy had said it expected to keep a team of men in Sealab for 15 days, then bring them up and send down new divers. Two of the original team were to remain for 30 days.

The change in plans today indicated that only Carpenter would remain in Sealab for the 30-day period. The other divers will change every 15 days so that three teams will occupy Sealab consecutively during the 45-day period.

In the first team of divers to go down there are four from the San Diego area:

Lt. Robert E. Sonnenburg, a Navy doctor, of 4363 Adams Ave.

Thomas A. Clarke, a graduate student at Scripps, of 7726 Fay Ave.

Earl A. Murray, a Scripps lab assistant, of 1252 Luneta Drive, Del Mar.

Jay Dee Skidmore, Navy chief photographer, of 1089 Woodlawn Ave., Chula Vista.

The divers are expected to enter Sealab next Friday or Saturday.

Here is the schedule for Sealab, which the Navy announced today:

Monday — A staging vessel will leave Long Beach under tow for La Jolla. It is expected to arrive at the Sealab site the following day. It will anchor over the site and be a mother ship for Sealab.

Tuesday — Sealab is expected to leave Long Beach under tow. It is now on a barge at Long Beach Naval Shipyard, but will be lifted from the barge by a crane and placed in the water before being towed to La Jolla. It is expected to arrive in La Jolla Wednesday.

Sealab Mother Ship In S.D. Tomorrow

By LEO BOWLER
EVENING TRIBUNE Science Writer

The Berkoni, staging vessel for Sealab II, is scheduled to arrive in San Diego tomorrow morning.

The vessel, made up of two Navy barges connected by a superstructure, was specially built to act as a mother ship for the Sealab experiment. It is to leave Los Angeles under tow early tonight.

Movement of the staging vessel to La Jolla will be the first major step this week in getting the undersea operation under way.

The vessel will be moored 3,000 yards off Scripps Pier in La Jolla. It will be connected to the shore by a complicated set of electronic circuits and when Sealab gets into operation it will be connected to the undersea laboratory with closed circuit television, and water and power lines.

The Berkoni carries several vans bolted to its deck. The vans serve as laboratories and headquarters areas and house extensive electronic equipment.

Sealab is part of the Navy's Man In The Sea program, which is designed to give divers the capability of operating on the bottom of the ocean for extended periods.

When Sealab gets under way here, three shifts of 10 divers each will stay on the bottom for 15 days. One diver, Cdr. Scott Carpenter, the astronaut turned aquanaut, will remain down for 30 days. Four San Diego area men are scheduled to be a part of the first 15-day shift.

Sealab, a 57-foot steel tube 12 feet in diameter, which will serve as both a dwelling and a laboratory for the divers, will be brought to San Diego Wednesday. It will be lowered to the bottom in 210 feet of water beneath the Berkoni. The first 10 divers will enter Sealab and begin their 15-day stint on Friday or Saturday. They will use a special capsule, which will be lowered by the Berkoni to within a few feet of Sealab. They will then swim from the capsule and enter the undersea laboratory.

The men will live in the laboratory in an atmosphere composed of helium, nitrogen and oxygen. The atmosphere will be at the same pressure as the water around them. They will be able to leave Sealab for daily swims in the area, but will not be able to come to the surface without 35 hours of decompression.

'Ocean Systems Capital' Awaits Sealab's Descent

At the annual meeting of the Chamber of Commerce the other day, the president of Lockheed Aircraft Corp. used an apt phrase to describe one field of San Diego's scientific endeavor.

He called the city "the West Coast capital for ocean systems," a sobriquet which, we feel, is already deserved and will be more universally accepted in the future.

It's important for San Diego to get such recognition from a leader of industry such as Daniel J. Haughton, the Lockheed president.

For these are times of vast stirrings in man's imagination, and all cities have sensed the need to identify themselves with the new scientific movement. And once a city has become identified with a part of such a program, its leadership becomes self-perpetuating.

It becomes a symbol of an era, like Dodge City in another day. Already, Houston has laid claim to the title of space capital of the nation, and it could hardly be ousted from its preeminence, since once government money is invested, more contracts follow.

But that is all outer space—and San Diego has always had the inside track on inner space, the ocean depths. Paradoxically, we may know less now about the ocean floor than we do of the face of Mars. The knowledge to be gained and the wealth possibly to be garnered are tremendous.

And except for Woods Hole in Massachusetts on the East Coast, San Diego is unrivalled in its position. Not in Los Angeles, San Francisco, New York, New Orleans, nowhere else, do they have facilities for exploring the vast deeps to compare with ours at Scripps and NEL.

We are proud of these facilities, and look forward to unprecedented discoveries, from daring aquanauts and scientists, for, as Haughton said, the next decade "will in fact be the decade of the oceans."

In a few days, as if to dramatize the city's claim to the title conferred by the Lockheed president, Sealab II will descend to the ocean's floor off La Jolla, where a group of aquanauts will live for a month.

Right here on our own doorstep, man will make an effort to widen his horizons of understanding. There is much to be learned in this adventure on the bottom of the sea, and all San Diego wishes the participants the best of luck and success.

Their deeds will make the West Coast Capital for Ocean Systems even prouder.

A-20 EVENING TRIBUNE SAN DIEGO, CALIFORNIA Friday, Aug. 13, 1965

U.S. Under Fire On Oceanography

COPLEY NEWS SERVICE

WASHINGTON — Oceanography has been fragmentized into meaningless bits and pieces by the U.S. government, Dr. W. M. Chapman charged today.

Chapman, 739 Golden Park Ave., Point Loma, is director of resources for the Van Camp Sea Food Co., Terminal Island. He assailed current oceanographic programs in a 78-page statement to the House subcommittee on oceanography.

Bureaucratic Maze

"In the United States government, there are 22 operating bureaus and offices, located in five department and three independent agencies, that conduct ocean activities," he said.

"They are accountable to 32 committees and subcommittees of the Congress."

As a result, Chapman continued, "we have no national ocean strategy, no national ocean program with which to implement it and no national ocean budget with which to finance it."

In the executive branch, he said, only the President has sufficient authority to make meaningful proposals for developing the undersea sciences.

And when the Chief Executive makes requests, Chapman went on, "there is no entity in Congress to review and approve them."

Chapman, a former special assistant for oceanography in the State Department, urged the subcommittee to approve a bill establishing a cabinet level national council on marine resources.

Commission Useful

Under legislation passed last week by the Senate, the council would be assisted by a temporary commission of experts appointed from outside the government.

"Undoubtedly it would be useful to have such a commission take a run at this problem," Chapman said.

San Francisco, Calif.
Examiner
(Cir. D. 292,539 - S. 435,887)
AUG 15 1965

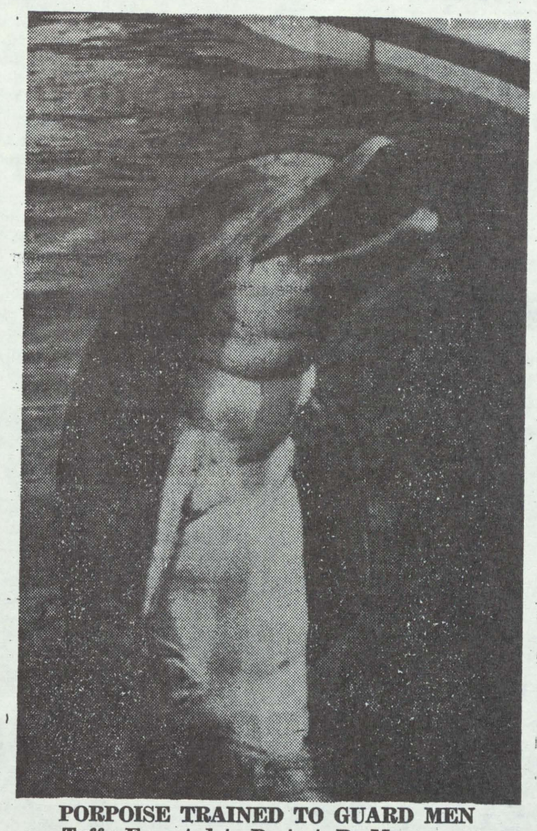
Astronaut To Turn Aquanaut

LA JOLLA—(UPI)—Astronaut M. Scott Carpenter will turn aquanaut for 30 consecutives days this week in the Sealab II experiment which has been extended from 30 to 45 days.

Although the over-all experiment has been extended, Carpenter will not remain submerged beyond the 30 days because of the danger involved, a spokesman for the Navy said.

"The experiment has been extended so we can get as much data and as many qualified aquanauts as possible," the spokesman said. The Navy hopes to develop techniques that will enable man to live in the ocean for prolonged periods.

The 298-ton Sealab cylinder was expected to be lowered into the submarine canyon 3,000 yards offshore Thursday. Ten aquanauts will live in and operate around it at a depth of 210 feet starting next Friday or Saturday. All but Carpenter will stay below for 15 days.



PORPOISE TRAINED TO GUARD MEN
Tuffy Expected to Protect, Be Messenger
—AP Wirephoto

PAGE 8, SECTION I THE HOUSTON POST
MONDAY, AUGUST 9, 1965

Porpoise With a Purpose

Tuffy on Team

POINT MUGU, Calif—(AP)—A pugnacious porpoise named Tuffy will get a chance soon to play bodyguard, shark-fighter and rescuer for divers in the Navy's underwater nut, Sealab II.

The 7-foot, 270-pound sea mammal, bearing scars from numerous encounters with sharks, has been in training at the Point Mugu Naval Missile Center for more than a year to take guidelines to lost divers and carry packages between divers on the bottom and between divers and men on the surface.

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Tuffy, an Atlantic bottlenose porpoise, will join them in September.

NOW ABOUT 10 years old, the shark-scarred Tuffy was captured in the Atlantic three years ago and spent two years in oceanariums.

He was trained to wear a harness and to fetch objects over distances up to 550 yards in response to a sound signal while working in the open sea two miles offshore.

22

SEALAB TESTS TO PROVIDE COMPARISONS

Aquanauts Will Be Busy

Editor's Note—How do you keep busy on the bottom of the ocean? The Navy's aquanauts, who will live under 210 feet of water off La Jolla this summer, have programs planned for them which would keep them hopping on land. The first in a series.

By LEO BOWLER
EVENING TRIBUNE Science Writer

The world's deepest human community and the world's highest appear at first glance to have little in common, but Navy psychologists here are preparing today to make an extensive study of the two.

They want to compare the behavior of the aquanauts in Sealab II with the behavior patterns recorded by the American team of mountain climbers who scaled Mt. Everest in 1963.

The Sealab aquanauts and the Everest climbers have important things in common, Navy doctors say. Both are teams of highly trained men living in an alien environment where one slip could mean death.

The Navy describes the conditions in Sealab this way:

"Space in the capsule is restricted. The high pressure and exotic gas mixture aquanauts will breathe is unique. The world outside is forbidding — cold, dark, and wet. And each man is two days away, because of decompression requirements, from a normal environment."

The psychological observation, which will be conducted by closed circuit television from the surface, is only one phase of studies which will be made during the Sealab experiment.

Capt. Lewis B. Melson, USN, director of Sealab, said there will be three programs of aquanaut activity. The aquanauts are apt to be the busiest men in the San Diego area when they enter their undersea environment, he said.

The first program is to test human performance in that environment. The comparison to Mt. Everest climbers is a part of this program.

Aquanauts will be required to undergo many complicated tests while swimming freely outside their steel home. They will measure their strength, the speed with which they can assembly simple mechanical structures, the quality of their sense of touch, their ability to understand words spoken under water, and their abilities to work as a team in mechanical construction.

The scores they make on these tests will be compared to scores achieved on dry land and while diving in shallow water.

Their ability to observe objects under water will be determined with a series of visibility tests which will score them on the distance they can see, how well they can distinguish a distant light, how well they distinguish colors, and how acute their vision is as compared to studies made on land.

They also will be tested against an underwater television set to determine whether free swimmers can see better than men above using television equipment.

Studies will also be made to determine how well aquanauts can distinguish various sounds under water, whether they can determine the direction from which the sounds come, and whether they can identify the distance from which the sounds originate.

All these tests will be conducted by aquanauts swimming freely outside Sealab. Then they will return to their steel house to do their homework, which will consist of solving problems in arithmetic to determine whether living in their strange world affects their mental efficiency.

In addition to specific tests which will produce objective scores, the aquanauts will be observed by television while working on other assigned tasks to get estimates of their efficency at everything from simple swimming to complex mechanical jobs.

SAN DIEGO
EVENING TRIBUNE
AUG 11 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

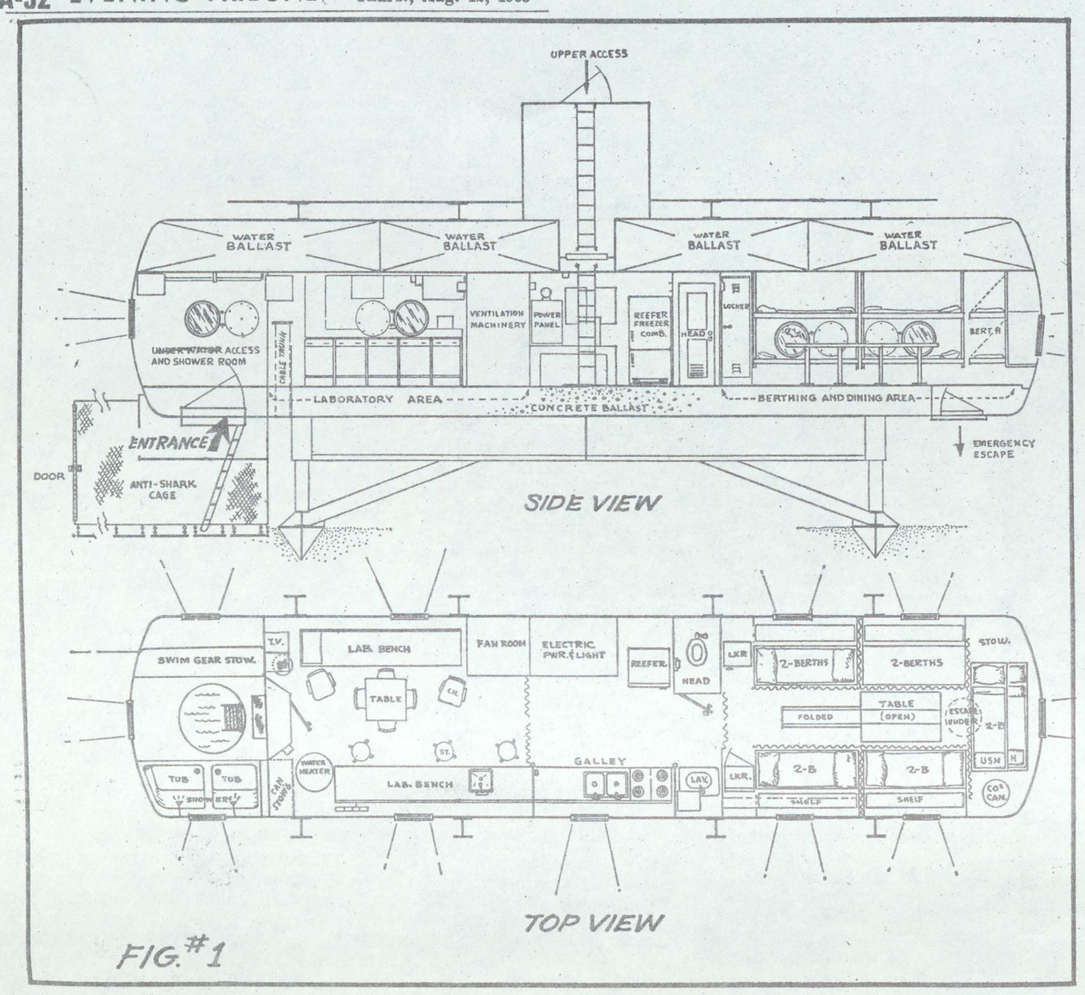


FIG. #1

Sealab Blends House With Sub

By LEO BOWLER
EVENING TRIBUNE Science Writer

Sealab II is described by the Navy as a dwelling which is built like a submarine.

Unlike either a house or a submarine, however, the front door is on the bottom, as shown in Figure 1.

Sealab will be moored on the ocean bottom in 210 feet of water (Figure 2) off Scripps Pier in La Jolla. Power, water and breathing gas will be supplied through umbilical cables from the staging ship above it and from Scripps Institution of Oceanography on shore.

The divers will be lowered to the bottom in a pressurized capsule (also shown in Figure 2) by a crane on the support vessel. When they leave Sealab, the divers will be taken to the surface in the same capsule, which will be hooked to a decompression chamber on the vessel to give them the necessary 35 hours of decompression.

An aquanaut entering his living quarters swims into the antishark cage, at the left end of Figure 1. The cage acts as a fenced-in front yard in which a diver can take refuge if need be from sharks or other undersea creatures.

The moment he comes through the hatch, he leaves the water and emerges into the special atmosphere provided for him to breathe during his underwater stay.

All windows and the upper access hatch are sealed shut so that the atmosphere remains in the dwelling, like the air remains inside a drinking glass if you turn it upside down and thrust it into a pan of water.

Inside the access room, the diver removes his breathing tanks and other diving equipment, and takes a warm shower or tub bath. The main purpose is to warm himself after his swim through the cold sea.

A door separates the access room from the next room in Sealab, which houses laboratory equipment, electronic gear and other necessities for scientific investigation.

A curtain separates the lab from the galley which contains a refrigerator-freezer combination unit, sinks and electric stove. Another curtain hangs between the galley and the sleeping room which has 10 bunks, a folding table and storage space for the personal belongings of the aquanauts.

In the floor of the sleeping room is an emergency hatch, the back door of Sealab. It is to be used only if some accident should block the regular access hatch.

The upper access hatch is located in the equivalent of a submarine's conning tower, and is used only when Sealab is on the surface.

Opening it under water would result in immediate flooding of Sealab.

The lab will be moored on the ocean floor and held there by concrete ballast, which also forms the floor, and water ballast in overhead tanks.

Sealab is designed to have stability on the surface while being towed into position for sinking, while submerging, and while surfacing after the experiment is over. The quantity of water in the ballast tanks can be varied to achieve this stability.

It is built to withstand 125 pounds per square inch of pressure and tested to 188 pounds. While on the bottom the atmosphere inside will be at the same pressure as the sea outside.

Sealab is 57 feet long and 12 feet in diameter. It weighs more than 200 tons in air and will weigh 13 tons on the bottom.

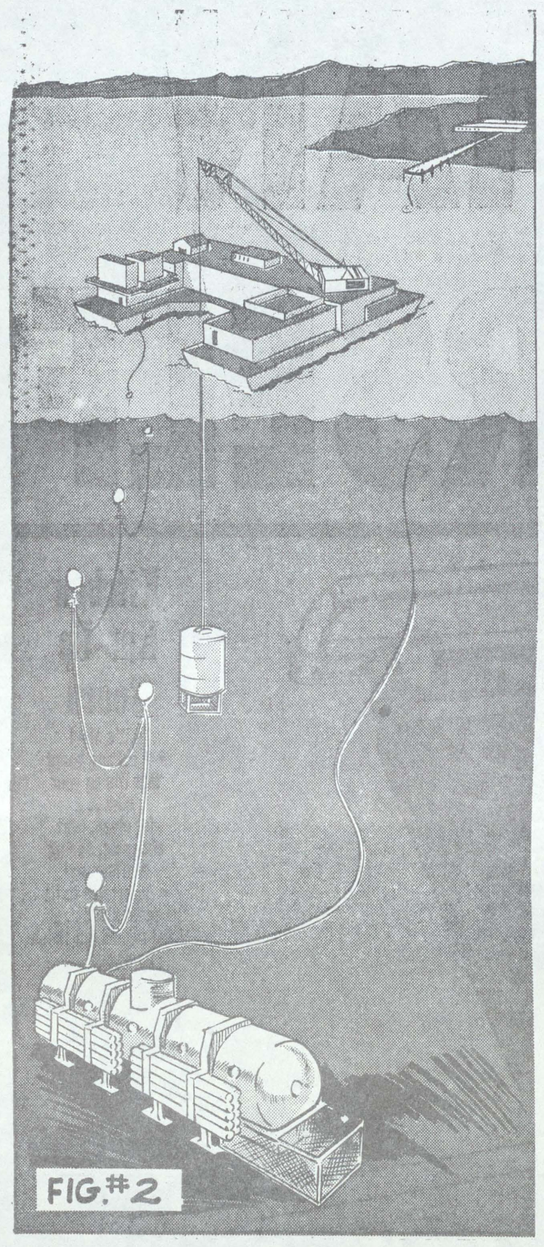


FIG. #2

Sealab II Seeks Answers To Open Up Watery World

For every adventurous individual who wants to reach out and explore the unknown there are countless others who petulantly ask:

"Why?"

Why spend billions to get to the moon or the planets?

And we're sure the same question has been raised about the forthcoming Sealab II operation off La Jolla.

Why spend all that time and money living on the bottom of the ocean?

These are good questions if for no other reason than the enlightening response to them by those who are doing the exploring, the venturing.

Such a man is Capt. L.B. Melson, USN, director, Naval Applications Group, Office of Naval Research. He is in charge of the underwater live-in laboratory.

Melson is well aware of the contradictory nature of man that makes him individually brilliant and daring and collectively a stick-in-the-mud.

It is to this group mind with its reluctance to embrace anything new that the Navy scientist addressed some exciting answers to the question of "Why?"

"What are some of the implications of becoming aquanauts?" he asked in a speech printed in Naval Research Reviews. "Many of them seem self-evident: We will be able to enjoy the beauty of the undersea world, we will be able to learn more about its rules by becoming participants rather than observers, we will locate new resources that have eluded us up to this point in time, we will develop new industries based upon the knowledge obtained from these explorations, and we will give to mankind a technique for further expansion."

That is a good answer to any who question the value of research in the oceans—perhaps the least known element of our planetary environment.

In fact, scientists probably already know more about the surface of the moon than the bottom of the sea not more than a mile off the San Diego coast.

Here, certainly, is a field worth exploring.

The potentials are enormously exciting today and could become vital to our survival in the future.

"Once we learn these waters," Melson said, "why shouldn't they become the suburbs of tomorrow for our metropolitan areas along the coastlines?

"Once we learn to harness the energies of the seas, why should we remain dependent upon the whims of the atmospheric weather that limit our hydroelectric power?

"Once we learn how to control aquaculture, why should we roam the oceans searching for fish, when we can process the catch at the scene of the harvest and transport only the processed product?

"Once we understand the problems of inner space, why should we attempt mining and petroleum extraction from the surface, when underwater ore reduction and petroleum refining will be more economical?"

Sealab II will help find the answers.



PET EXERCISE — Divers John Reaves, left, and Ken Conda frolic off Point Magu with Tuffy, the porpoise which will work with Sealab II divers on the ocean bottom off La Jolla next week. Reaves and Conda are in the pool of divers from which Sealab participants are being selected. The porpoise will be used to determine how much help he can give aquanauts with their underwater work. He will act as a message carrier and will be called to chase away sharks. — Navy Photo

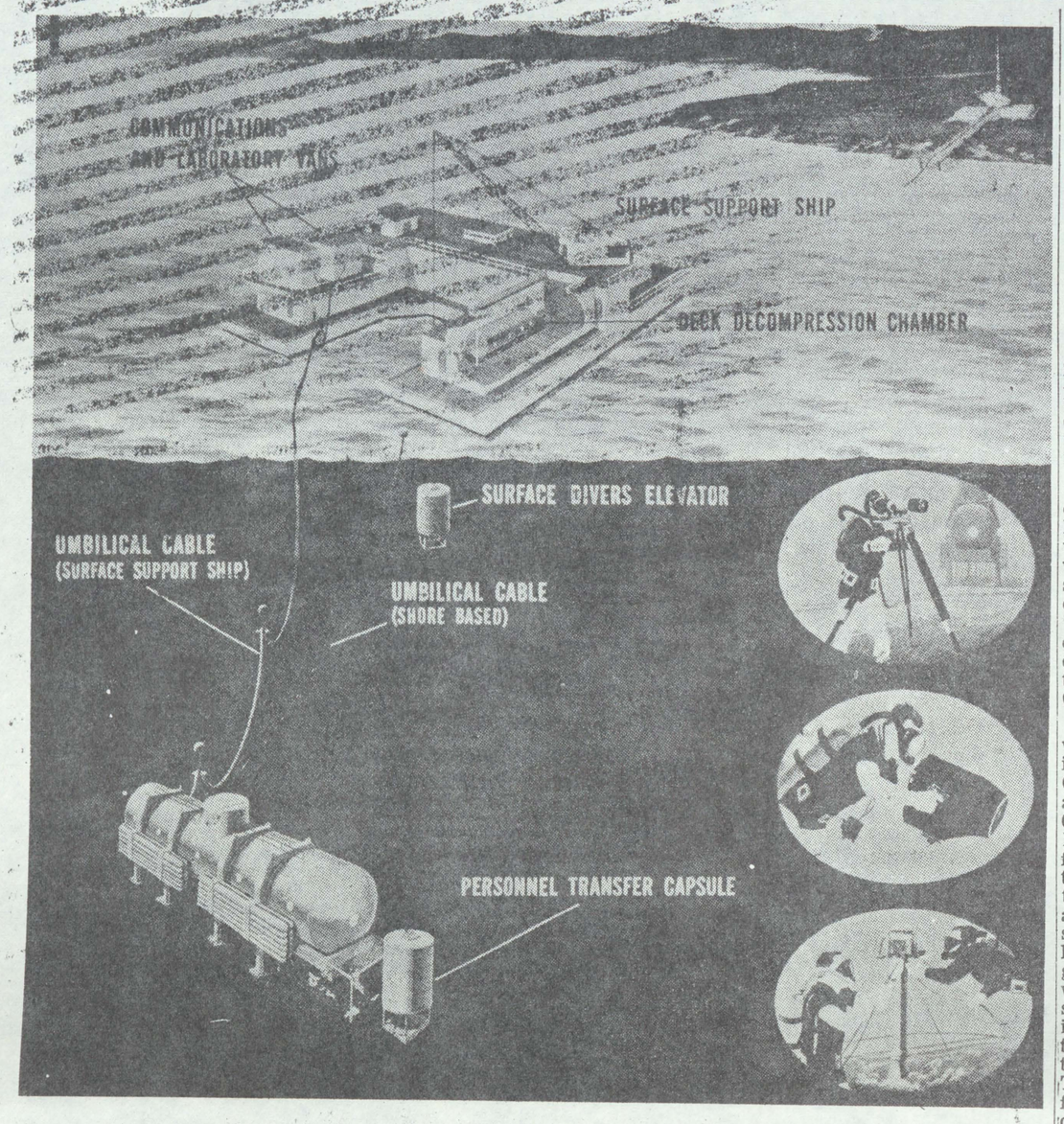
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VOLUME XXXIX, NUMBER 33 — THURSDAY, AUGUST 12, 1965 — 2724 GARNET AVE., PACIFIC BEACH, CALIF.



SEALAB SITE—This illustration of SeaLab, released by the Office of Naval Research, shows the relation of the actual SeaLab and the surface support ships that will participate in the 30-day experiment off the La Jolla coast. The 57-foot, 200 ton SeaLab will be in contact with the surface ships and shore installations through the umbilical cord shown, which is a maze of wires, tubes, and communication lines. Aquanauts will even be able to have live press conferences from the ocean bottom through TV facilities installed.

Costly Navy Project

Underwater Living Countdown Imminent

Final preparations are underway in San Diego and Long Beach for the beginning of the Navy's' longest, costliest, and most extensive underwater living experiment.

SeaLab II, which was preceded last year by SeaLab I experiments off Bermuda, will commence about Aug. 19 when the 57-foot, 200-ton, submarine-type craft is lowered to a depth of 210 feet. The 30-day experiment will be conducted in an underwater canyon about 4,000 feet off the Scripps Institute of Oceanography pier.

According to plans, 10 men will descend at various times in the Personnel Transfer Chamber (PTC) and a standard diving bell to the $850,000 SeaLab on the first day. For the remainder of the first day, they will acquaint themselves with living conditions, internal organization, and familiarization. On the second day they will begin layout of a swimmer navigation grid in conjunction with an initial survey of the surroundings. They will keep in mind selection of sites for the underwater "weather station" and a biological station. The divers will also become familiar with the Benthic lab, cable runs, and the PTC.

Also on the second day, the aquanauts are expected to inspect the condition of fixtures to be used in the salvage program, For the salvage program, a simulated submarine and various buoys will be raised with a foam process.

For the remainder of their days on the bottom, the first team will conduct mostly routine matters, including sorties in the gridded area, human engineering tasks, and public information activities.

Inside the actual lab, which is 12 feet in diameter, are a laboratory, galley and bunkroom as one goes forward from the entryway. Eleven viewing ports are provided in the hull, each covered by a light outboard cover and a pressure-proof hinged inboard cover.

The SeaLab atmosphere contains approximately 85 per cent helium, 11 per cent nitrogen, and 4 per cent oxygen. Replenishment gas will be brought in when needed through the umbilical cord from the surface support ship. A scrubber containing lithium hydroxide is used to remove carbon dioxide, while charcoal serves to remove odors.

The umbilical, between SeaLab and the staging vessel, contains a secondary power cable, a communication cable, an atmospheric gas supply cable, a gas sampling hose, and a compressed water hose for power tools.

The primary power supply from shore provides power and a fresh water supply.

The aquanauts will be relieved by a second team the sixteenth day of the test, although two divers are expected to remain the entire 30 days.

When returning to the surface, divers will enter the PTC which will be mated to a decompression chamber on the surface vessel. The entire decompression process should take about 35 hours.

According to Navy officials, a possible extension of the program hinges on developments during the two-planned testing periods.

SAN DIEGO
ENING TRIBUNE

AUG 17 1965

BLIC INFORMATION OFFICE
Eleventh Naval District
Diego, California

How Tuffy the Porpoise Will Help Aquanauts

SAN DIEGO.

A porpoise named Tuffy will serve as official messenger, lifeguard, and watchdog for the Office of Naval Research's Sealab 2 project, which begins this week off San Diego.

The project requires specially trained aquanauts to live and work in 210 feet of water to learn how the human body and mind function in the ocean depths. Ten



-AP

New worker knows the territory.

aquanauts will live on the bottom in a steel house that looks like a white watermelon with windows. It measures 60 feet long, 12 feet in diameter, and stands on a thick steel frame. The one-inch walls of the Sealab 2 house will withstand 200 pounds of pressure per square inch more than 400 feet down.

A special harness has been designed so Tuffy can carry messages from the surface to Sealab anchored on the rim of the submerged La Jolla Canyon. He also has been trained to carry life lines to "lost" sailors in deep, murky waters.

And if sharks appear, Tuffy will be released from his surface pen to learn if he will chase them away. Tuffy got his name from the scars he bears from skirmishes with sharks. "We have seen porpoises attack sharks in captivity by butting them," said Sam H. Ridgway, research veterinarian. "But we really don't know much about the porpoise in this field. Maybe he will attack the shark or at least chase it away." Tuffy's reaction to the problems he faces during the experiment will be closely watched by scientists. They want to determine where porpoises can be used to help man explore the ocean depths. Will Tuffy

24

S.D. Union, Aug. 14 PAGE B-1

1 Aquanaut To Be Under Sea A Month

Astronaut Plans Long Stay In SeaLab, Talk With Gemini

Cmdr. M. Scott Carpenter, the astronaut turned aquanaut, will be the only man in SeaLab II to remain submerged for 30 days, the Navy announced yesterday.

The Navy also said that an attempt will be made for Carpenter to talk from the sea bottom off La Jolla with one of the crewmen of Gemini 5 in orbit. The spacecraft is scheduled to take off Thursday.

Weather permitting, the Navy said, the SeaLab project will go on for 45 days — enough for three teams to spend 15 days each in the 298-ton habitat on the sea bottom. This will extend the project to Oct. 5.

The operation will be under way when the first team descends to the lab Friday or next Saturday. Previously it had been hoped to start Thursday or Friday.

The following schedule of next week's operations was announced:

MONDAY — SeaLab staging vessel leaves Long Beach.

TUESDAY—Staging vessel arrives at SeaLab site 3,000 yards off Scripps Pier, SeaLab leaves Long Beach under tow for San Diego. (This could be delayed until Wednesday.)

WEDNESDAY — SeaLab arrives here. Rear Adm. Walter H. Price, commandant of 11th Naval District, presents awards to SeaLab II personnel.

THURSDAY — SeaLab made ready for lowering at site.

THURSDAY-FRIDAY — SeaLab lowered and put under 24-hour test of all systems.

FRIDAY—NEXT SATURDAY—First 10-man team takes up residence in SeaLab.

PAGE D-2 EVENING TRIBUNE

Aug 17, 1965

THE AMERICAN TRADITION: Who gave you, Old Glory, the name that you bear/ With such pride everywhere/ As you cast yourself free to the rapturous air/ And leap out full-length?—James Whitcomb Riley.

On the Bottom: Sealab Lies At Focus of World Attention

Full fathoms 35 our Sealab lies.

A strange habitation indeed, lying on the floor of the Pacific Ocean off Scripps Pier at La Jolla. And living conditions down there will be strange, with a helium atmosphere that will make the conversation of the aquanauts unintelligible without the help of an electronic unscrambler.

It is a hostile environment off La Jolla, so near to familiar scenes and yet so far removed from human experience in any previous generation. Sealab is on the rim of the La Jolla undersea canyon, out of which not so many years ago rose the Great White Shark that wholly consumed a Pacific Beach skindiver, so that only part of one shark-bitten swim fin remained, to tell of the grim encounter.

The undersea frontier has the same Jules Verne quality as the space frontier. Mankind on both frontiers must take his supply of atmosphere, or its equivalent, with him in order to survive where there is no air.

They talk of colonies on the moon, and there may some day be cities under the sea.

Meantime, this city by the sea is watching the Sealab experience with keen interest, heightened by the knowledge that the event is focusing worldwide attention in an unprecedented way upon San Diego as a center of oceanography.

No such dramatic event has ever occurred here before in the annals of those who study the sea.

A mundane interest in the field of oceanography is justified by the economic facts. The San Diego Chamber of Commerce says the fields of ocean engineering and oceanography yield at least $9-billion in business and research annually in the world. More than two-thirds of this, of course, is worldwide fish production. But other activities are relatively more important in the U.S. $1.7-billion spending picture.

This country spends about $413 million a year for sea culture, such as plant harvesting and fish production; $546 million for government defense, research, and other activities; $480 million for petroleum exploration and production; $141 million for mineral mining and chemical extraction; $30 million for recreation and consumer activities, and $15 million for industrial research and development.

What may be more significant is the rapid growth rate for undersea activities in the United States. Excluding Navy antisubmarine warfare expenditures, it is believed to be between 8 per cent and 15 per cent.

Public To Get SeaLab View On Scripps TV

People who visit the campus of the Scripps Institution of Oceanography while the SeaLab II operation is in progress can "go aboard" the undersea habitat by means of closed circuit television.

The SeaLab information office said yesterday that the San Diego Chamber of Commerce has arranged to have monitoring television sets placed in Sumner Auditorium to show activities in and around SeaLab.

Times that the sets will be on will be announced later.

The Navy has placed a SeaLab exhibit in the Scripps Aquarium and Museum. The exhibit includes a scale model of SeaLab II, a series of transparencies showing its operation and a recording explaining the exhibit.

The staging vessel, the Berkone, which will be the topside mother ship for SeaLab II, will start on its trip from Long Beach to San Diego today. It is two barges bridged by a superstructure to make a supercatamaran.

Tomorrow the SeaLab itself will be towed here from Long Beach.

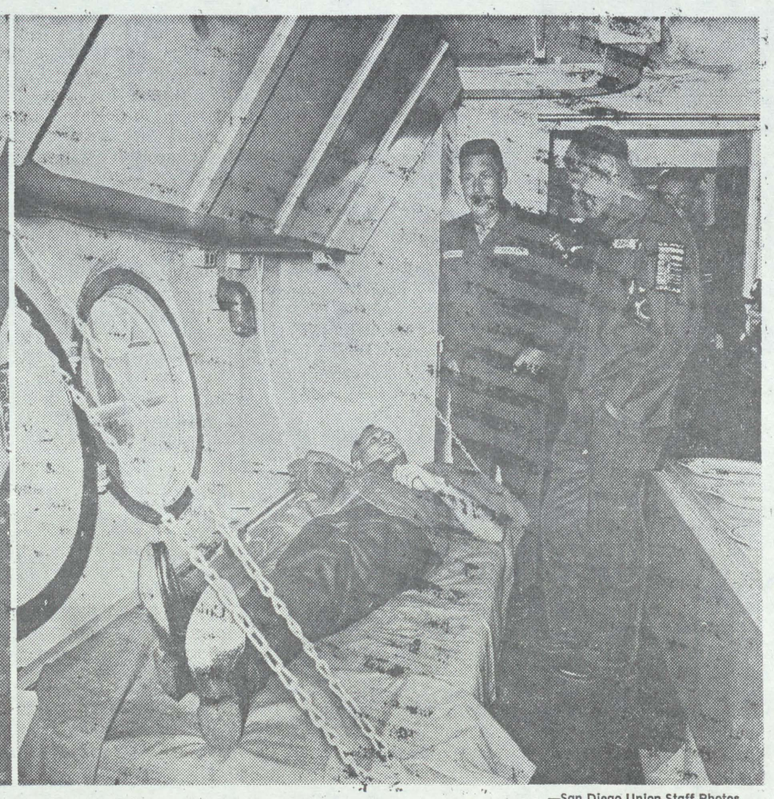
The San Diego Union

SAN DIEGO, CALIFORNIA, SUNDAY MORNING, AUGUST 15, 1965

SeaLab Scientists Prepare For Tests







—San Diego Union Staff Photos

Group of scientists and divers who will participate in SeaLab II project poses in front of undersea laboratory in left photo. In center, William Snell enters craft through aft hatch, the one the aquanauts will use in experiment. At right, Earl A. Murray demonstrates roominess of bed to Arthur Flechsig and Rick Grigg. Moving stage for SeaLab is due to arrive in San Diego today.

SeaLab's Auxiliary Vessel Slated To Arrive Tuesday

By BRYANT EVANS
The San Diego Union's
Science Writer

The moving stage for the most elaborate experiment in undersea living ever attempted is due to arrive in La Jolla Tuesday.

This is the Berkone, the staging vessel for SeaLab II. From it Navy officers, doctors and scientists will monitor and direct a 45-day experiment of living at a depth of 210 feet at a point 3,000 yards offshore from the Scripps Institution of Oceanography.

The SeaLab, to be the undersea habitat for 10 men at a time, is to be towed from Long Beach to San Diego Wednesday. In the meantime the Berkone, a giant catamaran, will be securely moored into its place.

PRESSURE INCREASED

On Thursday the Sea Lab is to be slowly lowered to its site. As it goes down a synthetic-gas atmosphere will be pumped into it to equal the sea water pressure at every point of its descent.

Finally, on the bottom, the internal pressure will be 110 pounds a square inch — about 7½ times the pressure under which we live on land.

On Saturday, or perhaps late Friday, the first 10 men will descend in a capsule and swim to an opening in the bottom of the new habitat. Nine of them will live in it for 15 days.

Cmdr. M. Scott Carpenter, USN, the astronaut lent by the National Aeronautical and Space Administration to the Navy for SeaLab, will be the only one of the number to stay down for 30 days if he shows no sign of narcosis from living under the pressurized atmosphere.

LEADER NAMED

Capt. George F. Bond (MC) USN, director of the Navy's Man-in-the-Sea program, believes narcosis is a possibility that has to be tested.

Carpenter will be leader of the first team to be submerged. He is also scheduled to have a conversation with one of the crewmen in Gemini V — the first conversation between a man on the bottom of the sea and another in outer space.

Capt. Lewis B. Melson, USN, is director of the SeaLab II. Cmdr. Thomas N. Blockwick, USN, is the deputy on-scene commander and Henry A. O'Neal, director of the Office of Naval Research application program, is SeaLab program director. Capt. Walter F. Mazzone, USN, is physiological measurement and atmosphere control officer.

Other members of the first team are: Thomas A. Clarke, 25, of 7726 Fay Ave., La Jolla, Scripps biologist; Earl A. Murray, 38, of 1252 Luneta Dr., Del Mar, Scripps technologist; Lt. Robert Eric Sonnenburg, (MC) USN, 28, of 4367 Adams Ave., Navy physician; Jay Dee Skidmore, 37, of 1089 Woodlawn Ave., Chula Vista, photographer.

Also, Chief Engineman Frederick J. Johler, USN, 40, of Groton, Conn.; Gunner's Mate Wilbur H. Eaton, USN, 39, of Fort Lauderdale, Fla.; Torpedoman's Mate 1st Class Billie L. Coffman, 36, of Tucson, Ariz.; Chief Engineman Cyril J. Tuckfield, USN, 44, of Miami, Fla.; Berry L. Cannon, electronic engineer, 30, of Panama City, Fla.

Life in the SeaLab will be comfortable and busy. The tank is 57 feet long and 12 feet in diameter. It is complete with shower room, laboratory, galley and dormitory for eating and sleeping.

The temperature will be kept at 88 degrees. This would be too warm in an ordinary atmosphere but the helium-rich atmosphere in which the aquanauts will be living transmits heat seven times as readily as air.

The helium atmosphere also causes bass voices to have a treble sound. Humans are said to sound like Mickey Mouse.

The reason for the helium-rich atmosphere is at the heart of the whole SeaLab project.

In ordinary SCUBA diving to 200 feet, divers can stay on the bottom for only a very few minutes — too short a time to do useful work. The Navy and the oceanographic community wanted longer times on the bottom.

Neither air nor pure oxygen would do. Air is mostly nitrogen and it causes a narcosis after only a few minutes. Oxygen damages the central nervous system and also the lungs.

Bond and other scientists worked out a formula which called for 4 per cent oxygen, 80 per cent helium and 16 per cent nitrogen. It was found that the narcotic effect of helium is only one-15th that of nitrogen.

OTHER EXPERIENCES

This formula worked well in SeaLab I off the Bahamas last year for a period of 11 days. Whether a longer time will interfere with the men's ability to live and work remains to be seen.

In 1963 Capt. Jacques-Yves Cousteau kept five men for 30 days at a pressure of two atmospheres at a depth of 36 feet, and two men for seven days at 90 feet. Neither of these experiences approach the SeaLab II experiment.

The SeaLab II experiment is designed to wring every possible bit of information out of the project. The men will be watched by closed-circuit television; tested daily with a battery of physiological instruments; and expected to work four hours a day in the water around their habitat.

PERSONNEL CAPSULE

At the end of their 15-day stint, the aquanauts will be brought to the surface in the pressurized personnel capsule. They will be transferred, without exposure to the low pressure of the normal atmosphere, to a decompression tank on the staging craft.

There they will remain for 35 hours while the pressure is gradually lowered. A sudden lowering of pressure would cause bubbles to form in their bodies, bringing fatal cases of what divers call "the bends."

All in all it is planned for 28 men to live on the bottom during the scheduled 45-day life of SeaLab II.

How well they perform and how well they endure the experience may give science its most valuable clue as to man's ultimate ability to conquer the rich but hostile world under the sea.

5 SeaLab I Vets To Get Navy Awards

Four Legion of Merit medals and one Secretary of the Navy Commendation medal are to be presented to five pioneers in the Navy's Man-in-the-Sea program today.

Rear Adm. Walter H. Price, USN, 11th Naval District commandant, will make the presentations in Sumner Auditorium at the Scripps Institution of Oceanography at 9 a.m.

The ceremony will take place as preparatory work goes forward at sea, a few thousand yards away, for the SeaLab II operation, the most elaborate of the Man-in-the-Sea projects yet undertaken.

All of the men to be decorated took part in the SeaLab I operation off the Bahama Islands last year.

Legion of Merit decorations will go to Capt. George Bond, (MC) USN, leader of the Man-in-the-Sea program; Lt. Cmdr. Robert E. Thompson (MC) USN, team leader on SeaLab I and now a radiologist at the Naval Hospital here; Senior Chief Hospital Corpsman Sanders W. Manning, a diver now assigned to SeaLab II; and Chief Quartermaster Robert A. Barth, also assigned as a diver to SeaLab II.

The Commendation Medal will go to Master Chief Torpedoman Robert C. Sheats, who trained the divers for SeaLab I.

The citations signed by Navy Secretary Paul H. Nitze cites Bond, who is to receive his second Legion of Merit award in the form of a Gold Star, for his SeaLab work.

It states that his work "has granted the United States Navy for the first time a new dimension of operations and a capability not previously possessed by any person or country."

Thompson was cited for his professional skill and inspiring leadership in the SeaLab I operation. It was Thompson who saved the lives of himself and teammates by sticking his finger through a hole in the decompression tank holding the men shortly after they were brought to the surface.

Manning and Barth were cited for "skill, courage and determined efforts. . .in keeping with the highest traditions of the Naval service. Sheats was cited for his care and responsibility in placing the SeaLab on the ocean floor.

The Berkone, staging vessel for the SeaLab II, was due to arrive on the site of the operation at 7 a.m. today.

Sealab Project Delayed by Leaks

LA JOLLA, Calif., Aug 25—(UPI)—The Sealab 2 project ran into another snag Wednesday when lowering of the 57-foot long vessel was delayed until Thursday morning.

The Sealab 2, in which Astronaut Scott Carpenter will spend 30 consecutive days and other aquanauts will spend up to 15 in a 45-day experiment, developed several leaks as it was being lowered. Repairs were made but unsufficient helium remained to recharge the vehicle for descent.

The project calls for Sealab 2 to be lowered to a ledge 210 feet below the surface of the ocean off Scripps Pier. Carpenter and others probably will descend to the steel cylinder by Friday.

The main purpose of the test is to see how man responds to prolonged periods underwater.

COOPERATION KEY FACTOR

'Compatibles' Of SeaLab Allowed To Blackball Group

The Navy took a leaf from the order of Elks when it picked the 27 men scheduled to become SeaLab II aquanauts off La Jolla during the remainder of this month and in September.

The 27 were chosen from 300 volunteers. Capt. George F. Bond (MC) USN, director of the Navy's Man-in-the-Sea program, did the choosing.

He accepted men on the basis of meeting four criteria and then used the Elks blackball system to test the fifth criterion which was compatibility.

"We picked the first 10," he said, "and then let them vote on the rest of the candidates. One blackball and the man was out. Maybe this was not very scientific. We did not use personality tests or anything like that. But I think our system worked."

"We have a crew strictly of individuals but I can name any two of them to work together and they do it like a team."

Four Criteria Considered

Bond listed the four criteria that came before the compatibility vote as follows:

1. Motivation, the sincerity behind volunteering for SeaLab duty.

2. Opinion, based on personal knowledge of their diving records and stability. All of the men have had diving experience.

3. Physiological data on each man. One purpose of SeaLab is to measure physiological changes resulting from living under the sea, if there are any. As a consequence, previous knowledge of physiological measurements is essential.

4. Experience, as a result of which the average age of the aquanauts is 35 years. They range in age from 22 to 40.

Giants, Small-Guys Included

Bond said he sought to get a broad range of physical types to determine if one type would withstand submerged life better than another.

"They range from giants with 18-inch biceps to comparatively small fellows," he said

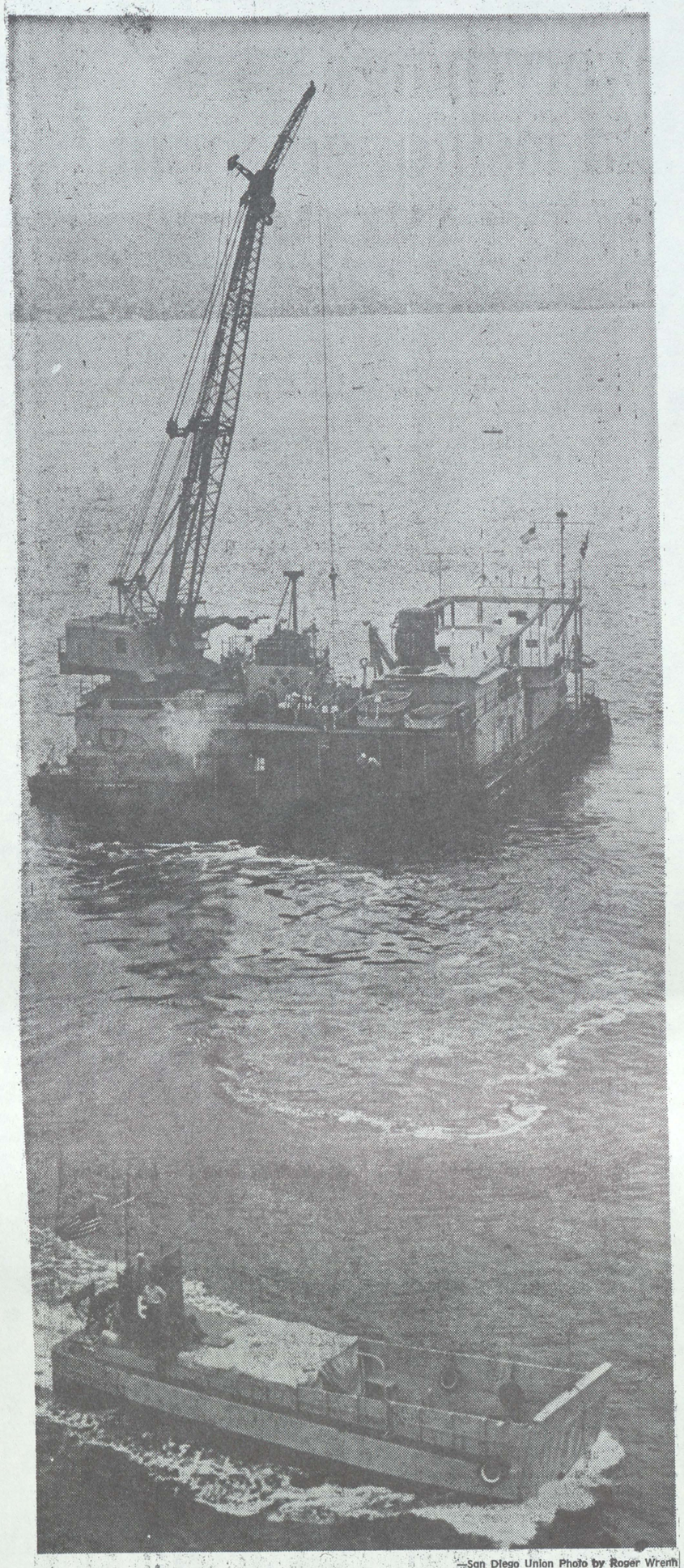
By now Bond knows his aquanaut team well. He has been with them in training at Panama City, Fla., and at Long Beach. To say he is satisfied would be an understatement.

"They are the most highly motivated group I have ever seen," he said. "Their morale is at a peak. They have a high degree of individualism but they also have the ability to function, no matter how you put them together."

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25

SeaLab Experiment's Mother Ship Poised Off Scripps Pier



—San Diego Union Photo by Roger Wrenn

The Berkone, catamaran mother ship for SeaLab II, floats 3,000 yards off Scripps pier after being towed from Long Beach. Vessel is made of two barges joined into U-shaped pattern.

Preparations Move Ahead For SeaLab

Mother Ship Lines Attached; Undersea Craft Awaited Today

Pictures—Page a-3

By BRYANT EVANS
The San Diego Union's Science Writer

Five mooring lines were fastened to the Berkone, the mother ship for SeaLab II, last night.

SeaLab II may arrive at the operation site off La Jolla today.

The site for the placing of the 57-foot-long, tank-car-like craft to serve as a home for 10 men is 3,000 feet off the Scripps Institution of Oceanography pier.

The SeaLab was in Long Beach last night awaiting the return of the salvage vessel Gear, which towed the Berkone here yesterday morning.

SeaLab officers last night were pleased at the speed at which the mooring lines were anchored on the sea floor to hold the Berkone motionless while it supplies services to the SeaLab for 45 days while three teams test their ability to live and work 210 feet under water.

DESCENT DATE

It was likely that the first 10 men would descend to the lab Sunday or Monday. After the lab is brought here and lowered it will be blown out by divers and tested for 24 hours before the aquanauts are permitted to descend in a capsule and go aboard.

Capt. Lewis B. Melson, USN, director of the operation, said that Cmdr. M. Scott Carpenter, USN, the astronaut who will captain the first aquanaut team, would talk by radio with astronaut Gordon Cooper in Gemini 5 as soon as possible after the SeaLab II operation starts.

He said that it is planned for Carpenter to stay in the Sea Lab for 30 days. Possibly one other member of the team also will stay that long, he said.

PORPOISE'S ROLE

Tuffy, the porpoise who is to work with the aquanauts, is to be brought here from Point Mugu next week but will not take part in the operation until the second team goes down, Dr. F. G. Wood, head of the Marine Scientific Division of the Naval Missile Facility, announced.

He said that Tuffy had trained with SeaLab II divers by carrying a line from one to the other under 80 feet of water.

"Going from 80 to 210 feet will be a big jump for Tuffy," Wood said, "but we know he can go to 300 feet."

Wood said the porpoise's ability to home on a sound source was believed to be a possible aid to undersea workers because human hearing cannot detect the direction of a sound source.

HEARING LIMITED

He explained that men working in water of poor visibility could easily become lost under water. Sound signals from their base, such as SeaLab, would carry well under water but human ears would not be able to determine the true direction of the sound.

If the aquanauts were accompanied by a porpoise, the porpoise could be trained to lead them home much as a Seeing-Eye Dog leads a blind man, Wood said.

The suggestion that Tuffy might protect the aquanauts from sharks is not in the plan, Wood said.

"He bears scars he obviously received from sharks when he was younger and he may have developed into a coward," Wood said.

QUESTION POSED

Capt. George Bond, (MC), USN, director of the Navy's Man-in-the-Sea program and chief investigator of SeaLab II, asked Wood whether there was a chance that the friendly porpoise would mistakenly try to push a diver to the surface.

Wood said this is unlikely. He suspected that stories of porpoises pushing people upward concerned not a life-saving maneuver but just part of porpoise playfulness.

Melson and Bond discussed the plans for the experiment after a session in which Bond and three others were awarded Legion of Merit medals for their part in the SeaLab I operation under 193 feet of water off the Bermudas last year.

OTHERS HONORED

Others to receive the medals were Lt. Cmdr. Robert E. Thompson, (MC) USN, now at the Naval Hospital here, Senior Chief Hospitalman Sanders W. Manning and Chief Quartermaster Robert A. Barth, who also will dive on SeaLab II. The medals were pinned on the four men by Rear Adm. Walter H. Price, 11th Naval District commandant.

Melson explained that the SeaLab experiment was brought here instead of being repeated in clear tropical waters because the Navy felt that it must test the ability to work under water in more usual conditions.



SEA SNACK — Tuffy, the Sealab II porpoise, is rewarded with a snack by diver John Reaves for completing undersea exercise in training for his job as aide-de-camp for men working in Sealab II experiment off La Jolla.

Sealab Craft Towed to Site Off La Jolla

Navy, Civilian Staff Prepares Vessel For Dive to Bottom

By LEO BOWLER
EVENING TRIBUNE Science Writer

Sealab II arrived here today.

The gleaming cylinder, which will house divers on the ocean bottom, was towed into the area by the submarine rescue vessel Gear about 8 a.m. The Gear dropped the towing line at 8:30 and small craft began maneuvering the lab to buoys near the mother ship Berkone.

The lab looked like a white submarine. Most of the hull area in which the aquanauts will live was under water.

A central hatch on top of Sealab, which is used for access while the lab is on the surface, looked like the conning tower of a sub.

Sealab officials said the aquanauts will not enter their undersea home until Tuesday. Last minute work was being carried on feverishly aboard the mother ship to get its equipment in order for the experiment in 210 feet of water.

Final Inspection

RAdm. Levering Smith, director of the Navy's Special Projects Office, toured the Berkone today in a final inspection. He arrived in San Diego last night and plans to spend the next three days here.

Capt. George Bond, principal medical investigator of Sealab, mustered nine of the first team of divers in a luncheon area on the campus of Scripps Institution of Oceanography.

The divers were instructed to report aboard the mother ship later today and were told they probably would get their last liberty ashore tomorrow.

From their position on shore they could watch as Sealab was moved to its mooring.

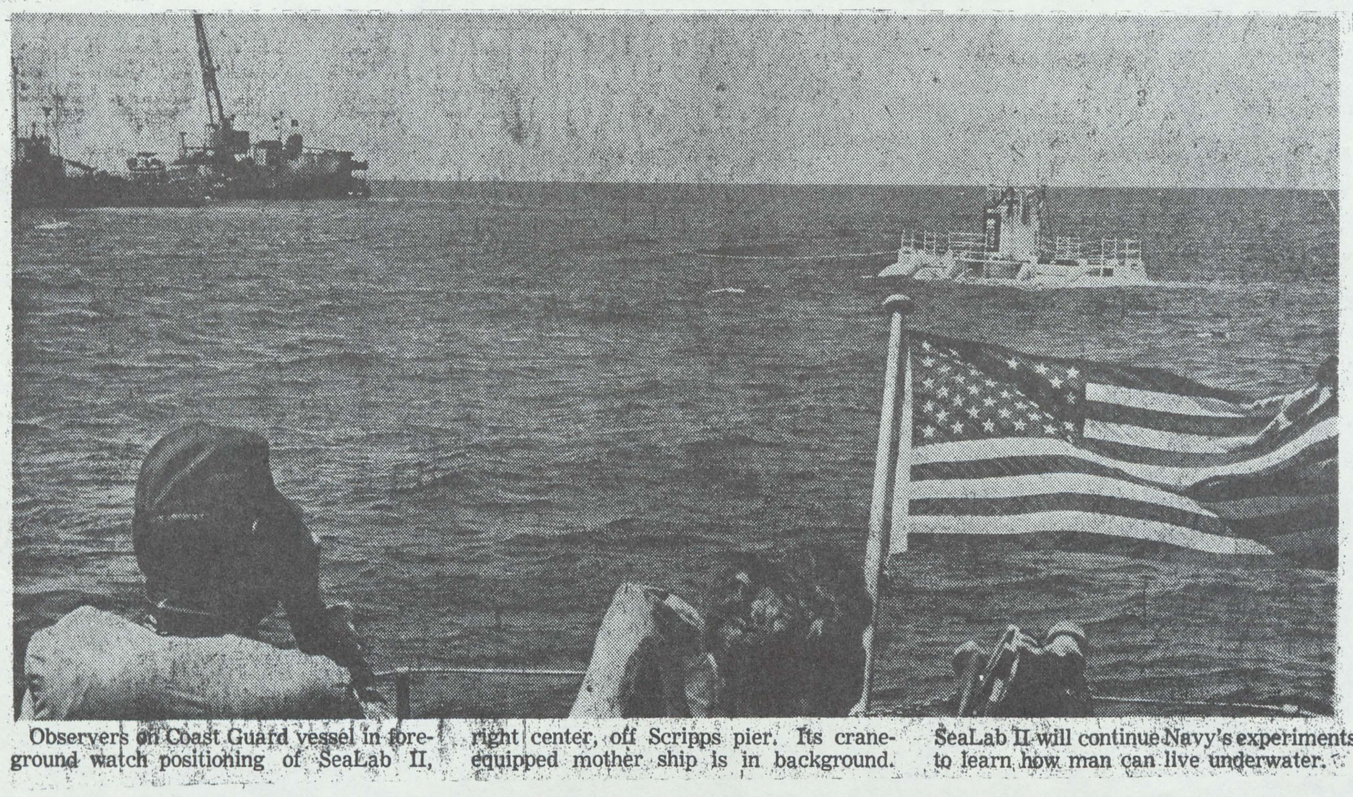
Final Test Near

Bond, who also is director of the Navy's Man in the Sea program, said compressed air would be pumped into the lab in a final test for high-pressure leaks.

Dr. George Bond, principal investigator for the Sealab Project and director of the Navy's Man in the Sea program, said compressed air would be pumped into the lab in a final test for high-pressure leaks.

When the air inside reaches 100 pounds per square inch, slightly more than the pressure at the depth it will be used, the air will be bled off and pumps will form a partial vacuum inside.

Then the atmosphere which the aquanauts will breathe will be made.



Observers on Coast Guard vessel in foreground watch positioning of SeaLab II, right center, off Scripps pier. Its crane-equipped mother ship is in background. SeaLab II will continue Navy's experiments to learn how man can live underwater.

HAL HUMPHREY

NASA Nixes Live TV on Space Trip

The TV networks lost out in their efforts to get the National Aeronautics and Space Administration to put TV cameras aboard Gemini-Titan 5 for its scheduled flight next Thursday.

Several meetings with NASA administrator James Webb on the subject of on-board TV brought the same answer—that he, Webb, would not oppose Dr. George Mueller, NASA's associate administrator for manned space flight.



Roy Neal

It has been Dr. Mueller's contention that there is no good reason to divert the extra money, weight and power required for TV cameras which were not planned for originally in the Gemini series of space flights.

Besides network pressure, NASA also has been asked about on-board TV by the National Aeronautics and Space Council which is headed by Vice President Hubert Humphrey. Astronaut Gordon Cooper, who will make the G-T 5 flight with Charles Conrad, wanted TV cameras because he said he found them useful on his 22-orbit Mercury mission in May, 1963.

With TV cameras on the G-T 5 the networks could have brought viewers live pictures of astronauts Cooper and Conrad to relieve some of the monotony bound to accumulate for home viewers in the proposed eight-day duration of this flight.

Another blow to the networks' planned coverage of G-T 5 was the Department of Defense refusal for live TV coverage of the landing and recovery operation from aboard the U.S.S. Champlain.

Official Reason

Tests were made last month and a signal was successfully bounced off the Early Bird satellite which the networks say would have been just as easy from portable equipment aboard the recovery ship in the Atlantic.

The official reason given for banning TV at the recovery site was that it would endanger safety. An unofficial version is that a battle was developing between International Telephone & Telegraph and COMSAT over which corporation's equipment would be used.

Now the Department of Defense has notified the network pool it may be able to telecast the recovery of G-T 6 which is scheduled for an early October flight.

Roy Neal, aeronautic and space correspondent for NBC, says TV will have a couple of new things to show viewers. One of these is the Navy's underwater C-Lab II which is scheduled to be submerged in 210 feet of Pacific water off the California coast at La Jolla, the day before the G-T 5 launch.

"When Cooper and Conrad are making their 17th orbit, they will be passing over La Jolla," Neal reports, "and the TV pool plans to pick up their conversation with astronaut Scott Carpenter who will be down in C-Lab II with a crew of nine."

The Navy C-Lab II is equipped with four TV cameras —two inside and two on the outside hull. If things go right, viewers can watch Carpenter's end of the conversation with G-T 5 and whatever underwater denizens are hovering in the vicinity.

Space Test

Some time during its eight-day space tour, G-T 5 will eject what Neal describes as "a bundle of cans tied together" and called R.E.P. for Radar Evaluation Pod. This 3 by 2-foot object will float in space around G-T 5 and Cooper and Conrad will take aim at it for purposes of testing G-T 5's maneuverability in linking up with a space satellite.

Pictures of this operation, of course, will not be seen until after the flight when the film in G-T 5's movie cameras is developed.

This procedure also will apply to the firing of two Minute Men missiles from Vandenberg and one Polaris from Cape Kennedy during one of G-T 5's passes over the United States.

"Eventually we'll see how those launches looked to Cooper and Conrad from over a hundred miles up, but not with live TV cameras," says Neal, edgily.

If NASA's Mueller ever relents in what seems almost a passion to keep live TV out of his manned space flights, the TV networks will be able to put on quite a show.

SEALAB READY FOR DIVE

Aquanauts to Conduct Salvage Tests

Editor's Note — The aquanauts will be among the busiest men in the San Diego area when Sealab gets under way here next week. This is the second in a series of stories on what they will be doing.

By LEO BOWLER
EVENING TRIBUNE Science Writer

Sealab's divers will have a relic of the air age with them on the bottom of the sea. One of their jobs will be to get it to the surface.

Testing methods of recovering undersea objects, ranging from the airplane to submarines, will be a major part of their work.

They will test a new technique with the airplane, but first they will practice on oil drums.

Six drums will be anchored on the bottom. Then hoses will be lowered from the staging vessel above Sealab. The divers will man their end of the hoses, and a chemical will be pumped through them from above.

To Float Drums

The aquanauts will see that the chemical enters the drums and drives the water out. Then it will harden into a rigid buoyant material which will float the drums on the ends of their tethers.

Periodically, the drums will be freed from their anchors by the divers and allowed to float to the surface. The reason for the delay between filling and floating is to determine what effects long periods underwater has on the chemical foam with which the aquanauts will fill them.

The same technique will be used on the aircraft. The plane will be anchored to the bottom during the experiment for reasons of safety. It will be floated to the surface when the area above it is clear.

Patchwork Planned

The aquanauts will attempt to put a patch on a secton of steel shaped like a part of a submarine's hull, just as they might try to patch a sub if it were disabled in deep water.

A standard but little used tool called an underwater stud driver will be used to "nail" the patch to the steel over a hole prepared in advance.

The patch will be a piece of steel plate a foot square. A rubber gasket will be used between the patch and the hull.

After the patch has been applied, the steel will be raised and taken to Long Beach Naval Shipyard to determine if it is waterproof enough to work under actual submarine slavage conditions.

A second submarine salvage technique to be tested is an attempt to "nail" a lifting pad to a simulated submarine hull, also with a stud driver.

The lifting pad will be designed so that a buoyant lifting device can be attached to it. It must withstand a pull of 10 tons in any direction after installation.

The simulated hull also will be raised after the experiment and taken to Long Beach for extensive tests to determine the actual load it will withstand.

Before the simulated hull and its pad are raised, however, the aquanauts will use it in another test.

They want to determine the feasibility of using a huge collapsible rubber container as a lifting pontoon in salvage work.

The container will be attached to the lift pad and inflated. It is expected to produce a little over eight tons of lift, not enough to raise the simulated hull, but strong enough to form a preliminary test of the holding power of the pad.

The experiment also will give a good indication of the feasibility of the rubber pontoon in salvage work.

Frank Rhoades

The 20 MEN who will spend 30 days each 200 feet below the sea during the Sea Lab II operation here will be fed by La Jolla restaurateur **Jimmy Erdman** and **Gene Merrill,** a CPA. The company they have formed to handle the job also will supply meals to the 45 working on the barge above the capsule, a mile off Scripps Pier. The underwater explorers will receive 3,700 calories daily—more than is recommended for common laborers. Erdman was instructed by the Navy to go heavy on starches (creamed soups, spaghetti, lots of bread), but few sweets. The divers will work in two 10-man teams, each team submerged 30 days.



Here's the best news of the summer.

* * *

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From
POST, Denver, Colo.
AUG 15 1965

More Knowledge of Sea a 'Must'

IT DIDN'T make any headlines but the Senate took an important step last week when it passed and sent to the House the Marine Resources and Engineering Development Act of 1965.

In years to come this action may rank along with the passage of medicare and the voting rights bill as one of the major accomplishments of an extraordinarily busy session.

At the present time more than a score of government agencies are engaged in ocean research and development work and they will spend $141.6 million during the current fiscal year.

There is an inter-agency committee which is supposed to coordinate the work of the various agencies, but it has no staff of experts and has no prestige or authority to develop a national policy on research or the development of food, mineral and other resources.

By comparison with our space expenditures, the $141.6 million looks rather puny, particularly when we consider that 71 per cent of the earth surface is covered by water, that man knows very little about the ocean depths or their effects on weather and that "farming" and "mining" of the sea will become increasingly necessary as the world population expands.

Men knowledgeable about such matters foresee a time when cargo submarines may carry a large share of world trade, undisturbed by surface weather conditions, when ocean currents will be harnessed, when sea water will be desalinized for the use of coastal cities.

More knowledge of the sea also is a "must" from the standpoint of national security in this age of Polaris and similar missiles.

THE bill passed by the Senate, with bipartisan support, would establish a National Council on Marine Resources and Engineering Development at cabinet rank, similar to the National Security Council and the National Space and Aeronautics Council.

It also would establish a Commission on Marine Science, Engineering and Resources composed of men from government, industry and universities and laboratories engaged in oceanography.

It would be the duty of these groups to accelerate the development of underseas resources — fish, chemicals, etc., to encourage private investments in marine commerce and the utilization of marine resources, to promote exploration and the development of exploration equipment and, generally, to preserve the leadership of the country in all marine sciences.

It is a big order but one worthy of the special effort the Senate bill seeks to advance.

SAN DIEGO
EVENING TRIBUNE
AUG 17 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

Sealab Dive Is Delayed

Minor difficulties have delayed Sealab II at least another day, the project's director, Navy Capt. Lewis B. Melson, said today.

The mother ship Berkone was due to arrive off La Jolla this morning, but will not be here until tomorrow, Melson said.

Melson said there was no major problem with the ship but that workmen in Long Beach were still checking out its equipment for malfunctions.

This means that the divers will not be in Sealab on the ocean bottom off La Jolla until Sunday or Monday. They originally had been scheduled to enter the 57-foot steel cylinder this week, but the program has slipped repeatedly because of minor troubles.

Sealab is an experiment in the Navy's Man in the Sea program, during which shifts of 10 divers will remain on the bottom for 15-day periods. One diver, Cdr. Scott Carpenter, who is both an astronaut and aquanaut, will stay down for 30 days.

4 in Project To Get Medals

The nation's highest peacetime decoration will be given to four Navy men here tomorrow for their participation in Sealab I.

Three of the four will get the Legion of Merit. The fourth, who already has received the medal, will get the Gold Star, equivalent of a second medal.

The recipients are Capt. George Bond, LCdr. Robert E. Thompson, Chief Hospital Corpsman Sanders W. (Tiger) Manning and Chief Quartermaster Robert A. Barth.

Researched Mixtures

Bond, who was one of the men who conceived the idea of Sealab I, will receive his Gold Star for "basic research into the development of correct breathing mixtures required for personnel to survive at depths to 1,000 feet."

Bond will be the principal investigator in Sealab II, starting off La Jolla Sunday and Monday.

Thompson, a doctor stationed at Naval Hospital, Manning, and Barth were divers in Sealab I. They stayed for nine days in 192 feet of water off Bermuda last year.

Assigned to Chamber

Thompson and Manning are assigned to the operation of the decompression chamber in Sealab II. The chamber will be used to readjust the aquanauts to a normal atmosphere after their stay at 210 feet for 15 days undersea in an atmosphere composed largely of helium.

Thompson is credited with saving the lives of the four Sealab I aquanauts when he stuck his thumb in a leak in the decompression chamber used in that experiment.

Barth is assigned as a diver in Sealab II.

Also to receive a decoration tomorrow is Master Chief Torpedoman Robert C. Sheats, who trained the divers for Sealab I. He will receive the Secretary of the Navy Commendation Medal.

Ceremonies at Scripps

The presentations will be made by RAdm. Walter H. Price, commandant of 11th Naval District. The ceremonies will be held in Sumner Auditorium on the Scripps Institution of Oceanography campus at 9 a.m.

Sealab I was the first undersea experiment in the Navy's Man in the Sea program. Sealab II is the second. In the second experiment, three teams of 10 men will remain on the bottom for 15 days each.

One man, Cdr. Scott Carpenter, will stay down 30 days.

The fourth diver in Sealab I, Gunners Mate Lester E. Anderson, will receive the Legion of Merit medal at a later date at his present duty station. He is in Seattle.

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San Diego, California

San Francisco, Calif.
Examiner
(Cir. D. 292,539 - S. 435,887)
AUG 17 1965

San Diego For the Aquanaut

SAN DIEGO — (AP) — The swelling tide of interest in oceanography is centering on San Diego as undersea research enters the era of the aquanaut.

Drawn by the area's climate, ocean conditions and scientific resources, government and industry are investing millions of dollars in the quest for answers to the mysteries of the sea.

Most spectacular of current operations will be the descent this month of Sealab II, the underwater laboratory designed to house 10 men at a depth of 215 feet for up to 30 days.

The 12 by 57-foot steel cylinder will be anchored on the ocean floor off nearby La Jolla as the second step in the Navy's "Man in the Sea" program.

Denzil Pauli, assistant project manager for Sealab, said the selection of the La Jolla site was based partly on water and sea floor conditions.

He noted that Sealab I operated in warm, clear water off Bermuda.

"At La Jolla, the conditions will be more realistic. The bottom is rough, the water is cold and the visibility is limited. It will give the men a better test of the more common undersea environment," he said.

Of equal or greater importance is the convenience of Scripps Institution of Oceanography.

The Sealab will go down about one-half mile off the end of Scripps pier. Scripps will supply water and power for the capsule through pipes and wires on the ocean floor.

Scripps and the Naval Electronics Laboratory have formed the nucleus for a growing number of coeanographic firms in the San Diego area.

Kennecott Copper Corps. has an office in San Diego devoted to exploring the possibilities of ocean mining.

Lockheed Aircraft and General Dynamics have opened major marine research facilities here recently.

In all, San Diego has nearly 30 firms dealing directly with oceanography.

While Scripps is a research and education facility affiliated with the University of California, the Naval Electronics Lab's function is to find better scientific weapons for sea warfare.

Typical of the Navy's work are its plans to bring the undersea research vehicle Deepstar to San Diego for a year's work.

The Deepstar program is part of extensive studies conducted at NEL in oceanography, acoustics, marine geology and biology.

The Navy has just awarded Lockheed a $2 million contract to study sound transmission beneath the surface of the ocean. Two ships, one from Scripps, will be used in the experiments.

MAN IN ORBIT TO TALK WITH PAL UNDER SEA

Cooper and Carpenter to Stage Feat

BY SEYMOUR KORMAN
[Chicago Tribune Press Service]

LaJolla, Cal., Aug. 11 — A conversation between an astronaut orbiting the earth and an aquanaut deep in the Pacific ocean is being planned as part of the navy's big underwater project beginning here Aug. 18, it was disclosed today.

Those scheduled to participate in this amazing and unprecedented communication, beyond the imagination even of science fiction writers, are Maj. Gordon Cooper and Navy Commander M. Scott Carpenter.

Cooper will be in the Gemini 5 capsule which will be launched Aug. 19 for an eight day outer space orbit. Carpenter will be one of 10 men in Sealab II, moored 210 feet below the ocean surface, 4,000 feet off La Jolla.

Thru Tracking Station

Carpenter, the only astronaut who is also an aquanaut, orbited the earth three times on May 24, 1962. He and Cooper are two of the original seven astronauts.

The radio - telephone transmission between Gemini and Sealab II will be handled thru a tracking station at Point Arguello, Cal., using combined facilities of the navy and the National Aeronautics and Space administration. The date for the conversation has not yet been set.

Carpenter and one other aquanaut, not yet identified, will remain below 30 days. The eight others who descend with them Aug. 18 will come up after 15 days and will be succeeded by another team who will remain in Sealab II the last 15 days. Scripps Institute of Oceanography, part of the University of California at San Diego, is working with the navy on the task.

Sealab 57 Feet Long

Sealab II is a specially constructed craft 57 feet long, containing laboratory, galley and bunkroom. Sealab II is now at Longbeach, Cal., and will be towed here Aug. 17.

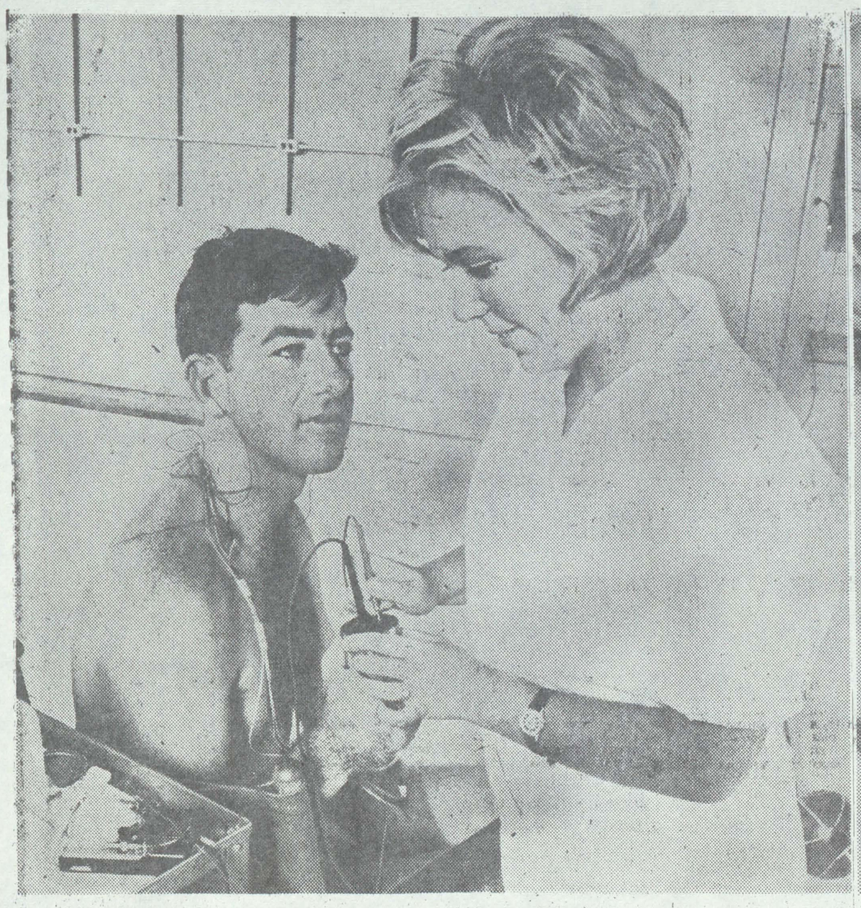
The aquanauts will swim out from their laboratory housing for studies of marine life, pressure changes and current velocities. The experiment is part of the navy's long range study to determine how effectively men can work on the ocean bottom.

In the Sealab I experiment off Bermuda in the summer of 1964 four divers lived and worked at a depth of 193 feet for 11 days.

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San Diego, California

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SeaLab Monitoring Devices Checked Out



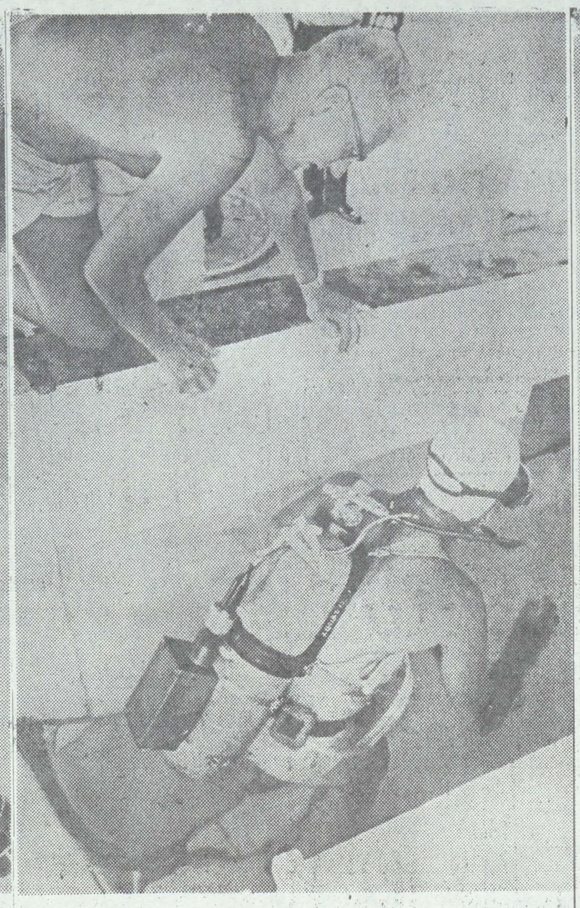
Reidun Bakkehoei of Oslo, Norway, checks connection of wires to electrodes on Monte Kirven in checkout of brain and heart monitoring system.

A Norwegian scientist who has been investigating the brain waves of astronauts yesterday made check-out tests of equipment he will use on SeaLab II aquanauts.

To do so, Dr. Carl Wilhelm Sem-Jacobsen of Oslo used the new physiology laboratory on the campus of the Scripps Institution of Oceanography to measure the brain waves and obtain an electrocardiogram of a swimming man.

He plans to use the same equipment to test the response of at least one of the aquanauts while he is swimming 210 feet under water. In this way he will establish two measurements of the effect of depth on the human body.

In his tests yesterday Monte Kirven, a Scripps employe, had electrodes placed in his body and in his skull. Then he donned a scuba diving gear and went for a swim in the moat and pool connected with the new laboratory.

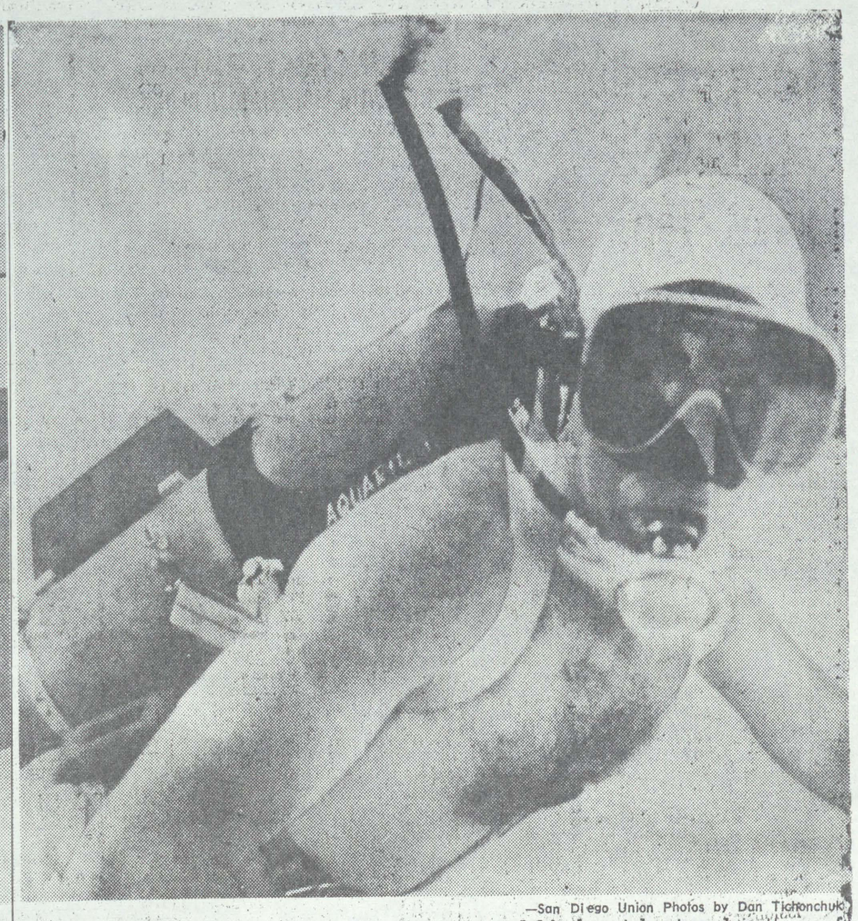


Dr. Carl Wilhelm Sem-Jacobsen starts Kirven on swim in preparation for SeaLab tests.

The electrodes were wired to a small recording device strapped to his back beneath his air tank. During the swim he would rest under water, swim with his legs only, swim with his arms only and then with both. In the meantime Sem-Jacobsen's assistants monitored what he was doing in order to compare it with the tracings of the brain wave and heart beats on the recorder.

Sem-Jacobsen is making the tests under contract with the Office of Naval Research and in conjunction with the neurological division of Naval Hospital.

He said that for years he monitored reactions of jet pilots for the U.S. Air Force and more recently has been doing the same thing for the National Aeronautics and Space Administration astronauts.



Kirven swims by window in Scripps physiological lab as electronic devices record his heart beat and pattern of brain waves.

—San Diego Union Photos by Dan Tichonchuk

SAN DIEGO UN
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San Diego, Californ

Leak, Caution Delay Arrival Of SeaLab II

A leak in a gas storage bottle and a decision to procede with caution yesterday caused a delay in moving the SeaLab II from Long Beach to San Diego.

The storage container—aboard the SeaLab — contains atmospheric gases. It is used by personnel aboard if regular air sources fail when they are submerged. The leak was repaired late yesterday.

Last night the 58-foot long tank that is to be a habitat for 10 men was being towed by the salvage vessel Gear toward La Jolla.

The Navy allowed 36 hours for the tow in order to avoid any tendency to endanger the SeaLab from haste. The SeaLab may arrive here late today or early tomorrow.

BOTTOM STUDIED

In the meantime, engineers continued their study of the bottom terrain in the vicinity where the SeaLab will rest for the 45 days while three teams of aquanauts will test their ability to live under 210 feet of seawater in a pressurized, helium-rich atmosphere.

Some of the first sites picked were found to be pleasantly contoured valleys, but covered by such a thick layer of silt that it would have prevented entering and leaving the chamber. The entrance is in the bottom of the lab.

Denzil Pauli, assistant program manager of the operation, said that the exact final spot has not yet been designated but that it has been decided to place the lab on an underwater hillside.

TERRACE PLANNED

To do this, Pauli said, it will be necessary to conduct a "washout" operation by hard-hat divers. They will cut a step into the hillside by forcing water around the SeaLab. When the job is completed the astronauts new home will rest on its own small submarine terrace.

Pauli said that it will be about 3,000 feet from the end of the Scripps Institution of Oceanography pier.

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Eleventh Naval Distric
San Diego, Californ

He said that Navy divers had reported that at the depth of the bottom in this region the water has been fairly clear. The region is under what oceanographers call the thermocline—the base of the top layer of relatively warm water. This lower cold water tends to be clearer.

Two men at the 200 foot depth, Pauli said, could see each other at a distance of 30 feet.

The temperature of the water this deep is 47 degrees—about 25 degrees colder than the surface water. Aquanauts who will live in 80-degree heat inside the SeaLab will have the experience of going from a semi-tropical country directly into the arctic when they step into the cold water.

The SeaLab II operation is part of the Navy's Man-in-the-Sea program to test man's ability to live and work under water on the continental shelf and to find ways to help him. The men will live under 6½ atmospheres of pressure to equal the pressure of the sea around them.

The purposes and the aims of the project were described last night at the annual public relations awards dinner of the Junior Chamber of Commerce in the Yacht Club Motor Hotel by Capt. Lewis B. Melson, USN, director of the project.

Capt. George Bond (MC) USN, is director of the Man-in-the-Sea program and chief scientific investigator for SeaLab II. He has been completing arrangements for the dive for the last two days in La Jolla.

Cmdr. M. Scott Carpenter, USN, an astronaut, is team captain of the first 10-man team which will make the descent—probably next Monday. He will stay below during both the 15-day residencies of Team 1 and Team 2.

Carpenter has remained working at the SeaLab in Long Beach, but is expected to meet with the team early today on the Scripps Campus.

THE VIEW FROM HERE / **Loudon Wainwright**

Exploring depths of sea and men

Man is restless in his narrow envelope of air and nibbles constantly to escape it. Though it's quite enough for me to function day by day in a normal environment where I don't need a space suit or a diving lung, there are others—I suppose they lead the way to everything—who gnaw at the limits of the envelope, working their ways up or down in what appears to be some sort of instinctual effort to prove that man is omnipotent. They give all sorts of sound reasons for their adventurous behavior—exploration of outer space and undersea can bring untold rewards for the people of Earth—but it has always seemed to me that the real reasons are much more personal. In three years of working with the Mercury Astronauts in the beginnings of manned space flight, I heard a lot of sincere conversation about how important these rides were for the country and for science and for the young people of America, but I remain absolutely convinced that the most important thing to each pilot about his flight was the fact that *he*, by God, did it.

Certainly one of this summer's most interesting efforts to break the constraints of normal living is Sealab II. This is the Navy undersea project in which groups of 10 men, using the tanklike Sealab II as a home base, will live and work at a depth of more than 200 feet for periods varying from 15 to 30 days at a stretch. The operation will begin sometime this month under the Pacific off La Jolla, Calif. and terminate if all goes well in early October. One of the key men aboard is Scott Carpenter, who was the second American to orbit the earth and who—going now in the other direction—will be in command of the submerged crew.

One of the first things that drew my attention when I visited Carpenter and the Sealab staff recently was the fact that they appear to be anxious to achieve under the water somewhat the normal tenor of life on the surface. For example, the projected plan for Day Number 7 reads in part: "Free Day. Sorties to limit of grid if desired. Holiday routine. Pursue work of own or collective choice."

Translating the Navyese, the illusion of pleasant leisure time is clear. Why, on such a splendid free day a man can read, write letters to be hauled up from Sealab II and sent to his surface home, play cards, watch television on the entertainment monitor near the galley, or with his buddy diver put on breathing apparatus and venture out for a spooky afternoon's sortie into the bitter murk of the surrounding depths. Surely this semblance of normality is critically important in an environment referred to by even its most experienced explorers as "hostile." Without a scheduled routine of work and rest, without a structure of responsibility in which there are tasks to be done and leaders to be followed, man could succumb to a hopeless, irrational anarchy whose most likely end is death by pressure sickness or drowning.

Temporarily detached from his space program duties to work with the underwater project, Carpenter showed me around Sealab II as it stood high and dry in the Navy shipyard at Long Beach. We climbed in through a hatch at the bottom of the 57-foot-long tank. Before it is submerged, Carpenter explained, the atmospheric pressure inside will be raised until it equals the pressure at the bottom, and when Sealab II is in place, the hatch will be opened and the divers, both Navy men and civilians from the Scripps Institution of Oceanography, will be able to move freely in and out.

The inside of Sealab is utterly simple in design. In the area of the hatch there are showers where the divers, returning from waters whose temperatures will be as low as 48°, can warm themselves. In the middle of the tank, which is roughly 12 feet across, there is a complex of instrumentation and laboratory equipment and also a simple galley with an electric stove. The forward compartment is the bunk room, and there are 10 bunks, each with its individual reading light. In this homey shelter deep under the sea, Carpenter advised me, taps will be at 10.

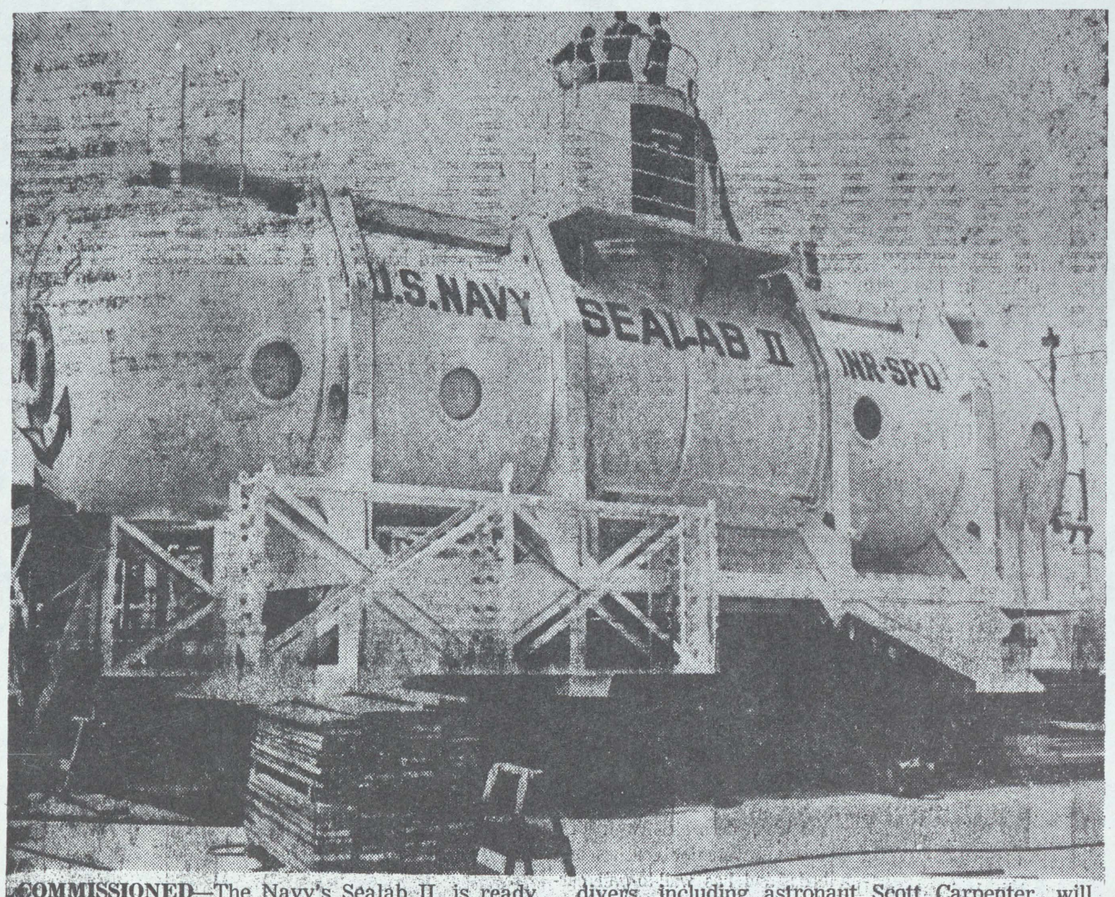
After he had told me about the various experiments, including the construction of an underwater weather station and an attempt to float a sunken airplane, that will be conducted during Sealab's stay on the bottom, Carpenter talked about the matter that obviously interested him most—the nature of human reactions to prolonged exposure to the depths. "The big parallels between this and space flight," he said, "are isolation, confinement and existence in an environment that won't support man without special help. We'll be running a lot of tests to determine how well a man can work, how his strength and dexterity hold up after long exposure to cold water. But we'll also be trying to get some idea of how men's minds work in those conditions."

I asked how they would do that. "We'll work with simple logic problems and arithmetic calculations," Carpenter explained. "Other exercises will require some original thought and all of them should give us some idea of what happens to mental processes in that situation. We'll be keeping account of our moods, of moments of anxiety or hilarity. I'm sure we'll find out some interesting things about ourselves."

How the men will behave below is also of prime concern to Dr. George Bond, the Navy captain who is the guiding boss of Sealab. Bond, who once personally proved out an escape technique by swimming to the surface without breathing equipment from a submarine parked over 300 feet down, will be in charge of operations from a vessel moored directly over his divers. Recalling one incident that took place last summer when the crew of Sealab I stayed down for 10 days at 192 feet off Bermuda, Bond said: "At first they addressed me over the intercom as 'Topside Control.' Soon they began calling me 'Poppa Topside,' and I knew the emotional umbilical to the surface had been broken. They felt free and confident and from then on I provided more fatherly counsel than orders. There's danger in too much confidence," he finished. "You can't breathe the stuff."

Before I ended my visit, I asked Scott Carpenter why he had volunteered for this new and extensive exposure to danger. "I'm curious about the bottom of the ocean," he answered, "and this gives me a chance to investigate a lot of the questions we have about it. It's a tremendous opportunity to learn more about this planet." These reasons had a familiar ring to me. Then, with characteristically thorough truthfulness, Carpenter added with a grin, "I guess I also get some pleasure out of doing things other people haven't done."

Sealab II is painted white on the outside, and as I looked at it I tried to imagine how it will look to a diver returning to the tank after he has worked his limit of perhaps an hour in the cold dark. Out of the envelope of normal life, he will be coming back to a little piece of it. He probably won't be able to see the tank until he gets quite close, but floodlights outside will show him the way. Then he will see the lights shining through the ports. In anticipation of a good, hot shower, a change of clothes, perhaps a little reading before hitting the sack, he will hurry a bit as he swims past the cage that keeps the sharks from the door, pops up through the open hatch and, like any surface man at the end of the day, sniffs to see what's on for dinner.



COMMISSIONED—The Navy's Sealab II, is ready for christening ceremonies in Long Beach. Twenty divers, including astronaut Scott Carpenter, will call it home for 30 days off La Jolla.—(AP) Photo

NBC to Televise Sea Tests

The TV Front: Pickup of Sealab 2 Planned

By RICHARD K. DOAN

The nation's TV audiences next month will see live pictures transmitted from a Navy underseas laboratory positioned 250 feet below the surface of the Pacific Ocean.

Pictures of Comdr. Scott Carpenter, the astronaut, and nine men spending 30 days under water with him in a Sealab 2 project will be televised on the three national TV networks during the Gemini - Titan 5 eight - day space flight tentatively scheduled for blast-off Aug. 19.



Doan

Details of the planned TV pickup from deep inside the ocean a mile off La Jolla, Calif., were disclosed by NBC News, which will handle a pooled operation for the networks.

The underwater project will involve experiments in communication between the Sealab and the orbiting G-T 5 spacecraft.

Carpenter and his Navy crew also will conduct tests outside the Sealab such as determining problems in raising a plane from that depth.

A major purpose of the 30-day stay in the ocean depths will be, of course, to determine how well man can live and work for extended periods in such an environment.

The Sealab will have four unmanned, fixed-position TV cameras aboard, two inside, two on the outside. An NBC spokesman said that the telecasts from the Sealab will include voice reports from its crew.

The undersea craft is a 12 by 50 foot cylindral submarine designed by the Navy Mine Defense Laboratory in Panama City, Fla.

A briefer Sealab 1 experiment was conducted off Bermuda.

Mechanical Repair Man On 'Beehive'

By LEO BOWLER
EVENING TRIBUNE Science Writer

An undersea communications center which lives in a bath of kerosene and does its own electronic repair work is undergoing a final checkout here today.

The center, called the Benthic Laboratory, is the brain child of a group of Scripps Institution of Oceanography scientists. It will be a vital part of the Sealab II project starting Sunday or Monday.

One of its most interesting features is a mechanical hand which will remove worn out or broken parts, discard them, and then reach into a spare parts bin for a replacement.

Hopes Revealed

It will accomplish this under 210 feet of ocean water 4,000 feet from shore.

If the Benthic Lab survives Sealab, it will seek new undersea worlds to conquer. Scientists hope to put it to work in 1,200 feet of water later.

The lab looks like a beehive perched on top of a stool. It weighs seven tons. It will be put in place off Scripps Pier tomorrow or Friday.

One Wire Planned

The lab's job is to take the multitude of electronic signals coming out of Sealab and multiplex them. This means that they will transmitted from the lab to shore on one wire.

Sealab needs more than 40 channels to transmit voice and television signals, and 128 channels to transmit other data. It would cost too much to lay a separate wire to shore for each channel. So all must be carried on one wire. It takes a lot of delicate electronic parts to accomplish this.

Source for Power Is Major Problem

Project Chief Tells Possibilities Of Big Repairs on Ocean Bottom

By LEO BOWLER
EVENING TRIBUNE Science Writer

A strange craft loaded with men and equipment puts out from shore after a call for help from a submarine stricken in 600 feet of water.

The craft hovers momentarily over the disabled sub, then slowly sinks to the bottom. Then men inside bring their atmosphere up to the pressure of the water around them, open a hatch and swim to the sub.

A swarm of divers, in 600 feet of water, working from a self-propelled vessel which can stay at the bottom for an indefinite period?

Dream of Sealab Men

That's the dream of the men who are carrying on Project Sealab II here.

"We want to cut the umbilical cable that ties us to land and to the surface," said Capt. Lewis B. Melson, director of Sealab. "We want the ability to work for prolonged periods on the sea bottom with no dependence on the surface.

"We want to salvage a submarine or a downed aircraft and we want to explore the continental shelf.

"With the exception of one thing, we have the technology to do it today."

Idea Born

The idea of installing a lab on the sea floor to multiplex signals from many sources was conceived at Scripps long before Sealab was started. A lot of work had been done when the need for such a communications center for Sealab arose.

Dr. Victor Anderson, assistant director of Scripp's Marine Physical Laboratory, took charge of the work of preparing the Benthic Lab.

The beehive is cast of concrete like an inverted cup. A rubber diaphram covers the bottom.

Bouyancy Key

After all the electronic gear is installed, it will be pumped full of kerosene. The diaphram will hold the kerosene in until the lab is lowered into the sea. Then the bouyancy of the kerosene will do the job.

Because of the kerosene, it will not be possible for any sea water to enter the lab. If the inside were to be left full of air, it would be necessary to house the instruments in a sealed steel container strong enough to withstand the pressure of the sea at the great depths where the Benthic Lab will be used ultimately.

Some Rewarding

Every type of electronic component used in the lab had to be tested to see if it would work in a kerosene bath and if it would withstand the pressures involved. Anderson said that many were found which could be used in the deepest part of the ocean.

Then they guide the hand to the card, remove and replace it with a spare.

Anderson says that 90 per cent of the electronic gear in the lab can be replaced in this manner.

The arm can move vertically along the central column, or can swing all the way around the column. The wrist has the ability of swinging from side to side, up or down, and can rotate.

The Benthic Lab will be taken to the Sealab site off Scripps Pier by a converted Landing Ship Utility which will also lay all the undersea cable. The lab will be lowered to the bottom by a crane from the Berkome, the Sealab mother ship.

One of the first jobs tackled by the aquanauts will be connecting the cables from the Benthic Lab to Sealab II.

The control center for the Benthic lab will be set up at Scripps and manned by Anderson and his men. From their TV screens they will be able to watch every inch of the kerosene filled inside of the lab and swing the mechanical hand into operation at the first sign of trouble.

Power One Exception

That one exception is a means of powering the craft, of keeping its systems running for long periods underwater with no ties to the shore, and of bringing it back to the surface after the job is done.

Internal combustion engines are out because of the undersea environment. Batteries don't last long enough. And present nuclear power plants are too cumbersome and require too many men to operate them.

Melson says scientists are working on better power sources, and he is confident that the problem will be whipped. When it is whipped, the Navy will embark on a new era of work in the sea.

Commercial Use Greater

"And the commercial use of such a system will be far greater than the military use," Melson said.

Undersea mining, drilling for oil, and harvesting the sea's food supply are some of the uses he and other scientists mention.

"That square mile of ocean out there is the best explored in the world," Melson said, waving his arm toward the area off Scripps Pier where the Sealab experiment will take place.

"Scientists have been studying it for more than 40 years. Yet when we point to a chart and ask 'What's here?' they have to answer 'We'll go look.'

'What We Don't Know'

"That's what we hit when we started talking about putting Sealab II down out there. When you multiply that by two or three million, you learn what we don't know about the continental shelves of the world."

Sealab I, Melson said, proved that men could live on the sea bottom. Sealab II will prove how much useful work he can do there.

Worse Than Space

"We think they will be able to work more than 2 hours a day. A regular diver can stay down there only 4 minutes. And he can make only one dive a day. It would take 15 divers to do an hour's work.

"And then there is the danger. We think it is worse than outer space. "The danger is in coming up, not going down. And the last 10 feet is the worst.

But electronic gear sometimes goes bad, so a way to repair it while it is on the sea floor is necessary. The presence of the kerosene and the great depths to which Anderson expects to send the lab later make the use of divers to do repairs impracticable.

So a special hand was given to the lab with which it can make its own repairs.

A cylindrical column was installed in the center of the beehive and the hand placed on an arm on the column.

The electronic gear is separated into circuits and mounted on cards of uniform size. The cards are slid into groves in a rack with plugs in the back and handles in the front.

When something goes wrong, the operator on shore, using closed circuit television to watch the results, guides the mechanical hand to a jack which can be plugged into test points. The scientists can take electronic readings from the test points until they determine which card is faulty.

"When the book says a diver must make his last decompression stop at 10 feet, it means 10 feet, not 9½ or 11. But when the waves start rolling in, how do you determine where 10 feet is?

"An aquanaut, on the other hand, just goes back into his quarters and stays on the bottom under pressure. He does all his decompressing in one session and it's a lot safer."

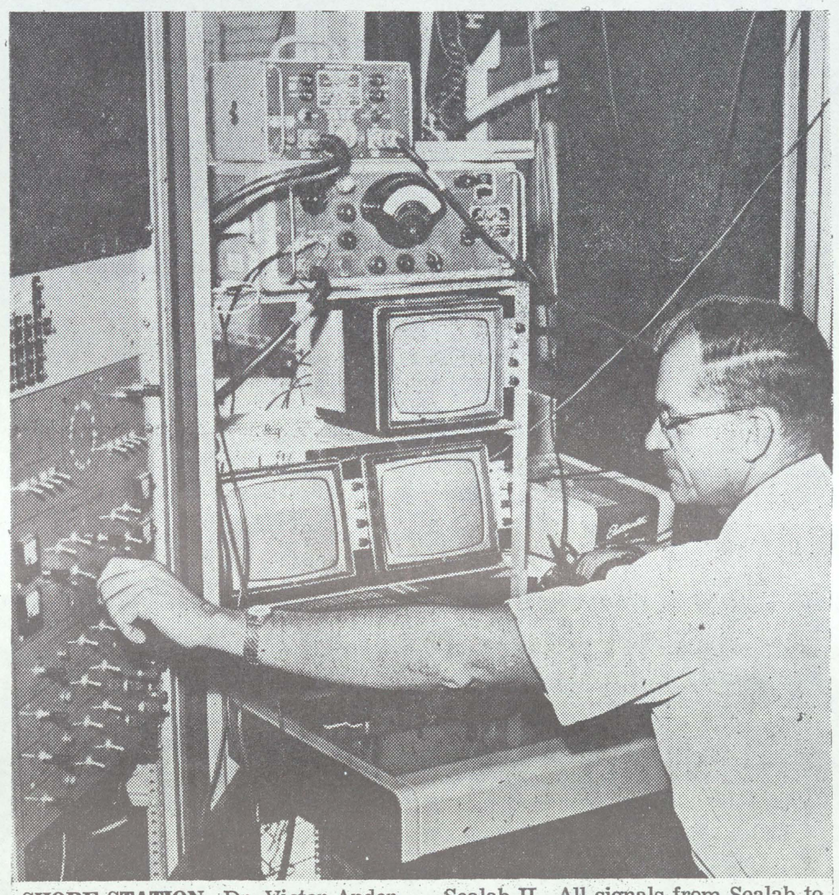
An astronaut orbiting the earth, Melson said, is basically a passenger. And he has to be a highly trained specialist.

'Give Us Capability'

"We want to be able to send a pipefitter into inner space if a pipefitter is needed, or a geologist if a geologist is needed. The Navy wants to be able to put enlisted men under the sea for their time-tested practical experience, and scientists for their knowledge.

"The Man in the Sea project is going to give us that capability."

Melson doesn't leave any doubt that he thinks the drive to conquer the sea is as important as the race into outer space.



SHORE STATION—Dr. Victor Anderson operates console which will control Benthic Lab from shore during Sealab II. All signals from Sealab to shore will pass through laboratory. It will be filled with kerosene.

San Francisco, Calif.
Examiner
Circ. D. 572,631 - S. 835,917)
AUG 23 1965

STUDY OF THE DEEP

1207

Sealab's Dive Today

LA JOLLA—(UPI)—Scientists are to lower Sealab 2 into the ocean near here today to begin a 45-day underwater expedition by astronaut Scott Carpenter, nine scientists and a porpoise named Tuffy.

The 200-ton steel cylinder originally was to be lowered yesterday but it was delayed because of silt in the area which made visibility poor.

Carpenter and the other scientists are scheduled to enter the cylinder tomorrow to begin their experiments which Assistant Secretary of the Navy Robert Morse said would be a key stel in the United States' exploration of more than one million square miles of submerged land.

Sealab 2 will rest on a ledge about 210 feet deep about 3,000 feet offshore. Carpenter was schedued to spend 30 continuous days in the capsule, but the others will spend only about 15 days in it at a time.

Tuffy the porpoise will be used to carry lines from one aquanaut to another while they are outside the capsule. The navy hopes to find out if he can help divers find their way back to Sealab. Tuffy was brought here from the Point Mugu naval facility.

—Associated Press Wirephoto
ASTRONAUT CARPENTER TURNED AQUANAUT
He's checking Sealab 2's capsule

Oregonian
Portland, Oregon
(Circ. D. 225,782 - S. 305,139)
AUG 24 1965

Navy To Start Undersea Test

SAN DIEGO, Calif. (AP) — The Navy's man-in-the-sea program is scheduled to start its greatest experiment Tuesday when 10 aquanauts descend to the ocean bottom and establish residence for 15 days.

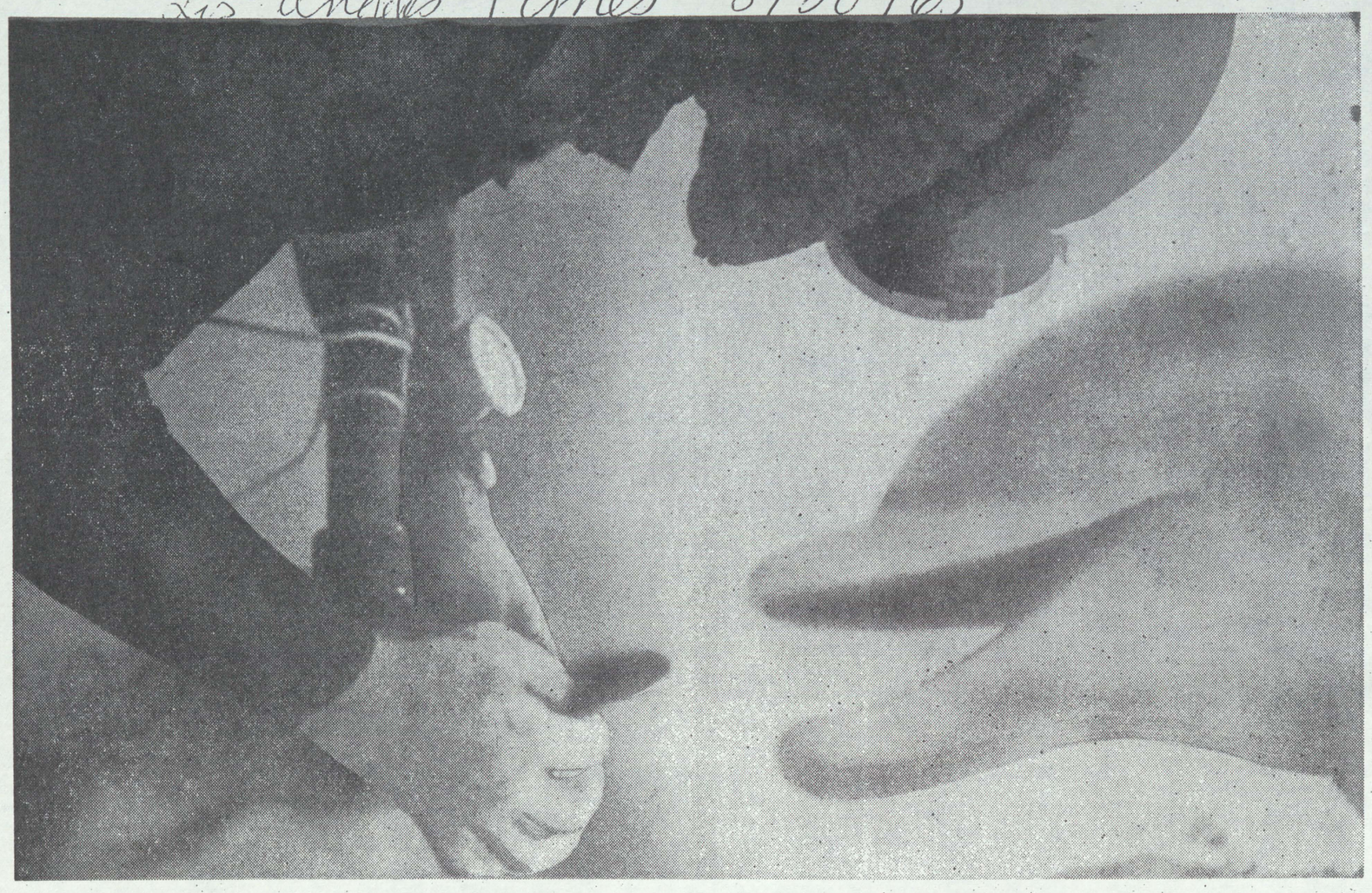
In all, 28 divers will live in Sealab II during the 45-day experiment at a depth of 210 feet.

Cmdr. G. Scott Carpenter, USN, will lead the first team. The astro-aquanaut is the only diver authorized to stay down more than 15 days. He could remain 30 days.

The Sealab, a 58-foot-long steel tank, 12 feet in diameter, was scheduled to be lowered Monday off Scripps Institution of Oceanography's pier at La Jolla.

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Los Angeles Times 8/20/65



REWARD—Tuffy, an educated dolphin who will help in Sealab experiments, receives a tasty reward for his skills from his trainer, diver John Reaves.

ASTRONAUT SCOTT CARPENTER TO LEAD DIVE

10 Aquanauts Set for 45-Day Tour Under Sea

BY CHARLES HILLINGER
Times Staff Writer

All systems aboard Sealab II—the Navy's "inner space" capsule — were reported functioning perfectly Thursday as aquanauts and scientists prepared to take up residence at the bottom of the sea for 45 days.

Sealab II, a 57-foot-long, snow-white, cigar-shaped undersea vehicle, is scheduled to be lowered to a 210-foot shelf Saturday off Scripps Institution of Oceanography at La Jolla.

Ten aquanauts breathing mixtures of 85% helium, 11% nitrogen and 4% oxygen, led by Scott Carpenter, 39, second man to orbit the earth, will enter the capsule Monday to begin man's most ambitious effort in his conquest of the sea.

Communications are planned between Carpenter on the floor of the ocean and L. Gordon Cooper Jr. in Gemini 5 when it goes into orbit.

Capts. George F. Bond and Lewis B. Melson, directors of the Office of Naval Research's Project Sealab II, in a news conference at Scripps Thursday disclosed details of the experiment.

Carpenter will live a month in the capsule. Three teams of 10 Navy divers, Scripps oceanographers and other scientists will stay submerged 15 days each.

NASA and the Navy will compare Carpenter's reactions and physiological data in the hostile environments of inner and outer space. The astronaut-aquanaut orbited the earth in a Mercury capsule three times on May 24, 1962.

The capsule includes 11 large picture windows, hot showers, bunks, a scientific lab, workshop, tables, galley and pantries stocked with food.

Pressure inside will be 6½ times greater than that at the surface (100 pounds a square inch compared with 14.3) and slightly higher than the outside water pressure, enabling a 4 foot wide bottom hatch to be opened at all times.

Aquanauts will leave the chamber via a shark-proof cage to harvest fish and other marine life for study in aquariums attached to the capsule, and to explore the ocean bottom.

Projects include salvage on a sunken Navy fighter plane and eventual recovery of the jet with experimental rubberized flotation bags, ore mining and construction of an offshore drilling rig platform.

Aquanauts will be observed to determine strength capabilities and efficiency.

The second week of the experiment, Tuffy, an educated dolphin from Point Mugu, will be pressed into service as an ocean bottom St. Bernard, leading aquanauts back to the capsule and delivering messages and equipment to divers at work as far as 300 feet from the capsule.

Tuffy will be able to remain below four minutes. Her round-trip swims to the surface for air will take a minute and a half.

Aquanauts will swim at will with self-contained helium-nitrogen-oxygen bottles —best for operating at 200-foot depths—strapped to diving suits padded with 30 to 40 pounds of weight.

"Breathing the exotic gases in our underwater home and on missions away from



ASTRO-AQUANAUT—Scott Carpenter at scene of launching of Sealab II, at the rear.

New York 38, N. Y.

From AUG 23 1965
INQUIRER
Philadelphia, Pa.

Trouble Delays Dive to Sealab

Special to The Inquirer

SAN DIEGO, Calif., Aug. 22. — The descent of Scott Carpenter and nine other divers and scientists to the Navy's Sealab II, 210 feet below the ocean's surface off nearby La Jolla, has been delayed until Tuesday morning. Minor mechanical problems were blamed.

Three teams of 10 divers each, breathing exotic mixtures of helium-nitrogen-oxygen, will live and work inside and outside the 57-foot steel chamber for 15-day periods during the next month and a half.

Carpenter, 39, second American to orbit the earth, is the diving commander of the Sealab II. He will live on the floor of the ocean a month— twice as long as any of the other aquanauts.

All Eyes On SeaLab

By BRYANT EVANS
The San Diego Union's
Science Writer

Goldfish in an aquarium lead relatively private lives compared with that of aquanauts in SeaLab II after they are submerged. Their first dive is scheduled next week.

The fish are only watched, but the aquanauts' blood pressure, heart action, breathing ability, quickness at figuring, varying strength and skill and general behavior will be under constant surveillance. In addition to gauges and meters, four television cameras will be aimed constantly at the 10 men learning to live under the sea.

This is all part of this greatest of all underwater experiments up until now. For in SeaLab II, the aquanauts will be experimenters and experimental animals subjected to an environment that is a new thing for human beings.

To collect all of the information on these submerged pioneers has required some technical triumphs.

There will be an electrocardiograph that monitors the heart action of a man swimming and sends back the readings by sonar. This is a brand new invention.

LAB DESIGNED

A benthic laboratory has been designed and built by the Scripps Institution of Oceanography to collect information and relay it on 20 audio information channels and 120 data channels. This information will be sent by a cable to a station on the Scripps campus that will be manned around the clock. The data will be recorded automatically.

NEW RESPIROMETER

A new type of respirometer will report its readings electronically to the shore laboratory. Each man's breathing volume will be tested before he descends to SeaLab to furnish a basis for comparison.

A long series of physical tests is planned in the SeaLab and outside to determine how well the men are bearing up.

All of these tests, of course, are meant to measure the effect of submerged living on humans. There are other tests of visibility and hearing which are to test the effect of various water states on man's ability to communicate at depths.

New York 38, N. Y.

From AUG 24 1965
INQUIRER
Philadelphia, Pa.

Sealab Dive Set Tuesday

LA JOLLA, Calif., Aug. 23 (AP).—Technical and mechanical problems are delaying the start of the Navy's Sealab 2 experiment to see how long men can live on the floor of the sea, officials said Monday.

Sealab 2, a 12-by-58-foot steel cylinder in which divers are to work and sleep for up to 45 days at a depth of 210 feet, is scheduled to be lowered into the ocean 3000 feet off this San Diego suburb Tuesday morning.

Astronaut M. Scott Carpenter, a Navy commander with extensive diving experience, and nine other divers and scientists are expected to descend to the underwater laboratory Tuesday night or Wednesday morning.

Chances grew dim for a planned conversation between Carpenter on the ocean floor and Astronaut L. Gordon Cooper, orbiting the earth in Gemini 5.

N Y Times
8/24/65

Navy Sealab Ready For Extensive Test Of Undersea Living

LA JOLLA, Calif., Aug. 23 (AP) — Accidents and technical problems have been delaying the start of the Navy's Sealab 2 experiment to see how long men can live on the floor of the sea, officials said today.

However, Sealab 2, a 12-by-58-foot steel cylinder in which divers are able to work and sleep for up to 45 days at a depth of 210 feet, is scheduled to be lowered into the ocean 3,000 feet off this San Diego suburb tomorrow morning.

Lieut. Comdr. M. Scott Carpenter, an astronaut who has extensive diving experience, and nine other divers and scientists are expected to descend to the underwater laboratory tomorrow night or Wednesday morning, a spokesman said.

Chances grew dim for a planned conversation between Commander Carpenter on the ocean floor and Lieut. Col. L. Gordon Cooper Jr., who is orbiting the earth in Gemini 5, because of a busy flight schedule.

The lowering of Sealab 2, originally scheduled for Aug. 15, has been delayed by numerous problems. A seven-ton beehive-shaped communications and power pod was wrecked while being lowered to the site by cable Saturday. A sudden surge of ocean currents smashed it against the bottom, cracking its concrete shell.

A new shell was made hurriedly at the nearby Naval Electronics Laboratory. The pod, to be connected by cables to a mother ship and to Sealab 2, houses electrical gear to relay power and communications between the laboratory and scientists on the surface.

Most of the divers are scheduled to spend 15 days in Sealab 2, rotating in teams of 10. Commander Carpenter will try to stay down 30 days, a new record.

Team to Live Undersea 45 Days

LA JOLLA, Calif., Aug. 21 (UPI)—Astronaut Scott Carpenter and nine other divers are about to venture into the depths of the Pacific where they will live in a steel cylinder and perform experiments.

The 200-ton, 57-foot long cylinder, Sealab II, will be occupied for a total of 45 days during the Navy's most ambitious deep submergence project. It rests 3000 feet offshore on a 210-foot deep ledge off Scripps Canyon.

The experiment is the second phase of the Navy's "man-in-the-sea" program. Last year in Sealab I, four men remained submerged in the Atlantic at a depth of 193 feet for 11 days.

All but one of the aquanauts, operating in teams of 10, will remain in Sealab II for 15 days. Carpenter will stay there for 30 straight days.

The aquanauts are to be lowered today or Monday, but technical problems could delay their descent a few days.

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Evening Standard

43,908 FRIDAY, AUGUST 20, 1965 4d. 4



MALCOLM SCOTT CARPENTER

From capsule above to capsule below

a radio hook-up is planned



GORDON COOPER



CHARLES CONRAD

NOW A DEEP-SEA SPACEMAN

A month at the bottom of the ocean

PETER FAIRLEY

While Gordon Cooper and Charles Conrad readied themselves a second time to go UP, another American spaceman—Malcolm Scott Carpenter—announced today that he was all set to become the first astronaut to go DOWN.

The 38-year-old Navy commander, father of four, will spend a month sampling "**inner** space"—living on the sea-bed.

The Sunday dive

U.S. Navy officials today gave the green light to the project, which is man's most ambitious undersea venture.

Scott Carpenter, with a nine-man team of "aquanauts," is expected to dive on Sunday.

Scientists, engineers and technicians were busy this afternoon checking and lowering a 57ft. long "house"—in which the 10 explorers will sleep, eat, rest and conduct experiments—to the ocean floor half a mile from the Scripps Oceanographic Institution at La Jolla, California.

In clear blue water

It has bunks, hot showers, central heating, air conditioning, radio and TV. It will rest in 210 feet of clear, blue water.

Carpenter — who went into outer space in May, 1962, and orbited the earth three times, is the only one who will complete the 30-day marathon.

The other divers will surface after a fortnight and be replaced by a fresh team of "aquanauts."

Why was he picked?

"Because he is used to observing, collecting and evaluating scientific data in a hostile environment," a U.S. Navl official told me todav. "and because many of the conditions in 'inner space' are similar to those in outer space."

And there should be a spectacular climax to the first week. Engineers plan a radio "hook up" between the aquanaut-astronaut under the sea and Cooper and Conrad circling overhead in space.

The only problem: The spacemen may not understand what Carpenter says. He will be breathing a strange gas mixture —85 per cent helium, 11 per cent nitrogen and only four per cent oxygen—which makes a man's voice sound like Donald Duck's.

The aquanauts have been given a heavy programme of work. Television cameras will monitor every second of their life under the sea.

Job after job

Among other jobs they will:

RAISE a crashed U.S. Navy aeroplane from the sea-floor by pumping in buoyant plastic foam. The fighter has been deliberately sunk near the sea-house;

PATCH a submarine hull with steel;

SET UP an underwater "weather station" to measure the direction of currents, pressure and temperature in the sea;

BUILD two large fish cages and a pyramid of concrete blocks, herd fish into them and study their behaviour;

TAG fish—and take a census of all species of marine life in the area. Engineers have built a special "fish rake"—a long metal roller studded with spikes —to flush out lurking organisms;

INSPECT and study the bottom—rocks, sand and the layer of water ust above. They will drop fluorescent sands to study the movement of sediment;

DO SUMS — to gnd out whether living under the sea and breathing gas under pressure has an effect on mental agility;

OBSERVE a variety of objects in the water under different lightng conditions;

MONITOR their physical and emotional condition.

The team includes a doctor, 38-year-old Lt. Robert Sonnenburg. He will check the "aquanauts'" hearts, breathing, blood, muscle-power and mental state several times a day.

One point under special scrutiny: psyhcological changes in the men after several days of underwater living.

Previous experiments have hinted that "aquanauts" undergo some sort of personality change in which they believe they are all-powerful bosses.

The living compartment of the "house"—a cylinder 12 feet in diameter with a concrete deck—has been divided into a laboratory, galley and bunk room. It has been given a shark-proof door.

The atmosphere inside will be pressurised to match the surrounding sea — at 210 feet, six times greater than on the surface. The "aquanauts" will remain under this pressure all the time, their blood and tissues saturated with the helium gas mixture. Doctors believe the mixture is safe—avoiding the old diving problem of narcosis and hallucinations caused by breathing ordinary air under pressure.

But a major problem will be cold. Because helium conducts heat away from the body much more efficiently than air, powerful heaters have been installed to keep the "house" temperature at nearly 90 degrees F.

And a special atomic generator—exuding heat—has been positioned in the seabed outside so that "aquanauts" who begin to shiver dangerously while working can warm themselves up.

All supplies—food, water and power—will be delivered daily from a "mother ship" (two large barges joined together) on the surface. And a miniature telephone exchange has been sunk near the "house" to carry voice messages and TV pictures to Navy scientists above.

The man-in-sea endurance test is part of a massive £200 million programme launched by the U.S. Navy this year with the object of opening up the world's oceans to man.

Comment from Captain L. B. Melson, director of the Naval Applications Group of the U.S. Office of Naval Research in Washington:

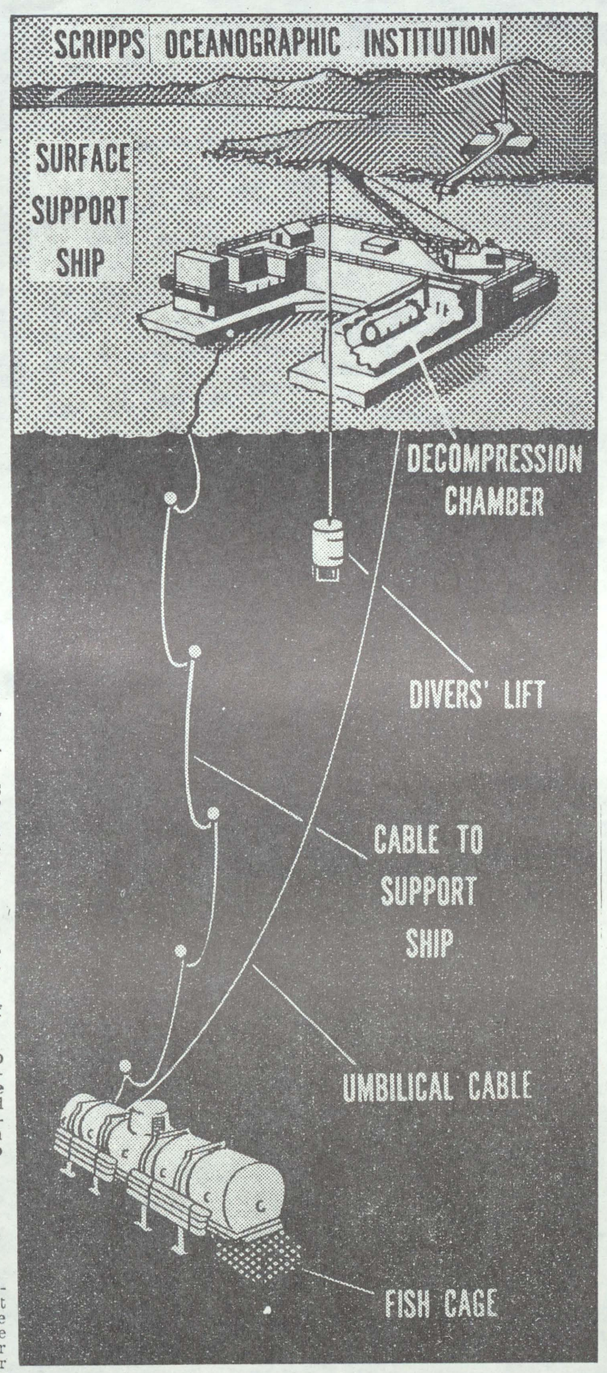
"No longer must man venture hesitantly into the oceans like a toy encased in a protective coat dangling from the end of a string tethered precariously to a ship on he surface.

"His ability to live beneath the surface at depths greater than anyone envisioned a few short years ago has been proved. He now possesses the ability to live, work, eat, sleep, and participate within the oceanic environment,remaining not for minutes, but for days, weeks or months if the need arises."

He added: "Scientists today are arguing to a certain extent about the surface of the moon in preparation for a landing, yet we kno weven less about the conditions of the bottom of the seas not more than one mile off our coastlines. Once we learn these maters, why shouldn't they become the suburbs of tomorrow for our metropolitan areas along the coastlines?"

And what will life be like under the sea?

Space in the capsule is restricted. The high pressure and exotic gas mix of the atmosphere are unique. The world outside is forbidding—cold, dark and wet. Although "only"



Evening Standard artist Leslie Green's impression of the U.S. Navy sea "house" with its surface tender off La Jolla.

New York 38, N. Y.
AUG 25 1965
FREE PRESS
Detroit, Mich.

Technical Problems Delay Sealab Again

LA JOLLA, Calif.—(AP)—New technical problems caused further delay Tuesday in the lowering of the Navy's Sealab 2, but scientists spent the time polishing the behavior of a once-pugnacious porpoise that will serve divers as an underwater errand boy.

Leaks showed up in tests of a diving bell that will take divers to and from Sealab 2 once the 12x58-foot steel cylinder is in place on the ocean floor 1,000 yards off this San Diego County resort.

The leaks were minor and easily repaired, a spokesman said, and officials planned to submerge Sealab 2 shortly. Divers and scientists are expected to begin a 45-day residence on the sea floor laboratory Wednesday afternoon.

Officials said the delays had two bright aspects:

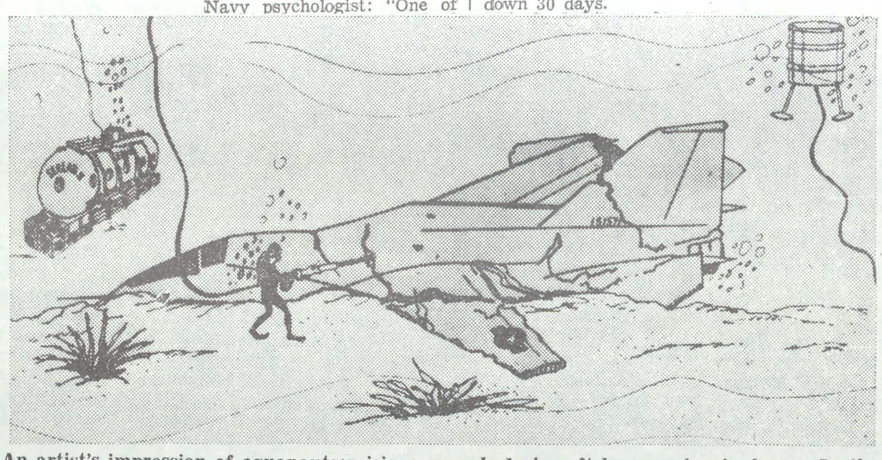
1—"Tuffy," a 270-pound male Atlantic bottlenose porpoise being trained to carry tools—and rescue lines if needed—to divers working outside Sealab 2, has reached a peak in performance.

Said Dr. James Miller, a Navy psychologist: "One of the divers was very skeptical until he saw Tuffy at work. He's really an amazing creature. I predict he'll become a real pet. And that may turn out to be a problem. Tuffy has a job to do."

Tuffy now is in training at the Naval Missile Center at Point Mugu, Calif., 150 miles to the north. He once was so belligerent he attacked handlers. Tuffy will be brought here by helicopters in about a week and kept in a pen until released to join the divers.

2—The delays have given psychologists more time to study the surface behavior of the divers for comparison with their behavior at a depth of 210 feet.

Astronaut Scott Carpenter, a Navy commander who is a diving expert, will try to stay down 30 days.



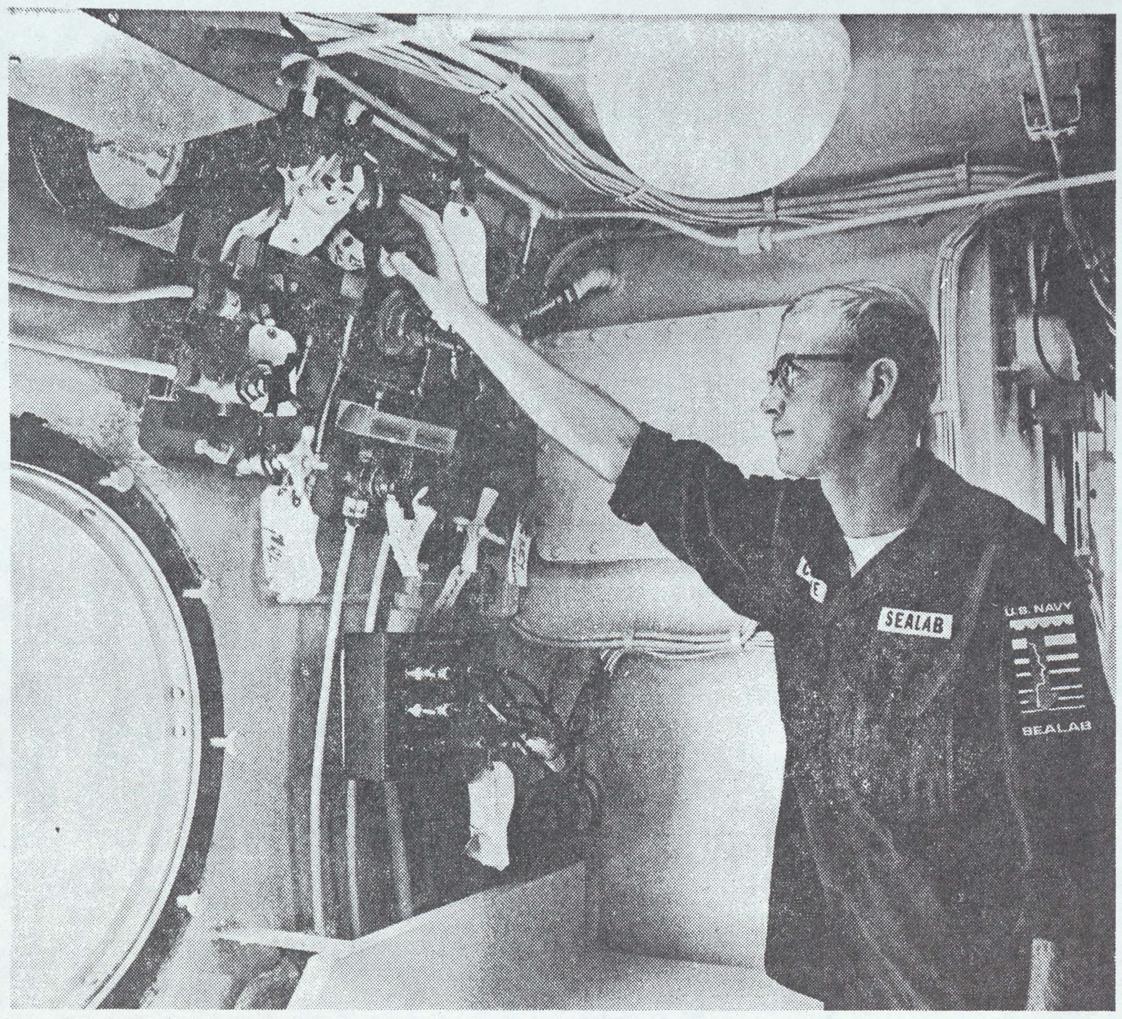
An artist's impression of aquanauts raising a wrecked aircraft by pumping in foam. In the background—the small atomic heater which aquanauts can warm themselves by in emergency.

The American Navy undersea "house" which will house the aquanauts at a depth of 210ft. for extended periods off the California coast at La Jolla.

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EVENING TRIBUNE

San Diego, Calif., Friday, August 13, 1965
Comics . . . Financial . . . Section A, Page



DEEP WORK—Thomas A. Clarke, 24, a graduate student at Scripps Institution of Oceanography, checks equipment on the Sealab which will be the undersea home of 10 aquanauts off La Jolla. Clarke is one of four San Diego area men selected for the project. Submergence program starts in August.

Sealab, Crewmen Bow At Ceremony

10 Will Live Under Water Off S.D.; Experimental Vehicle Is Christened

By BRYANT EVANS
The San Diego Union's Science Writer

LONG BEACH—Sealab II and the 10 men who will occupy this Navy-built home under the sea for 15 days next month were introduced formally at a ceremony at the Navy Shipyard here yesterday.

Capt. George Bond, head of the Navy's man-under-the-sea program, announced the "first team" that will participate in the 30-day program of submergence 3,000 feet off the Scripps Institution of Oceanography pier starting Aug. 16. Five of the 10 are residents of the San Diego area.

SAN DIEGANS

The five are Cmdr. M. Scott Carpenter, 40, astronaut, who now lives in La Jolla; Thomas A. Clarke, 24, a graduate student at the Scripps institution; Earl A. Murray, 37, a Scripps laboratory technician; Jay Skidmore, 36, a Navy photographer who lives in Chula Vista, and Lt. Robert E. Sonnenburg, USN, 27, a medical diving specialist, of East San Diego.

Other first team members are Berry L. Cannon, 30, Panama City, Fla.; Billie L. Coffman, 36, Tucson, Ariz.; Wilbur H. Eaton, 39, Fort Lauderdale, Fla.; Frederick J. Johler, 39, Buffalo, N.Y., and Cyril J. Tuckfield, 43, Miami, Fla.

The first team is scheduled to stay submerged about 15 days. Then a second team, as yet unnamed, will enter the Sealab. Travel between the vehicle and the surface will be accomplished in a diving bell.

LIKE CAR

For the first time Sealab II, flying its red, white and blue flag with symbols representing man descending beneath the waves, was shown at a press briefing before its official christening. For the first and perhaps last time before submergence, reporters and photographers were permitted to enter its spic-and-span, highly instrumented interior.

From the outside the Sealab II looks like an oversized railroad tank car, complete with central tower. The tower and hatch beneath it are used for loading equipment while the Sealab is still on the surface. The hatch will not be opened while submerged.

The structure is cylindrical, 57 feet long and 12 feet in diameter. It weighs 200 tons, is built of mild steel and withstood pressures of 180 pounds' hydrostatic pressure in Navy tests.

Under the water the hull will be under no pressure. Inside the air pressure will be maintained at 97 pounds a square inch but this will be exactly equal to the surrounding sea pressure at 210 feet under the ocean surface. This is 6.6 times the pressure of the atmosphere at sea level.

POINT STRESSED

This matter of atmosphere, Bond explained, is of the utmost importance. Men are being put under this pressure to match the sea so that they can work on the sea bottom, but if they were put under compressed air of a pressure of 97 pounds a square inch it would kill them.

This is the reason for the many valves and pipes that were visible in the Sealab. They are used to supply the ingredients for the artificial atmosphere which human beings can tolerate at that pressure. It is made up of 4 per cent oxygen, 16 per cent nitrogen and 80 per cent helium.

The oxygen level, only a fourth of that in air, is so low that there will be no smoking in Sealab II once it is submerged. There is no rule against smoking but cigarettes will not burn. The burners on the electric stove will cook but will not glow. Bond said that because of this there is a danger that aquanauts may burn their hands on the black-hot burners.

BOTTOM WELL

Entrance to the Sealab is through a well in the bottom. This well will never be closed. There is no need for closing it because the pressure inside the lab will keep the water from rising in the well.

Directly inside the well, the visitors went through the change room where aquanauts will take off their scuba diving gear, get a warm shower and proceed into the laboratory for tests and inside work. Inside the temperature will be kept at 88 degrees because the helium-rich atmosphere conducts heat away from the body much more readily than natural air.

The work and test requirements will be so heavy, Bond said, that he does not see how the aquanauts will get much sleep. Breath volume, heart rate, blood and other physiological parameters will be under constant surveillance.

PURPOSE CITED

After all, Bond said, the purpose of the experiment is to see how well man can tolerate life under the sea. The tests as well as a closed circuit television will keep the scientists on the surface informed.

The middle part of the Sealab is, accordingly, laboratory space and is fitted with a large number of instruments to monitor the men and the Sealab environment in which they live.

Sides are painted white and illumination comes from overhead semi-spherical electric fixtures fed from a 75-kilowatt power supply fed by an umbilical cord attached to the surface vessel.

SLEEPING PLACE

In the extreme end from the entrance well — there seem to be no fore and aft — are the sleeping quarters for the aquanauts. These are furnished with bunks that are folded up when not in use. Beside the lower bunks are spacious portholes that look out into the sea. One can imagine the experience of an aquanaut who, on awakening, finds a fish staring at him through the window.

Reporters also visited the Berkone. This is a huge catamaran made by putting a bridge across two steel barges. This will be the surface ship for servicing the Sealab II. It was named for Capt. Walter Mazzone, technical projects officer, and John Berkich, range engineer for the Navy Ordnance Test Station in Pasadena who helped arrange the vessel.

The Berkone will receive the upper end of all communications from Sealab and support the umbilical cord that maintains communications, electrical supply and gases. Information will be fed by cable from the Berkone to a command post on the Scripps campus.

In case anything should fail in the communications between the Berkone and the Sealab, Bond explained, the Sealab will have enough gas and food to wait for 45 days for a repair.

The Sealab will be brought to San Diego for its final testing about Aug. 1.

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VARIED TOOLS USED

Divers to Gauge Ocean Weather

Editor's Note — The aquanauts in Sealab will be very busy men during their stay under the sea. Here is the last in a series of stories on their activities.

By LEO BOWLER
EVENING TRIBUNE Science Writer

Sealab divers will have their own weather station, but it won't measure rainfall, fog, wind speed, the temperature of the air, or other factors involved in meteorology.

It will keep track instead of the weather conditions outside their home 210 feet under the surface of the sea.

In addition to other duties assigned to the aquanauts, they have a scientific program of investigations in physical and biological oceanography. The weather station is a key unit in these investigations.

Anchor Used . . .

It consists of a 500-pound anchor, a 60-foot line, a float, and instruments. The line will be attached to the anchor and held upright like a flagpole by the float.

Instruments to measure temperature of the water will be hung on the line at intervals, and there will be two meters to record the currents in the sea. One will be on the bottom and the other 30 feet above.

At the bottom of the line will be a pressure meter.

'Weather' Data

These instruments will give the aquanauts the land based equivalent of wind speed, barometric pressure, and air temperature. Other instruments will measure the visibility near the Sealab.

The aquanauts will set up the instruments themselves and keep them operating throughout their stay.

They will also have a supply of fluorescent sand which they will place in strategic locations so they can measure the movement of sediment along the bottom, stakes to put out in a grid pattern to use in making topographical measurements, and instruments to detect the movement of water along the bottom near Sealab.

The biological studies will range from the largest fish to the smallest marine organisms encountered in the area.

Build Zoo

The aquanauts will construct their own zoo which will consist of two cages, each with 1,000 cubic feet of space. After constructing the cages, they will catch fish to stock them.

The cages will be arranged so that the fish inside may be observed through the windows of Sealab. An aquanaut can watch his charges without the necessity of donning breathing tanks and swimming outside.

They will also construct concrete block "fish habitats" by stacking the blocks so that there will be tunnels and openings for fish to use, much as conservationists on land build brush piles to attract quail and rabbits.

Take Census . . .

The divers, as part of their studies, will take a fish census to determine the species and quantities encountered. Special attention will be given to tiny organisms which live in holes in the sand. These will be dug out with special tools.

Even the insides of the fish won't be safe from scientific instruments. Oceanographers want to know the composition of the gas in the bladders which fish use to regulate their buoyancy.



GOING DOWN—Three members of the 10-man team for the Navy's SeaLab II. appear before the craft before christening ceremonies Friday at the Long Beach Naval Shipyard. They are (from left) Thomas A. Clarke, 24, of La Jolla, a UCSD Scripps Institution of Oceanography graduate student; Earl A. Murray, 37, Del Mar, a laboratory assistant in marine geology; and Navy Cmdr. M. Scott Carpenter, 40, on loan from NASA.

UNDERWATER LIVING

Sealab Benefits Envisioned

San Diego Union Staff Dispatch

LONG BEACH—A prediction that Sealab II will lead to "an advanced sea habitation" as a commonplace human experience was made yesterday by Robert W. Morse, assistant secretary of the Navy for research and development, at a christening ceremony for the new facility.

At the conclusion of his address, Heidi Nitze, daughter of Paul H. Nitze, secretary of the Navy, mounted the platform next to the 57-foot-long steel dwelling and broke a bottle of champagne against it.

'I CHRISTEN YOU'

"I christen you Sealab II," she said, and the formality of launching a $1.5 million program to test how men can work under the sea was completed.

The Sealab will be brought to San Diego early next month and it is planned to put it in place 210 feet deep off the Scripps Pier about Aug. 16.

Morse discussed the underwater program of the Navy as a pioneering project for economic and military advancement of the national interest.

SCOPE NOTED

"All told, about 2,000 officers and men of the Navy are engaged in some form of underwater activity as free swimmers or divers," he said. "Yet each of these men is limited at depths of 200 feet to but a few minutes of productive effort each day.

"The provision of a saturation diving capability for these men would multiply the uses to which their talents could be applied and consequently the total number of such men who could be usefully employed by the Navy would greatly increase."

He said Sealab II is "at the threshold of expanded military capability" on every continental shelf or reef. It also will foster non-military interests, he said. They include tending pipelines, extraction of minerals, scientific research and harvesting the protein of the sea.

TREATY CITED

Morse pointed out that the continental shelf treaty signed last year gives the United States sovereign rights to undersea lands to "a depth of 200 meters (650 feet) or to a depth which admits of practicable exploitation." This is at least an area of more than a million square miles, he said.

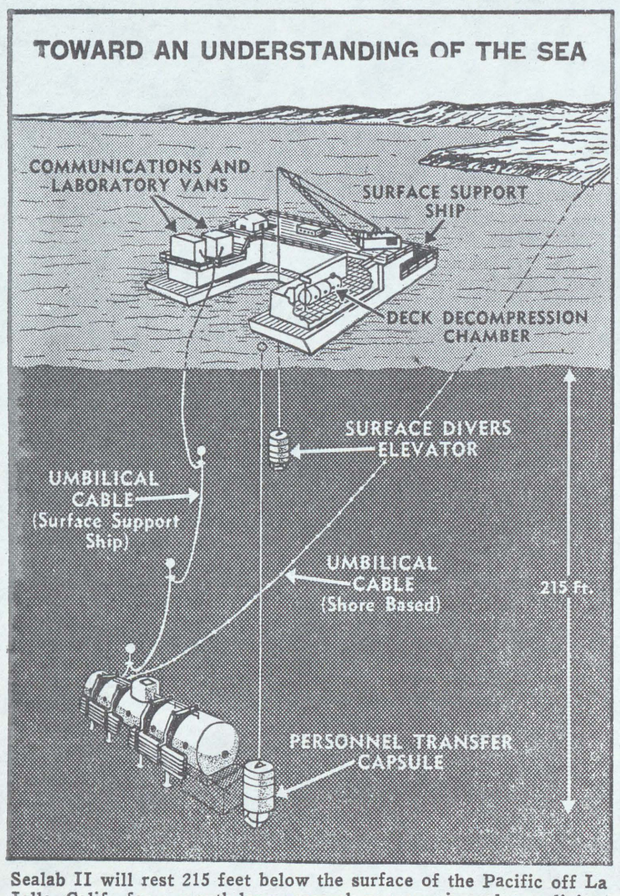
"Until an undersea engineering capability is developed which is competitive with terrestrial engineering in cost and use of human resources, the potential of the shelf, no matter how rich, will not be realized," he said.

This would require, he went on, the capability of men, machines and vehicles to operate with ease over submarine lands. The Sealab is a step in that direction.

The christening ceremony was conducted before an audience of about 500 persons at the Navy Shipyard here. Capt. Jamie Adair, shipyard commander, was master of ceremonies. Music was provided by the band of the Pacific Cruiser-Destroyer Force.

Science: Exploring the Heights and the Depths

SAN DIEGO
EVENING TRIBUNE
AUG 18 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California



Sealab II will rest 215 feet below the surface of the Pacific off La Jolla, Calif., for a month-long research program in undersea living. From the surface support ship men will be lowered to the vehicle, or raised from it in a diver's elevator capsule operated by crane from the support ship. Umbilical cables from the support ship carry communications lines, power cable, atmospheric gas supply hose and other needs. A line from shore carries power and fresh water supply. The surface ship carries laboratories and other operational facilities.

Sealab 2 Will Make Ocean Study

The Navy's Sealab 2, radically different in both design and purpose from Gemini, is a 57-foot long undersea compartment 12 feet in diameter containing a laboratory, galley and bunkroom and 11 viewing ports. It has hatches giving its residents access to the ocean floor. The project, tentatively scheduled to begin operations Wednesday off La Jolla Calif., is designed to be self sufficient with respect to food and atmosphere for at least six weeks.

The program, involving at least two teams of 10 men each, will be an effort to live, work and do appropriate research for long periods at a depth of 215 feet.

One of the men who is expected to stay submerged longest in the Sealab 2 is Commander M. Scott Carpenter, second American Astronaut to go into orbit in the nation's manned space flight program. He and another man may live in Sealab 2 for 30 days.

The craft's atmospheric pressure will be kept at about that of the ocean depths around it so that the men working and living inside will not have to go through a lengthy decompression process after each venture outside. Ordinarily, decompression from such pressure, in the range of 100 pounds a square inch, would require several hours. This limits the amount of time a diver can stay below if he is operating from the surface.

The longest, deepest dive that can now be made under Navy operational conditions is 380 feet for 30 minutes. Other brief dives have actually been made to substantially greater depths and long "dives" to greater simulated depths have been made in experimental pressure tanks.

Second Phase

Sealab 2 is the second phase of the Navy's "Man-in-the-Sea" program. The first phase, conducted last year off Bermuda in Sealab 1, did not go to as great a depth nor did it encompass as ambitious a research program.

The present project, scheduled to last 30 days with possible extention to 45, will involve a broad range of studies in oceanography, marine biology, ocean bottom geology and sediments and studies of the working efficiency and possible usefulness of men living for substantial time at the depth under study.

Marine biologists will study oceanic life in its natural depth and habitat with the aid of two large size "fish cages" or underwater aquaria and cement block artificial fish habitations. The latter give nooks and crannies for "nesting" or its equivalent. The ocean creatures can come and go at will.

Censuses will be taken of fish, plankton and other life; the ocean floor will be raked to flush out species that burrow in sediments. Slow-moving creatures will be observed to see how far and under what circumstances they acturally do move. Geologists will study the bottom, its sediments and sediment movements. An undersea weather station will be set up to gauge temperatures, pressures, currents and other variables.

The Navy will be particularly interested in how well the men adapt to the artificial atmosphere of about 5 per cent oxygen, less than 20 per cent nitrogen and, the remaining 75 to 80 per cent, helium. This will also be of some interest to the space program, presumably. In space flights of extremely long duration it is probable, according to specialists, that the present 100 per cent oxygen atmosphere will be replaced by one also containing another gas — helium possibly — as well.

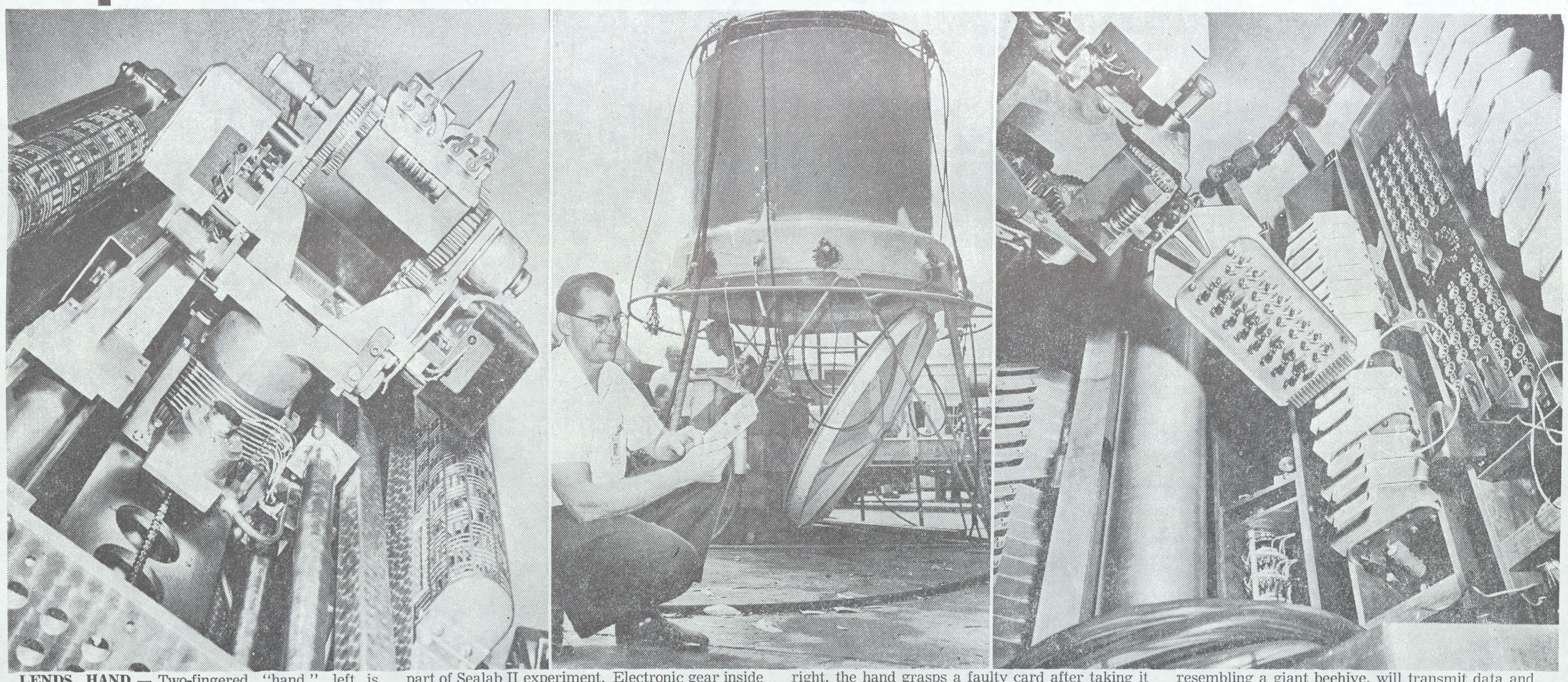
The sea-diving scientists and other specialists will try experimental salvage methods, one involving the use of a buoyant plastic foam to float a sunken jet aircraft. They will also do other simple construction tasks and be gauged in many ways regarding their strength, physical well being, manual dexterity and alertness in periodic tests often not dissimilar to some the Astronauts will be undergoing at about the same time more than 100 miles above.

The submerged laboratory will be in continual contact with its surface supply ship and the shore.

It will be possible to bring men up (with suitable decompression) and send men down.

Television and voice contact between surface and ocean floor will help psychologists do studies of interest both to the man-in-space and man-in-the-sea programs. These are studies of the psychological adaptation of the men to the confinement and isolation experienced in a capsule surrounded by the dark, the cold and the danger that make the environments of space and the ocean depths in some ways similar.

Capsule to Provide Sealab II Communications



LENDS HAND — Two-fingered "hand," left, is ready to make repairs inside Benthic Lab which will be lowered to the bottom of the sea off La Jolla as part of Sealab II experiment. Electronic gear inside the lab is mounted on cards like the one held by Dr. Victor Anderson, center, in front of the lab. At right, the hand grasps a faulty card after taking it from rack. It will install new card from supply of spares. Hand is controlled from shore. The lab, resembling a giant beehive, will transmit data and sound from Sealab on a single wire.—Tribune Staff Photos by Thane MacIntosh and John Greensmith

U.S. Undersea Pioneers and Their Porpoise

LA JOLLA—(UPI)—Astronaut Scott Carpenter and nine other divers are about to venture into the depths of the Pacific where they will live in a steel cylinder and perform experiments: some with the help of a porpoise named Tuffy.

The 200-ton, 57-foot-long cylinder, Sealab II, will be occupied for a total of 45 days during the Navy's most ambitious deep submergence project. It rests 3,000 feet off shore on a 210-foot-deep ledge of Scripps Canyon.

2ND PHASE

The experiment is the second phase of the Navy's "Man-in-the-Sea" program. Last year in Sealab I four men remained submerged in the Atlantic at a depth of 193 feet for 11 days.

All but one of the aquanauts, operating in teams of 10, will remain in Sealab II for 15 days. Carpenter will stay there 30 days continuously.

The Aquanauts are to be lowered today or tomorrow, but technical problems could delay their descent a few days.

Tuffy will be used to carry lines from one aquanaut to another to determine if he can help divers find their way back to Sealab. The porpoise, who can make the trip between the surface and Sealab in about 30 seconds, will be brought here from the Pt. Mugu naval facility the last week in August.

KEY STEP

Assistant Secretary of the Navy Robert Morse said the experiment will be a key step in the United States' exploration of more than a million square miles of submerged land.

Morse said the undersea pioneers "will point the way toward an exploitation of the mineral, geological . . . and agricultural potential of the sea."

INNER SPACE

But the "inner space race" is not being waged just to find out how far down man can go. The main aim of Sealab II is to find out if man can live and work at such great depths.

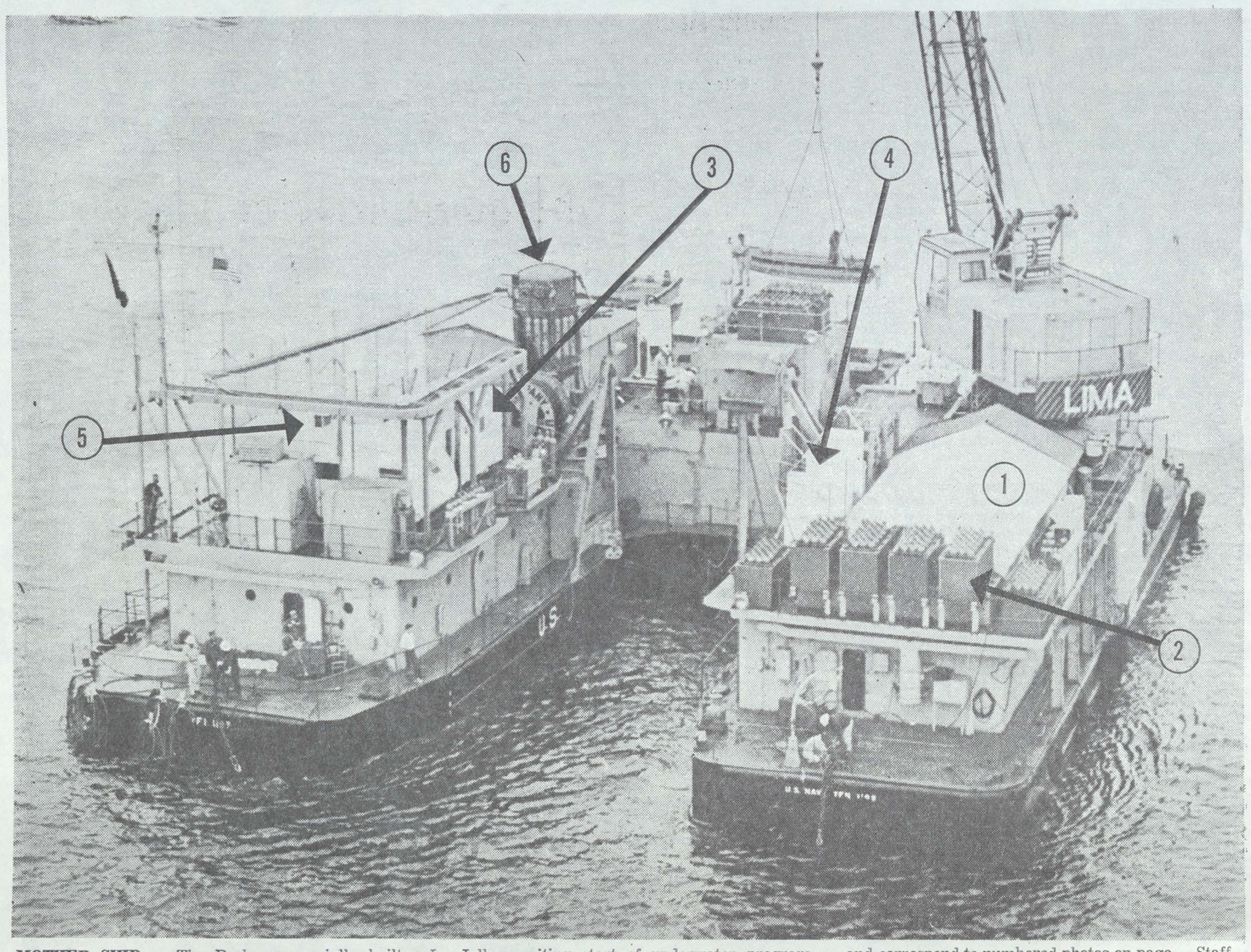
The men will be subjected to temperatures never experienced at such depths. They will spend as much time as possible working in the 55-degree water outside the Sealab.

San Francisco, Calif.
Examiner
(Cir. D. 292,539 - S. 435,887)

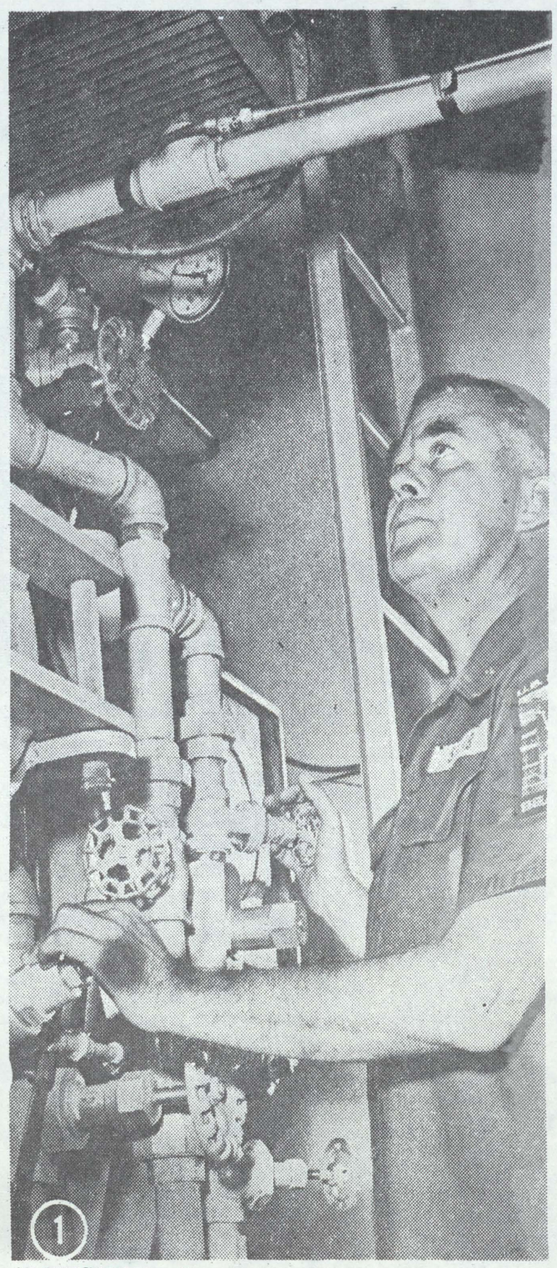
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Sealab Going Down to Come Up With New Data



MOTHER SHIP — The Berkone, specially built mother ship of the Sealab II experiment, lies off La Jolla awaiting start of underwater program. Numbers on photo represent vital areas of vessel and correspond to numbered photos on page. —Staff Photos by John Greensmith and Roger Wrenn



LIFESAVER—Capt. George Bond checks decompression chamber, a vital part of experiment.

SeaLab Set For Descent Tomorrow

Pictures—Page B

By BRYANT EVANS
The San Diego Union's Science Writer

The SeaLab II will be lowered for its 45-day stay under water tomorrow morning and the first crew of 10 aquanauts will go aboard as soon as possible after daybreak Tuesday.

The SeaLab is a 58-foot-long tank, 12 feet in diameter, which will be the sea bottom home for three teams of 10 men for periods of 15 days each. The SeaLab operation is being carried on by the Navy to determine the work capability of men to live under the water and sally forth in diving gear to accomplish needed tasks.

SEALAB ARRIVES

The SeaLab arrived off La Jolla at 6 a.m. yesterday after a long, slow tow from Long Beach. All day long it swung at anchor a couple of hundred yards from the Berkone, its staging vessel.

Aboard the Berkone the aquanauts made final preparations for a descent to their 210-foot-deep habitat and posed for pictures by newspaper and television cameramen.

Rear Adm. Levering Smith, director of the Ocean Projects Office of the Navy, under whose supervision the Man-in-the-Sea program falls, was given his first on-site briefing of the SeaLab operation from Capt. Lewis B. Melson, USN, director of the operation, and Capt. George Bond, USN, director of the Man-in-the-Sea program.

The admiral said that he viewed the project as an important Navy effort toward making it possible for men to do defense work on the ocean bottom. Ultimately, he said, he hoped they could work at 600 feet under the surface.

"This would give us capability in salvage work, in the recovery of men and equipment and to place detection hydrophones to obtain warning of the presence of enemy submarines," he said.

The admiral, Bond and Cmdr. M. Scott Carpenter, astronaut and captain of the SeaLab's first team of aquanauts, were interviewed on the crowded deck of the Berkone. The U-shaped vessel, formed by two barges being bridged, is covered with structures, gear and trailers for scientific uses.

ASTRONAUT'S VIEW

Carpenter said that his greatest interest in the experience ahead of him was to learn how men react to a prolonged period of being sequestered under the sea.

Carpenter plans to stay down for 30 days while the other members of his team will come up after 15 days, according to plans.

Carpenter was told that because of malfunctioning of a fuel cell the Gemini 5 spacecraft might cut short its space flight and that it had been reported that the National Aeronautics and Space Administration had canceled plans for a conversation between Carpenter and the space vehicle.

"How would you feel about that if you were in the Gemini?" Cooper was asked.

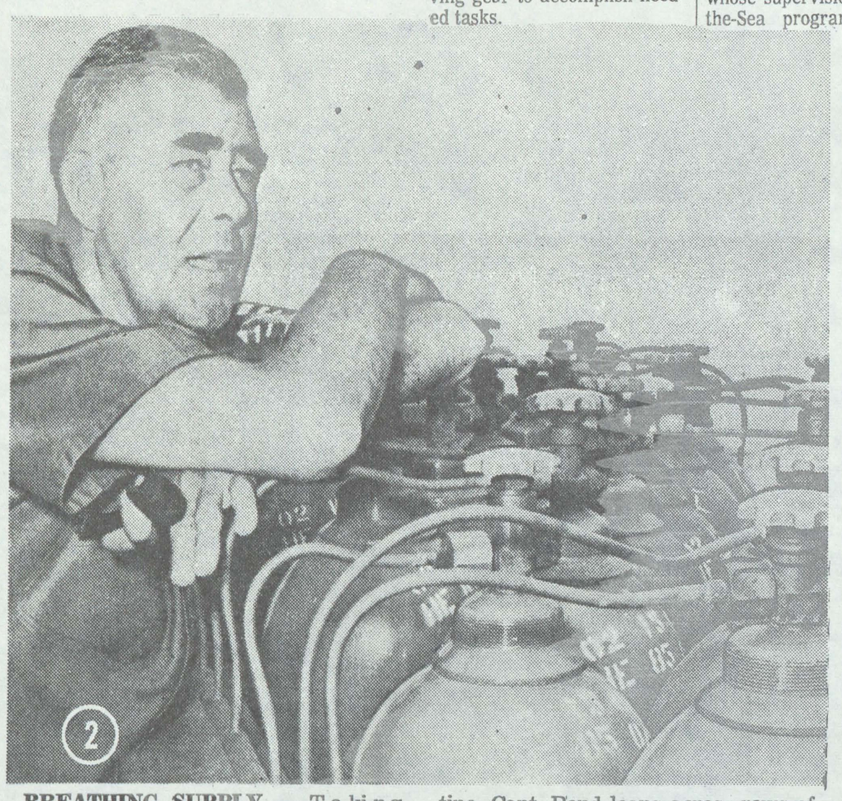
"I would be disappointed just as I know they (the astronauts) are," he said.

Bond revealed that the SeaLab II site on the ocean bottom has been chosen. He said it will be on a 5 per cent slope on solid terrain about 165 feet south of the precipitous sides of the Scripps submarine canyon. He said the SeaLab will be oriented in a position parallel with the canyon, about 3,000 feet from the Scripps pier.

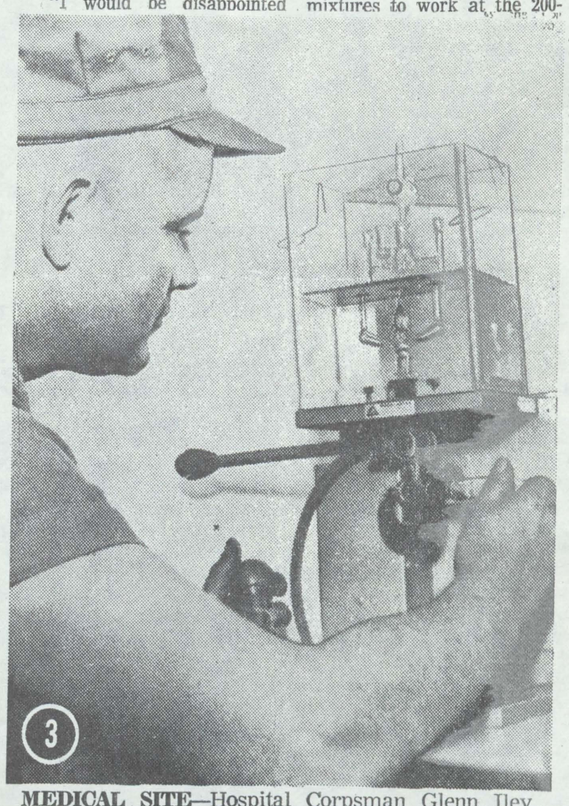
While Bond was speaking, divers from a landing craft were making further explorations of the bottom. These Navy men are using special gas mixtures to work at the 200-foot depth and are brought to the surface in easy stages to reduce the danger of bends.

Melson has announced that no divers not directly connected with the program will be permitted to visit the SeaLab. He explained that he is determined to avoid the delays to the SeaLab operation that would be incurred by rescue operations. James Stewart, diving officer for the Scripps Institution of Oceanography, said that dives to this depth would be extremely hazardous for any but expert divers at the peak of condition.

In all of the area around the site, only the SeaLab II showed no activity yesterday. Its white enamel coat gleamed in the sunshine and it looked like nothing so much as a dairy tank car washash.



BREATHING SUPPLY — Taking break from exhaustive checkout routine, Capt. Bond leans across rows of gas bottles which will supply Sealab.



MEDICAL SITE—Hospital Corpsman Glenn Iley checks device to measure oxygen in divers' blood.

Sunday, August 22, 1965 New York Herald Tribune

Sealab II: Ten Men & a Porpoise For Keeping House Under Water

By David Hoffman
Of The Herald Tribune Staff

The bends came suddenly, crippling the diver with pain. Nitrogen had escaped from his bloodstream, and bubbles the size of marbles had lodged in his right knee and elbow. Moving either joint made the pain intolerable.

With his good left arm, the diver removed a waterproof "flashlight" from the tool kit fastened to his belt. He flicked a switch, and the light began pulsing—twice every second. An audible click accompanied every pulse of light from the Strobe. Motionless, the diver waited.

Two hundred and ten feet overhead, a 270-pound porpoise named Tuffy heard the click, rolled once for air and dove straight down toward the stranded diver. Homing in on the clicks, Tuffy reached the diver in less than three minutes.

The porpoise wore a harness and attached to its dorsal strap was the end of a strong nylon rope. Untying it, the diver wound the rope through his belt. He tugged rhythmically three times and the rope tightened, hauling him slowly toward the surface. Less than 10 minutes of oxygen remained in his back tanks when the diver's head broke water beside the salvage ship.

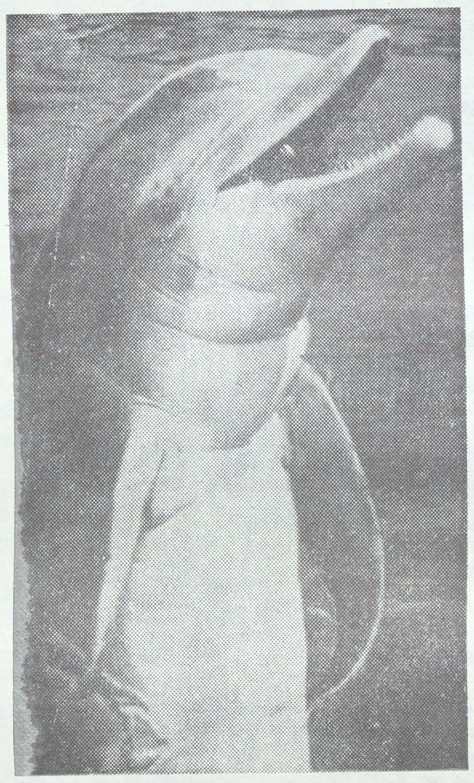
A scene from television? Certainly not.

Tomorrow morning, if the weather co-operates, a team of 10 divers led by Astronaut Scott Carpenter will take up residence in Sealab II, a three-room undersea apartment the size of a large house trailer. Sealab II has been anchored in 210 feet of water 3,000 yards from the California port of La Jolla.

For the next 15 days, the divers will live in this 200-ton cylinder where the air pressure is equal to five atmospheres. Then nine of the men will surface and nine more will take their place. Astronaut Carpenter, a Navy commander on loan to the project, will remain down for 30 days if his physical condition permits.

Tuffy makes his appearance during the second Sealab shift.

Since the first of August, Tuffy and his trainer, Forrest Wood, head of marine science at the Point Mugu Naval Missile Center, have been working with Sealab divers. According to Mr. Wood, "we want to see if Tuffy can be summoned from the surface by a diver near the Sealab, then called by another (more distant) diver who simulates someone in trouble."



U. S. Navy photo

Tuffy



An Atlantic bottle-nose porpoise, Tuffy was purchased from a California amusement park by the Navy. Thus far, this surface-dwelling animal has survived dives to 300 feet and has been taught to "home in" on two different underwater sounds. On is the click emitted by the Strobe light. The other is a hand-held, battery-powered buzzer.

Mr. Wood reports that Tuffy has picked up the clicks from a distance of 576 yards and followed them to the diver.

Waiting above Sealab II will be the Tender U. S. S. Berkoni and leading down from the ship will be a sort of dumbwaiter, a pressurized "transfer chamber." Assume this elevator quits working: Tuffy—or, for that matter, a whole squadron of specially trained porpoises—might be called upon to ferry critical supplies from the ship to the lab below. Drugs would be a likely item.

To test Tuffy's ability, Navy scientists will attach small pressure chambers to the porpoise's harness. Then divers standing beside Sealab will call the porpoise as if whistling for a dog. The reward: one fish per dive.

Although Navy public relations refers to the divers as "Aqua-nauts," Mr. Wood stresses that there is no gimmickery in the experiments with Tuffy. Divers now at work with the porpoise want Tuffy around all the time, he said last week. "They're really enthusiastic."

Summoning Tuffy is just one of 44 projects the divers will attempt in the chill, 47-degree Pacific water. Navy Capt. Lewis Melson, Sealab's over-all director, says the Navy wants to know "whether men can live and work in the depths for prolonged periods and without suffering physically."

For divers, it is not merely a problem of avoiding bends and nitrogen narcosis (a sort of undersea drunkenness). In order for a diver to work at any depth, his buoyancy must approximate his weight. Thus, if the diver swings a hammer, he will careen from the blow just as an astronaut would in orbit. How much work, then, can a human accomplish in water pressure?

To find out, the Navy has sunk the fuselage of an old fighter plane beside Sealab II. Divers will attempt to fill it with polyurethane foam, pump air into it, and float the carcass. The Navy is also sending down sections of a ship, which the divers will try to weld and rivet. A third test will involve constructing an undersea oil-drilling rig, though no drilling will be done. Each task will be timed by the divers.

In 47-degree water, the diver fights a constant battle against the weakening influence of cold. Sealab divers, however, will be armed with two new "wet-suits"—suits in which sea water is allowed to touch the diver's body, there to act as insulation. In one, latex foam is sandwiched between two layers of rubber. Cells of the foam contain carbon dioxide, a very poor heat conductor. Body heat, therefore, is held close to the diver's body. The other suit uses battery power to produce heat, which is circulated by an undergarment.

To guard against nitrogen narcosis, the divers will breathe an artificial atmosphere consisting of 85 per cent helium, 11 per cent nitrogen and 4 per cent oxygen. But this, too, poses problems. The body reacts to helium by producing less heat and disposing of that more rapidly.

In other words, the diver feels colder at a given temperature than he normally would feel on the surface.

The countermeasure is to raise the temperature inside Sealab to 88 degrees and to keep it there. In addition, the lab houses an elaborate bathroom in which divers can take scalding showers or relax in a deep tub.

In Sealab I, four Navy divers submerged off the coast of Bermuda, went down 193 feet and remained inside a similar shelter for 11 days. That was to prove, and did prove, that men can stay under water for prolonged periods without getting sick. But Sealab 1 divers did very little work; they merely existed.

Not only will Sealab II divers get a physical workout, they'll also serve as guinea pigs to test man's dexterity underwater. In a sort of undersea drivers test, the men will swim a figure "S" profile above a big, S-like target on the bottom. The target has a big groove cut in it. As the men swim above, they try to keep the point of a probe inside the groove, without touching either side. Can it be done? No one knows.

Water off the Bermuda coast is clear and warm. Off California, the cold Japanese current is one hardship; the generally poor visibility is another. According to Dr. Martin Krepp, a reserve commander in the Navy Medical Corps, the average visibility at 210 feet near La Jolla is only 30 feet. And when currents roil the carpet of silt on the bottom, the water has the clarity of brown ink.

Despite the cold, sharks inhabit the California depths. When the divers leave their underwater apartment (exiting through the bottom), they step into what looks like a big screened porch. This is a "Shark cage," and from it, the men can scan the area for large fish. The area, of course, has a radius of 30 feet on the average and the divers will roam farther. But none considers the shark a hazard.

Sealab II—It cost $850,000 to build the cylinder and equip the tending ship—has three compartments. One is a combination bedroom-dining room with Pullman type bunks. One is a fully equipped laboratory. The third is a galley with four-burner stove, freezer and refrigerator. Large portholes, almost like picture windows, line the walls.

While underwater, the men will prepare freeze-dried foods in the galley, but their diet has not been rigidly regulated. The only real restriction is that they cannot fry food, not because this is less healthy but because the smoke would fog portholes and otherwise get the house dirty. Navy sources reported, but could not explain, why the divers of Sealab I loaded up with Mexican food before submerging.

If Gemini 5 is successful, Astronauts Leroy Gordon Cooper and Charles "Pete" Conrad plan to radio a message from space to their colleague, Astronaut Carpenter, under water. And what good scientific purpose might that serve? Asked the question last week, Gemini Flight Director Christopher Kraft replied: "well, we expect to get some interesting conversation . . ."

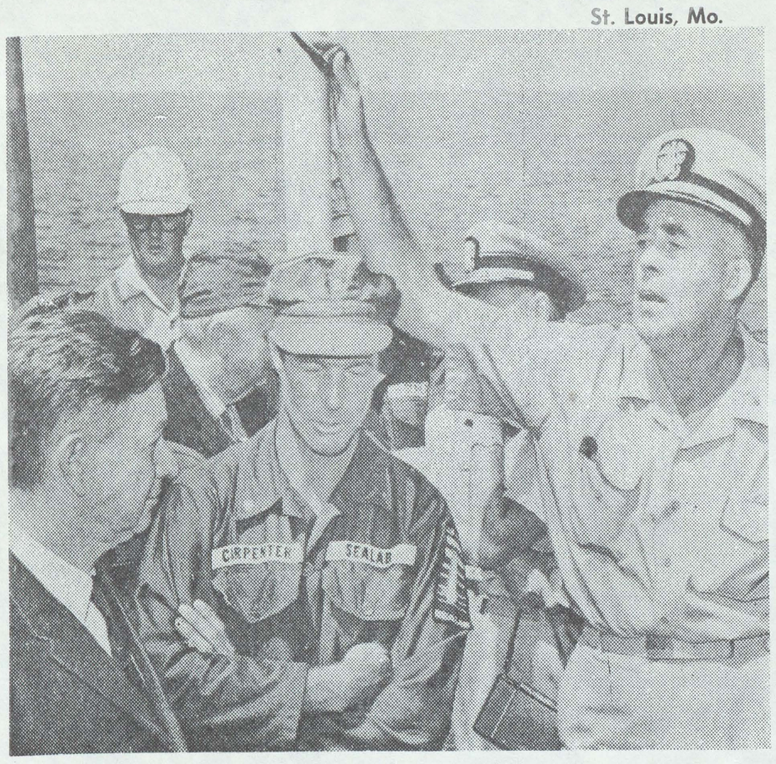
Perhaps Jacques Couseau has no monopoly on underwater show biz.



U. S. Navy photo

Scott Carpenter

AUG 24 1965
POST-DISPATCH
St. Louis, Mo.



From Space to the Depths

Astronaut M. Scott Carpenter (center) discussing the Sealab 2 project with R. Adm. Levering Smith (left), supervisor of the Navy's Ocean Projects Office, and Capt. George Bond, director of the Man-in-Sea project, at LaJolla, Calif., yesterday.

Navy Ready to Lower Sealab 2 to Ocean Floor

LA JOLLA, Calif., Aug. 24 (AP)

AFTER MORE THAN a week of technical delays the Navy said it was ready today to lower its Sealab 2 to the ocean floor, where teams of divers will spend up to 45 days working, eating and sleeping at a depth of 210 feet.

The Sealab is a 12-by-58-foot steel cylinder. The first team of 10 divers, including astronaut M. Scott Carpenter, 39 years old, is expected to go down tomorrow after the underwater base is checked for leaks and for reliability of communications with the surface.

Navy Comdr. Carpenter, an expert in diving techniques, may stay down as long as 30 days in an attempt to set a new underwater record. Four men lived 13 days at a depth of 160 feet in the smaller Sealab 1 off Bermuda last year.

THE OTHER divers will rotate on 15-day tours of duty in Sealab 2, which has facilities for 10 at a time.

Lowering of the pressurized steel chamber to its site 1000 yards offshore from this San Diego county resort has been delayed since Aug. 15 by numerous technical problems, including damage over the weekend to a seven-ton pod that will relay power and communications over cables between Sealab 2 and the surface.

The pod's concrete casing was cracked when an underwater current smashed it against the bottom as it was being lowered Saturday. A replacement was built hurriedly at the Naval Electronics Laboratory in San Diego.

A spokesman said the pod would be working in time for start of operations tomorrow, but he said there would be some delay in planned live television from Sealab 2.

HOPES DIMMED for a planned conversation between Carpenter in Sealab 2 and astronaut L. Gordon Cooper orbiting the earth in Gemini 5. United States space agency officials at Houston said the conversation had been given a low priority on a busy flight schedule.

If it takes place the chat between spacecraft and underwater laboratory will be channeled through a Gemini tracking station at Point Arguello, Calif.

Goal of the Sealab project is to determine how long and how well men can function deep in the ocean at a pressure six times that on the surface.

This capability, officials said, would enable the Navy to expand rescue and salvage operations and eventually open a vast area for military and commercial exploration.

Sealab Dive Postponed For Two Days

By LEO BOWLER
EVENING TRIBUNE Science Writer

Aquanauts will not enter Sealab II until Wednesday or Thursday.

Problems developing in the personnel transfer capsule which is to be used to lower the aquanauts to the bottom and to retrieve them later slowed work at the project site today 3,000 feet off Scripps pier.

Sealab officers had hoped to test the capsule last night or early this morning but when they found leaks in the internal piping they postponed the test.

They wanted to lower the capsule to the bottom without anyone in it then raise it again as a check on how it worked.

The work on the capsule also delayed the checkout and final pressurization of the Sealab itself. Officials had hoped to open Sealab early today for final loading and checking, but the work did not get underway until afternoon.

The new schedule for the 45-day experiment was announced today by Capt. Lewis B. Melson after a conference with his top aides. Melson is director of the project.

The program is the Navy's Man-in-the-Sea project, which will put teams of 10 men inside Sealab II for periods up to 15 days each. The lab will be submerged in 210 feet of water, 3,000 feet off Scripps Pier.

Navy Cdr. Scott Carpenter, astronaut turned aquanaut, will remain in Sealab for 30 days during the experiment.

Another problem developed in transformers in one of two Benthic labs, concrete structures shaped like huge behives, which were to be placed on the sea bottom after being filled with kerosene. The kerosene will keep the sea water out.

The other beehieve, housing a communications center, had already failed and was never installed. The concrete housing around the transformers apparently broke when it was placed on the sea floor.

It was raised over the weekend from 200 feet of water and sent to the Marine Physical Laboratory of Scripps Institution of Oceanography where it is being fitted with a steel jacket.

Melson said many hours were lost yesterday recovering from the bottom a stainless steel fitting which must be brought ashore and welded to the new jacket.

Sealab will be put in final readiness and sent to the bottom despite the transformer package trouble, but the aquanauts will not be sent down until the transformers are on the sea floor and in use, Melson said.

He said Sealab can get power through its umbilical cable which ties it to the mother ship Berkone above it. The transformers were to furnish an alternate source of power from shore.

Placing divers in Sealab without two sources of power would be too risky, Melson said.

Melson said a new site on the side of Scripps Canyon has been selected for Sealab by surface divers. The old site, 200 feet to the north, was covered with organic residue from recent red tides in the area and was unsuitable.

Melson said these steps are to be taken today and tomorrow in getting the project under way:

First — Sealab will be opened and a final check made inside. It will be loaded with the remaining equipment not now on board and resealed. Then some of its ballast tanks will be filled with water.

Second — Compressed air will be pumped into it to test it for leaks and to furnish oxygen to be used later by the aquanauts.

Third — Helium will then be pumped in through the umbilical cable until the atmosphere inside is about 100 pounds per square inch. The helium will mix with the air to form the 80 per cent helium, 16 per cent nitrogen, and 4 per cent oxygen atmosphere the aquanauts will need.

Fourth — The remaining ballast tanks will be filled and a crane aboard the Berkone will lower the lab to the site where it will be leveled by divers.

Fifth — The lab will get its final check and be opened by surface divers who will prepare it for the entrance of the aquanauts.

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ELECTRONICS (McGraw Hill) 8/23/65

Probing the News



Military electronics

Underwater city: Sealab II

Navy outpost on the ocean floor demands a new breed of electronics to support men in a harsh but promising new world

By John F. Mason
Military Electronics Editor

Every morning, ten Navy divers crawl out of their bunks, brush their teeth, shave, then eat a hearty breakfast. Later, some of them put on "wet" suits and breathing gear, climb down a ladder through the floor of their quarters, and swim to work.

Traveling 210 feet below the surface of the sea, two men, on a typical day, might swim off to repair a malfunctioning telemetering station not too far away, while another pair tests the range of underwater communications gear.

At the end of the month-long project, called Sealab II, now under way a half-mile off the coast of La Jolla, Calif., the Navy will have made the most extensive test yet of man's ability to live and work in the ocean depths for long periods of time under saturated diving conditions—the pressure in the undersea lab is the same as that of the water outside. The environment in the divers' quarters and in the water surrounding it is severe and every piece of electronic equipment is being watched to see how it stands up.

For Sealab II, the Navy is using equpiment designed for other Navy programs, commercial scuba diving gear and some built especially for Sealab.

Under pressure. Denzil C. Pauli, assistant project officer for Sealab II, says that what is learned from the performance of this equipment may mean a new generation of underwater sensors, data links, navigation and reconnaissance gear. It will also provide information on tools for building and making repairs, vehicles for transportation, and the "hydronics" these vehicles will need for navigation and communication.

Pressure in the undersea lab, which is called a habitat by the Navy, and in the water is about 125 pounds per square inch, or seven atmospheres of pressure. This environment requires television and vacuum tubes that will not implode, and transistors that cannot be squeezed out of shape. The atmosphere the men breathe is mainly helium. Because high humidity (60% or more) is essential for physical comfort in a helium environment and because helium transfers heat five times fast han a standard atmosphere, components must be resistant both to humidity and heat.

I. The objectives

There are many reasons for training men to live and work for long periods at depths they normally visit for only a few minutes at a time. Navy divers could rescue men from distressed submarines, install navigation devices, build undersea habitats, repair sonar installations used for detecting enemy submarines, and retrieve space capsules and instrumentation.

Undersea wealth. Civilian groups are exploring the ocean floor for commercial reasons. Jacques Yves Cousteau, the French explorer, believes—and the U.S. Navy agrees—that off-shore gas and oil wells can be drilled cheaper, faster and more safely by divers than from a barge.

Large supplies of fish can be found deep in the sea. Eventually, there may be fish or plant-food farms that divers will tend.

II. Navy's project

Sealab II is the Navy's second experiment in underwater living. Last summer, off the coast of Bermuda, four men stayed in Sealab I at a depth of 193 feet for 11 days. In Sealab II, a total of 18 men will participate for 30 to 4(days at a depth of 210 feet. Plans are to replace eight of the ten men in the habitat after they have stayed down 15 days; two of the original ten will live in Sealab II for the entire experiment.

Participants. The Sealab project, which is part of the Navy's Man-In-The-Sea portion of the Deep Submergence program, is sponsored by the Office of Naval Research in collaboration with the Special Projects Office. Other naval organizations contributing to the program include the Navy Mine Defense Laboratory, which prepared the plans and specifications for the Sealab II structure, tested and evaluated much of the electronic equipment, and under the direction of astronaut Commander Scott Carpenter, trained the divers, or aquanauts.

III. The site

Approaching Sealab II is somewhat like coming into a small town, because of the cables that lead to it and the number of small structures scattered around it. About 100 feet from the habitat there is an automated telemetering station through which television and audio communications and environmental data are channeled. A cable runs from Sealab to the telemetering station and from there to shore.

Vital link. Rising from Sealab, there is an umbilical cord that extends upward to the support vesse.. In this cord there are a gas supply hose, a gas-sampling hose that men in the support vessel use to monitor the gas mixture in Sealab, emergency power cables and cables for communication and telemetry.

IV. Communications

The umbilical cord carries all communications between Sealab and the support ship. Future colonies will undoubtedly want to communicate independently of a cable, by radio or other means.

Cables in the cord provide the links for both a two-way electrowriter system and voice communications. To make the men's voices from Sealab up to the barge intelligible—the helium atmosphere in the habitat makes them sound like Donald Duck—speech unscramblers are being used. Developed by the Naval Applied Science Laboratory in Brooklyn, N. Y. for helium diving operations, the device translates the high frequencies of the men's voices to lower, more normal frequencies.

Video monitors. Four television channels are carried up through the umbilical cord to the support ship where doctors and scientists moni-



Berry L. Cannon uses the AN/PQS-1B sonar to search the ocean floor.

Life on the ocean floor

Electronics engineers are working in steaming jungles, arid deserts and the bitter cold of the Arctic. But only one of them is working at the bottom of the sea.

Berry L. Cannon is one of the ten men living in the 57- by 12-foot cylinder ballasted on the ocean floor, 210 feet below the surface, near the coast of La Jolla, Calif. Cannon is responsible for monitoring test equipment; should any of the electronic devices break down, he will repair them. And, several times a day, Cannon and another diver swim out to run tests on the intelligibility of various kinds of swimmer-to-swimmer communications. The tests, repeated frequently, are to determine whether there are changes in range over varying time periods, and if so, what factors, such as turbidity and temperature, cause them.

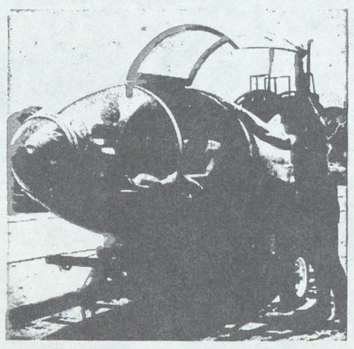
In August, 1963, Cannon was designing underwater electronic devices for the Navy Mine Defense Laboratory at Panama City, Fla. In order to learn more about the job he was doing, Cannon asked to go to diving school. After some deep-water experience he was transferred to the swimmer-diver branch at the lab. Ever since his graduation from the University of Florida in 1962, Cannon had worked on the control section of towed vehicles, designed an intercom system, and aided in a number of underwater projects.

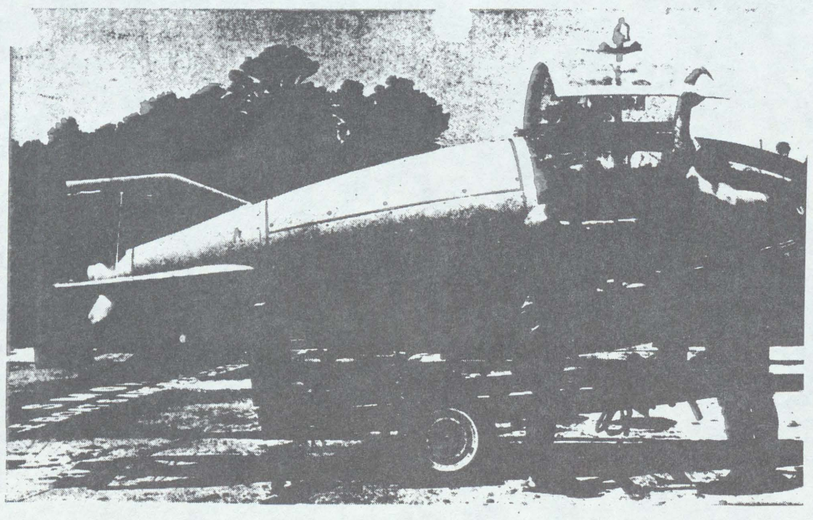
Cannon is enthusiastic about his role of pioneer in a new world and expects to learn a great deal from his two-week stint at the bottom of the sea.

"I'll be a much better designer after my stay in Sealab II," he told Electronics shortly before the descent.

In addition to Cannon, project Sealab II includes a doctor, an aeronautical engineer, mechanical engineers, geologists, biologists, physical oceanographers, military oceanographers, a medical corpsman and professional Navy divers. Commander Scott Carpenter, an aeronautical engineer as well as astronaut and skin diver, trained the men at Panama City, Fla. and is now in Sealab II himself.

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Wet submarines travel at 9 knots but are too maneuverable to use at deep levels where a quick ascent would be dangerous to aquanauts. The miniature sub might be used by surface divers to take supplies to Sealab.

tor the divers. Two cameras are inside the habitat and two are just outside in the water. Commercial tv and f-m radio piped through the cord will be available.

Sealab and the Scripps Institution of Oceanography communicate directly with each other only by cable through the underwater telemetering station. Scripps, a half-mile from the Sealab II site, is assisting in the physiological and oceanographic research.

Swimmer-to-swimmer. The divers have three systems for talking with each other when they are swimming:

- The AN/PQC-1, a standard single sideband, low-frequency (8 Kc) a-m, sonic communicator with a range of 1,000 feet. The main drawback is that the mouthpiece of the breathing unit makes enunciation difficult.
- The Aquasonics communicator is a 42-Kc, a-m, sonic device with a 1,000-foot range. It doesn't use a mouth bit, but has a mask, like an oxygen mask, that fits over the mouth and is subject to flooding.
- A buddy-swimmer intercom system developed at the Navy Mine Defense Laboratory uses bone-conduction microphones, connected by a 24-foot wire. The microphone, fastened to the head, near the ear, picks up the speaker's voice and also enables him to hear. The unit contains an amplifier, switch and battery.

Swimmers talk to the support ship or to Sealab by using the PQC-1. The ship uses an underwater loudspeaker, the AN/BQC-1.

Tape recorder. One tool that the men in Sealab II don't have, but future undersea workers will need, is a watertight tape recorder into which a swimmer can dictate his scientific findings as he sees them.

Lasers have been examined by a number of companies for solving the swimmer-to-swimmer communication problem, but the high attenuation and the narrow beam rule it out for the time being.

V. Instrumentation

To record the ever-changing conditions in the sea, a weather station with conventional electronic equipment is fixed to the sea bottom near the habitat. To measure the height of the waves, some 200 feet above, a Vibrotron pressure sensor is used. Current is measured with a Savonius type rotor. And temperature of the water every ten feet from the bottom up to 50 is obtained with a series of thermistors. Data from the weather station goes to the telemetering station via Sealab and from there to Scripps for recording and storing in the computer.

Visibility is measured by a volume-scattering coefficient meter and by a null balance transmissometer. The amount of light that small marine organisms emit when they are disturbed is measured by a bioluminescent meter that uses a photomultiplier sensor.

Environmental control. Inside Sealab, a number of environmental conditions are constantly monitored: temperature, humidity and partial pressure of the oxygen. Readings of these measurements are displayed in Sealab, in the ship and in the Scripps lab.

The oxygen content in the habitat is monitored by a device called a Krasberg sensor, built by the Westinghouse Electric Corp. for the Sealab program. In the support ship, another Krasberg sensor checks the oxygen in the samples of air brought up through the tube in the umbilical cord. Other constituents of the gas are analyzed in the support ship by a gas chromatograph. At the Scripps laboratory, a mass spectrometer analyzes the breathing mixture to measure elements not detectable by the chromatograph.

Power supply. Power to keep this elaborate colony of instruments and men going is transmitted from Scripps by cable to a sealed transformer bank near Sealab where the 4,160 voltage is transformed to 450 volts. In case of power failure on shore, 450-volt power can also be obtained via the umbilical cord from the support ship.

Far off shore, future undersea laboratories will require self-contained power sources. Possibilities include fuel cells, isotopes and nuclear reactors. Isotope and reactor sources look very promising because of their useful by-product —heat. Fuel cells are also promising because they provide water as well as heat.

VI. Reconnaissance

Electronic gear helps a diver investigate the ocean floor. When visibility is poor, he uses the AN/PQS-1B handheld sonar. Produced by the Dalmo-Victor Co., a division of Textron Inc., the instrument, under the right conditions, can find a water bucket at 120 yards and a beer can at 20 yards. Although this is good, the Navy would like still greater range with the same resolution plus visual readout. Readout from the present unit is aural only, with pitch denoting distance. An echo returning from an object 20 yards away has a pitch of 2,500 cycles; at one yard it is 250 cycles. The bandwidth is 30 Kc in the 50- to 9-Kc range.

Improved sonar. The Mine Defense Laboratory has improved the sonar by repackaging it and making it a much smaller unit. To reduce the size of the transducer, the frequency was changed to 200 Kc; the old transducer was one inch in diameter and 8 inches long, housed in a circular cone.

The new unit uses two transducers, one inch in diameter and only a half-inch long, mounted in an end plate one-half inch thick. The original sonar is a 22-pound hemisphere, 15 inches in diameter and 15 inches high. The new one weighs only three pounds, is in the shape of a cylinder, 3¼ inches in diameter and 9 inches long. Both units are fully transistorized. After the new unit is tested, industry will be invited to submit bid proposals for manufacturing it.

VII. Navigation

To prevent the men from straying up or down too far without realizing it, depth gauges that measure pressure are worn on the wrist. In murky water, however, they can't be read easily. The Navy would like an accurate depth gauge a swimmer can read under any condition.

To help the men find their way back, Sealab operates a pinger that sends out sounds in all directions. Swimmers carrying the PQS-1B sonar can pick up these sounds and —no matter how dark the water— home in on their habitat.

Future, more elaborate, missions might use pingers at several sites. These could be coded, or transmit at different frequencies, to identify the particular site.

VIII. Tools and transportation

So little work has been done at great ocean depths that almost



Aquasonics communicator is a 42-Kc a-m, device with 1,000 foot range

nothing is known about the kind of tools that will be needed. The Navy and the National Aeronautics and Space Administration are keeping an eye on what the other might come up with for working in weightless and underwater environments. Sealab II should furnish requirements that the electronics industry can try to satisfy.

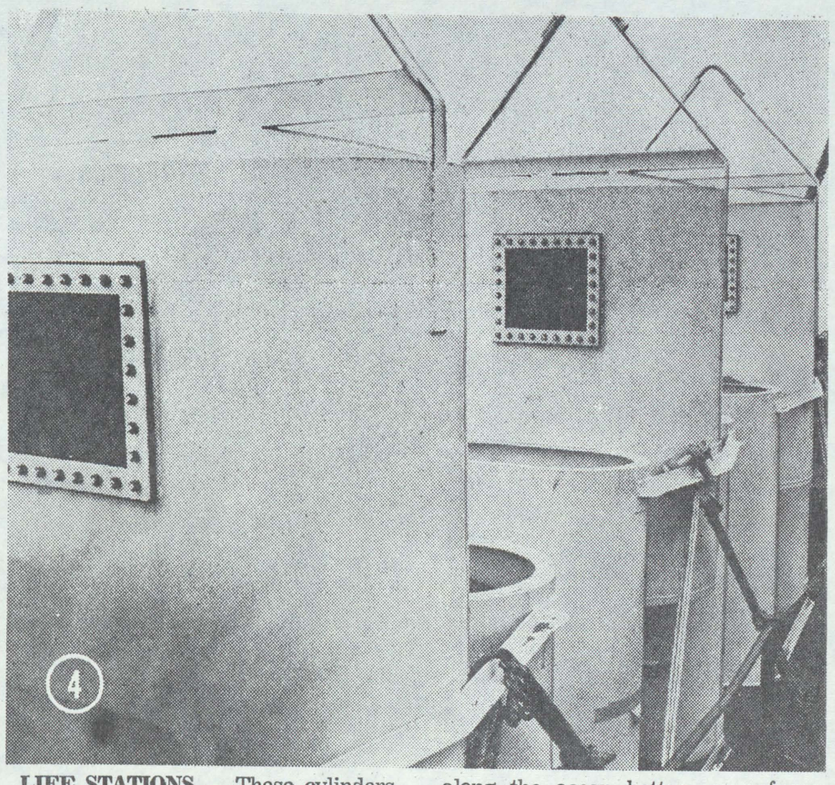
Wet submarines. More is known about requirements for transportation at deep levels but there is, as yet, little equipment. The aquanauts' average swimming speed is ¾ knots and this is far too slow. There are vehicles called wet swimmer propulsion units with speeds up to 9 knots. These miniature submarines, are powered by batteries and driven by a propeller. They won't be used by the divers because they are too maneuverable and might take them up above the safe 33-foot change in depth, or too far from the habitat; the navigation gear presently available won't guide the small craft home. However, a wet sub might be used by surface divers to take supplies to Sealab and then surface quickly.

'Hydronics.' Precise navigation gear will be needed along with pressure gauges, depth measuring devices and communications. As the ocean floor becomes busier and there are more vehicles carrying men faster and over greater distances a new kind of underwater vehicle electronics, or hydronics, will emerge. Undersea exploration offers new vistas to the electronics industry.

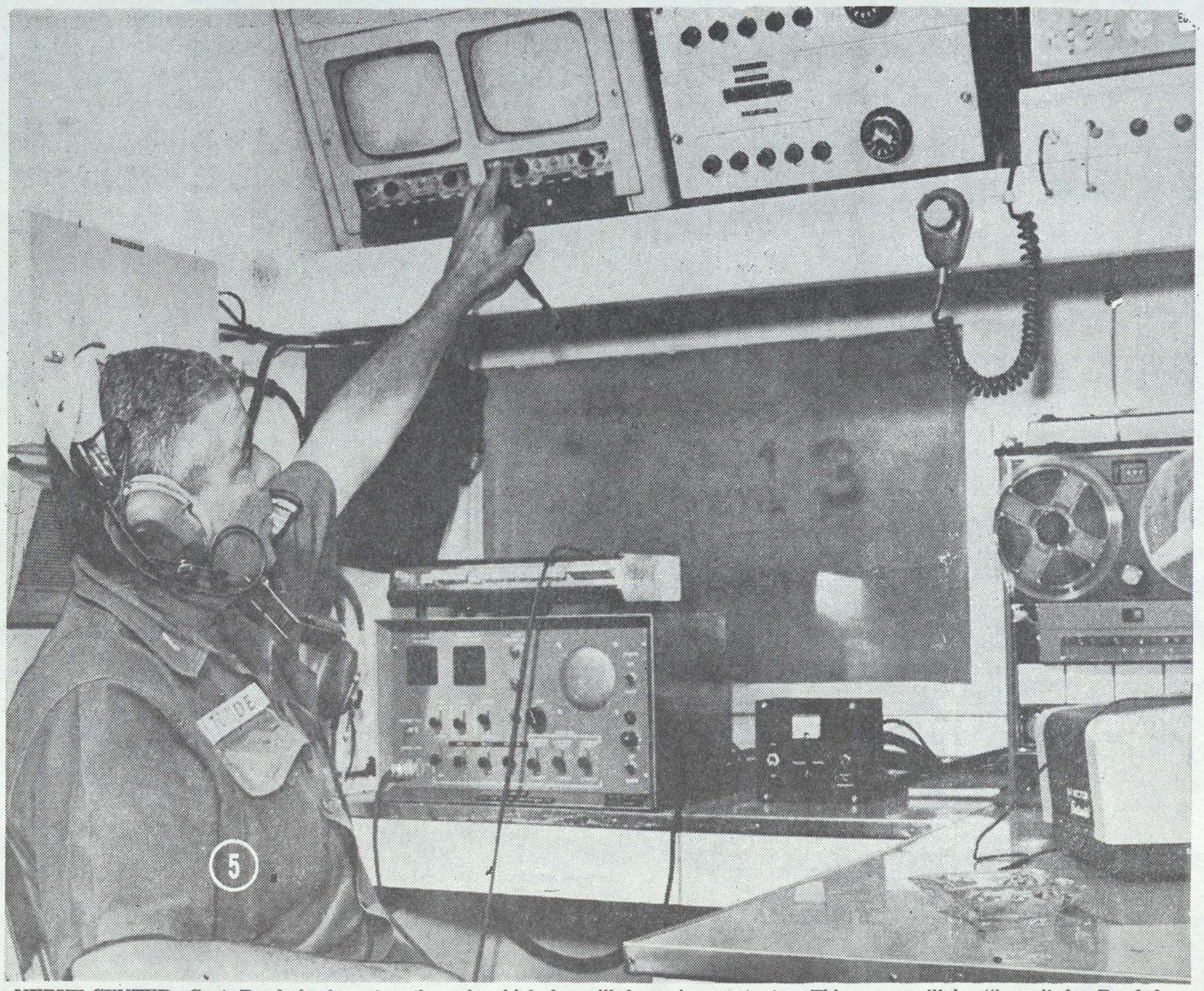
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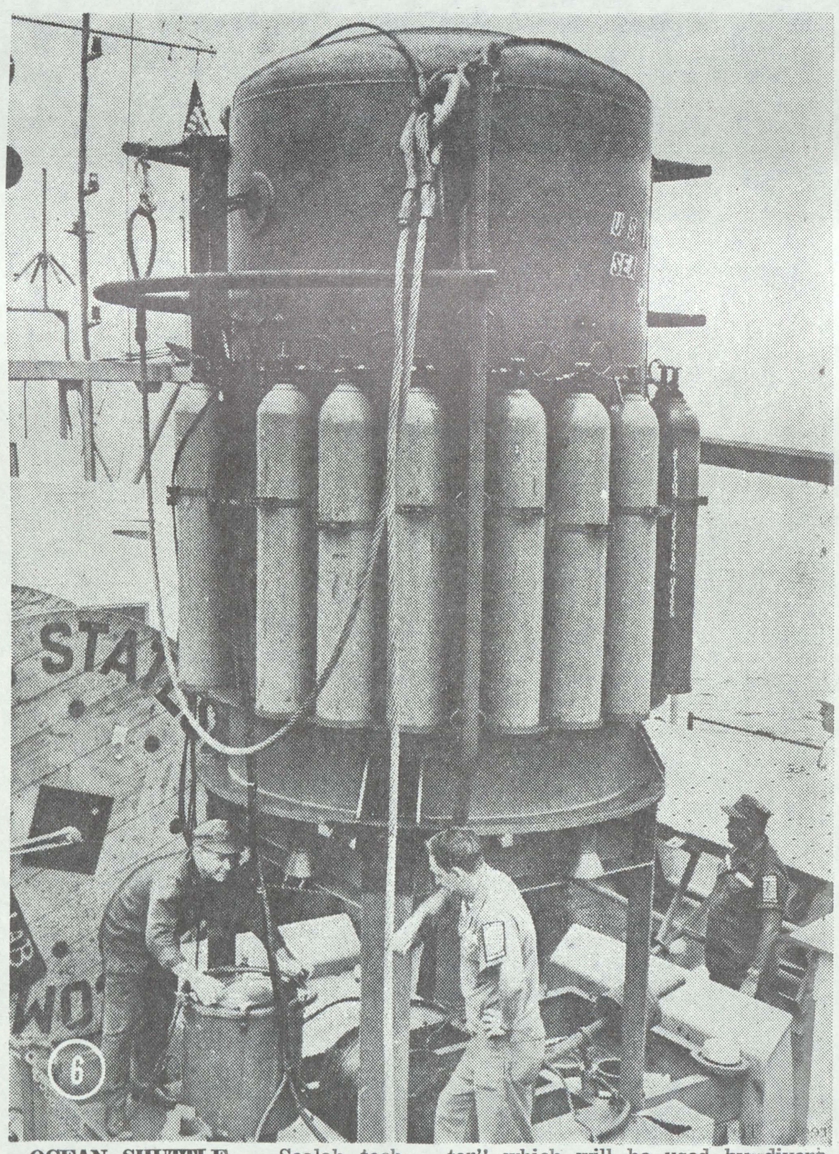
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LIFE STATIONS — These cylinders, filled with special atmosphere Sealab divers will breathe, will be spaced along the ocean bottom as refuges for divers who may run into trouble during the experiment.



NERVE CENTER—Capt. Bond checks out complex panel of electronic equipment through which he will keep in constant contact with men beneath the surface. This room will be "home" for Bond for 45 days as he keeps tabs on the aquanauts.



OCEAN SHUTTLE — Sealab technicians work on underwater "elevator" which will be used by divers shuttling from surface to sea floor.

SeaLab's Staff Gets Prepared

Decision Due On Timing

A bustle of activity pervaded the SeaLab II project yesterday as last-minute preparations were made for the start of the 45-day underwater experiment.

A decision will be reached today on the exact time the first crew of 10 aquanauts will go down 210 feet to the ocean floor off La Jolla.

The first team is captained by Cmdr. M. Scott Carpenter, the astronaut-turned-aquanaut, who is scheduled to remain on the ocean bottom in the SeaLab for 30 days.

58 FEET LONG

The SeaLab is a 58-foot-long tank, 12 feet in diameter, which resembles a dairy car. The Navy project is to determine the work capability of men living under water.

Some "ifs" popped up as detailed inspection of all phases of the project continued. For instance:

If the personnel transfer capsule checks out OK in a test this morning, the aquanauts could be sent down tomorrow afternoon. The capsule is a small decompression chamber which is to be used in transferring the men from the mother ship Berkone to the SeaLab.

TIMING UNCERTAIN

If the SeaLab is pressurized overnight, it will be possible to lower it onto the experiment site before nightfall today. Otherwise, another day will be required.

And if workmen complete manufacture of a new power package case, it will be installed today.

Navy divers who have been checking the ocean bottom off La Jolla for a month found a new site which they considered superior to the one picked earlier.

This necessitated moving the Berkone yesterday. The new site is 200 feet east of the old one, on level ground south of the Scripps submarine canyon, 3,800 feet off the Scripps pier.

The SeaLab was pressurized and double-checked for any possible leaks.

Navy officials said the leak in the power package case was noticed after the shore power cable had been laid.

When the package was raised, investigation revealed that the case was broken and some cable terminals had pulled loose, officials said.

They theorized that a surge while lowering it allowed the package to crash against the bottom. The package will provide a backup system of power, water and gases to the Sealab.

Then, if rough weather develops or the Berkone has to be moved, the experiment can be continued through the backup system to shore.

The stowing, rigging and loading inspection of the Sealab continued last night. It will be about 12 hours after the Sealab is lowered onto the site before the aquanauts will go down.

The Berkone is a U-shaped vessel which was formed by two barges being bridged and is covered with structures, gear and trailers for scientific use. The Sealab was brought close to it yesterday after the Berkone was moved to the new experiment site.

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Technical Snarls Delay Navy's Sealab 2 Dive

LA JOLLA, Calif., Aug. 23 (AP)—Accidents and technical problems are delaying the start of the Navy's Sealab 2 experiment to see how long men can live on the floor of the sea, officials said today.

Sealab 2, a 12-x-58-foot steel cylinder in which divers are to work and sleep for up to 45 days at a depth of 210 feet, is scheduled to be lowered into the ocean 3,000 feet off this San Diego suburb tomorrow morning.

Astronaut M. Scott Carpenter, a Navy commander with extensive diving experience, and nine other divers and scientists are expected to descend to the underwater laboratory tomorrow night or Wednesday morning, a spokesman said.

Busy Flight Schedule

Chances grew dim for a planned conversation between Carpenter on the ocean floor and astronaut L. Gordon Cooper, orbiting the earth in Gimini 5.

Navy officials said they hoped to have Carpenter down in Sealab 2 before the end of the Gemini 5 mission, but U. S. Space Agency officials at Houston said the conversation had been given a low priority on a busy flight schedule.

Lowering of Sealab 2, originally scheduled for Aug. 15, has been delayed by numerous problems including these latest over the week-end:

A seven-ton, beehive-shaped pod was wrecked while being lowered to the site by cable Saturday. A sudden surge of ocean currents smashed it against the bottom, cracking its concrete shell. A new shell was made hurriedly at the nearby Naval Electronics Laboratory. The pod, to be connected by cables to a mother ship and to Sealab 2, houses electrical gear to relay power and communications between the laboratory and scientists on the surface.

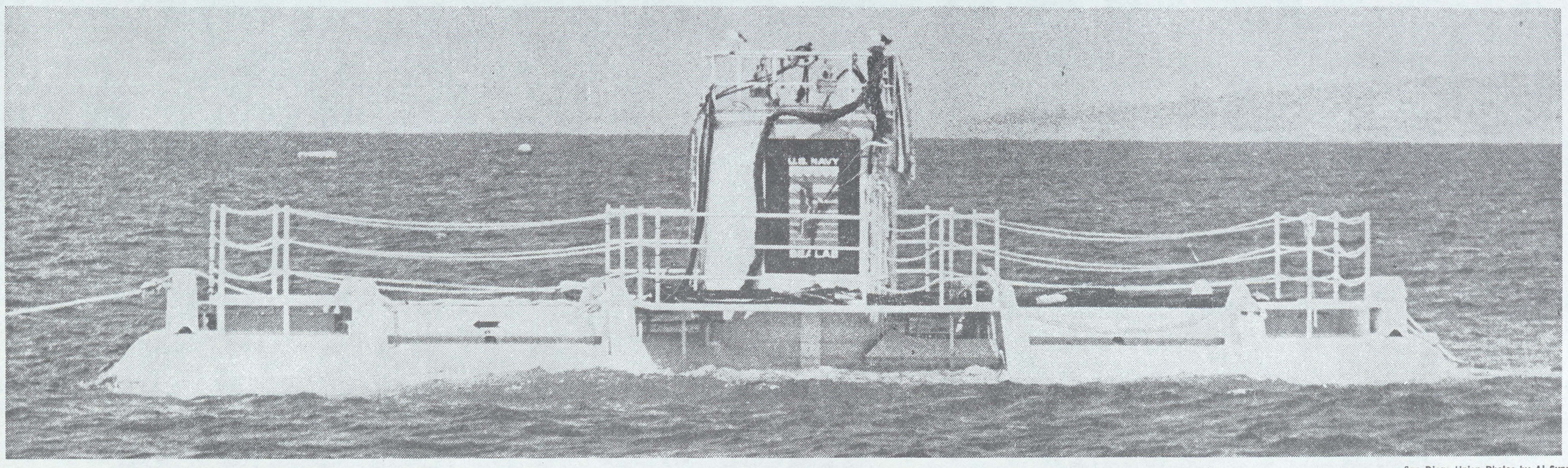
Tested Lowering System

Much of yesterday was spent testing a balky counterweight system for lowering a small capsule which will carry the divers to and from Sealab 2. It is designed to be attached, in a hurry if necessary, to a decompression chamber on the mother ship. Divers returning from 15-day stays on the ocean floor will have to spend as much as two days in the decompression chamber to rid their tissues of the nitrogen and helium gases they will breathe, along with oxygen, while submerged.

Carpenter will try to stay down 30 days, a new record. Four men lived 13 days at a depth of 160 feet in Sealab 1 last year off Bermuda. Carpenter planned to take part in that experiment but broke a leg in a preliminary dive.

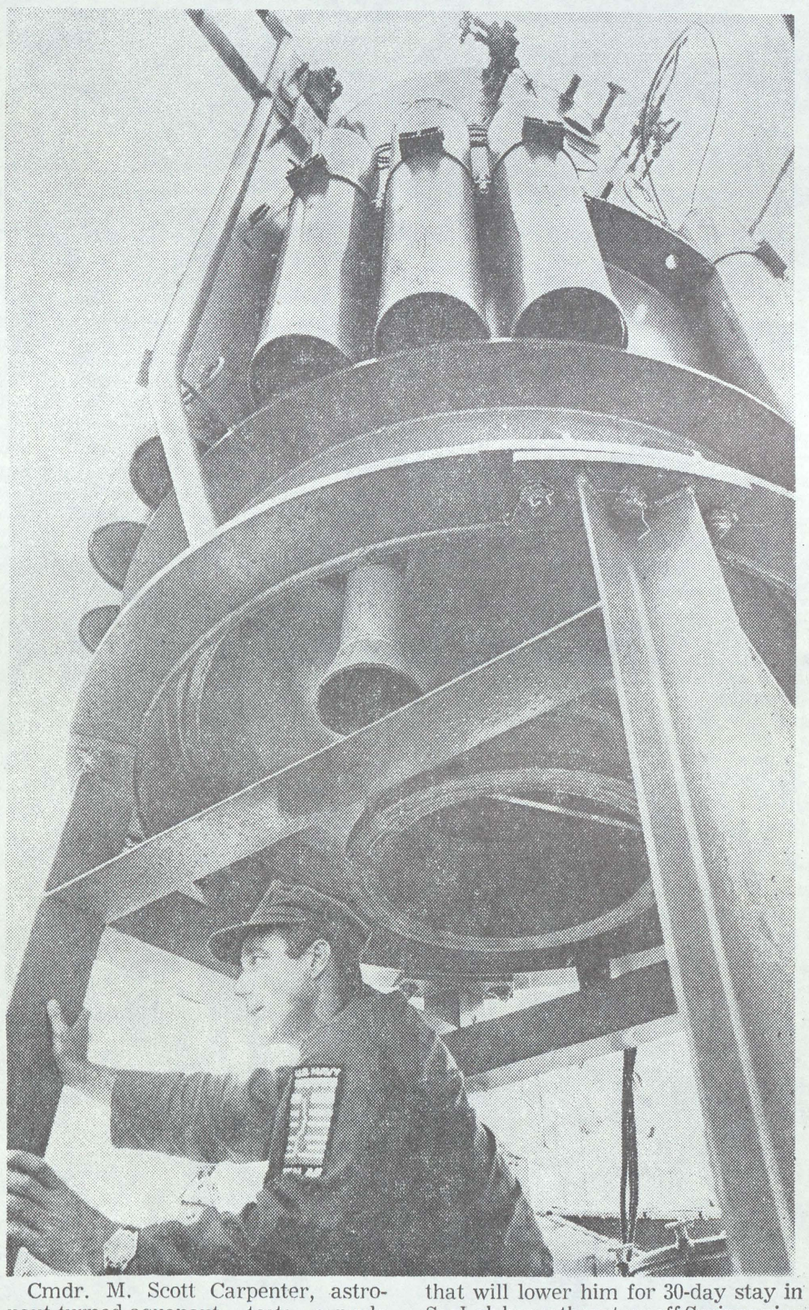
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POST-GAZETTE
Pittsburgh, Pa.

SeaLab, Aquanauts Ready For Big Dive



—San Diego Union Photos by Al Sund

Towed down from Long Beach, SeaLab II bobs on the swells off Scripps Pier, La Jolla. The 60-foot "home" for aquanauts in Man-in-the-Sea program will be lowered 210 feet below surface tomorrow for 45 days. Ten aquanauts will spend varying periods in SeaLab II to learn how man can live under the sea. Navy hopes ultimately to work down to 600 feet below the surface. (Story, a-1)



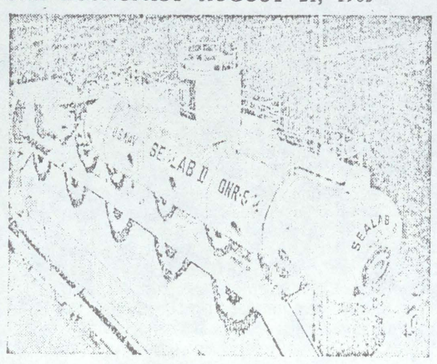
Cmdr. M. Scott Carpenter, astronaut-turned-aquanaut, tests capsule that will lower him for 30-day stay in SeaLab beneath waters off Scripps pier.

AMERICAN SURVEY

Underwater Industry

FROM A CORRESPONDENT IN CALIFORNIA

THE ECONOMIST AUGUST 21, 1965



This weekend, if all goes according to plan, Sealab II, the United States Navy's second manned underwater laboratory, will be towed half a mile off shore from La Jolla, a suburb of San Diego, California, and submerged to a depth of 210 feet. There, for a month, this cylinder, 57 feet long and 12 feet in diameter, complete with lights and hot showers, will serve as the "home" of two ten-man teams of "acquanauts," naval and civilian scientists; the leader is a former astronaut, Commander Scott Carpenter, and each team will stay down for a fortnight.

This is by no means the first project of its kind; the French have been pioneers in oceanography and last year four American divers spent 11 days 193 feet down off the coast of Bermuda in Sealab I. For some years now America's interest in "inner space" has gradually been awakening. The new concern began with the nuclear submarines, which stay under water for months at a time, and was sharpened by the tragic and mysterious foundering of one of them, the *Thresher*.

But today industry is becoming aware of the vast untapped resources of oil, metals, raw materials for drugs and even food in the ocean. According to the experts, within ten years the exploration of the ocean will be attracting as much popular attention as does the exploration of space today and the return from exploiting the wealth under the sea will run into hundreds of millions of dollars a year.

In this month's experiment, to test the ability of men to live and work under water for long periods, the divers will emerge from the cylinder to raise a submerged aircraft by pumping it full of plastic foam, to repair a submarine hull with a stud gun, to assemble an oil-drilling rig from beneath the surface and to mine minerals from the ocean bottom. The San Diego area was chosen because of the mild climate, the comparatively stable ocean conditions and a deep trench offshore. Furthermore, not only is San Diego a naval base but specialised help can also be obtained from the Navy Electronics Research Laboratory, the Navy's advanced instrumentation research facility, the Bureau of Commercial Fisheries' marine biology laboratory and the Scripps Institution of Oceanography, now a branch of the University of California, all of which are in or near San Diego.

Scripps is both the oldest and the largest establishment devoted to such research in the United States; since it was set up fifty years ago it has provided a constant stream of oceanographers to staff other institutions, government and international agencies and industrial laboratories. Its research ships sail all over the world and it has provided some of the civilian divers for the Sealab II project. Its experts also designed the Bethnic Laboratory, an undersea telemetry station which will serve as the "central switchboard" for the underwater community, providing channels for television, voices and the transmission of data. Sealab will also be equipped with arms manipulated by remote control from the shore, so that it can make its own repairs.

A number of satellite enterprises have clustered around Scripps and the neighbouring government research facilities, producing for them, and for commercial customers, buoys, platforms, cables, anchors, and such specialised instruments as bathythermometers (to measure the temperature-depth ratio of sea water) and salinometers (to measure its saltiness). Not all these firms are small. They include, for example, the Convair division of General Dynamics Corporation and Lockheed Aircraft. The practical interest being shown by these giant firms and by other big companies such as Westinghouse Electric, Litton Industries, Union Carbide, and so on, is a most significant development for the future of oceanography.

The enthusiasm of the experts, the promotions of the Chamber of Commerce—San Diego considers itself the oceanographic capital of the *United States*—count for little in the absence of money and so far oceanography has lacked this. The chief source of funds is the government; the Navy is in the midst of a ten-year, $1 billion research and development programme and the Federal Council for Science and Technology is committed to spend some $2 billion between 1963 and 1972. The sums are large, but are being allocated over long periods and the lion's share will, inevitably, go to the Navy. The remaining money has to be spread out over the whole spectrum of government departments and what is left must be scrambled for between private industry and the research institutions.

The latter wish that industry would commit some of its own funds to exploiting the potentially profitable resources of the ocean. Perhaps before long it will. The way that such firms as Westinghouse and Litton are acting suggests that they believe that investment in oceanography will yield a profitable return eventually. For example, Lockheed is now a partner in a project which is trying to find ways of dredging phosphorite for fertiliser, manganese, precious metals, from the continental shelf. Union Carbide is involved in a new venture concerned with how deep diving might facilitate drilling for oil offshore. Sealab II's efforts are supposed to advance such undertakings; if it succeeds it may help loosen the pursestrings of industry.

SeaLab Nears Site For Test Under Water

SeaLab II was proceeding in tow at 3½ knots off San Diego County last night toward the site for its record-challenging undersea experiment near La Jolla.

The 58-foot tank which will be a home for three groups of 10 men each 210 feet under the ocean surface is expected to arrive at the site early this morning.

MOTHER SHIP

The lab then will be berthed in the open space of the U-shaped Berkone, the staging vessel that will serve as a mother ship to the SeaLab.

Aquanauts of the first 10-man team to spend a 15-day stint in the SeaLab will board the Berkone today to get their last look at their home before it is lowered into the sea.

No schedule was available last night as to the time the SeaLab will be lowered or when the aquanauts will take up their submarine residence. However, it was said that it will be at least 24 hours after the SeaLab is lowered before the men will go aboard.

SURFACE LINK

The lab will be connected with surface facilities and thoroughly tested before it is occupied. Communications will be maintained through a benthic (sea bottom) laboratory built by the Scripps Institution of Oceanography, which will relay voice, video and data signals to the shore.

The lab also will be connected through an umbilical cord with the Berkone. People ashore and on the Berkone will be able to observe the operation.

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Eleventh Naval Distri
San Diego, Califor

San Mateo, Calif.
Times & News Leader
(Circ. D. 31,671)
AUG 24 1965

Sealab Goes Down Today

LA JOLLA, Calif. (AP) — Sealab 2 will submerge today for 45 days, while aquanauts work, eat and sleep at a depth of 210 feet, the Navy said.

Technical difficulties have for the past week hampered the Navy's largest undersea experiment. Small leaks Monday had threatened to postpone the 12 x 58-foot steel cylinder's descent until Wednesday.

Sealob's initial lowering at 4:05 p.m. is to be to a depth of 20 feet, where it will be checked for leaks or other malfunctions. It will continue to the bottom when Capt. Lewis Melson, project director, gives the okay.

The first team of 10 divers, including astronaut M. Scott Carpenter, 39, is expected to go down Wednesday after the underwater base is checked for leaks and for reliability of communications with the surface.

Navy Commander Carpenter, an expert in diving techniques, may stay down as long as 30 days in an attempt to set a new underwater record. Four men lived 13 days at a depth of 160 feet in the smaller Sealab 1 off Bermuda last year.

The other divers will rotate on 15-day tours of duty in Sealab 2, which has facilities for 10 at a time.

Lowering of the pressurized steel chamber to its site 1,000 yards offshore from this San Diego County resort has been delayed since Aug. 15 by numerous technical problems, including damage over the weekend to a seven-ton pod which will relay power and communications via cables between Sealab 2 and the surface.

The pod's concrete casing was cracked when an underwater current smashed it against the bottom as it was being lowered Saturday. A replacement was built hurriedly at the Naval Electronics Laboratory in San Diego.

A spokesman said the pod would be working in time for the start of operations Wednesday but that there would be some delay in planned live television from Sealab 2.

Hopes dimmed for a planned conversation between Carpenter in Sealab 2 and astronaut L. Gordon Cooper Jr. orbiting the earth in Gemini 5. Space agency officials at Houston said the conversation had been given a low priority on a busy flight schedule.

39

Mishaps Delay Sealab Start

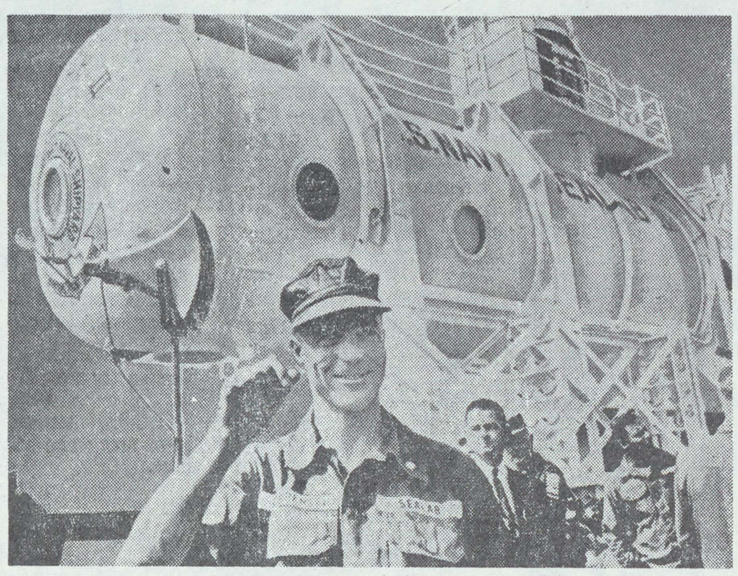
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LA JOLLA (San Diego County) — Accidents and technical problems delayed the start of the Navy's Sealab 2 experiment 2 to see how long men can live on the floor of the sea, officials said yesterday.

The 45-day experiment involving astronaut M. Scott Carpenter, nine scientists and an "educated" porpoise named Tuffy now is scheduled to begin late today with the lowering of the 200-ton steel Sealab cylinder installed yesterday after the failure of a transformer.

Carpenter and the scientists are due to enter the cylinder Wednesday to begin experients which are a key step in America's exploration of more than 1 million square miles of submerged land.

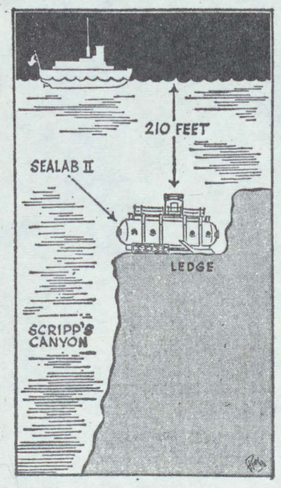
Sealab 2 will rest on a ledge about 210 feet deep in Scripps Canyon, about 3,000 feet offshore near Scripps pier.



—United Press International Telephoto.

ASTRONAUT SCOTT M. CARPENTER TO WORK AS AQUANAUT
He'll spend a month underwater in Sealab II experiment

Carpenter, who orbited the earth three times May 24, 1962, in the Mercury capsule Aurora 7, was expected to remain submerged 30 consecutive days, the other experimenters only about 15 days.



SEALAB'S NICHE
In Scripp's Canyon

Chances grew dim for a planned conversation between Carpenter and astronaut L. Gordon Cooper, orbiting the earth in Gemini 5.

Space agency officials said the conversation had been given a low priority on a busy Gemini flight schedule.

Lowering of Sealab 2, originally scheduled for Aug. 15, has been delayed by numerous problems. Over the weekend:

A seven-ton, beehive-shaped communications and power pod was wrecked while being lowered to the site by cable Saturday. A sudden surge of ocean currents smashed it against the bottom, cracking its concrete shell. A new shell was made hurriedly. The pod, to be connected by cables to a mother ship and to Sealab 2, houses electrical gear.

Much of yesterday was spent testing a balky counterweight system for lowering a small capsule which will carry the divers to and from Sealab 2.

The men engaged in the experiment will be known as aquanauts. They will leave Sealab 2—which has 11 large picture windows, hot showers, bunks, a laboratory and a kitchen—to harvest fish and other underwater life for study purposes and to explore the ocean bottom.

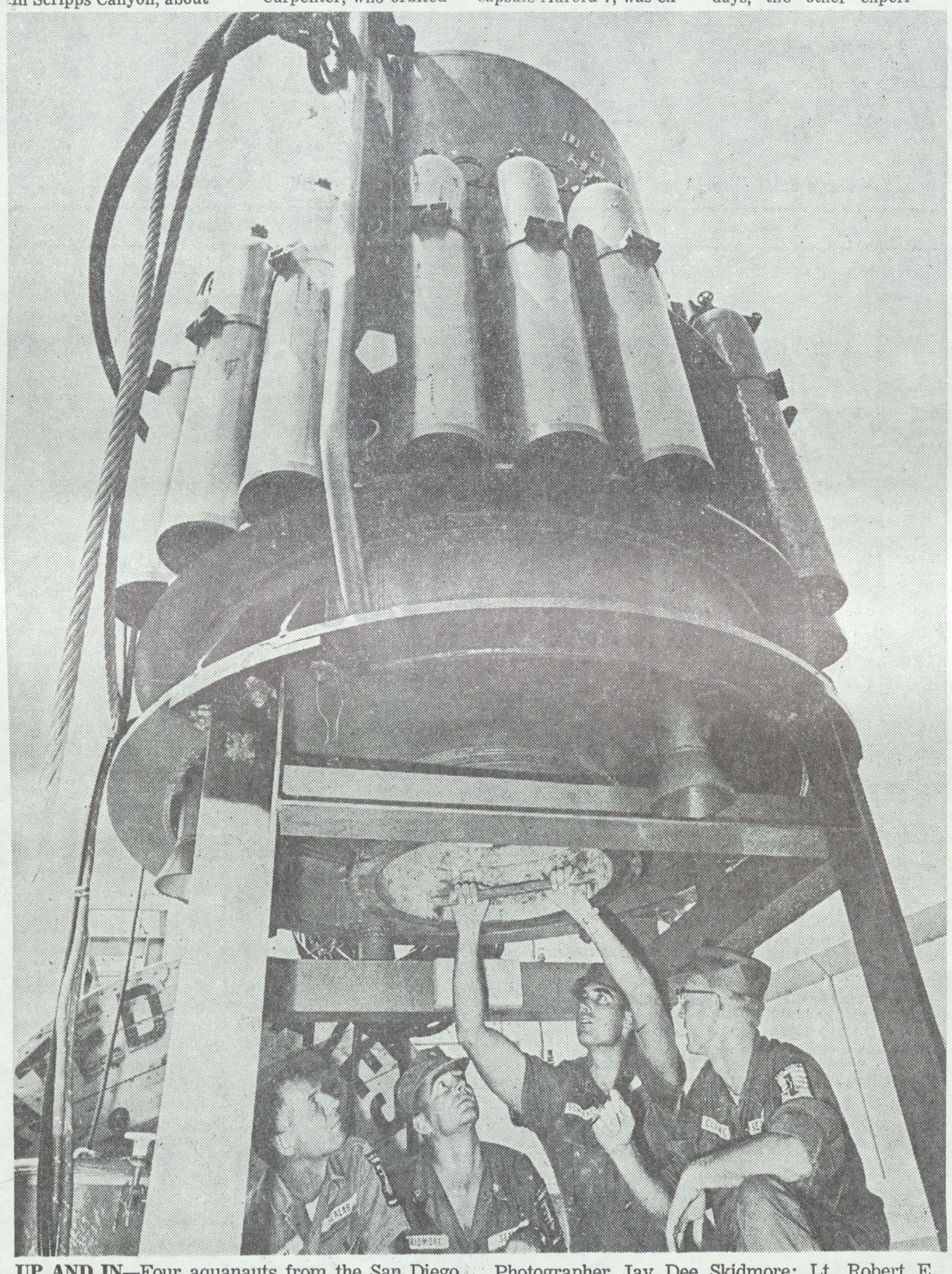
The aquanauts will try to establish and man the world's first underwater weather station. They also will try to salvage a sunken Navy fighter plane.



TUFFY TRAINS OR SEEALAB II PROJECT
The porpoise will carry tools and messages to divers

San Francisco, Calif.
Examiner
(Cir. D. 292,539 - S. 435,887)

AUG 24 1965



UP AND IN—Four aquanauts from the San Diego area who are on the first team of divers which will enter Sealab this week inspect hatch in the capsule that will take them to the bottom and bring them back. From left are Earl A. Murray, a diver from Scripps Institution of Oceanography; Navy Chief Photographer Jay Dee Skidmore; Lt. Robert E. Sonnenburg, a Navy doctor, and Tom Clarke, a Scripps graduate student. Murray is from Del Mar, Skidmore from Chula Vista, and Sonnenburg and Clarke from San Diego. The capsule is aboard the mother ship. Staff Photo by Al Sund

Sealab's Schedule Delayed by 'Bugs'

By LEO BOWLER
EVENING TRIBUNE Science Writer

Navy and civilian technicians worked today to meet a new schedule for the start of the Sealab II experiment off La Jolla.

The Sealab is scheduled to be submerged early tomorrow, and the first team of aquanauts is to be placed inside the undersea laboratory on Wednesday.

The new schedule for the 45-day experiment was announced last night by Capt. Lewis B. Melson after a conference with his top aides. Melson is director of the project.

210 Feet Key Depth

The program is the Navy's Man-in-the-Sea project, which will put teams of 10 men inside Sealab II for periods up to 15 days each. The lab will be submerged in 210 feet of water, 3,000 feet off Scripps Pier.

Navy Cdr. Scott Carpenter, astronaut turned aquanaut, will remain in Sealab for 30 days during the experiment.

Failure of an undersea electrical power transformer unit over the weekend dashed hopes of sending the aquanauts down tomorrow morning.

Transformers Used

The transformers were in one of two Benthic labs, concrete structures shaped like huge beehives, which were to be placed on the sea bottom after being filled with kerosene. The kerosene will keep the sea water out.

The other beehieve, housing a communications center, had already failed and was never installed. The concrete housing around the transformers apparently broke when it was placed on the sea floor.

It was raised over the weekend from 200 feet of water and sent to the Marine Physical Laboratory of Scripps Institution of Oceanography where it is being fitted with a steel jacket.

Melson said many hours were lost yesterday recovering from the bottom a stainless steel fitting which must be brought ashore and welded to the new jacket.

Sealab will be put in final readiness and sent to the bottom despite the transformer package trouble, but the aquanauts will not be sent down until the transformers are on the sea floor and in use, Melson said.

Cable to Carry Power

He said Sealab can get power through its umbilical cable which ties it to the mother ship Berkone above it. The transformers were to furnish an alternate source of power from shore.

Team to Live Undersea 45 Days

LA JOLLA, Calif., Aug. 21 (UPI)—Astronaut Scott Carpenter and nine other divers are about to venture into the depths of the Pacific where they will live in a steel cylinder and perform experiments.

The 200-ton, 57-foot long cylinder, Sealab II, will be occupied for a total of 45 days during the Navy's most ambitious deep submergence project. It rests 3000 feet offshore on a 210-foot deep ledge off Scripps Canyon.

The experiment is the second phase of the Navy's "man-in-the-sea" program. Last year in Sealab I, four men remained submerged in the Atlantic at a depth of 193 feet for 11 days.

All but one of the aquanauts, operating in teams of 10, will remain in Sealab II for 15 days. Carpenter will stay there for 30 straight days.

The aquanauts are to be lowered today or Monday, but technical problems could delay their descent a few days.

Ocean Probe Begins

LA JOLLA, Calif. — (UPI) — Final preparations were under way Saturday for launching the Navy's most ambitious deep sea probe, the lowering of Sealab 2 into the ocean depths as the second phase in the man-in-the-sea program.

The mother ship Berkone stood by about 4,000 feet off Scripps Pier ready to lower the 200-ton steel cylinder to a depth of 210 feet to a ledge in Scripps Canyon.

Ten aquanauts of the first team, headed by Astronaut Scott Carpenter, were expected to descend Sunday or Monday into the 57-foot-long tube that is Sealab 2.

Two other teams of aquanauts also will remain submerged for 15 days each during the 45-day experiment. Carpenter alone will remain under water 30 days.

SEALAB 2 RUNS INTO NEW DELAY

LA JOLLA, Calif., Aug. 25 (AP)—Safety checks of gear for Sealaf 2 are taking far more time than planned, Navy officers say, and it may be Thursday or Friday before divers will be allowed to enter the steel chamber that will be their underwater base for 45 days.

"There are no big problems—just a whole lot of minor ones that have to be solved before we can let the men begin residence at a depth of 210 feet," said Capt. Ray Spenser of the engineering applications division of the Office of Naval Research.

Lowering of Sealab 2 to the bottom 1000 years off this southern California resort, planned since Aug. 15, was delayed yesterday by a series of problems that cropped up as piece after piece of auxiliary equipment was checked out.

First there were leaks in a diving bell that will take 10-man teams to and from Sealab for 15-day stays. There were repaired. Then came trouble with air-hose seals and other equipment.

Much of the day was spent practicing lifting the diving bell from the water and swinging it by crane to a decompression chamber on the mother ship. This is a tricky procedure on a rolling sea and one that must be performed with split-second precision in event of an emergency below.

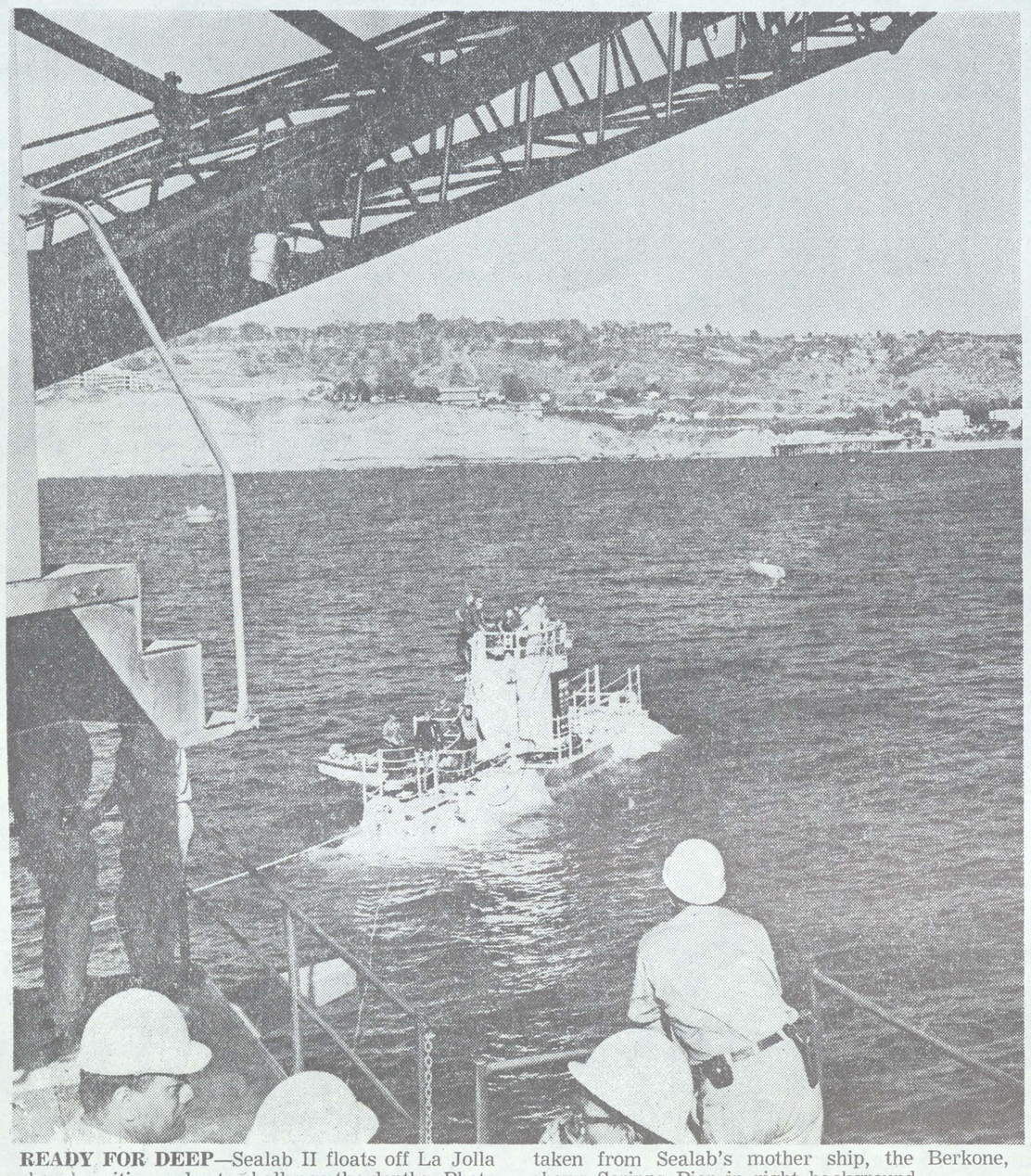
After Sealab 2 is lowered, both it and a power pod to which it is connected by cables will undergo further safety checks.

AUG 25 1965
POST-DISPATCH
St. Louis, Mo.

40

EVENING TRIBUNE
San Diego, Calif., Tuesday, August 24, 1965 Page 15

S.D. Navy Doctor Will Spend Two 15-Day Tours in Sealab



READY FOR DEEP—Sealab II floats off La Jolla shore awaiting order to challenge the depths. Photo taken from Sealab's mother ship, the Berkone, shows Scripps Pier in right background.



CHANTEY—Scott Carpenter, an aquanaut and former astronaut, grabs his ukelele from a friend, before his undersea venture in Sealab II. Carpenter is scheduled to stay undersea for period of 30 days

Craft Is Readied For Lowering Task

Aquanauts, Technicians Load Equipment, Gear in Vehicles

By LEO BOWLER
EVENING TRIBUNE Science Writer

A San Diego Navy doctor will be the second man to spend 30 days on the bottom of the ocean in Sealab II.

Lt. Robert Eric Sonnenburg, 28, of 4367 Adams Ave., will spend the first 15 days of the experiment on the bottom, come up for a 15-day breather, then return to the bottom for another 15 days with the last crew to go down.

The announcement was made today by Capt. George Bond, principal investigator in the Sealab project and director of the Navy's Man-in-the-Sea project of which Sealab is a part.

Unbroken 30 Days

Scott Carpenter, who is both astronaut and aquanaut, will also spend 30 days on the bottom. His period in Sealab will be unbroken.

The other aquanauts will spend no more than 15 days under the sea.

Sonnenberg entered the Navy in July, 1961, while still a medical student. He got his medical degree in 1962 and became a submarine medical officer. He attended UCLA and the University of Chicago.

On Polaris Patrols

He participated in two Polaris submarine patrols out of Holy Loch, Scotland, during which physiological research was conducted under water.

His mother, Ada Clare Hickman, lives at the Adams Avenue address. Sonnenberg is married and has two daughters and a son.

The steel cylinder which comprises the Sealab house today was being prepared for lowering to the site on the bottom 3,000 feet off Scripps Pier where the experiment will take place.

Late yesterday Sealab was towed to a point 75 feet shoreward from the mother ship Berkone and opened. It had been sealed in Long Beach and had not been opened since arriving here Saturday morning.

Only Minor Problems

Aquanauts and technicians swarmed aboard and reported only minor problems from the long tow here.

They immediately began stowing gear inside. The items ranged from Carpenter's ukulele through an exercising bicycle to special cameras and electronic equipment.

Carpenter said he expects to play the uke on the bottom. The bicycle was brought aboard to be used in experiments by doctors who want to test the aquanauts' hearts and lungs under heavy exercise inside the steel house where the atmosphere will be at the same pressure as the surrounding sea.



LT. R. E. SONNENBURG
30 days on bottom

Bond said that with a little extra luck the divers would enter Sealab tomorrow afternoon. Otherwise, he said, it would be Thursday or Friday before the lab is occupied.

Lowering Tomorrow

Joe Berkage, an engineer from the Naval Ordnance Test Station in Pasadena, and Capt. Walter F. Mazzone, atmosphere control officer, said they hope to have Sealab sealed up and its special helium, nitrogen and oxygen atmosphere inside and under pressure in time to begin lowering Sealab tomorrow morning.

The name of the mothership Berkone is a contraction of the names of the two men.

Technicians spent all day yesterday working on the personnel transfer capsule in which the aquanauts will go the bottom and return.

Power Packs Delay

The Sealab project also was being delayed by work which had to be done on a package of underwater power transformers.

The concrete case on the transformers broke when it was placed on the bottom and had to be raised and remanufactured.

New York 38, N. Y.
AUG 2

Sealab Going Down After Power Delay

LA JOLLA, Calif., Aug. 2 (UPI)—The 200-ton, 57-foot long Sealab 2 was scheduled to be lowered 210 feet into the ocean today, after a 24-hour delay caused by failure of an electric power transformer unit.

Sealab 2 will rest on a ledge in Scripps Canyon about 3000 feet offshore near Scripps Pier during the 45-day experiment involving astronaut/aquanaut M. Scott Carpenter, nine scientists and a porpoise named Tuffy.

From AUG 22 1965
INQUIRER
Philadelphia, Pa.

Navy Prepares To Lower Sealab

LA JOLLA, Calif., Aug. 21 (UPI).—Final preparations were under way on Saturday for launching the Navy's most ambitious deep sea probe, the lowering of Sealab 2 into the ocean depths as the second phase in the man-in-the-sea program.

The mother ship Berkone stood by about 4000 feet off Scripps Pier ready to lower the 200-ton steel cylinder to a depth of 210 feet to a ledge in Scripps Canyon.

OCEAN-FLOOR LIVING TEST IS DELAYED

Sealab 2 Problems Arise; Lowering Set Today

La Jolla, Cal., Aug. 23 (AP)—Accidents and technical problems are delaying the start of the Navy's Sealab 2 experiment to see how long men can live on the floor of the sea, officials said today.

Sealab 2, a 12 by 58-foot steel cylinder in which divers are to work and sleep for up to 45 days at a depth of 210 feet, is scheduled to be lowered into the ocean 3,000 feet off this San Diego suburb tomorrow morning.

Scott Carpenter, an astronaut and Navy commander with extensive diving experience, and nine other divers and scientists are expected to descend to the underwater laboratory tomorrow night or Wednesday morning, a spokesman said.

Numerous Problems

Chances grew dim for a planned conversation between Carpenter on the ocean floor and Gordon Cooper, orbiting the earth in Gemini 5.

Navy officials said they hoped to have Carpenter down in Sealab 2 before the end of the Gemini 5 mission, but United States space agency officials at Houston said the conversation had been given a low priority on a busy flight schedule.

Lowering of Sealab 2, originally scheduled for August 15, has been delayed by numerous problems including these latest over the weekend:

Electrical Gear

A seven - ton, beehive - shaped communications and power pod was wrecked while being lowered to the site by cable Saturday. A sudden surge of ocean currents smashed it against the bottom, cracking its concrete shell. A new shell was made hurriedly at the nearby Naval Electronics Laboratory.

The pod, to be connected by cables to a mother ship and to Sealab 2, houses electrical gear to relay power and communications between the laboratory and scientists on the surface.

Most of the divers are scheduled to spend fifteen days in Sealab 2, rotating in teams of ten.

San Mateo, Calif.
Times & News Leader
(Circ. D. 31,671)

1 1965

Sealab 2 Ready to Go

LA JOLLA (UPI) — Final preparations were underway today for launching the Navy's most ambitious deep sea probe, the lowering of Sealab 2 into the ocean depths as the second phase in the Man-in - the - Sea program.

The mother ship Berkone stood by about 4,000 feet off Scripps Pier ready to lower the 200 - ton steel cylinder to a depth of 210 feet to a ledge in Scripps Canyon.

Ten Aquanauts of the first team, headed by Aqua- Scott Carpenter were expected to descend Sunday or Monday into the 57 - foot - long tube that is Sealab 2, where they will perform experiments for 15 days.

Some of the experiments will be conducted with Tuffy, an "educated" porpoise.

Two other teams of Aquanauts also will remain submerged for 15 days each during the 45 - day experiment. Carpenter alone will remain underwater 30 days.

The purpose of the experiment is to obtain data on how well man can function under high atmospheric pressure.

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Astronaut to Lead 'Inner Space' Team; Expert Diver to Help

SPECIAL TO THE DETROIT NEWS

LA JOLLA, Calif., Aug. 23. — Scientists began to lower Sealab 2 into the ocean today to begin a 45-day underwater expedition in which astronaut-aquanaut Scott Carpenter will be the diving leader.

Sealab 2, a 200-ton snow-white capsule, is to be lowered 210 feet to a shelf in the sea which overlooks a 700-foot-deep canyon. The sinking is to take about four hours.

Carpenter and nine other divers and scientists will be lowered most of the way to the steel chamber tomorrow in a small pressurized transport capsule—sort of an undersea dumbwaiter. They will swim the rest of the distance.

VISITING EXPERT

Assisting the 10 human experts in their experiments will be Tuffy, an educated porpoise and the most expert diver in the bunch.

Tuffy will be used to carry lines from one aquanaut to another while they are outside the capsule. The Navy hopes to find out if he can help divers find their way back to Sealab. Tuffy was brought here from the Point Mugu Naval Facility.

Among the first to enter Sealab 2 will be Navy Dr. Robert E. Sonnenberg, 27, of San Diego. He will give daily physical examinations to each of the men in the lab.

The men will be subjected to temperatures never experienced at such depths. Officials hope they will spend as much time as possible in the 55-degree water outside the capsule.

Assistant Secretary of the Navy Robert Morse said the experiments would be a key step in U.S. exploration of more than one million square miles of submerged land.

Carpenter is to spend 30 continuous days in the capsule, but the others will spend only about 15 days in it at a time.

Morse said the undersea pioneers "will point the way toward an exploitation of the mineral, geological and agricultural potential of the sea."

The "inner space" probe won't be man's deepest or the longest. The bathyscaph Trieste went to a depth of 35,000 feet with two men inside in 1962, and Jacques Yves-Cousteau, of France, once remained at 90 feet in his Conshelf 2 for one month.

LOOKING AHEAD

However, officials have expressed the hope that the scientists in Sealab 2 will make great strides in gathering information about the underwater world and man's capability to work and live there.

Carpenter, 39, second American to orbit the earth, compared hostile environments of outer space and the "inner space" of the oceans:

"Equal dangers exist in whirling around the planet in a small capsule and living at the bottom of the sea.

"Both are new frontiers being conquered for the first time by man."

In his Mercury space capsule, when Carpenter orbited the earth three times on May 24, 1962, the atmosphere was similar to that on earth.

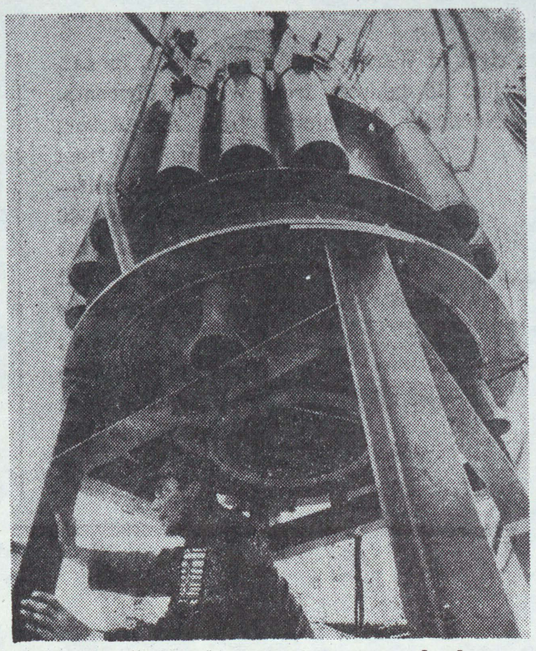
PRESSURE UP

Living beneath the sea, the aquanauts will exist in an environment where pressure will be 6½ times that at the surface.

Among the 47 major experiments will be an attempt to learn the kind of gases inside the bladders of deep sea fish.

Aquanauts will mine ores on the sea's bottom, harvest fish, salvage and refloat a sunken jet fighter and build an undersea platform.

Last year four Navy divers lived 11 days at 196 feet off Bermuda in the Navy's Sealab 1.



Now an aquanaut, Scott Carpenter checks out the pressurized device which will take him down 210 feet into the Pacific to Sealab 2.—AP.

Redwood City, Calif.
Tribune
(Circ. D. 20,156)

AUG 24 1965

Gas Leak Found In Sealab Test

La Jolla, Cal., Aug. 25 (AP)—The Navy's Sealab 2 was lowered 20 feet into the water today and brought back to the surface when pressurizing helium gas began escaping.

Officials said the leaks around hatches in the underwater laboratory would be repaired later today and that more helium would be pumped into the 12x58-foot steel cylinder at 6 A.M. tomorrow.

Sealab 2, designed to be a submerged home for three rotating teams of divers and scientists for 45 days, should be lowered 205 feet to the ocean floor two hours later, they said.

The first team of 10 divers, headed by astronaut M. Scott Carpenter, a Navy commander, could enter Sealab 2 Friday morning if all goes well. Each of the teams will stay submerged 15 days, but Carpenter is expected to stay down 30 days.

After Weeks of Delays:

Sealab 2 Descends To Floor of Ocean

LA JOLLA, Calif. (AP) — After more than a week of technical delays the Navy said it was ready today to lower its Sealab 2 to the ocean floor, where teams of divers will spend up to 45 days working, eating and sleeping at a depth of 210 feet.

The 12x58-foot steel cylinder was to descend between 6 a.m. and 9 a.m.

The first team of 10 divers, including astronaut M. Scott Carpenter, 39, is expected to go down Wednesday after the underwater base is checked for leaks and for reliability of communications with the surface.

Navy Commander Carpenter, an expert in diving techniques, may stay down as long as 30 days in an attempt to set a new underwater record. Four men lived 13 days at a depth of 160 feet in the smaller Sealab 1 off Bermuda last year.

The other divers will rotate on 15-day tours of duty in Sealab 2, which has facilities for 10 at a time.

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A spokesman said the pod would be working in time for the start of operations Wednesday but that there would be some delay in planned live television from Sealab 2.

Hopes dimmed for a planned conversation between Carpenter in Sealab 2 and astronaut L. Gordon Cooper Jr. orbiting the earth in Gemini 5. Space agency officials at Houston said the conversation had been given a low priority on a busy flight schedule.

If it takes place the chat between spacecraft and underwater laboratory will be channeled through a Gemini tracking station at Point Arguello, Calif.

Goal of the project is to determine how long and how well men can function deep in the ocean at a pressure six times that on the surface.

From AUG 22 1965
POST-DISPATCH
St. Louis, Mo.

10 Men to Go to Ocean Floor In 30-Day Sealab II Venture

LA JOLLA, Calif., Aug. 21 (UPI)—Astronaut Scott Carpenter and nine other divers are about to venture into the depths of the Pacific where they will live in a steel cylinder and perform experiments, some with the help of a porpoise named Tuffy.

The 200-ton, 57-foot long cylinder, Sealab II, will be occupied for a total of 45 days in the Navy's most ambitious deep submergence project. It rests 3000 feet offshore on a 210-foot deep ledge of Sripps canyon.

The experiment is the second phase of the Navy's "Man-in-the -sea" program. Last year in Sealab I four men remained submerged in the Atlantic at a depth of 193 feet for 11 days.

All but one of the aquanauts, operating in teams of 10, will remain in Sealab II for 15 days. Carpenter will stay there 30 days continuously.

The aquanauts are to be lowered Sunday or Monday, but technical problems could delay their descent a few days.

Job for Porpoise

Tuffy will be used to carry lines from one aquanaut to another to determine whether the purpoise can help divers find their way back to Sealab. The porpoise, which can make the trip between the surface and Sealab in about 30 seconds, will be brought here from the Point Mugu naval facility the last week in August.

Assistant Secretary of the Navy Robert Morse said the experiment would be a key step in United States exploration of more than a million square miles of submerged land. He said the undersea pioneers "will point the way toward an exploitation of the mineral, geological and agricultural potential of the sea."

"A capability will be created to foster the nonmilitary interests involved in such matters as tending pipelines, cables and underwater installations," he said.

Sealab II also will provide data for future submarine rescue operations.

Main Aim

The main aim of Sealab II is to find out whether man can live and work at such great depths. The trip is expected to produce the most complete store of medical and physiological data ever obtained about man's ability to function under the sea.

The aquanauts will descend in a special diving bell part of the way to the lab and swim the rest of the way. Among the first group will be a Navy doctor, Lt. Robert E. Sonnenberg, 27 years old, of San Diego. He will give daily physical examinations, testing each man's respiration, blood pressure, heart, blood, urine and even sputum.

The men will be subjected to temperatures never experienced at such depths. They will spend as much time as possible working in the 55-degree water outside the Sealab.

They will catch fish and demolish wrecked automobiles and planes placed on the sea floor.

But inside a constant 88 degrees will be maintained by copper radiant heat conductors underneath the lab's cement floors.

Time Outside Important

The time spent outside the Sealab is highly important.

Lt. Comdr. Malcolm MacKinnon of Maplewood, N. J., who supervised the construction of the lab, said that "a diver working from the surface will perform only seven to 10 minutes work. It might take 48 men to do the amount of work that one man could do in eight hours.

"If you could put one man on the bottom and get him to do what it now takes 48 men to do — well, that's what programs like this are aiming for," he said.

Because of the medical interests, Carpenter would be a welcome addition to the experiment. A tremendous amount of medical information has already been learned about him from his space travels.

"I am curious about the ocean bottom," he said recently when inspecting the lab with MacKinnon. "But I'm even more interested in the limits to which we can take men, and support them safely and effectively.

"The problems of environmental control, of living in a permanently hostile environment, and of coping with isolation are very similar—whether you're in space or under the sea."

Three Mermaids Go to Sea For Brain Wave Experiment

The closest things to mermaids most aquanauts will ever see have donated their brain waves to science.

The three boarded Sealab yesterday. They are the only women allowed aboard since the lab was put into the water at Long Beach last week.

No one else not connected with the project has been aboard either, but the three girls spent almost two hours in the craft yesterday on the eve of its descent to the bottom for the undersea experiment.

The three are Anlaug E. Sem-Jacobsen, 18, Reidun Bakkehoei, 20, and Alfhild Aae, 19, all from Oslo.

Sealab officials let them aboard because Dr. Carl Wilheim Sem-Jacobsen, a Norwegian scientist visiting here with the girls, said they were vital to a scientific experiment which we will conduct with the aquanauts.

Sem-Jacobsen is going to take brain wave measurements from at least one aquanaut. He hopes to use complicated telemetry equipment to get a brain wave while the aquanaut is swimming 210 feet below the surface of the sea.

But first he had to test his equipment. So he put electrodes on his daughter Anlaug and their friend Alfhild. He assigned the other friend of his daughter Reidun, the task of helping with his equipment.

Then he told Sealab officials. He said it was essential that the instruments be tested aboard Sealab. He put his daughter and her friends aboard the mother ship Berkone every chance he got, with the electrodes already in place and their wires trailing.

Yesterday he got his chance. He and the Norwegian mermaids boarded Sealab, completed their tests, then departed in a skiff for shore, waving and smiling at the aquanatus.

The wires from the electrodes were still waving in the wind.



EQUIPMENT TEST—Dr. Carl Wilheim Sem-Jacobsen takes brain wave pattern from his daughter, Anlaug, 18, in Sealab II with Alfhild Aae, 19, helping. Gear will be used in undersea experiment.

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New York 38, N. Y.

From AUG 24 1965

Aquanauts to Study Sea Floor

Submerge Craft Today to Start 45 Day Test

BY SEYMOUR KORMAN
[Chicago Tribune Press Service]

La Jolla, Cal., Aug. 23 — A huge steel craft resembling a staring sea monster is scheduled to be lowered 210 feet into the Pacific ocean 3,000 feet off shore from here tomorrow. The next day, if the craft is securely moored, a team of 10 aquanauts, headed by Navy Comdr. M. Scott Carpenter, will descend to begin 45 days of tests in the most ambitious underwater exploration thus far attempted.

Carpenter is the astronaut who orbited the earth three times on May 24, 1962. Another of the seven original astronauts, L. Gordon Cooper, is now on the Gemini 5 flight and if that continues, it is planned to have Carpenter and Cooper speak to each other by radio telephone, linking outer space and the ocean depths in communication for the first time.

Work Outside of Craft

The 200-ton craft, called Sealab II, will be the housing for the aquanauts. They will live in it and swim out in diving suits for studies of marine life, pressure changes, and current velocities.

Carpenter will remain below 30 days. After the first 15 days, the other nine will come up, and be replaced by nine more. A new team of 10 will go under for the final 15 days.

A break in a power cable delayed the Sealab's submerging, which had originally been planned for last week. Additional adjustments were also necessary on the decompression equipment. It will require two days of careful pressure changing to bring the aquanauts to the surface.

Has 11 Viewing Ports

The specially designed Sealab II is 57 feet long. The 11 viewing ports give it the monster appearance. The living compartment, separated into laboratory, galley, and bunkroom, is 12 feet in diameter.

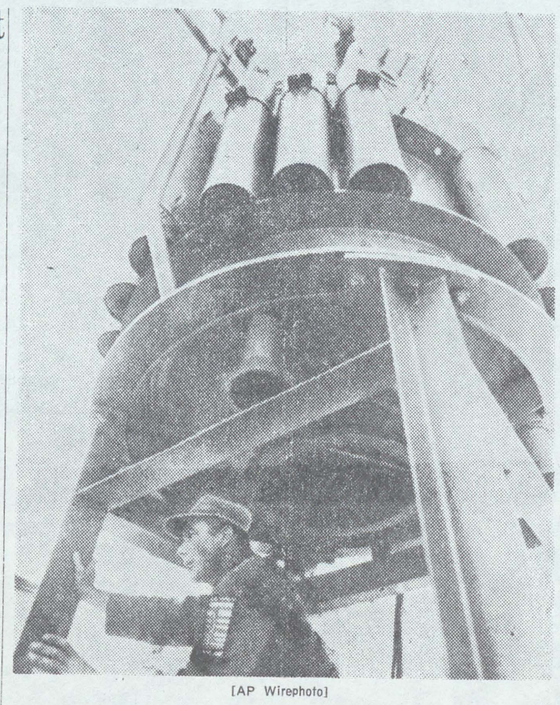
The interior temperature will be kept at 80 to 90 degrees, and the aquanauts will be breathing a mixture of 80 per cent helium, 15 per cent nitrogen, and 5 per cent oxygen.

Study Reaction to Pressure

Among those who will study the aquanauts is Roland Radloff, a psychologist from the naval medical research institute at Bethesda, Md.

"We are interested in how a small group performs under stresses—eating and sleeping habits, and moods," Radloff said today. "We also want physiological data such as coordination and manual dexterity from their swims. The pressure where they will be working 210 feet down in the water is 100 pounds per square inch, compared with 14 pounds at sea level."

In particular, psychologists and physiologists will have the opportunity to compare Carpenter's reactions under water with the information already documented about him in space travel.



[AP Wirephoto]

Comdr. M. Scott Carpenter, astronaut-turned-aquanaut checking capsule that will lower him to floor of Pacific ocear off San Diego for planned 30-day stay in Sealab 2.

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Probing the deep

Man is ever in quest of new frontiers. With jungles, deserts, and polar regions, skies and mountain peaks behind them, men are soaring into outer space and plunging to the inmost depths of the oceans.

"Astronaut" may still be a more familiar term than "aquanaut," but exploration of the underwater frontier is about to move into high gear. It is astronaut M. Scott Carpenter who provides the present link. He is about to join Navy divers where he will live in Sealab II, 215 feet beneath the Pacific for thirty days. His "very intensive training in working in a hostile environment" prompted his choice for this assignment.

About three-quarters of the earth's surface is under water. In the depths lies a vast region little explored by man. Natural curiosity, technical progress, economic factors, and strategic considerations have combined to ensure the exploration and development of this realm of enchantment. The moon and Mars may be largely barren wastes, but the seas are filled with life and color.

Who that has seen the film of the underwater explorations of the team headed by Jacques-Yves Cousteau would not wish to join, at least, the first tourist cruise through the fascinating labyrinths he reveals? For the underwater pioneer there is promise of adventures unlimited.

As underwater domains become increasingly important to national interest, we wonder whether there will be a great rush to claim them, colonize them, fortify them, and carve them up among existing nation states. Or will mutual agreement be able to place them under international authority? So much depends upon the conquest of that ultimate frontier—men's mastery of their own inner nature.

CHRISTIAN SCIENCE MONITOR
Boston, Mass.

AUG 25 1965

SAN DIEGO TRIBUNE AUGUST 26, 1965

Sealab Starts Descent To Bottom of Pacific

Check Due Before Ship Hits Floor

By LEO BOWLER
EVENING TRIBUNE Science Writer

Sealab II slipped beneath the surface of the ocean at 1:23 this afternoon on its way to the bottom.

Astronaut Scott Carpenter was the last man to leave the craft on the surface.

Inspection Planned

Officials plan to stop the lab's slow descent at 50 feet below the surface to check its pressure, rearrange mooring lines and inspect it for leaks before sending it on to the ocean floor.

They plan to stop the descent 20 feet from the bottom and make a new set of checks.

The lab will be lowered the final 20 feet after it is determined it will land in the correct position.

Bubbles Left

The lab left bubbles on the surface from leaks around windows. Officials said the leaks will seal when the huge container reaches its eventual depth.

A Navy LCU was standing by with a load of helium to pump into Sealab as it was lowered.

Capt. Lewis B. Melson, director of the project, said no decision has been made about postponing the entrance of the aquanauts into Sealab.

Melson earlier said he hoped to send the men down late tomorrow, but it now appears unlikely that the aquanauts will enter the lab until Saturday.

Workmen yesterday connected cables to a package of power transformers which has given trouble since it was put on the bottom last week. It had to be raised because it broke apart under water.

To Change Voltage

The package will change 3,000 volts of electricity brought from shore in an underwater cable to 440 volts before it is piped into Sealab.

Melson said he planned to lower the package to the bottom tomorrow morning. Then the mother ship Berkone is to be moved 40 feet so it will not be directly over Sealab.

Next a transfer capsule will be lowered. The capsule will be used to bring the men back after their stay in Sealab is over.

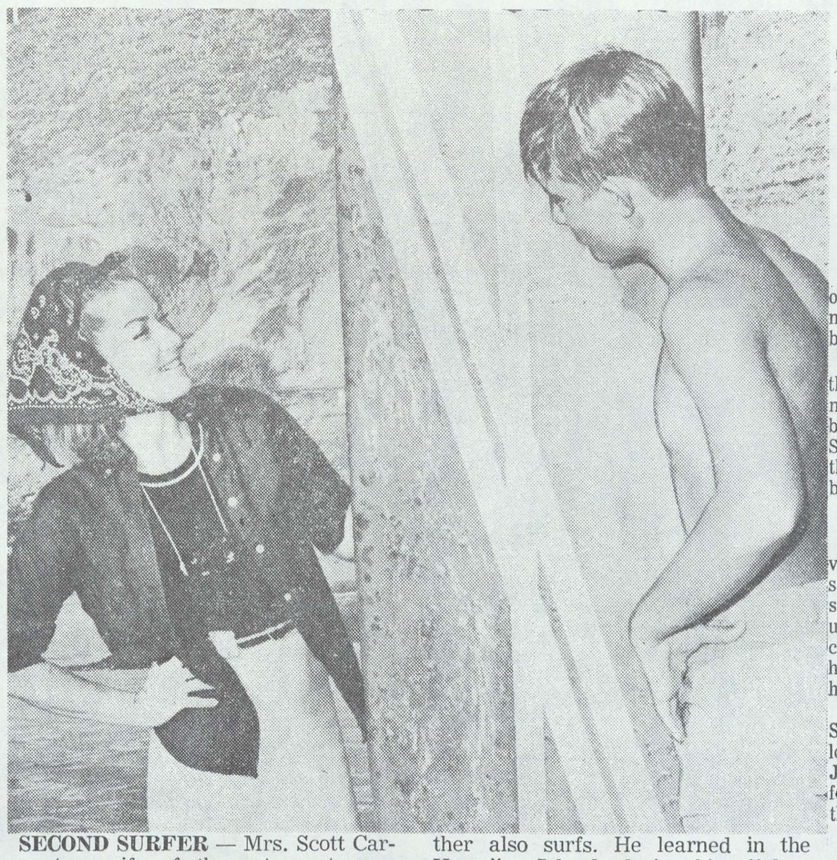
The decision on when to man Sealab will be made after the capsule is down, Melson said.

TV Cable Laid

Workmen yesterday also laid a cable ashore for closed television circuits. Officials ashore were able to watch the inside of its moorings.

Capt. Walter F. Mazzone, atmosphere control officer, said that three divers have been injured in minor accidents aboard the Berkone. The three are Chief Steelworker Howard L. Buckner, 36, Chief Gunner's Mate Charles M. Coggeshall, 35, and Boatswain's Mate William D. Meeks, 34.

Mazzone said the injuries will not take any of the men out of the program. None is in the first team of aquanauts scheduled to enter the lab.



SECOND SURFER — Mrs. Scott Carpenter, wife of the astronaut-aquanaut, hears about La Jolla surfing from her son, Scott, 13. The boy's father also surfs. He learned in the Hawaiian Islands during his off-duty hours while on station there with the Mercury space program.

'NOT MUCH TIME'

Quandary Besets Mrs. Carpenter

Mrs. Scott Carpenter, the wife of the astronaut who is now the nation's chief aquanaut, is torn between two dates.

She wants to be in La Jolla the day her husband leads his men into Sealab II, 210 feet beneath the sea off La Jolla. She also wants to be in Houston the day her children are due back in school.

Watches Ships

Mrs. Carpenter was interviewed yesterday afternoon. She sat on the grass at Scripps Institution of Oceanography and used binoculars to watch the cluster of ships offshore where her husband was working and her son as he surfed near shore.

She explained that if the Sealab project is delayed much longer she will have to leave La Jolla with her four children before Carpenter makes his trip to the ocean floor.

'Wants to Do'

"Schools in Houston where we live start next Wednesday," she said. "Scott drove us out here in 2½ days, but it will take me four days to drive back. That doesn't leave us much time."

Mrs. Carpenter said she thinks her husband's stay in Sealab will be more dangerous than his trip into space. He made three orbits of the earth in 1962 in a Mercury capsule.

Mrs. Carpenter obviously isn't eager for her husband's date with adventure on the ocean bottom.

"If people only knew all the problems they face out there," she says. "It's a lot easier going into space. But this is what Scott wants to do."

Few Excursions

The couple has two sons, Scott, 15, Jay, 13, and two daughters, Kris, 10, and Candy, 8.

Young Scott has surfed near Scripps Pier almost daily since the family came to La Jolla July 8.

Carpenter is also a surfer, but has had time for only a few excursions into the water with his son.

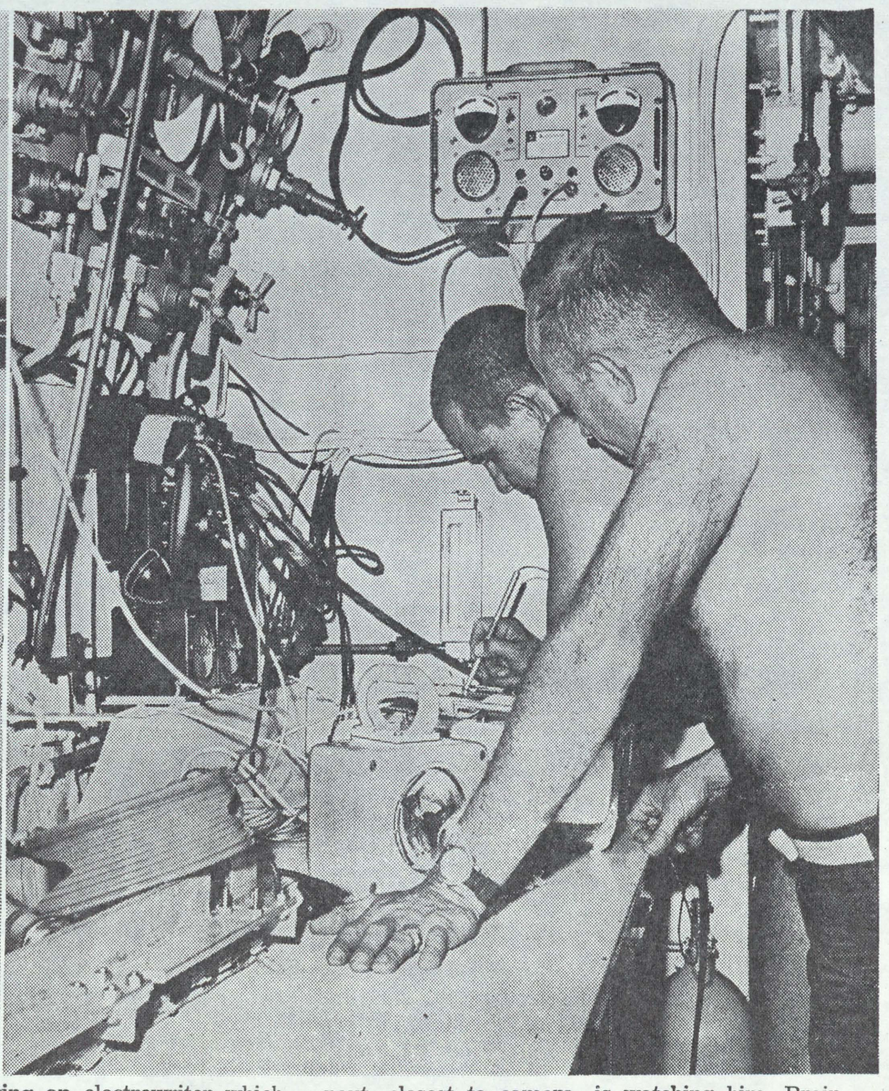
"My husband learned to surf in the Hawaiian Islands when he was stationed out there in one of the tracking stations for a Mercury space shot," she said. "He loves it.

"We will all hate leaving La Jolla. We'll wait a couple of more days to see what happens in the Sealab project. Maybe we can still be here when he goes into the lab."

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Sealab II Leaks Delay Descent Another Day





LOADED CAPSULE—Exclusive photos made inside Sealab during final stages of loading operation to prepare it for trip to the bottom of the sea show Dr. Carl Wilhelm Sem-Jacobsen, left, taking brain wave patterns with the help of Alfhild Aae, left, and Reidun Bakkenhoei. Right photo shows aquanaut Cyril J. Tuckfield testing an electrowriter which transmits what he writes or draws to the mother ship. Navy Chief Frederick J. Johler, also an aquanaut, closest to camera, is watching him. Brain tests were made in aquanaut sleeping quarters. Electrowriter is in laboratory area of steel cylinder.

METROPOLITAN AREA NEWS

EVENING TRIBUNE

San Diego, Calif., Wednesday, August 25, 1965 Page 15

SECTION A FINANCIAL

Helium Tests Show Defects At Windows

By LEO BOWLER
EVENING TRIBUNE Staff Writer

Leaky windows in Sealab II frustrated Navy hopes to place the capsule on the bottom of the ocean off La Jolla today.

Officials now plan to lower the lab tomorrow morning. Leaks were found before dawn today when the chamber was presurized with helium gas.

Capt. Walter F. Mazzone, atmosphere control officer for the project, said enough helium leaked out to force officials to send to Long Beach for more gas.

No Try at Night

The gas is expected to arrive tonight. Navy Capt. Lewis B. Melson, project director, said it is too risky to sink the laboratory after dark.

Meanwhile, Sealab is awash off the stern of the mother ship Berkone. Divers worked to fix some of the leaks.

Mazzone said it would not be necessary to stop the leaks entirely. He said if enough helium is available, Sealab could be sunk to the bottom under pressure and the pressure of the water at the bottom would stop escape of the gas.

Top Priority Given

Officials still are standing by an earlier decision to give top priority to the placement of Sealab over other phases of the project.

However, some of the other work on the project was going on today while they waited for helium.

The aquanauts completed loading their personal gear aboard Sealab late yesterday. Four hours had been budgeted for this, but the operation stretched out to better than 24 hours.

Sealab officials said that the fact that there is only one hatch slowed the work. Heavier than normal swells hampered activities.

Tests Made

As aquanauts worked yesterday to ready Sealab, the personnel transfer capsule was tested to see if it could be successfully mated to the giant decompression chamber aboard the Berkone.

The aquanauts are to be brought up from Sealab in the capsule after their stay there. The transfer capsule will keep them at the pressure of the bottom of the sea.

It will be necessary to stand the capsule on top of the chamber and attach it with a pressure tight seal so that the aquanauts can climb into the decompression chamber without going through a reduction in pressure.

Connection Made

The 30-ton crane on the Berkone swung the capsule over the chamber and lowered it. Swells which rocked the Berkone made the capsule twist and swing, but workmen were able to complete the operation and make the connection.

New York 38, N. Y.

From AUG 2

CONSTITUTION Atlanta, Ga.

Troubled-Plagued Sealab Is Ready

LA JOLLA, Calif. (AP) — Accidents and technical problems are delaying the start of the Navy's Sealab 2 experiment to see how long men can live on the floor of the sea, officials said Monday.

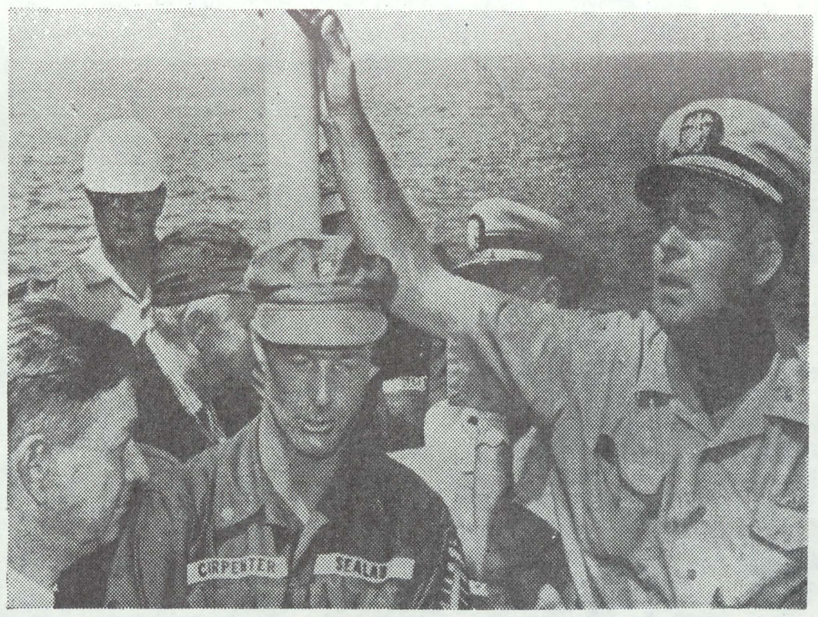
Sealab 2, a 12x58-foot steel cylinder in which divers are to work and sleep for up to 45 days at a depth of 210 feet, is scheduled to be lowered into the ocean 3,000 feet off this San Diego suburb Tuesday morning.

Astronaut M. Scott Carpenter, a Navy commander with extensive diving experience, and nine other divers and scientists are expected to descend to the underwater laboratory Tuesday night or Wednesday morning, a spokesman said.

Chances grew dim for a planned conversation between Carpenter on the ocean floor and astronaut L. Gordon Cooper, orbiting the earth in Gemini 5.

Navy officials said they hoped to have Carpenter down in Sealab 2 before the end of the Gemini 5 mission, but U.S. space agency officials at Houston, Tex., said the mission had been given a low priority on a busy flight schedule.

Lowering of Sealab 2, originally scheduled for Aug. 15, has been delayed by numerous problems including these latest over the weekend: A seven-ton, beehive-shaped communications and power pod was wrecked while being lowered to the site by cable Saturday. A sudden surge of ocean currents smashed it against the bottom, cracking its concrete shell. A new shell was made hurriedly at the nearby naval electronics laboratory. The pod, to be connected by cables to a mother ship and to Sealab 2, houses electrical gear to relay power and communications between the laboratory and scientists on the surface.



Herald Tribune—UPI telephoto

Cmdr. Scott Carpenter with top project officers at the Sealab base in San Diego, Calif.

Carpenter and Sealab Stalled Again

LA JOLLA, Calif. (UPI). The Sealab 2 experiment to test man's adaptability to a life underwater was delayed again yesterday, with Cmdr. Scott Carpenter and his fellow aquanauts not expected to go below until tomorrow.

The Navy, which delayed the descent of Sealab 2 Monday because of mechanical trouble, had scheduled the drop for 6 p. m. yesterday. Instead it announced there would be no attempt made to lower the steel cylinder until 8 a. m. tomorrow.

Cmdr. Carpenter and the other aquanauts will descend and board the Sealab 2 for a "voyage" 3,000 feet offshore and 210 feet beneath the surface. The Sealab will rest on a ledge of Scripps Canyon for 45 days.

A porpoise called "Tuffy" has a role in the experiment.

The experiment, delayed because of a mechanical problem, is the second phase of the Navy's "Man-in-the-Sea" program. Last year in Sealab I, four men remained submerged in the Atlantic at a depth of 193 feet for 11 days.

Cmdr. Carpenter will stay beneath the surface for 30 days continuously, but the other aquanauts will rotate for 15 days at a time.

Normal functions—the life processes—will be analyzed much the way scientists study the conduct of astronauts in space.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

AUG 23 1965

Mechanical Faults Delay Aquanauts' Ocean Visit

By CHARLES HILLINGER
The Washington Post-LA Times Service

SAN DIEGO, Calif. — The descent of astro-aquanaut Scott Carpenter and nine other divers and scientists to the Navy's Sealab II 210 feet below the ocean's surface off nearby La Jolla, has been delayed until Tuesday morning. Minor mechanical problems were blamed.

Three teams of 10 divers each, breathing exotic mixtures of helium-nitrogen-oxygen, will live and work inside and outside the 57 foot steel chamber for 15-day periods during the next month and a half.

Carpenter, 39, second American to orbit the earth, is the diving commander of the Sealab II. He will live on the floor of the ocean a month — twice as long as any of the other aquanauts.

In a news conference, Carpenter compared hostile environments of outer space and the "inner space" of the oceans:

"Equal dangers exist in whirling around the planet in a small capsule and living at the bottom of the sea.

"Both are new frontiers being conquered for the first time by man."

In his mercury space capsule when Carpenter orbited the earth three times on May 24, 1962, the atmosphere was similar to that on earth.

Living beneath the sea, the aquanauts will exist in an environment where pressure will be 6½ times that at the surface.

At anchor Sunday 3,000 feet off Scripps Institution of Oceanography, Sealab II glistened in the sun as it lay a few yards off the barge which will serve as control center for the Navy project.

The snow-white capsule is scheduled to be lowered to the 210 foot shelf in the sea overlooking a 700-foot canyon early Monday morning.

Project engineers anticipate that four hours will be required to sink the 200-ton capsule by slowly flooding its ballast tanks with sea water.

Aquanauts will be lowered into the steel chamber in a small pressurized personnel transport capsule — sort of an undersea dumbwaiter.

Among the 47 different major experiments, there will be an attempt to learn the kind of gases inside the bladders of deep sea fish.

Tuffy, an educated dolphin, will be pressed into service as man's first non-human assistant in the ocean's depths.

Aquanauts will mine ores on the sea's bottom, harvest fish, salvage and refloat a sunken jet fighter and build an undersea platform.

Last year four Navy divers lived 11 days at 196 feet off Bermuda in the Navy's Sealab I.

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NAVY CAPSULE SUBMERGES TO SCAN PACIFIC

BY SEYMOUR KORMAN
(Picture on back page)
[Chicago Tribune Press Service]

La Jolla, Cal., Aug. 26—Sealab 2, a 200-ton steel capsule, was submerged today and moored 205 feet deep in the Pacific ocean as the prelude to the navy's most intensive exploration underseas.

A team of 10 aquanauts, headed by Comdr. M. Scott Carpenter of the navy, who also is an astronaut, is expected to descend late tomorrow or early Saturday in the capsule.

The plan is for Carpenter to remain underwater 30 days. The other nine will be brought to the surface after 15 days. Nine more men will go below to join Carpenter for his second 15 days. After Carpenter and the second nine come up, a third team of aquanauts will submerge for the concluding period of the 45 days of tests.

Lowered to Shelf

The lowering of Sealab 2 began at 3:25 p. m., Chicago time, 3,000 feet offshore from La Jolla. The craft settled on a sandy underwater shelf at 5:03 p. m., Chicago time. Originally a site at 210 feet depth had been selected, but it was determined that a nearby location 5 feet higher was more secure.

Carpenter made the final checks on Sealab 2 before the craft began submerging, then returned to the support vessel, a catamaran barge, from where he and his team will descend. The catamaran will be in constant contact with the aquanauts. It has been dubbed the Berkone, a combination of the names of Joseph Berkich, the project engineer, and Capt. Walter Mazzon, navy physiological control officer.

The capsule was pumped full of a combination of 80 per cent helium, 16 per cent nitrogen, and 4 per cent oxygen which the aquanauts will breath. Then the ballast tanks were loaded and the lowering by a crane and a system of weights and counterweights.

Divers Examine Capsule

Six navy divers, carrying scuba equipment [self-contained underwater breathing apparatus] examined Sealab 2 at various stages in the drop and mooring and reported conditions satisfactory.

The pressure at a depth of 205 feet is 100 pounds per square inch, and the interior of the capsule is pressurized at that figure. Equalization of pressure assures that the aquanauts will not suffer physiological disturbance when swimming out to gather data. It also prevents water from flooding the capsule when swimmers open the hatch to leave and to return.

Tomorrow morning power cables from shore will be connected to the capsule, and a personnel transport capsule will be lowered to nestle nearby.

Will Bring Them Up

That chamber, also kept at 100 pounds per square inch pressure, will be used to bring the aquanauts to the surface when their underwater stays are completed.

The personnel transport then will lock onto the catamaran and the pressure will be gradually lowered to the 14 pounds per square inch prevailing at sea level.

It's Go, Go! High and Low

Once again, we are in for a nail-biting session of praying for a pair of our astronauts to fly high and land safely. It'll be a wonder if we have any nails left because of the troubles already encountered and because this will be the longest mission yet, eight days.

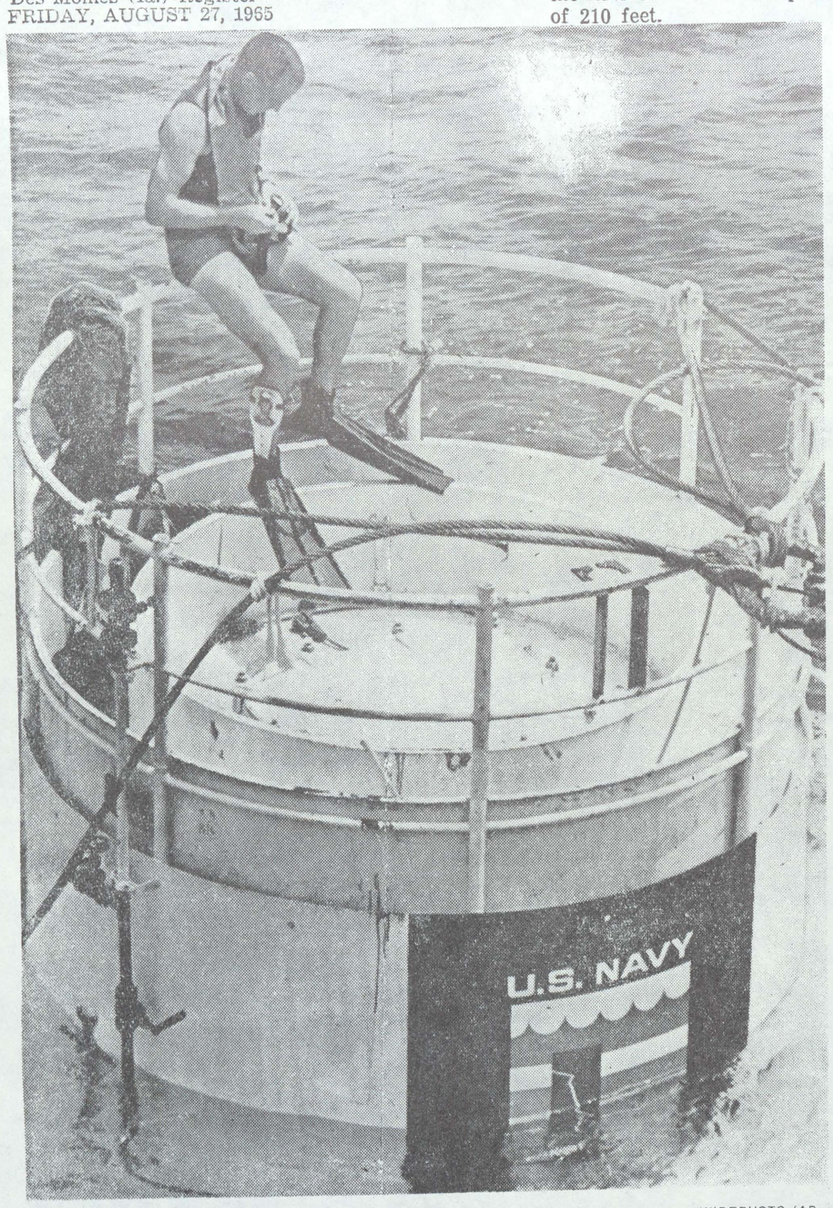
It's worth noting, however, that while Gordon Cooper and Charles Conrad are out amongst the stars another team of explorers, 10 Navy aquanauts, will be in Sealab II for weeks of research at the bottom of the sea. Just as the astronauts are testing man's ability to survive long periods in space, the aquanauts are testing the feasibility of men working at the bottom of the sea for extended periods.

The aquanauts deserve not to be buried under the sea of publicity attending the astronaut's flight. The diving mission may lack the glamor of going out of this world but it is no less important because it underlines the fact that while probing the mystery of the stars we are not neglecting the vast unknowns here on earth.

So, astronauts and aquanauts, we wish you all good luck and God speed.

New York 38, N. Y.
From AUG 25 1965
ADVANCE
Staten Island, N. Y.

Des Moines (Ia.) Register
FRIDAY, AUGUST 27, 1965



WIREPHOTO (AP)

Taking a Ride Down

Astronaut Scott Carpenter becomes an "aquanaut" near La Jolla, Calif., Thursday as he sits on Sealab 2 just before the underwater-living capsule went beneath the surface. Capsule was placed on bottom at a depth of 205 feet in preparation for a 45-day experiment. La Jolla (pronounced "La Hoy-ya") is north of San Diego—about 100 miles south of Los Angeles.

Wash. Post - 8/25/65

Divers Delayed

LA JOLLA, Calif.—New technical problems caused further delay in the lowering of the Navy's Sealab 2, but scientists spent the time polishing the behavior of a once-pugnacious porpoise divers will use as an underwater errand boy.

Leaks showed up in tests of a diving bell that will take divers to and from the 12-by-58 foot steel cyclinder when it is in place on the ocean floor. The delay pushed back to at least Thursday the time when divers and scientists ar expected to begin a 45-day residence in the laboratory.

San Francisco, Calif.
Examiner
(Cir. D. 292,539 - S. 435,887)
AUG 25 1965

Leaks Show In Diving Lab Bell

LA JOLLA — (AP) — New technical problems caused further delay yesterday in the lowering of the Navy's Sealab 2, but scientists spent the time polishing the behavior of a once-pugnacious porpoise divers will use as an underwater arrand boy.

Leaks showed up in tests of a diving bell which will take divers to and from Sealab 2 once the 12x58-foot steel cylinder is in place on the ocean floor 1,000 yards off this San Diego County resort.

Officials had planned to submerge Sealab 2 late yesterday but the leaks and other equipment problems forced a postponement to at least this morning. Not until at least tomorrow can divers and scientists begin a 45-day residence in the sea floor laboratory.

Officials said the delays had two bright aspects:

- "Tuffy," a 270-pound male Atlantic bottlenose being trained to carry tools — and rescue lines if needed — to divers working outside Sealab 2, has reached a peak in performance which experts call amazing. He once was so belligerent he attacked handlers.
- The delays have given psychologists more time to study the surface behavior of the divers for comparison with their behavior under the stresses of life at a depth of 210 feet.

Sealab to Bottom Of Sea--for 45 Days

LA JOLLA — (AP) — The Navy's Sealab 2 reached the bottom of the ocean at a depth of 205 feet yesterday and officials said no serious problems were encountered during the descent.

The 12 by 50-foot steel capsule will be home for scientists and divers during a 45-day experiment scheduled to start today or tomorrow.

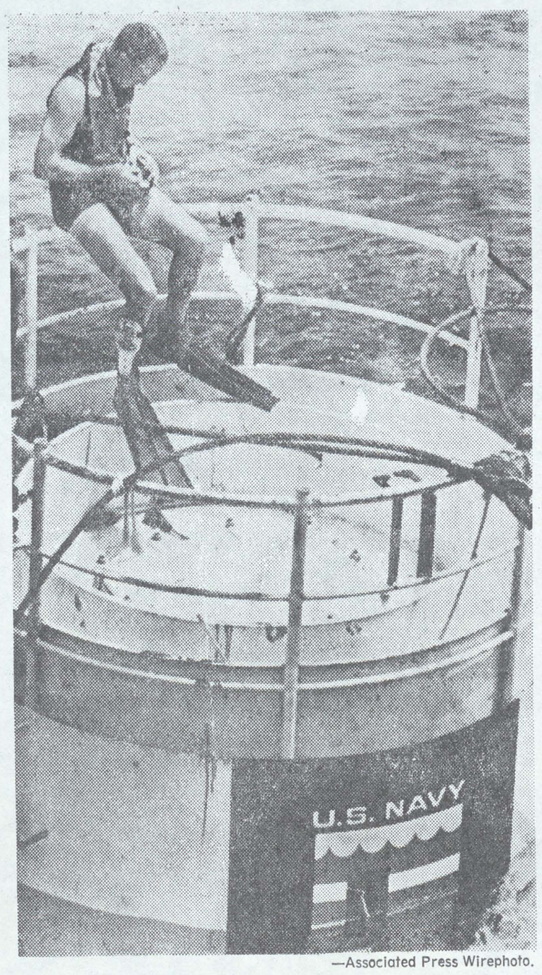
Officials said the aquanauts will descend to the Sealab as soon as equipment can be readied and the necessary checks made.

Astronaut Scott Carpenter will be in the first team of 10 divers to occupy the underwater house. He is expected to try to spend 30 days submerged. The others will be relieved by a new team after 15 days.

The navy had scheduled to lower the Sealab Aug. 15 but technical difficulties, including leaks, caused repeated delays.

Some helium leaks were discovered yesterday as the capsule was lowered but these are minor and can be repaired once the aquanauts are down, officials said. Helium makes up most of the atmosphere the men will breathe.

San Francisco, Calif.
Examiner
(Cir. D. 292,539 - S. 435,887)
AUG 27 1965



—Associated Press Wirephoto.

Astronaut Scott Carpenter sat on Sealab 2 just betore the undersea capsule submerged off La Jolla

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)
AUG 26 1965

Sealab Descent Delayed By Gear Safety Checks

LA JOLLA, Calif. (AP) — Safety checks of gear for Sealab 2 are taking far more time than planned, Navy officers say, and it may be Thursday or Friday before divers will be allowed to enter the 12x58 foot steel chamber which will be their underwater base for 45 days.

"There are no big problems — just a whole lot of minor ones that have to be solved before we can let the men begin residence at a depth of 210 feet," said Capt. Ray Spenser of the engineering applications division of the Office of Naval Research.

Lowering of Sealab 2 to the bottom 1,000 yards off this Southern California resort, planned since Aug. 15, was delayed Tuesday afternoon by a series of problems that cropped up as piece after piece of auxiliary equipment was checked out.

First there were leaks in a diving bell which will take 10-man teams to and from Sealab for 15 day stays. These were repaired. Then came trouble with air-hose seals and other equipment.

Much of the day was spent practicing lifting the diving bell from the water and swinging it by crane to a decompression chamber on the mother ship, a tricky procedure on a rolling sea and one that must be performed with split-second precision in event of an emergency below.

Meantime, the first team stowed their gear aboard the Sealab 2, gear that included a ukelele belonging to the team leader, Astronaut M. Scott Carpenter, a Navy commander who is a diving expert.

Carpenter plans to use the ukelele to while away some of the lonely hours below. But there was some doubt how long he would persist.

New York 38, N. Y.
AUG 27 1965
INQUIRER
Philadelphia, Pa.

Aquanauts Next on Program

Although by its nature the experiment with the Navy's Sealab 2 can hardly be as overtly spectacular as the exploits of Gemini 5, the work about to start at a depth of 205 feet off La Jolla, Calif., may be every bit as important to the future of this country.

And, as a token of its significance, Commander Scott Carpenter, one of the original astronauts, will participate in the program—perhaps to a fuller extent than any of the other 19 men involved. Carpenter, leader of the first ten to descend, hopes to stay for the entire 30 days of the experiment.

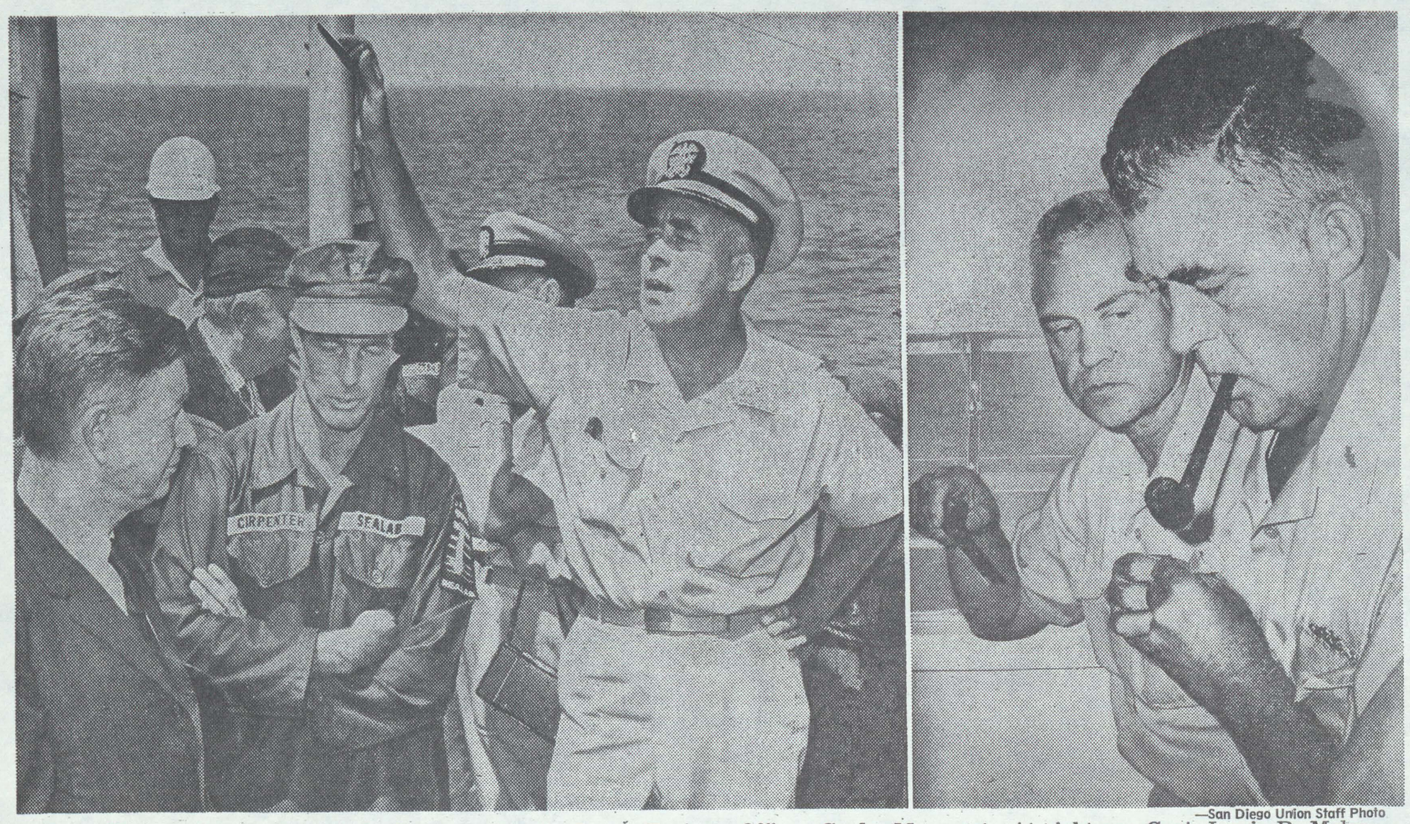
The delays brought about by leaks discovered under deep-sea pressure have enabled scientists to establish better "norms" for conduct of the men on the surface, against which they can check submerged performance under stress.

The men on the bottom will not only attempt to live in their capsule, but go out from it frequently on sea-bottom mapping expeditions.

One of the most engaging features of the program will be the help—real, not fictitious—of Tuffy, a 270-pound bottlenose Atlantic porpoise, who carries tools and lifelines. There may be some question about "who's really in charge" if he performs too well.

In any event, it is gratifying that, even while the so-called space race is in full cry, the United States has the scientific curiosity and far-sightedness to begin to try to understand living at the bottom of the ocean. Since five-sixths of the world is covered by water, it could be of overwhelming importance to later generations to know not only how to survive down there but to flourish.

45



—San Diego Union Staff Photo

Top officials of SeaLab project discuss details of 45-day underwater stay during briefing at left. They are, left to right, Rear Adm. Levering Smith, supervisor of Navy's Ocean Projects Office; Cmdr. M. Scott Carpenter, the astronaut and captain of first team of aquanauts, and Capt. George Bond, director of Man-in-Sea project. At right are Capt. Lewis B. Melson, left, and Bond at press interview aboard mother ship. Melson is director of the Sealab II project.

SeaLab Operation Delayed By Leaks

By BRYANT EVANS
The San Diego Union's Science Writer

Little leaks and a lot of careful deliberation brought a postponement of about one day in the beginning of the SeaLab II operation off La Jolla.

Capt. Lewis Melson, director of the project, said that he believed that the 58-foot-long tank-home for 10 men would be lowered to its new berth, 210 feet deep, today. But, he said, final preparations could delay it until tomorrow.

Melson said it will be approximately 24 hours after the SeaLab is lowered beneath the surface until the aquanauts can move in. This would place the earliest moment of occupation late tomorrow.

LEAKS NOT SERIOUS

The delays yesterday were caused by a leak in a valve inside the personnel transport capsule, and a leak in the power package that will serve as one of the two energy sources for SeaLab. Neither of these was a serious problem. They just took some time.

When it appears that everything is ready, Melson said, the SeaLab will be towed over beside the Berkone, the staging vessel, and the SeaLab will be loaded with supplies. This load will include most of the things that are to supply the three 10-men teams for periods of 15 days each. Then all systems will be checked. Air will be pumped into the lab to raise the pressure to 26 pounds per square inch.

Next two ballast tanks will be flooded and the SeaLab, now negatively buoyant, will be lowered 20 feet in the water by a cable from the Berkone.

LOWERING OPERATION

This lowering operation will be done with the help of a counterweight under water with a sheave through which the main cable to the SeaLab will run. The function of this counterweight is to reduce wave action and keep the lab from oscillating up and down during the process.

At 20 feet, helium will be pumped in until the atmospheric pressure is up to 6½ atmospheres — about 96 pounds a square inch. Melson said that the helium's mixing with the air already in the lab should give the desired mixture of 80 per cent helium, 16 per cent nitrogen and 4 per cent oxygen.

When the pressure reaches this point — equal to the water pressure on the bottom — the SeaLab will be lowered to the bottom.

Melson said that the point at which it will rest will be a nearly level area of firm, impacted sand. He said he did not think it will be necessary to modify the contour of the site with streams of water as had been thought needed for a site considered previously.

After the SeaLab is on the bottom, a diver will go down and open an air valve which will blow the water out of the well in the bottom of the lab through which the men will enter and leave.

OPEN TO SEA

When this is blown dry, a diver will open the hatch and the interior of the SeaLab will be open to the sea. But, of course, the sea will not rise through this well in the bottom because of the atmospheric pressure inside the lab. In effect the gases inside will make a bubble that will remain just as the air will remain in an upside-down bottle pushed into the water.

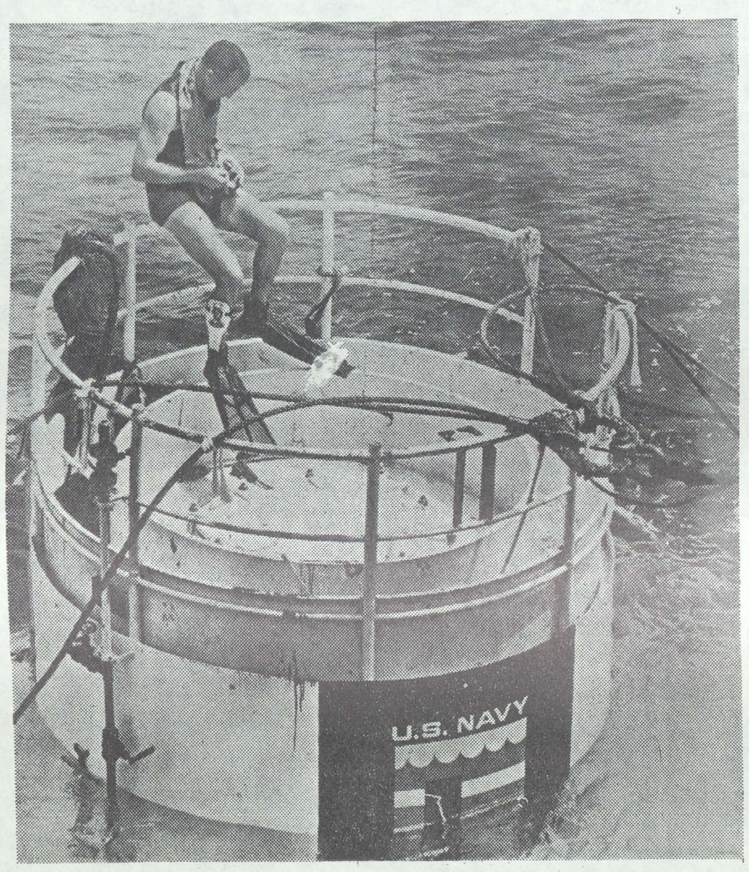
Then a diver will turn on and check the electric circuits inside the SeaLab. Things will then be ready for the 10 divers, led by Cmdr. M. Scott Carpenter, USN, the astronaut, to ride the personnel transport capsule from the Berkone down to SeaLab II.

SCUBA APPARATUS

The aquanauts will wear Scuba diving apparatus to come out of the capsule and swim to their new temporary home. When they enter, the operation will be under way.

The power package, a leak in which caused some delay, is a unit containing several transformers to split a current being brought out from shore to the SeaLab. It also will supply an automatic observation laboratory, called a "benthic laboratory" because it rests on the bottom.

The shore line, Melson explains, can supply the lab with power if bad weather were to force the Berkone to leave the scene.



At Least Carpenter Is Ready

Astronaut Malcolm Scott Carpenter, former Coloradan, sits on Sealab just before the underwater capsule was lowered to ocean floor near La Jolla, Calif., Thursday. Minor technical difficulties have delayed project but Carpenter and other aquanauts hope to enter capsule Saturday

POST, Denver, Colo.
AUG 27 1965

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

AUG 25 1965

Technical Bugs Delay Navy Sealab Experiment

LA JOLLA, Calif. (AP) — New technical problems caused further delay Tuesday in the lowering of the Navy's Sealab 2 but scientists spent the time polishing the behavior of a once-pugnacious porpoise divers will use as an underwater errand boy.

Leaks showed up in tests of a diving bell which will take divers to and from Sealab 2 once the 12x58-foot steel cylinder is in place on the ocean floor 1,000 yards off this San Diego County resort.

The leaks were minor and easily repaired, a spokesman said, and officials planned to submerge Sealab 2 late Tuesday. Divers and scientists are expected to begin a 45-day residence in the sea floor laboratory Wednesday afternoon.

The leakage problem was the latest of a series that have put off start of the underwater experiment since Aug. 15.

The groups will consist of teams of 10 men — six Navy divers and four scientists. Each team will spend 15 days in rotation eating, sleeping and working in the submerged laboratory and making excursions to map the ocean bottom.

The leader of the first team, Astronaut M. Scott Carpenter, a Navy commander who is a diving expert, will try to stay down 30 days — a record for underwater living.

Christian Science Monitor -- 25 Aug 1965
Editorial

Probing the deep

Man is ever in quest of new frontiers. With jungles, deserts, and polar regions, skies and mountain peaks behind them, men are soaring into outer space and plunging to the inmost depths of the oceans.

"Astronaut" may still be a more familiar term than "aquanaut," but exploration of the underwater frontier is about to move into high gear. It is astronaut M. Scott Carpenter who provides the present link. He is about to join Navy divers where he will live in Sealab II, 215 feet beneath the Pacific for thirty days. His "very intensive training in working in a hostile environment" prompted his choice for this assignment.

About three-quarters of the earth's surface is under water. In the depths lies a vast region little explored by man. Natural curiosity, technical progress, economic factors, and strategic considerations have combined to ensure the exploration and development of this realm of enchantment. The moon and Mars may be largely barren wastes, but the seas are filled with life and color.

Who that has seen the film of the underwater explorations of the team headed by Jacques-Yves Cousteau would not wish to join, at least, the first tourist cruise through the fascinating labyrinths he reveals? For the underwater pioneer there is promise of adventures unlimited.

As underwater domains become increasingly important to national interest, we wonder whether there will be a great rush to claim them, colonize them, fortify them, and carve them up among existing nation states. Or will mutual agreement be able to place them under international authority? So much depends upon the conquest of that ultimate frontier—men's mastery of their own inner nature.

POST, Denver, Colo.
AUG 24 1965



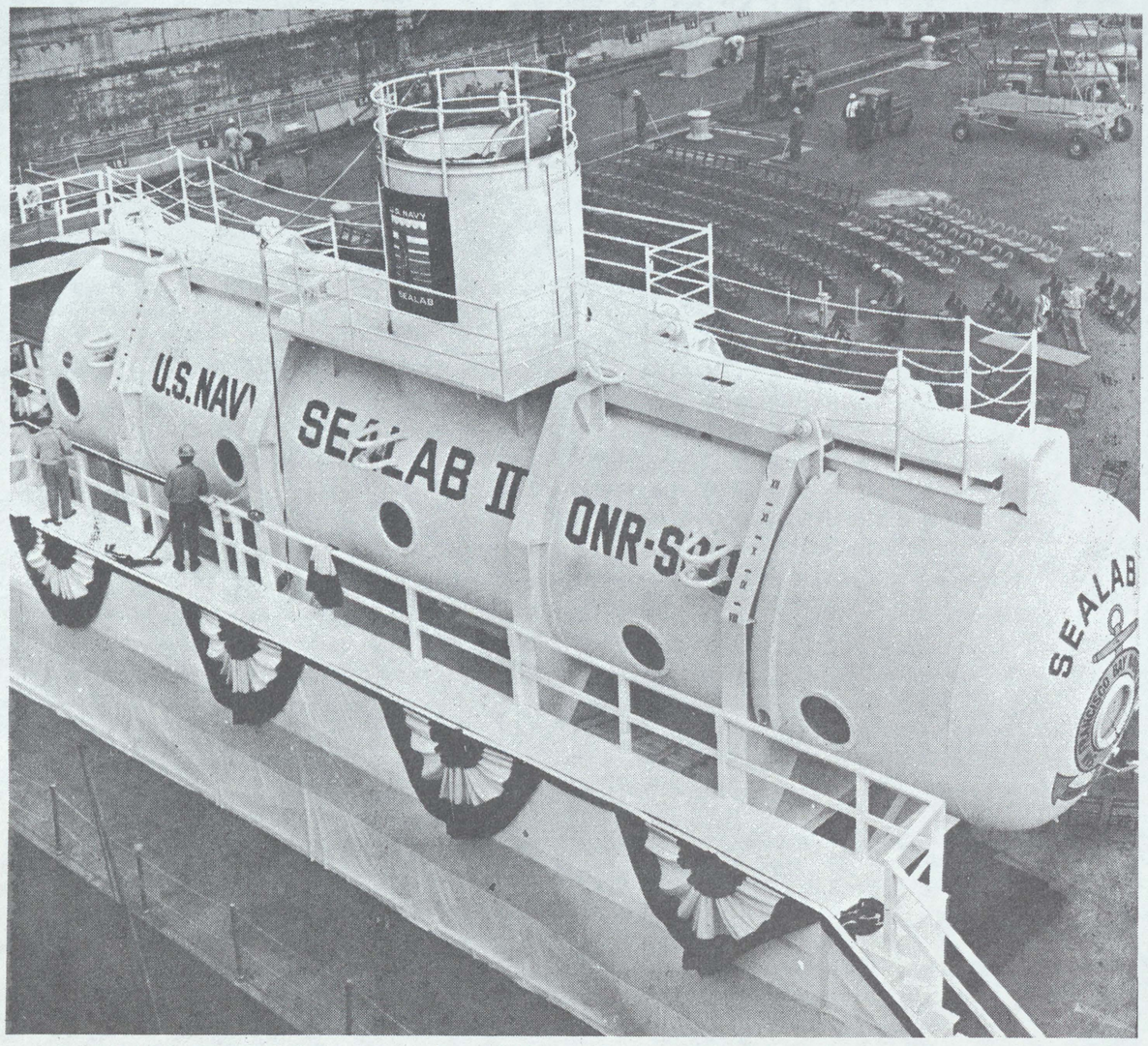
UPI Telephoto

Sealab Ready for Underwater Living

Discussing final plans for the 45-day underwater project, Sealab 2, are, from left, Rear Adm. Levering Smith, supervisor of the Navy's Ocean Projects Office; astronaut M. Scott Carpenter, who will captain one team of 10 divers, and Capt. George Bond, director of the man-in-sea project. Final plans were made Tuesday to lower Sealab 2 to the ocean floor where divers will spend up to 45 days working, eating and sleeping at a depth of 210 feet. Divers will rotate on 15-day tours of duty in Sealab 2, but Carpenter may stay down as long as 30 days in attempt at underwater record.

46

SEA LAB IN OPERATION HERE



Sea Lab II, a non-propelled sea-going craft, much like a submarine which will be lowered to 210 ft. on the ocean floor off La Jolla Shores, is an underwater habitat where 10 aquanauts will live for 15 days, in three teams, in an artificial atmosphere. Sea Lab II's living compartment has a pressurized atmosphere equal to sea water pressure and thus will create an "air bubble" beneath a dome. Astronuat Scott Carpenter is captain of the teams and will be the only aquanaut to remain underwater for 30 days. Sea Lab was scheduled for lowering of its staging vessel, "Berkone," either yesterday or today.

Undersea Life Study Planned Off Scripps Pier

By Gen Fortis

The blue Pacific off La Jolla Shores assumed a new look this week as vessels connected with Sea Lab II converged to lower the habitat for aquanauts who will live underwater in three teams for 10 days each at a time.

Many "firsts" are happening and will continue to happen as this experiment of the U. S. Navy gets underway by this weekend. La Jolla now has the distinction of having in our midst Astronaut Scott Carpenter, turned aquanaut to captain the teams and to be the only person to remain underwater for 30 days.

Within 10 days, after the first team has surfaced from their house on the bottom of the ocean 210 feet deep and 3,000 feet off Scripps pier, a helicopter from Pt. Mugu will bring "Tuffy," a porpoise, to his floating pen alongside the staging vessel on the ocean above Sea Lab II. "Tuffy" will be used, in addition to a study of porpoise physiology, to carry guide lines to "lost" divers and to carry messages and small packages between divers on the bottom and between divers and men on the surface.

At a briefing last week on the functions of Sea Lab, Capt. Louis B. Nelson, project director, explained the functions of the 57-foot home-in-the-sea off La Jolla Shores.

"There was a time when the ocean was thought of as the 'mysterious deep'," he related. "We now are aware that there are continental shelves as big as the continent of Africa and of the riches contained underwater."

"It has been proven that men can explore safely under the surface of the ocean and a part of Sea Lab II experiment will be the answer to whether he can work for long periods of time at great depths."

Problems of physiology and biology are the two principal tests to be accomplished during the 45 days. Projects for researching will be assigned in groups and divers will leave and enter the "home" through hatches under the round tank-like research vessel.

In addition to theoretical work, the aquanauts will attempt to perform practical tasks such as operating nuts and bolts on a steel hatch weighted to the ocean floor. Another of this type of experiment will be a "foam salvage" operation which will consist of raising six individual 55-gallon weighted oil drums and one jet aircraft hulk using a new cast-in-place foam process. The foam is developed by pumping liquid chemicals which foam and harden into a rigid buoyant material from the staging vessel.

The U-shaped staging vessel will be held in position by five mooring legs, each of 13,000 pound anchor chain and wire. Capt. George F. Bond, director of the man-in-the-sea program, will monitor activities below by an umbilical cable to the home-under-the-sea. Three televisions inside the Sea Lab and two outside will transmit pictures to the staging vessel, Berkone, and then to shore where it is planned to allow the public to view the operations at certain times.

Bond warned however, that the sediment on the ocean bottom may cause "clouds" which would make it difficult to work or televise. He did, however, point to La Jolla as the "best site in the world" for experiments.

"We could have gone to tropical waters but we must challenge the divers in their work," he pointed out.

If Sea Lab II (which replaces Sea Lab I in which men lived for 11 days off the ocean near Bermuda) is lowered by today, it may be 24 to 48 hours before the first team of 10 men is lowered in the transfer capsule off the Berkone. A leak in a valve upon arrival here Monday and another leak in the power package caused the delay in lowering.

When it is ready, two ballast tanks will be flooded and Sea Lab II will be lowered 20 feet in the water by a cable from the Berkone staging vessel. At that depth, helium will be pumped in until the atmospheric pressure is up to 6½ atmospheres, producing the desired mixture of 80 percent helium, 16 percent nitrogen and four percent oxygen.

It is because of this mixture of "air" that the aquanauts could not be understood if voice transfer was direct from the ocean floor. Therefore, an "unscrambling" device will be used when the transmission by television is made to the surface.

"The speech would not be a true speech due to the effect of helium on the voice. The aquanauts will learn to talk and understand each other but we will have the voices unscrambled topside," a navy spokesman said.

At the 6½ atmospheric pressure, equal to the water pressure on the bottom, Sea Lab II will be lowered to a level area of sand. A diver will go down and open air valves to blow water out of the well in the bottom of the lab through which the men enter and leave. Then when this is blown dry, the diver will open the hatch but the sea will not rise through the well because of the atmospheric pressure inside.

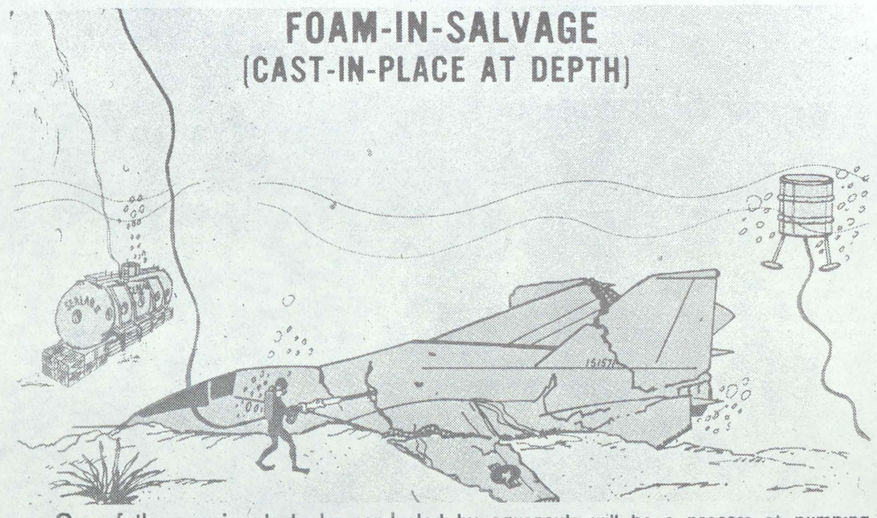
Following checkout by the diver, Sea Lab II will be ready for occupancy by the aquanauts.

LA JOLLA LIGHT

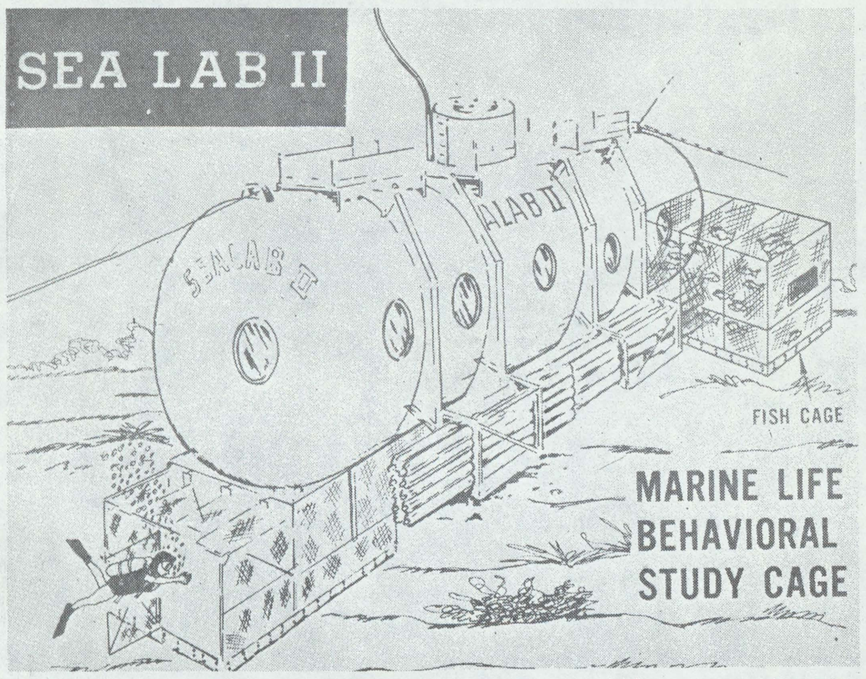
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La Jolla Journal

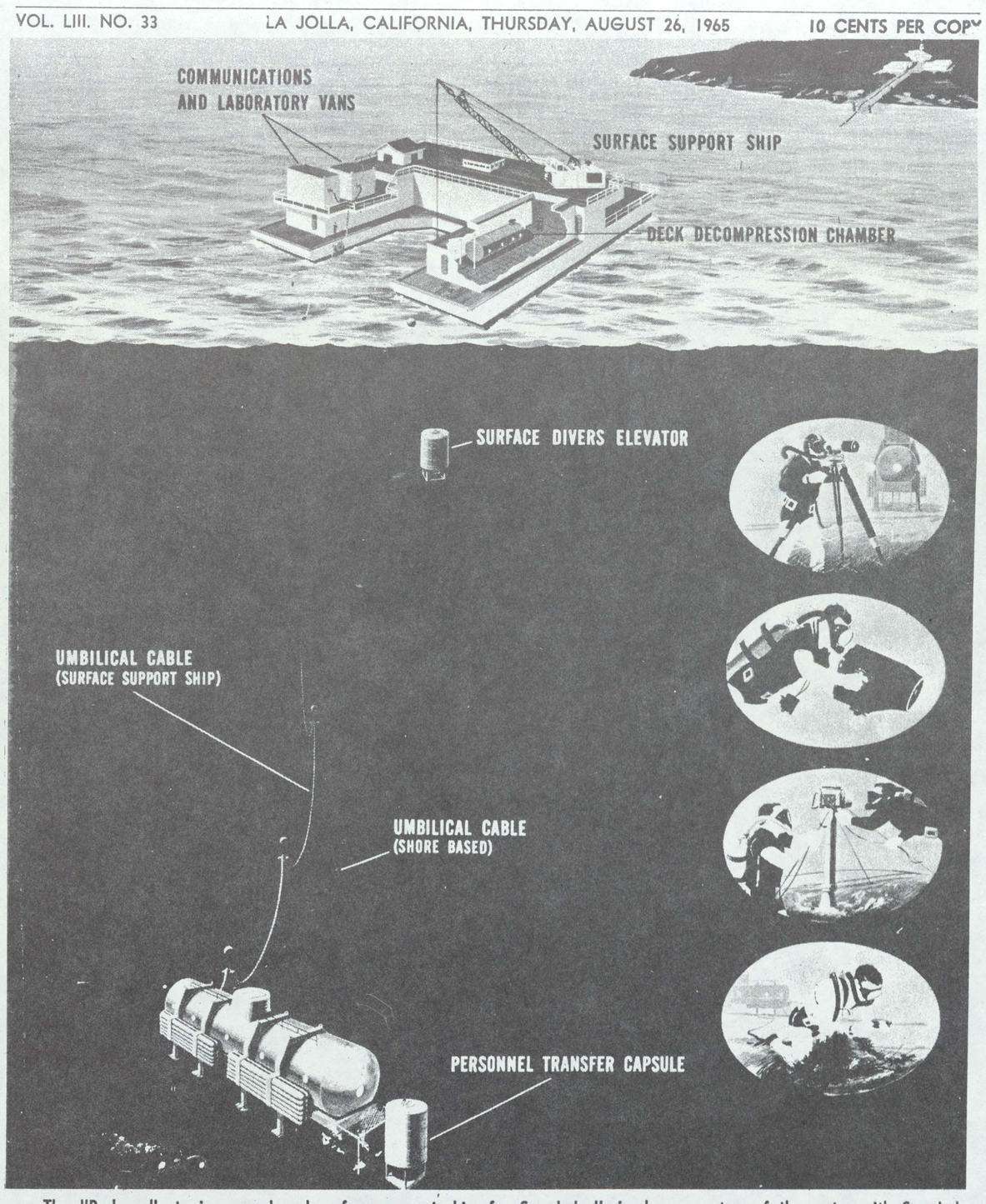
VOL. LIII. NO. 33 — LA JOLLA, CALIFORNIA, THURSDAY, AUGUST 26, 1965 — 10 CENTS PER COPY



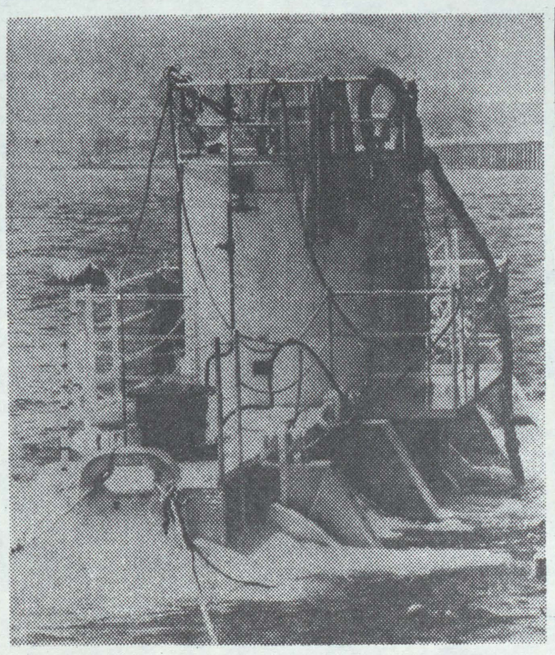
One of the experiments to be conducted by aquanauts will be a process of pumping, from the staging vessel into a jet aircraft hulk, liquid chemicals which foam and harden into a rigid, bouyant material. For the experiment, the aircraft hulk will be anchored to study the effect of long periods of submergence on the bouyancy of the foam.



An aquanaut enters the 57-foot cylinder through an anti-shark cage suspended below the hull. The aquanaut swims into the cage and ascends into the four-foot diameter access hatch, removes his diving gear, climbs a ladder and emerges into the living compartment where he may take a hot shower or soak in a tub of warm water. The living compartment is livided into a laboratory, galley and bunkroom with 11 viewing ports. Studies of fish will be made in the fish cage at the opposite end of Sea Lab II.



The "Berkone," staging vessel and surface support ship for Sea Lab II, is shown on top of the water with Sea Lab attached by an umbilical cable for transmission of television and messages to the surface. The divers' elevator also is shown as well as drawings of divers at work on experiments planned to show life under the sea, how long man can adjust to the new environment and other physiological and biological conditions of both man and fish.



AP Photo

UNDERSEA HOUSE—Sealab II, Navy's experimental house for underwater living, nears site off La Jolla, Calif.

Tests Delay Sealab 2

LA JOLLA, Calif. (AP) — Safety checks of gear for Sealab 2 are taking far more time than planned, Navy officers say, and it may be tomorrow or Friday before divers will be allowed to enter the 12 x 58-foot steel chamber which will be their underwater base for 45 days.

"There are no big problems — just a whole lot of minor ones that have to be solved before we can let the men begin residence at a depth of 210 feet," said Capt. Ray Spenser of the Engineering Applications Division of the Office of Naval Research.

Lowering of Sealab 2 to the bottom 1,000 yards off this Southern California resort, planned since Aug. 15, was delayed yesterday afternoon by a series of problems.

Bell Had Leaks

First there were leaks in a diving bell which will take 10-man teams to and from Sealab for 15 day stays. These were repaired. Then came trouble with air-hose seals and other equipment.

The first team stowed their gear aboard the Sealab 2. The gear includes a ukulele belonging to the team leader, astro-Navy commander who is a diving expert.

Capre ter plans to use the ukulele to while away some of the lonely hours below. There was some doubt, however, how long he would persist.

In the mostly helium atmosphere with which Sealab 2 will be pressurized, face-to-face conversation sounds like cartoon mice and ducks in an argument—so what will a ukulele do to the ears of Carpenter's teammates?

Cause Unknown

The cause is not precisely known, but apparently sound is distorted in traveling through heliu m —sometimes so badly that human speech is unintelligible.

"One of the things we hope to do in Sealab 2 is perfect some way of unscrambling helium distorted speech," an official said.

After Sealab 2 is lowered, both it and a power pod to will undergo further safety which it is connected by cables checks. This will take 24 hours, or perhaps longer. Only after the last difficulty has been over come, Capt. Spenser said, will the divers be permitted to start living, working and sleeping in their submerged base.

New York 38, N. Y.

From AUG 27 1965

...o, Ill.

NEW CHAPTERS FOR TEXTBOOKS

SeaLab Will Determine Underwater Work Limits

By BRYANT EVANS
The San Diego Union's
Science Writer

A major purpose of SeaLab II will be to determine how much work people can do under water.

To get the answer the Navy and scientists at the Scripps Institution of Oceanography came up with projects that were not only good tests but were also things that ought to be done.

Some of these, supplied by the Navy, are engineering jobs concerned with salvage and life saving.

Others, planned by oceanographers, are observations and experiments that could never be done before. Biologists thought of animal experiments to answer some heretofore unanswerable questions.

When SeaLab is through, there will be some new chapters written for the textbooks.

One of the salvage jobs will concern the raising of a sunken plane. Aquanauts from SeaLab will use a gun which combines a liquid and a gas to produce foam. This mixture is injected into the plane's fuselage and wings to make it buoyant. In this way planes can be lifted from the sea.

Another salvage test will be to put a patch on a simulated submarine hull with an underwater stud driver. The plate will be insulated with a rubber gasket. After the test the hull section will be raised and tested at the Long Beach Naval Shipyard for air tightness.

LIFTING PAD

A lifting pad will be attached to another simulated submarine by a similar method. Here a lifting force of 10 tons will be attached to the submarine.

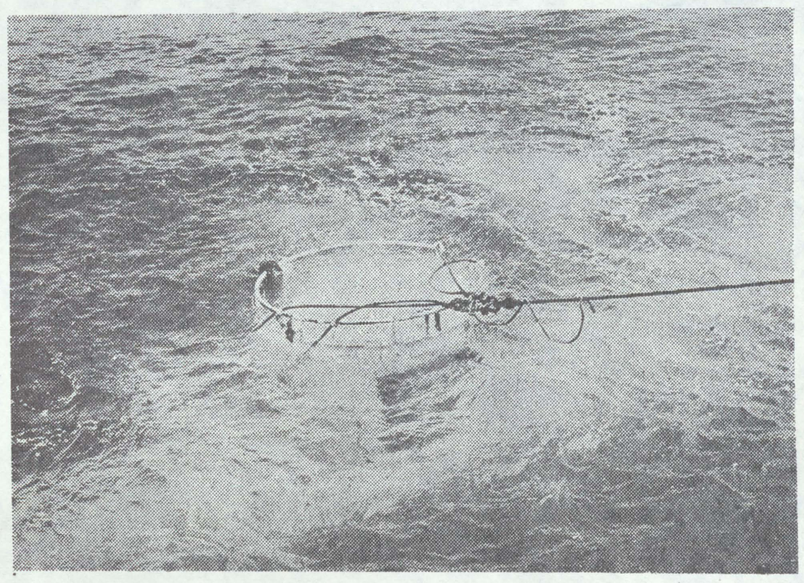
The question to be answered is: Can men living under water successfully do salvage work like this?

A top oceanography project is the installation of an underwater weather station. The weather instrument assembly will be held off the bottom by a float with a 60-foot tether and it will be held down by a 500-pound anchor.

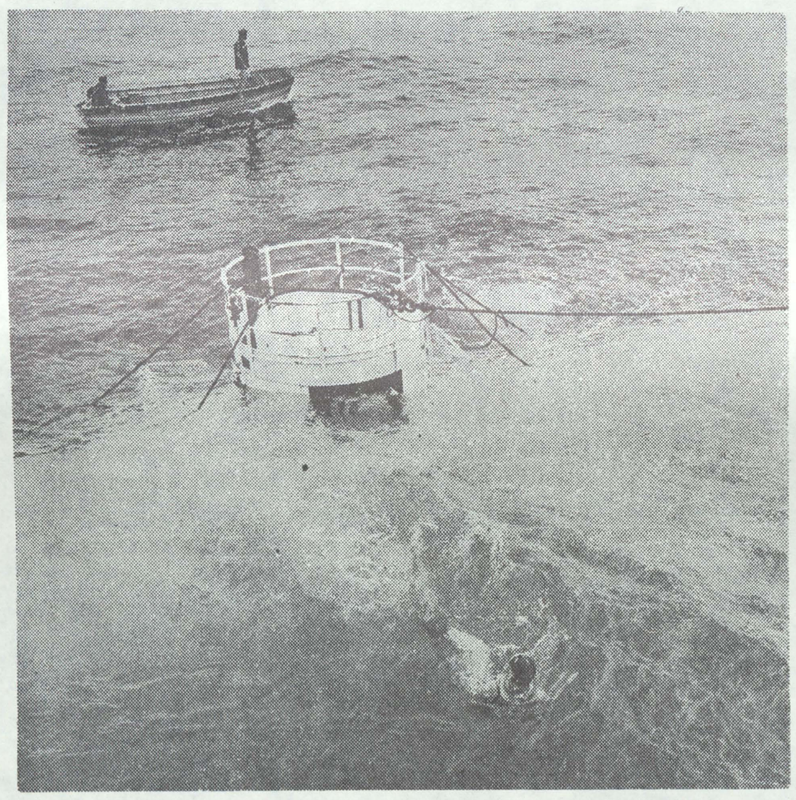
MEASURING TASKS

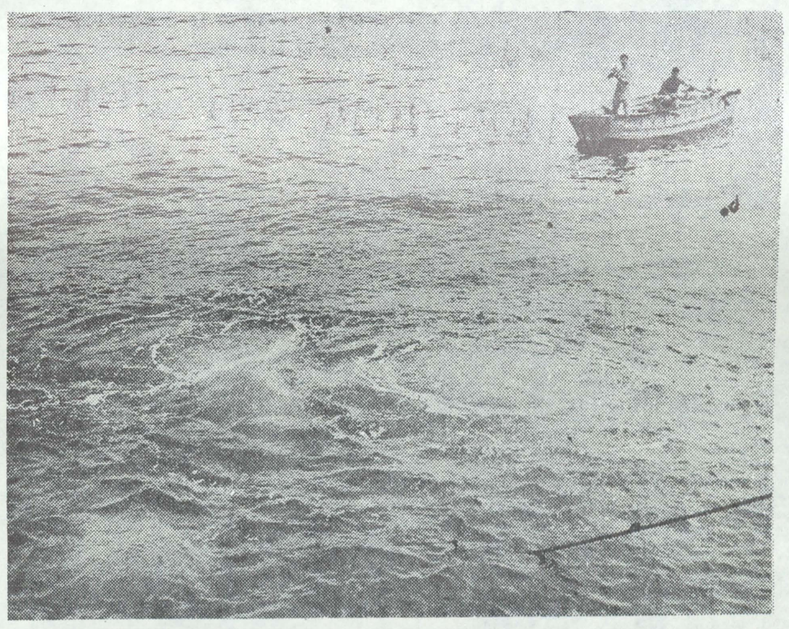
The station will measure temperature, the speed and direction of the current and the changes in pressure on the bottom and 30 feet above the bottom.

The aquanauts will set up a visibility-measuring range of lights and objects at measured distances from SeaLab.



Going, Going, Gone!





Navy Sealab Ready For Extensive Test Of Undersea Living

LA JOLLA, Calif., Aug. 23 (AP) — Accidents and technical problems have been delaying the start of the Navy's Sealab 2 experiment to see how long men can live on the floor of the sea, officials said today.

However, Sealab 2, a 12-by-58-foot steel cylinder in which divers are able to work and sleep for up to 45 days at a depth of 210 feet, is scheduled to be lowered into the ocean 3,000 feet off this San Diego suburb tomorrow morning.

Lieut. Comdr. M. Scott Carpenter, an astronaut who has extensive diving experience, and nine other divers and scientists are expected to descend to the underwater laboratory tomorrow night or Wednesday morning, a spokesman said.

Chances grew dim for a planned conversation between Commander Carpenter on the ocean floor and Lieut. Col. L. Gordon Cooper Jr., who is orbiting the earth in Gemini 5, because of a busy flight schedule.

The lowering of Sealab 2, originally scheduled for Aug. 15, has been delayed by numerous problems. A seven-ton beehive-shaped communications and power pod was wrecked while being lowered to the site by cable Saturday. A sudden surge of ocean currents smashed it against the bottom, cracking its concrete shell.

A new shell was made hurriedly at the nearby Naval Electronics Laboratory. The pod, to be connected by cables to a mother ship and to Sealab 2, houses electrical gear to relay power and communications between the laboratory and scientists on the surface.

Most of the divers are scheduled to spend 15 days in Sealab 2, rotating in teams of 10. Commander Carpenter will try to stay down 30 days, a new record.

Undersea 'Gemini' Submerges

By United Press International

LA JOLLA, Calif.

The Sealab 2, an oceanic cousin of Gemini 5, slipped beneath the surface yesterday in the first phase of the project to test man's ability to live underwater for an extended period.

Astronaut Scott Carpenter and nine other divers—or "aquanauts"—will descend today or tomorrow to enter the 57-foot-long white steel cylinder which lies 210 feet deep on a ledge in Scripps Canyon, one-half mile offshore. The Sealab 2 will remain 45 days, with Lt. Cmdr. Carpenter below for 30 days.

A porpoise named Tuffy also has a role in the project.

It took 98 minutes to lower the Sealab from two cables, one of which was attached to the mother ship Berkone and the second to a submarine rescue vessel. The interior was pressurized with helium, nitrogen and oxygen at an 80-16-4 per cent ratio. Cables will be used to supply water and power to the Sealab.

Although stationary once it does lie on the ocean's ledge, the Sealab's purpose is comparable to that of the Gemini and other space shots: to find out how man reacts to a foreign environment.

The scientists hope during the 45-day period to establish and man the world's first undersea weather station and collect specimens of underwater life.

Lt. Cmdr. Carpenter will be the only member of the team to spend 30 consecutive days beneath the surface.

Tuffy's part is experimental, to see whether the creature can help the divers find their way back to the Sealab.

A doctor will be present in the tube to give daily physical examinations testing respiration, blood pressure, heart, urine and even sputum.

HERALD TRIBUNE
New York, N. Y.

AUG 27 1965

Sealab Set For 45 Days On Bottom

LA JOLLA, Calif. —(AP)— The Navy's Sealab 2 was scheduled to be lowered to the ocean's floor Thursday to begin a 45-day experiment in underwater living.

The Navy said it plans to have the 12-by-58-foot steel cylinder in place at a depth of 205 feet by 6 p.m.

All checkouts are expected to be completed by Friday, and the decision then will be made on when to send down the first team of 10 divers and scientists.

The aquanauts will descend three at a time in a diving bell and are to stay submerged for 15 days. Astronaut M. Scott Carpenter, a Navy commander, is expected to try to stay down for 30 days.

Leaks discovered during testing Wednesday again delayed the scheduled descent of the capsule.

POST, Denver, Colo.

AUG 26 1965

48

Capsule Dives To Bottom Despite Leaks

It took two ships, several small boats, a lot of sweat and a few prayers to get Sealab II to the bottom yesterday.

One Sealab official said he had never seen a leaky craft that was so hard to sink.

The first plan of attack had to be scrapped.

Change in Plans

Under this plan, Sealab officials had expected to bring the atmosphere in Sealab up to the pressure it would encounter on the ocean floor, then sink it.

The lab had been tested to this pressure, which is six and a half times the pressure on the surface, but the tests were run with compressed air.

The lab held compressed air, but when an attempt was made to pressurize it with an atmosphere composed mostly of helium, it was found that the gas escaped through pressure equalization systems built into the windows.

Helium Escapes

Sealab project engineer J. A. Berkich of Pasadena explained that since helium is much less dense than air, it was able to escape through crevices air couldn't get through.

The attempt to pressurize Sealab on the surface had to be abandoned and a plan was evolved under which it could be pressurized slowly as it was lowered.

The plan hinged on the fact that the pressure of the sea would increase as the lab got deeper and help hold the helium inside. When it reached the bottom, the pressures inside and outside would be about equal and no gas would escape

Lines Attached

The tricky operation started yesterday shortly after dawn. The lab was placed so that the mothership Berkone was on one side and the submarine rescue ship Gear on the other. Nylon lines were strung from each ship to Sealab so that it was held between them. A heavy steel cable from the Berkone's winch was also attached to Sealab.

When all was ready, the order to lower away was given and valves were turned which allowed water to flow into a ballast tank in Sealab's conning tower. As the lab sank, the lines on the Gear were slacked off and the lab swung downward on the lines to the Berkone, bringing it beneath the stern of the mother ship.

Divers Make Check

Officials had expected to stop the descent at 50 feet, but by the time the slack was taken out of the winch, Sealab was at 67 feet. It was stopped there.

Divers went down and freed the lines, checked for further leaks, and saw to it that power and communications cables from the Berkone were clear. Then the lab was lowered with the winch to 165 feet.

More divers were sent down for a final check. After they reported that all was well, Capt. Lewis B. Melson, project director, ordered the lab lowered to the bottom.

10 Will Dive Today Or Tomorrow

Tank Dropped After Series Of Problems Is Met

By BRYANT EVANS
The San Diego Union's Science Writer

SeaLab II reached the bottom of the ocean off La Jolla at 3:03 p.m. yesterday.

The lowering of the tank which will be home for 10 men at a time during a 45-day experiment took one hour and 37 minutes. A series of minor problems had kept it on the surface for a week.

Capt. Lewis Melson, USN, director of the project, said that the 10 first-team aquanauts will be taken down to SeaLab this afternoon or early tomorrow. The decision on the time will be made this morning. Nine of the men will remain 15 days and their captain, Cmdr. M. Scott Carpenter, USN, famous as an astronaut, will remain in the lab for 30 days.

PLANS CHANGED

As SeaLab was being lowered to the spot where it will serve as a habitat for 45 days, gas leaks forced a change in the lowering plans.

The leaks were in safety valves around portholes. These valves bleed off pressure between steel plates temporarily protecting the windows in order to keep the Plexiglas from being blown out during the descent.

Because of these leaks SeaLab was put down fairly rapidly to allow the ocean pressure to slow the loss of helium.

Then at a depth of 165 feet, four divers went down and capped the leaks. The lab then was lowered to the ocean bottom.

MEN ANXIOUS

Although there was no occasion for concern at any time in the operation, anxiety built up among the men aboard the staging vessel, the Berkone, as the operation continued. There was a wave of relief when the 1¼-inch steel cable used to let the 200-ton tank-like vehicle down finally slackened — the sign that the descent was completed.

Throughout the operation, carried out on a sunlit and still afternoon, a specially designed counterweight system worked without a hitch.

In this system the line from the Berkone's winch passed through a sheave attached to a 9,000-pound weight.

Five pioneers in Man in Sea program are honored

Five pioneers in the Navy's Man-in-the-Sea program were honored during a ceremony at the Scripps Institution of Oceanography here at 9:00 a.m., Wednesday, August 18.

Four Legion of Merit Medals, the nation's highest peacetime decoration, and a Secretary of the Navy Commendation Medal, were presented to two Naval Officers and three enlisted men who took part in SeaLab I last year. The presentations were made by Rear Admiral Walter H. Price, USN, Commandant, Eleventh Naval District.

Recipients of the Legion of Merit were Captain George Bond, MC, USN, his second award; Lt. Cdr. Robert E. Thompson, MC, USN, currently stationed at the U.S. Naval Hospital, San Diego; Senior Chief Hospital Corpsman Sanders W. Manning who is a diver assigned to SeaLab II; and Chief Quartermaster Robert A. Barth, also assigned as a diver in SeaLab II.

Master Chief Torpedoman Robert C. Sheats, who trained the divers for SeaLab I, received the Secretary of the Navy Commendation Medal.

Captain Bond, who is the Principal Investigator in Project SeaLab II, received a Gold Star in lieu of a second Legion of Merit Medal. His citation, signed by Secretary of the Navy Paul H. Nitze, reads in part:

"Captain Bond's insight into the ability of United States Naval personnel to live for extended conditions that permit them to operate effectively without dependence upon direct surface ship support, has granted the United States Navy for the first time a new dimension of operations and a capability not previously possessed by any person or country. His outstanding contributions to the basic research into the development of the correct breathing mixtures required for personnel to survive at depths to 1,000 feet were the bases upon which the success of the operation depended..."

LCdr. Thompson's citation with the Legion of Merit reads in part:

"...as Team Leader of the Project SeaLab I aquanauts who proved the ability of United States Naval Personnel to live for extended periods of time under ambient conditions at depths greater than those ever attempted before. By his outstanding professional skill, inspiring leadership and superb knowledge of the ability of human beings to adapt to an underwater environment..upheld the highest traditions of the United States Naval Service..."

Senior Chief Manning and Chief Bath's citations with their Legion of Merit medals read in part...

"Voluntarily participating in the United States Navy's first deep submergence test in which the participants lived for eleven days at a depth of 192 feet beneath the surface of the ocean...trained for two years to become an aquanaut...His skill, courage, and determined efforts were in keeping with the highest traditions

The citation that accompanies Master Chief Sheats' Secretary of the Navy Commendation Medal reads in part...

"In addition to skillfully supervising the fitting out and testing of the SeaLab I dwelling, and training the divers who supported the occupants of the SeaLab during its two-week submergence in the open ocean at a depth of 192 feet, Sheats carefully checked on every item that could have hampered the conduct of the project...In the face of adverse conditions, he accepted the responsibility for placing the SeaLab on the floor of the ocean..."

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On the Bottom: Sealab Lies At Focus of World Attention

Full fathoms 35 our Sealab lies.

A strange habitation indeed, lying on the floor of the Pacific Ocean off Scripps Pier at La Jolla. And living conditions down there will be strange, with a helium atmosphere that will make the conversation of the aquanauts unintelligible without the help of an electronic unscrambler.

It is a hostile environment off La Jolla, so near to familiar scenes and yet so far removed from human experience in any previous generation. Sealab is on the rim of the La Jolla undersea canyon, out of which not so many years ago rose the Great White Shark that wholly consumed a Pacific Beach skindiver, so that only part of one shark-bitten swim fin remained, to tell of the grim encounter.

The undersea frontier has the same Jules Verne quality as the space frontier. Mankind on both frontiers must take his supply of atmosphere, or its equivalent, with him in order to survive where there is no air.

They talk of colonies on the moon, and there may some day be cities under the sea.

Meantime, this city by the sea is watching the Sealab experience with keen interest, heightened by the knowledge that the event is focusing worldwide attention in an unprecedented way upon San Diego as a center of oceanography.

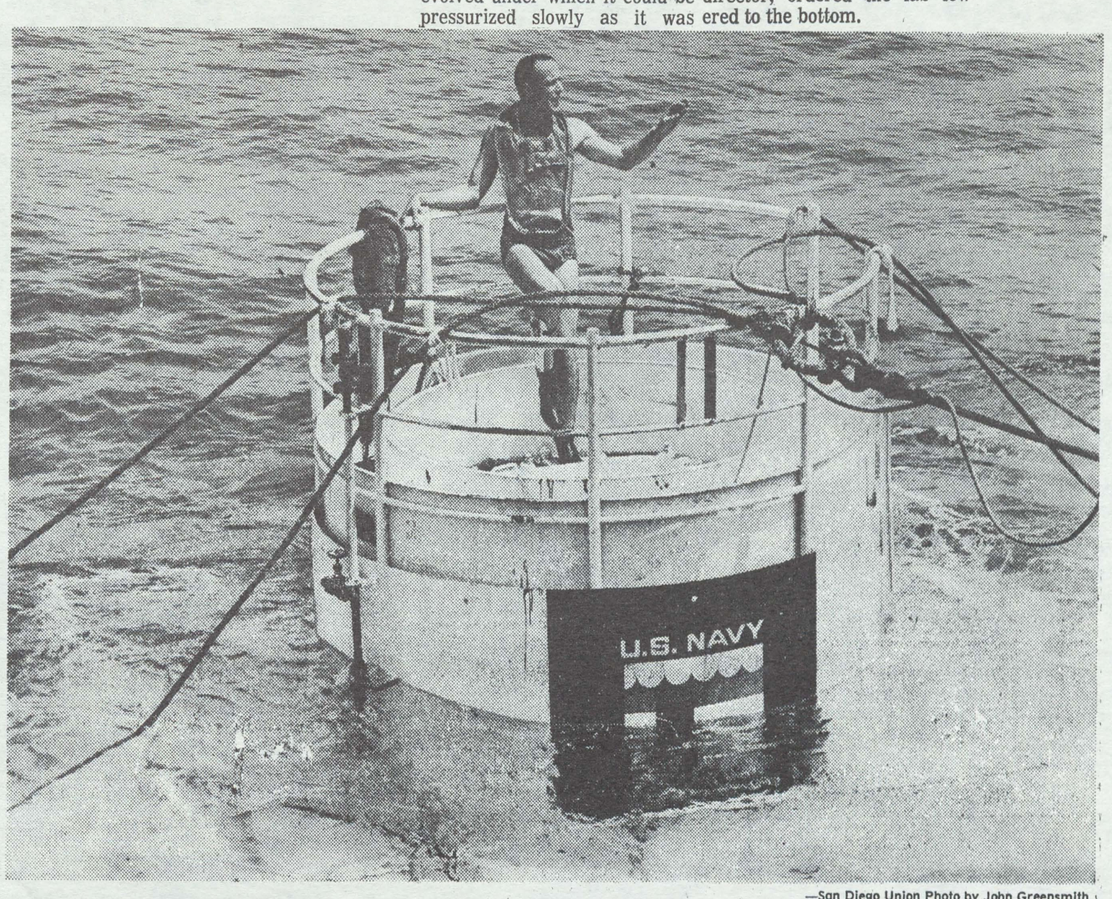
No such dramatic event has ever occurred here before in the annals of those who study the sea.

A mundane interest in the field of oceanography is justified by the economic facts. The San Diego Chamber of Commerce says the fields of ocean engineering and oceanography yield at least $9-billion in business and research annually in the world. More than two-thirds of this, of course, is worldwide fish production. But other activities are relatively more important in the U.S. $1.7-billion spending picture.

This country spends about $413 million a year for sea culture, such as plant harvesting and fish production; $546 million for government defense, research, and other activities; $480 million for petroleum exploration and production; $141 million for mineral mining and chemical extraction; $30 million for recreation and consumer activities, and $15 million for industrial research and development.

What may be more significant is the rapid growth rate for undersea activities in the United States. Excluding Navy antisubmarine warfare expenditures, it is believed to be between 8 per cent and 15 per cent.

SAN DIEGO
EVENING TRIBUNE
AUG 27 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California



—San Diego Union Photo by John Greensmith

Cmdr. M. Scott Carpenter, astronaut and captain of the first SeaLab II aquanaut team, gives signals as SeaLab submerges 202 feet off Scripps Institution pier.

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Sealab's Down — 10 Aquanauts Next

Sealab officials said today they were over the hump in their much delayed program to put 10 men on the bottom of the ocean 3,000 feet off Scripps Pier.

They plunked their 200-ton steel cylinder on the bottom yesterday. Touchdown was at 3 p.m., but they had to raise the lab 10 feet later and turn it so it would settle in a more level position.

Teams to Revolve

The first team is expected to take up residence in the steel cylinder tomorrow. It will be led by astronaut-aquanaut Scott Carpenter who will stay for 30 days.

The other nine men will come up after 15 days and be replaced by a second team. At the end of 15 more days, they will all come up and a third team of 10 will go down. Lt. Robert E. Sonnenburg, a San Diego Navy doctor will be a member of both the first and third teams.

On the Botton: Sealab Lies at Focus of World Attention, an Editorial, Page D-2.

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Change of Plans

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Later the plan was modified to have the aquanauts go to the bottom in a standard diving bell.

Today Carpenter said the first four men down would swim from the surface to Sealab, check it out, enter it, and get it ready for the other six. The six are still expected to be lowered from the surface in the bell.

Ordered Off Twice

Carpenter will lead the four who will swim to the bottom.

He was the star performer aboard Sealab as the critical moment of lowering approached. He was ordered off the craft twice before finally abandoning it as it sank.

His first trip from the mother ship to the lab was made in a small outboard-powered boat. The decks atop Sealab were awash, and Carpenter was wearing dungarees and tennis shoes, so he was carried piggyback to the conning tower by Lt. Wallace Smith, who was dressed for the occasion.

From his perch on the tower he directed a team of Navy and civilian divers and swimmers in the final preparations for lowering.

When the swimmers had been ordered away from the craft, Carpenter was told to abandon ship. He turned down an offer from Smith for another piggyback ride and waded to a waiting boat.

Moments later he was back aboard, this time in swimming gear. Something was wrong with the internal pressure and more valves had to be turned. He swam to the mother ship Berkone after Cdr. Tom Blockwick, skipper of the Berkone, pointed out the dangers of remaining aboard any longer.

A little later, Carpenter again swam to the lab to make more adjustments, then dived into the water and returned to the Berkone before Sealab disappeared beneath the surface.

Events yesterday climaxed five days of work since Sealab was towed here Saturday and many delays because some equipment had to be repaired and replaced.



FINISHING TOUCH—Scott Carpenter leans from top of Sealab cylinder to hand pipewrench to diver John (Shorty) Lyons for last-minute adjustments before the capsule sinks to ocean floor off La Jolla. Carpenter will be with first team to enter the container. —Tribune staff photo by Roger Wrenn

THE AMERICAN TRADITION: Who gave you, Old Glory, the name that you bear/ With such pride everywhere/ As you cast yourself free to the rapturous air/ And leap out full-length?—James Whitcomb Riley.

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SeaLab Test Finds Gas Leak; Dive Delayed

By BRYANT EVANS
The San Diego Union's Science Writer

A test to provide an extra margin of safety for SeaLab II aquanaut revealed a gas leak yesterday that delayed the operation for another 24-hours.

It appeared last night that the 58-foot long undersea habitat will be submerged sometime today, hopefully in the forenoon.

The aquanauts will not go into the SeaLab until late tomorrow and more probably Saturday morning, a Navy spokesman said.

Although SeaLab II operation is now eight days behind schedule, no one connected with it shows much concern over the delay. Such things are more or less expected in an experimental procedure of this proportion.

CONCERN VOICED

Some concern was expressed, however, that the delay might interfere with the proposed radio conversation between Cmdr. Scott Carpenter, astronaut and captain of the first SeaLab II aquanaut team, and Gordon Cooper in the Gemini 5 spacecraft The Gemini is scheduled to splash down Sunday.

The leak found yesterday was around a porthole in the SeaLab itself. The lab had passed a number of tests when compressed air was pumped in, but when helium was used it promptly started escaping.

This was not an unlikely result. Helium, the second lightest of all elements, will seep through cracks that will not let heavier gasses go through. The test was made because the SeaLab atmosphere will be made up of 87 per cent helium, 9 per cent nitrogen and 4 per cent oxygen. (A formerly published formula called for 80 per cent helium and 16 per cent nitrogen with 4 per cent oxygen.)

PRESSURE LEVEL

This artificial atmosphere was designed to prevent narcosis, the "rapture of the depth" which can be fatal to divers who breathe ordinary air under the pressure in which the aquanauts will live. It will be six-and-one-half times the atmospheric pressure they ordinarily breathe at sea level.

Yesterday's tiny leak was speedily fixed but it had so far diminished the helium supply aboard the Berkone, the staging vessel, that the submerging procedure had to be delayed until a new helium supply is procured.

A change was made yesterday in plans for lowering aquanauts to the SeaLab when it is in place. Formerly it had been planned to take all 10 down at one time in a personnel transport capsule. Now it has been decided that pressurizing the capsule with men in it will be unnecessarily difficult.

Under the new plan the capsule will be put down empty and will be pressurized as it descends. It will be kept on the bottom to bring the men back up at the end of 15 days or any time before, if it proves necessary. The men will ride down to the SeaLab on a small diving bell, three or four at a time.

BREATHING APPARATUS

During the descent they will wear Mark VI semi-closed gas breathing apparatus. This is a type of breathing apparatus which feeds an oxygen-helium mixture to divers. Near the bottom the men will leave the diving bell and will swim to SeaLab.

If the SeaLab is lowered today to its site, now quoted as 205 feet below the oceans's surface, and about 3000 feet from Scripps' Pier, there will remain the task of making the final power connections between the SeaLab and the shore. A vital link in the power system, a package containing a group of transformers, has been fitted with a steel shell to replace a concrete shell which failed during underwater tests.

Sealab Down; 10 Aquanauts Will Go Next

By LEO BOWLER
EVENING TRIBUNE Science Writer

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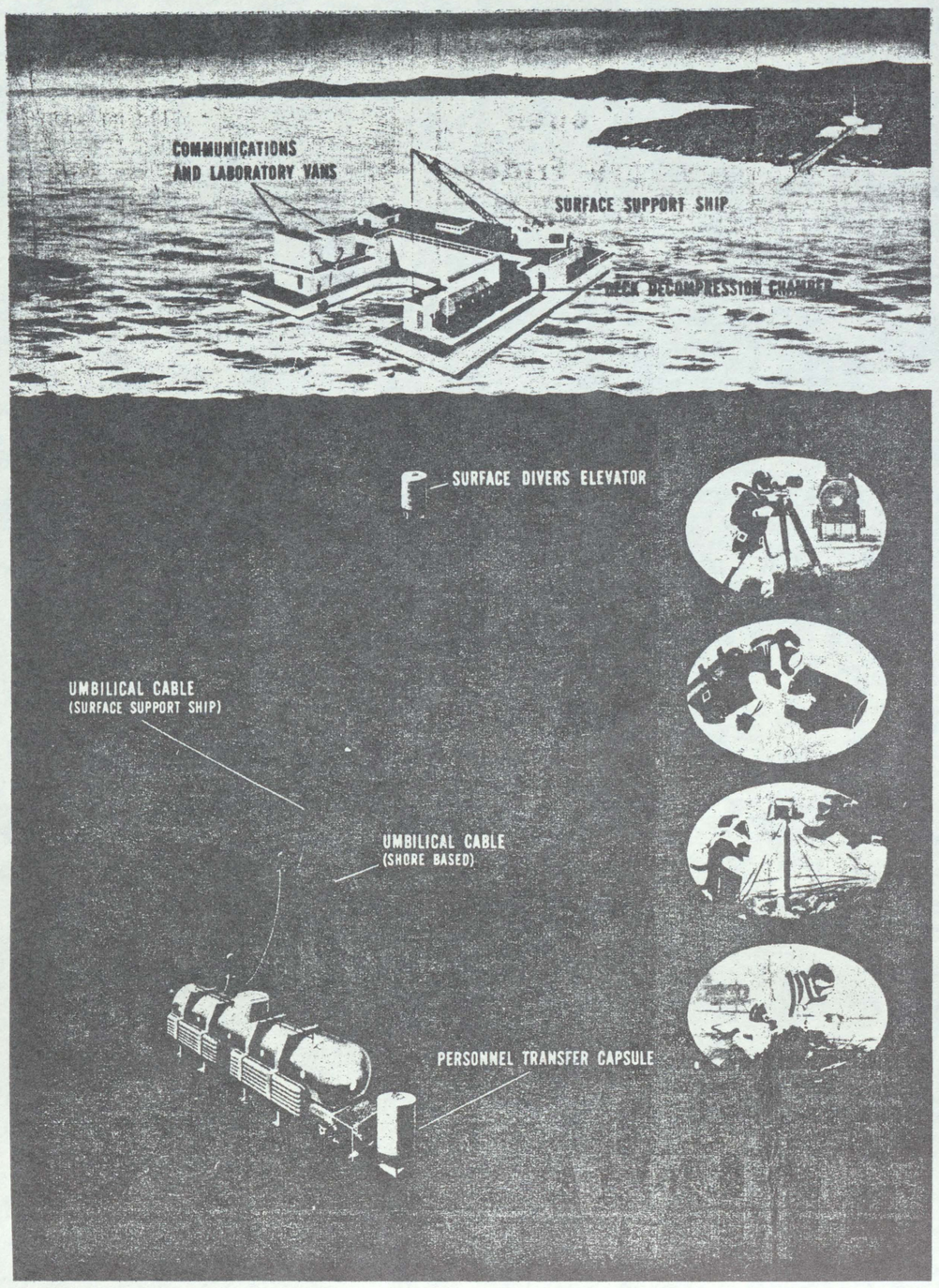
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Union
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AUG 1 1965

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SeaLab Operation Delayed By Leaks

By BRYANT EVANS
The San Diego Union's Science Writer

Little leaks and a lot of careful deliberation brought a postponement of about one day in the beginning of the SeaLab II operation off La Jolla.

Capt. Lewis Melson, director of the project, said that he believed that the 58-foot-long tankhome for 10 men would be lowered to its new berth, 210 feet deep, today. But, he said, final preparations could delay it until tomorrow.

Melson said it will be approximately 24 hours after the SeaLab is lowered beneath the surface until the aquanauts can move in. This would place the earliest moment of occupation late tomorrow.

LEAKS NOT SERIOUS

The delays yesterday were caused by a leak in a valve inside the personnel transport capsule, and a leak in the power package that will serve as one of the two energy sources for SeaLab. Neither of these was a serious problem. They just took some time.

When it appears that everything is ready, Melson said, the SeaLab will be towed over beside the Berkone, the staging vessel, and the SeaLab will be loaded with supplies. This load will include most of the things that are to supply the three 10-men teams for periods of 15 days each. Then all systems will be checked. Air will be pumped into the lab to raise the pressure to 26 pounds per square inch.

Next two ballast tanks will be flooded and the SeaLab, now negatively buoyant, will be lowered 20 feet in the water by a cable from the Berkone.

LOWERING OPERATION

This lowering operation will be done with the help of a counterweight under water with a sheave through which the main cable to the SeaLab will run. The function of this counterweight is to reduce wave action and keep the lab from oscillating up and down during the process.

At 20 feet, helium will be pumped in until the atmospheric pressure is up to 6½ atmospheres — about 96 pounds a square inch. Melson said that the helium's mixing with the air already in the lab should give the desired mixture of 80 per cent helium, 16 per cent nitrogen and 4 per cent oxygen.

When the pressure reaches this point — equal to the water pressure on the bottom — the SeaLab will be lowered to the bottom.

Melson said that the point at which it will rest will be a nearly level area of firm, impacted sand. He said he did not think it will be necessary to modify the contour of the site with streams of water as had been thought needed for a site considered previously.

After the SeaLab is on the bottom, a diver will go down and open an air valve which will blow the water out of the well in the bottom of the lab through which the men will enter and leave.

OPEN TO SEA

When this is blown dry, a diver will open the hatch and the interior of the SeaLab will be open to the sea. But, of course, the sea will not rise through this well in the bottom because of the atmospheric pressure inside the lab. In effect the gases inside will make a bubble that will remain just as the air will remain in an upside-down bottle pushed into the water.

Then a diver will turn on and check the electric circuits inside the SeaLab. Things will then be ready for the 10 divers, led by Cmdr. M. Scott Carpenter, USN, the astronaut, to ride the personnel transport capsule from the Berkone down to SeaLab II.

SCUBA APPARATUS

The aquanauts will wear Scuba diving apparatus to come out of the capsule and swim to their new temporary home. When they enter, the operation will be under way.

The power package, a leak in which caused some delay, is a unit containing several transformers to split a current being brought out from shore to the SeaLab. It also will supply an automatic observation laboratory, called a "benthic laboratory" because it rests on the bottom.

The shore line, Melson explains, can supply the lab with power if bad weather were to force the Berkone to leave the scene.

SAN DIEGO DISPATCH

Vol. 5 No. 12 August 27, 1965

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Devoted To The Navy, Marine & Coast Guard Community Of San Diego

SEALAB ON OCEAN BOTTOM AQUANAUTS MAY GO TODAY

Historic event off San Diego coast

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SEALAB II, the second phase of the Navy's "Man-in-the-sea" program will involve experimental salvage techniques, engaging in oceanographic and marine biological research, and undergoing a series of physiological and human performance tests.

The undersea experiment will be conducted by the Office of Naval Research (NR) in collaboration with the Navy's Special Projects Office as part of the Deep Submergence Sys. Program.

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"Tuffy the Porpoise" to Pay Visit Here

Probably the most famous visitor to La Jolla, outside of Astronaut Scott Carpenter, this summer will be Tuffy the Porpoise.

And being so famous, Tuffy, of course, will not arrive by sea—rather by air.

The latest announcement by Sea Lab II is that the porpoise which will be used in underwater experiments off La Jolla, will come by helicopter from his ocean home off Pt. Mugu in about a week.

"When he is happy with La Jolla and his new environment, we will start his experiments with the second team of astronauts," a navy spokesman said.

Tuffy will be delivered from Pt. Mugu marine sciences center where he was brought from Pacific Ocean park in 1964. His helicopter will put him into his tanks adjoining the "Berkone" staging vessel and mother ship for Sea Lab II, 3,000 feet off Scripps pier.

He has been trained in tanks at Pt. Mugu and advanced from there to Pt. Mugu lagoon. In February he was taken to sea where he learned to wear a harness, retrieve in open water and home on a signal. In tests at Pt. Mugu, he has made several dives to depths of 300 feet, which is 90 feet deeper than Sea Lab II will be operating. He has responded to the acoustic homing signal from distances up to 550 yards while working as far as two miles from shore and one of his tests will be connected with rescue work and home guidance with the aquanauts.

Capt. Forest Wood of the naval missile center marine sciences division at Pt. Mugu, doesn't quite know what Tuffy, who bears several marks of shark battles, would do if he encountered a shark.

"I have no intention of letting him loose if one shows up. His body shows encounters with sharks—but he may be a complete coward for all we know," Wood says.

One thing Wood does know is that Tuffy can surface 300 feet in a minute and a half—fast enough to kill a man if attached.

"We think he could deliver something like medical supplies to Sea Lab II in a hurry . . . all I can say about the possibility of him surfacing with a diver, is that he has not shown any tendency to 'nudge' (divers term for pushing)," he concluded.

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SeaLab to Make Oceanographic History

Enthusiasm generated for the most daring experiment in oceanographic history, SeaLab II, becomes contagious when you speak to the project directors and 10 aquanauts who will be making a shelf of the ocean their home during this next month and a half off Scripps Institution of Oceanography at La Jolla.

Both the San Diego Gas & Electric Co. and Scripps, in the best traditions of San Diego hospitality, have given those connected with the project co-operation to the point of embarrassment. They typify San Diego interest.

This week the 10 aquanauts, hopefully, will set out on their daring expedition to determine just how hostile the environment at 210 feet below the surface can become and to test man's ability to work during long periods underwater.

On SeaLab's success hinges not only man's ability to raise ships from the deep but airliners as well, leading to new degrees of safety for civilian transportation leaders as well as the military.

If man can learn to live beneath the sea he can, for instance, find out the cause of marine disasters that visit themselves on sea-going craft, giving builders the information they so vitally need to prevent catastrophes of this nature.

Some of the secrets the SeaLab technicians will wrest from the ocean will also aid future astronauts, as there are a number of parallels between both environmental factors. Problems of weightlessness could very well be solved at the ocean's bottom.

America's stake in this journey into the sea is impossible to gauge on a short-range basis since it will reap not only immediate benefits but save lives of those even in future generations.

Our hopes for SeaLab's success, together with our commendation to the 10 aquanauts, project directors and all those connected with this daring experiment, will be riding the ocean shelf with them each day of the exploration.

We are proud to have these pioneers working off our shores.

JOURNAL AMERICAN
New York, N. Y.
AUG 26

Sealab Ready For Ocean Dive

LA JOLLA, Calif., Aug. 26 (AP). — The Navy's Sealab 2 was scheduled to be lowered to the ocean's floor today to begin a 45-day experiment in underwater living.

After checkouts are completed the aquanauts will descend three at a time in a diving bell to the lab and are to stay submerged for 15 days. Astronaut M. Scott Carpenter, a Navy Commander, is expected to try to stay down for 30 days.



UPI Telephoto

Before Taking the Plunge

Astronaut M. Scott Carpenter (uniform) watching as Sealab 2 was prepared for lowering to the ocean floor, 205 feet down, off La Jolla, Calif., yesterday. Carpenter is a member of a team taking part in an underwater living experiment.

New York 38, N. Y.
From AUG 27 1965
POST-DISPATCH
St. Louis, Mo.

New York 38, N. Y.
From AUG 25 1965
INQUIRER
Philadelphia, Pa.

Tuffy Practices Chores, Mishap Delays Sealab 2

LA JOLLA, Calif., Aug. 24 (AP).—New technical problems caused further delay Tuesday in the lowering of the Navy's Sealab 2, but scientists spent the time polishing the behavior of a once-pugnacious porpoise which will act as an underwater errand boy for divers.

Leaks showed up in tests of a diving bell which will take divers to and from Sealab 2 once the 12-by-58-foot steel cylinder is in place on the ocean floor 1000 yards off this San Diego county resort.

Officials had planned to submerge Sealab 2 late Tuesday but the leaks and other equipment problems forced a postponement to at least Wednesday morning. This pushed back to Thursday or later the time when divers and scientists are expected to begin a 45-day residence in the sea floor laboratory.

SERIES OF PROBLEMS

The new problems were the latest of a series that have put off the start of the experiment since Aug. 15.

Officials said the delays had two bright aspects:

1. Tuffy, a 270-pound male Atlantic bottlenose porpoise being trained to carry tools—and rescue lines if needed—to divers working outside Sealab 2, has reached a peak in performance which experts call amazing.

Said Dr. James Miller, a Navy psychologist: "One of the divers was very skeptical until he saw Tuffy at work. He's really an amazing creature—I predict he'll become a real pet. And that may turn out to be a problem. Tuffy has a job to do."

TUFFY IN TRAINING

Tuffy now is in training at the naval missile center at Point Mugu, Calif., 150 miles north. He once was so belligerent he attacked handlers. Tuffy will be brought here by helicopter in about a week and kept in a pen until released to join the divers.

2. The delays have given Miller and other psychologists more time to study the surface behavior of the divers for comparison with their behavior under the stresses of life at a depth of 210 feet.

Miller said studies of the four men who spent 15 days at a depth of 160 feet in Sealab 1 off Bermuda last year showed a tendency for them to feel separated from observers on the surface.

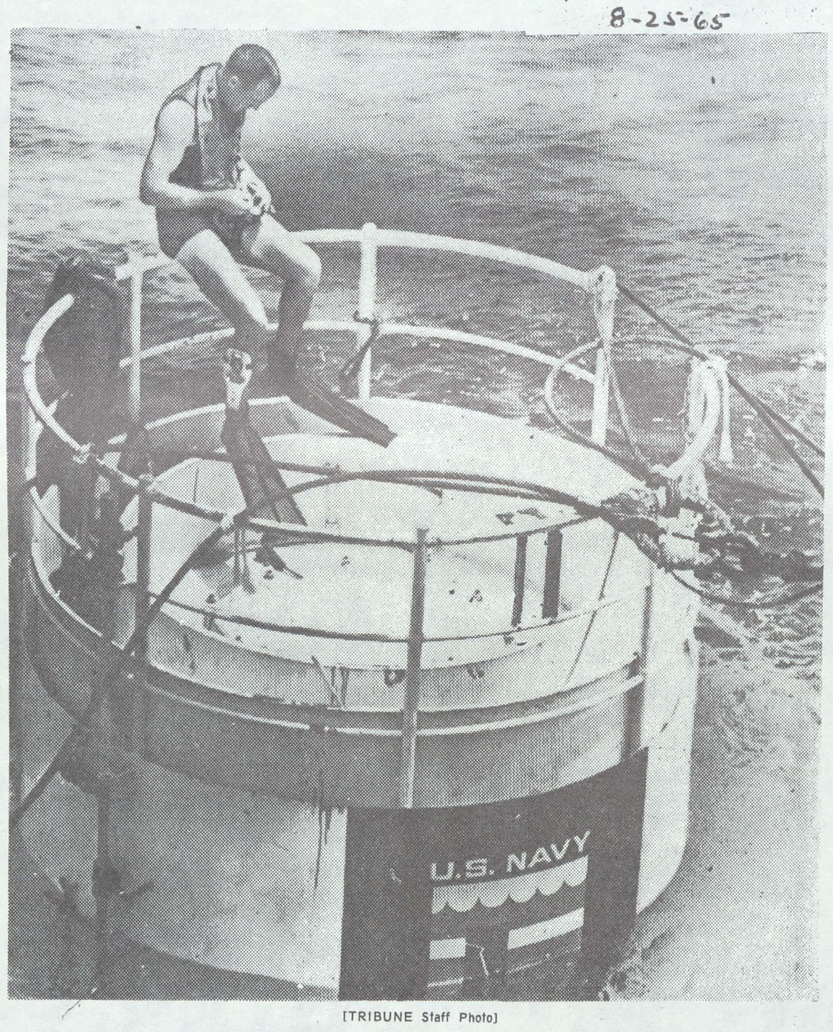
"Some of them seemed to grow too interested in their underwater environment," he said. "There was a reluctance to take orders and do certain tasks. It was a normal thing—people in branch offices sometimes get the feeling the home office doesn't know how things are out in the field.

"We don't know whether we'll find this in Sealab 2, but it is one of the things we'll be watching for. This is a very rare opportunity to study groups of men under conditions of real stress."

The groups will consist of teams of 10 men—six Navy divers and four scientists. Each team will spend 15 days in rotation eating, sleeping and working in the submerged laboratory and making excursions to map the ocean bottom.

The leader of the first team, astronaut M. Scott Carpenter, a Navy commander who is a diving expert, will try to stay down 30 days—a record for underwater living.

SAN DIEGO UNION
8-25-65



[TRIBUNE Staff Photo]

Aquanaut M. Scott Carpenter making final checks on Sealab 2 just before the capsule was submerged and moored more than 200 feet deep in Pacific ocean off La Jolla, Cal., as prelude to the navy's most intensive exploration underseas.

Sealab Reaches Ocean Bottom

La Jolla, Cal., Aug. 26 (AP)—The Navy's Sealab 2 reached the bottom of the ocean at a depth of 205 feet today and officials said no serious problems were encountered during the descent.

The 12-by-58-foot steel capsule will be home for scientists and divers during a 45-day living experiment scheduled to start tomorrow or Saturday.

Officials said the aquanauts will descend to the Sealab as soon as equipment can be readied and the necessary checks made.

Astronaut Scott Carpenter will be in the first team of ten divers to occupy the underwater house. He is expected to try to spend 30 days submerged. The others will be relieved by a new team after fifteen days.

The Navy was scheduled to lower the Sealab August 15 but technical difficulties, including leaks, caused repeated delays.

Some helium leaks were discovered today as the capsule was lowered but these are minor and can be repaired once the aquanauts are down, officials said. Helium makes up most of the atmosphere the men will breathe.

Newark, N. J.
AUG 27 1965

International
Press Clipping Bureau, Inc.
New York City

Versatile

A MAN for all environments is Scott Carpenter, the naval officer turned astronaut who is returning to the sea in a bathysphere.

Lt. Cmdr. Carpenter experienced all sorts of adventures, along with a few misadventures, as the second American to orbit the earth. He alarmed his ground crew when a faulty thermometer gave him temperature readings of 103 degrees. He set off a scrambling sea search when his Mercury capsule overshot the landing mark by 250 miles. When finally plucked from the sea three agonizing hours later his first question was, "What's the next mission?"

Well, there'll be no journey to the moon for Astronaut Carpenter. At 40, he's considered past the age limit. But he's not ready to retire his restive, inquisitive nature.

The assignment he requested aboard Sealab II will take him 230 feet beneath the Pacific, with occasional jaunts outside the tub in a undersea suit. There, too, is a vast region seldom explored and filled with wonderous mysteries.

One of these days Scott Carpenter ought to sit still long enough to write a book.

Sealab Reaches Floor of Ocean

LA JOLLA, Calif., Aug. 26 (AP).—The Navy's Sealab 2 reached the bottom of the ocean at a depth of 205 feet Thursday and officials said no serious problems were encountered during the descent.

The 12-by 58-foot steel capsule will be home for scientists and divers during a 45-day experiment on underwater living scheduled to start Friday or Saturday.

Astronaut Scott Carpenter will be in the first team of 10 divers to occupy the underwater house. He is expected to try to spend 30 days submerged. The others will be relieved by a new team after 15 days.

New York 38, N. Y.
From AUG 27 1965
INQUIRER
Philadelphia, Pa.

Sealab Lowered

LA JOLLA, Calif — The Navy lowered its Sealab II into the ocean a half mile off this California city. The all-afternoon vertical journey ended at 205 feet.

Authorities are expected to decide today when the first team of 10 divers and scientists will be sent down to the 12 by 58-foot cylinder in a diving bell) for their 15-day experiments in underwater living.

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The San Diego Union

SAN DIEGO, CALIFORNIA, SATURDAY MORNING, AUGUST 28, 1965

SEALAB'S AQUANAUTS WILL DESCEND TODAY

Craft Waits In Deep For Living Test

10 Set To Drop Onto Bottom By Diving, With Bell

By BRYANT EVANS
The San Diego Union's Science Writer

The first team of SeaLab II aquanauts, headed by Cmdr. M. Scott Carpenter, will start their sojourn in their undersea home today, Capt. Lewis Melson, project director, said last night.

He estimated dive time at 11 a.m.

Nine members of the 10-man team are to stay in the 58-foot-long cylinder 202 feet under the ocean for 15 days. Carpenter will stay 30 and also captain the second team to descend Sept. 5.

Carpenter and SeaLab officials were still hoping yesterday that it will be possible for him to have a conversation with Gordon Cooper in the Gemini 5 spaceship before the Gemini 5 splashes down tomorrow.

Yesterday was spent by engineers and divers in completing all arrangements for the new tenants to move into the habitat 3,000 feet off Scripps Pier in La Jolla.

The SeaLab was reoriented slightly from its original position to correct its inclination and list. It still tilts so that aquanatus will have to walk up a 6 per cent grade when they walk from the laboratory to their living quarters.

It also still lists about 3 degrees to port. Any further improvements in the site will depend on the aquanauts after they move in.

The package of electric transformers that will distribute power from shore to the SeaLab and other installations was put in place on the ocean bottom yesterday.

Aboard the staging vessel, the Berkone, Carpenter put his team through the last drill for boarding the personnel transport capsule, the aquanauts' pressurized elevator to bring them back to the surface.

Melson said that when the aquanauts go down today they will not ride in the capsule as originally planned, but some will descend as free swimmers and others in a small diving bell. They will wear Mark VI underwater breathing gear and wet diving suits to protect them from the deep, cold water.

Good news for the aquanauts was received from the Scripps Institution of Oceanography yesterday. They were told that there is a body of clear, blue water off Point Loma moving north. It should increase visibility around the SeaLab to 100 feet or more.

This is at least twice the visibility reported by two members of the aquanaut squad who went down to the SeaLab yesterday to remove the lowering cable and other lines no longer needed.

They were Rick Grigg, a graduate student at the Scripps institution, and Bob Barth of Panama City, Fla., the only SeaLab II diver who also served on SeaLab I off the Bahamas last year.

They went down at 10:07 a.m. and spent eight minutes on the outside of the SeaLab.

Grigg said the lab was resting on a flat patch of sand. On top of the sand he saw some giant kelp lying on the bottom but not growing there. There was also some matted surf grass. He reported seeing small fish which, he said, were probably anchovies.

Barth said that he could see the ends of the SeaLab clearly from amidships. There was no artificial illumination at the time. Barth said he was surprised at how much light filtered down from the surface.

"It was like a bright moonlight night," he said.

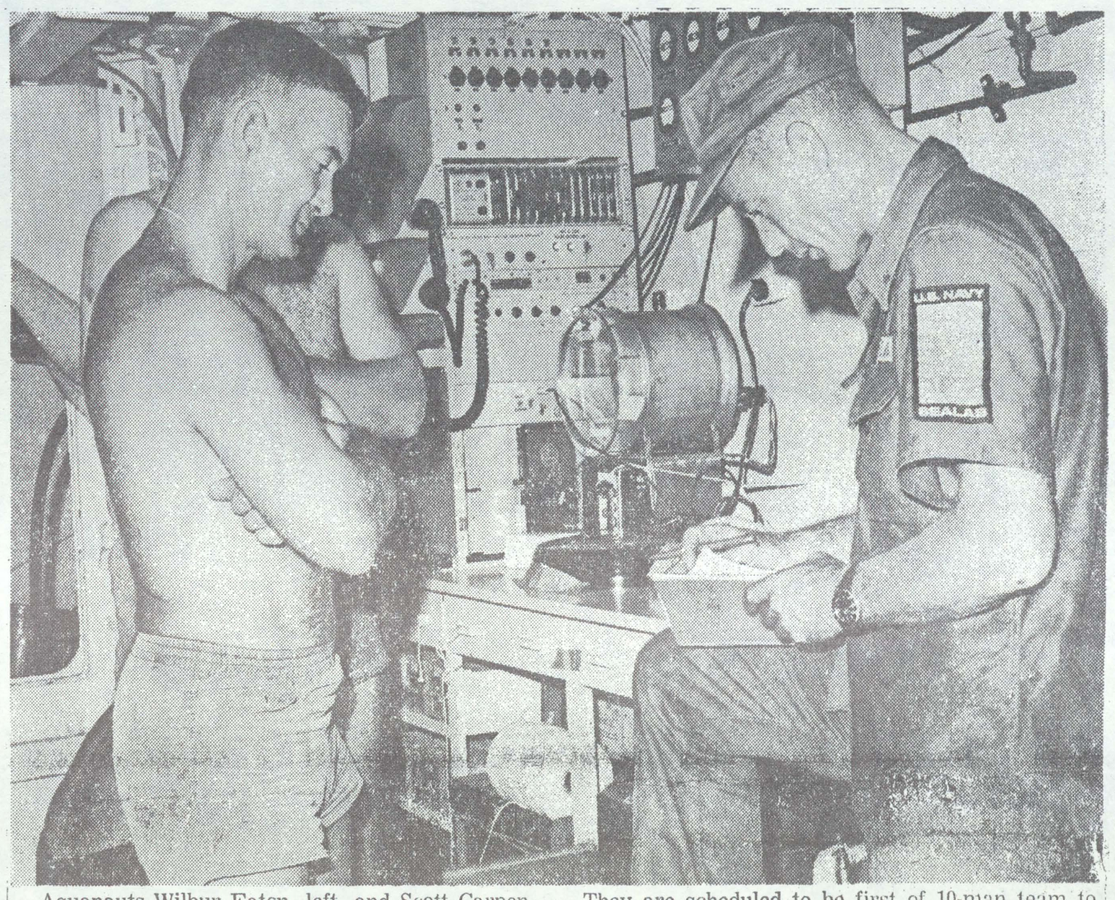
Two jobs remained to be done before the aquanauts can move into the SeaLab.

The personnel transport capsule to bring the divers back will have to be installed on the bottom.

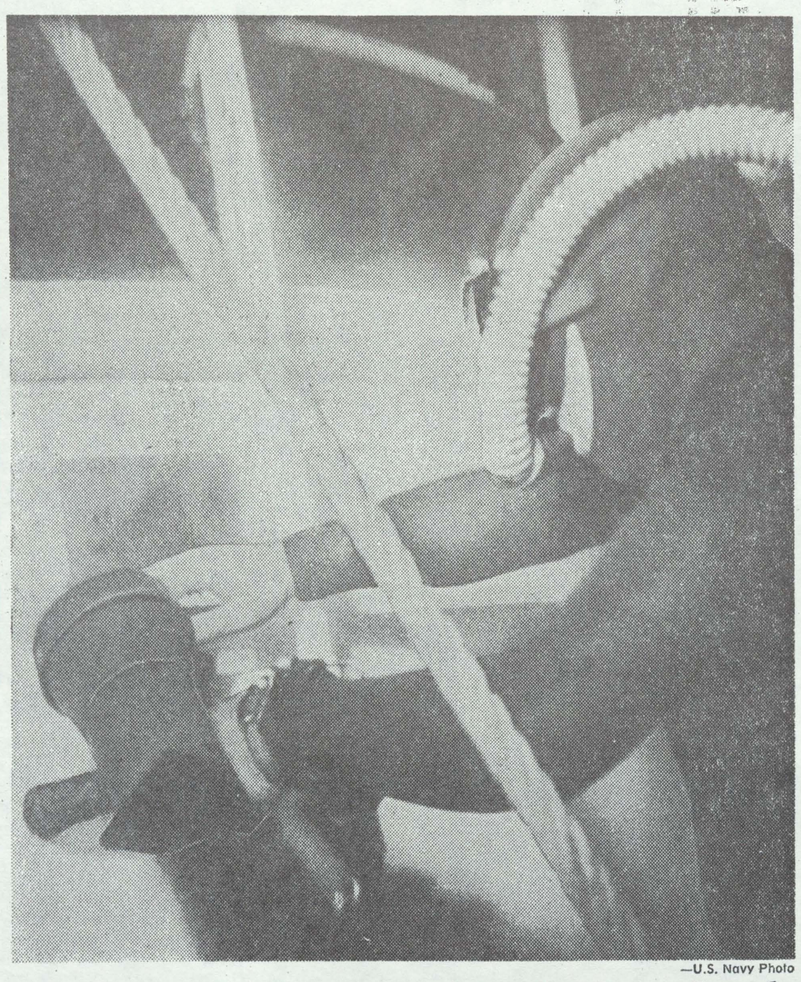
A diver will have to go to the SeaLab, blow the entry well and open the hatch for the aquanauts to enter.

Persons who hoped to see closed-circuit television pictures of the aquanauts in the SeaLab over this weekend in Sumner Auditorium will be disappointed. The pictures will not be available until after the placing of the benthic laboratory to relay signals. This should be put on the ocean bottom Monday.

SAN DIEGO
EVENING TRIBUNE
AUG 28 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California



Aquanauts Wilbur Eaton, left, and Scott Carpenter go through checklist before diving to SeaLab. They are scheduled to be first of 10-man team to enter deep sea chamber for deep sea exploration.



—U.S. Navy Photo

Under Water With SeaLab

Navy diver Robert Sheats opens main vent valve on SeaLab conning tower, allowing air to escape while water floods ballast tank. Picture was taken at depth of more than 200 feet off La Jolla. (Story on Page a-1)

Sealab, Gemini Link Nears Completion

Special Circuit Held Open For Cooper, Carpenter to Talk

By LEO BOWLER
EVENING TRIBUNE Science Writer

Sealab and federal space agency officials were joining forces today to make possible the long delayed conversation between Scott Carpenter and Gordon Cooper.

They were putting the final splices in an electronic link between Sealab which is 202 feet beneath the ocean off La Jolla and the Gemini 5 capsule which is whizzing through space.

From Point Arguello, the conversation will be relayed over the regular radio communications link with Gemini 5.

Cooper and his space mate, Charles Conrad, are to land tomorrow.

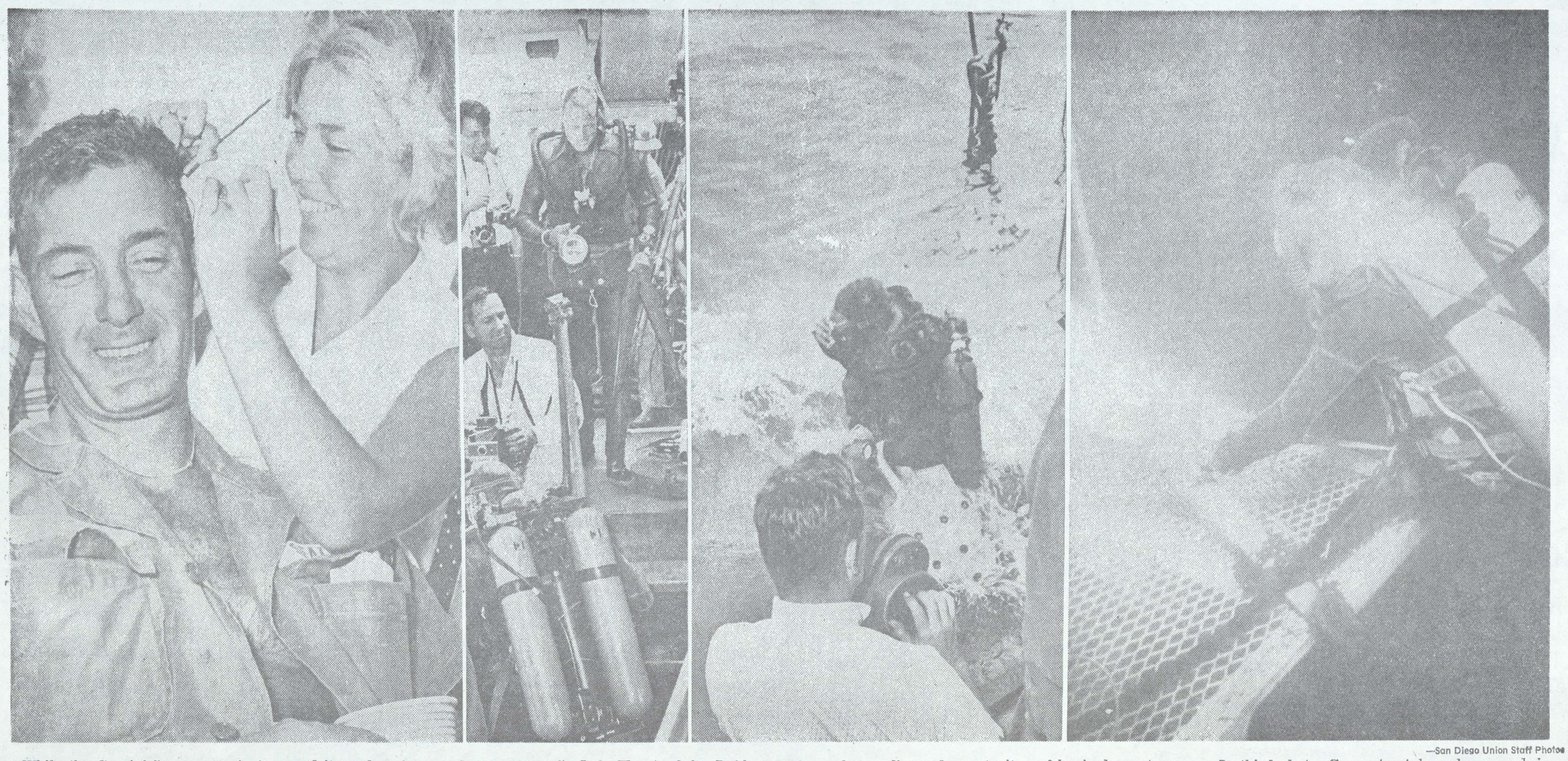
The purpose of the conversation, Sealab officials said, was to dramatize Sealab, prove that such a conversation could be held, and allow two old friends to keep track of each other's adventures.

Sealab officials were hopeful that the conversation would take place at 3:10 a.m. tomorrow.

Carpenter, a Navy commander and chief aquanaut for the Sealab project, made three orbits around the earth in a Mercury space capsule in 1962. He has been on loan to Sealab from the space program.

They were holding open a special circuit between Sealab and the mothership Berkone moored above it. The circuit was spliced with a land line directly to the Gemini tracking station at Point Arguello.

It's Splashdown Time—But For Aquanauts



—San Diego Union Staff Photos

While the Gemini 5 space project neared its end yesterday, a group of San Diego aquanauts began their preparation and descent into "inner space" for another project—SeaLab II. At left, Reidun Bahkehoei places electrodes, which will transmit medical data to surface, on Wilbur Eaton. In last three photos, divers don wetsuits and begin descent. In second photo, man facing camera, Astronaut-aquanaut Scott Carpenter, prepares to leap into sea. In third photo, Carpenter takes plunge and, in final of series, the astronaut is shown underwater with shark cage. (Story on Page a-1)

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

EAT, SLEEP WELL

Aquanauts Work Outside SeaLab

By JUDITH MORGAN

SeaLab II aquanauts yesterday spent 7½ hours on missions outside their undersea home performing scientific tasks and general area clean-up.

The first sorties were scheduled from 8 a.m. to 11:30 a.m. and the second from 2 to 6 p.m.

Two divers spent four hours outside the lab breathing through "hookah" gear rather than carrying their own supply of helium-nitrogen-oxygen in back tanks. Hookah is similar to the umbilical cord used by astronaut Edward White on his famous walk in space. The hookah is like a hose which allows the diver to breathe from the SeaLab itself.

Capt. George F. Bond, USN, head of the Navy's man-in-the-sea project, said that all the divers were sleeping and eating well. From his station at the control center aboard the mother ship, Berkone, Bond reported that the temperature in SeaLab was correct at 85 degrees Fahrenheit.

Bond said the aquanauts all were happy and in good health.

He reported a delay in installation of the Benthic laboratory which was scheduled to begin service yesterday as an undersea communications center.

The Benthic lab is expected to be installed this afternoon and will improve the closed circuit pictures being received by Navy and Scripps Institution of Oceanography scientists topside. The job of the lab — which weighs seven tons — is to take the many electronic signals coming out of SeaLab and multiplex them so they can be transmitted from the lab to shore on one wire.

Bond said it is too early for any reports of the physiological tests being taken by the aquanauts. Yesterday's tasks outside the lab included connecting SeaLab communications lines to the Benthic control lab, connecting the diving lights and conducting a general area clean-up.

The aquanauts were awake

(Continued on a-2, Col. 7)



BILLIE L. COFFMAN
. . . re-enlisting 'under pressure'

ALL DOING WELL

Aquanauts In Tasks Outside Lab

(Continued from Page a-1)

at 7 a.m. yesterday with Dr. Robert Eric Sonnenburg the last to arise. The highlight of breakfast was a western omelet — one of the prepackaged foods used in SeaLab.

Lunch was at noon with a siesta from 1 to 2 p.m. Dinner was served at 6:30 p.m.

A SeaLab spokesman said the aquanauts had been caught raiding the icebox by topside observers of closed circuit television.

The fact that extra sandwiches had been made was confirmed yesterday when the aquanauts requested more lettuce and bread from the surface.

These items were delivered by air-tight "trolley" which acts as a surface to SeaLab dumb waiter.

Meanwhile, it was disclosed that Billie L. Coffman, 36, will re-enlist in the Navy today under great pressure.

The torpedoman's mate, 1st class, USN, will sign his papers at 11 a.m. in a special ceremony in SeaLab II where Coffman is a member of the first team of aquanauts. It will be the first such ceremony at a depth of 205 feet.

Capt. Bond and Capt. Walter F. Mazzone, USN, will swim down from the mother ship Berkone for the event. Mazzone is physiological control officer.

Coffman entered the Navy in January, 1948, at Tucson, Ariz. During his service, he has received many citations including the Bronze Star medal with combat V. Coffman, who has served with various experimental diving units, lives in Willimantic, Conn.

Navy Says 'Go' For Sealab 2 Drop Today

LA JOLLA, Calif. (AP) — The Navy says all systems are "go" for the descent today of 10 aquanauts, including Astronaut M. Scott Carpenter, to Sealab 2 on the ocean bottom 1,000 yards off shore.

Three teams of 10 divers are scheduled to spend 15 days each in the 12x58-foot steel cylinder over the next 45 days, eating, sleeping and working at a depth of 205 feet.

Carpenter, a Navy commander, and nine other Navy divers and scientists, are expected to start descending about 11 a.m. (PDT). Some may go down in a three-man diving bell, others may make the trip in skindiver gear.

Still uncertain was Carpenter's planned talk via radio-telephone with fellow astronaut L. Gordon Cooper Jr. in the orbiting Gemini 5 spacecraft.

Space agency officials have indicated that the sea-floor-to-space chat has a low priority on a busy schedule.

Sealab 2, an experiment to determine how long men can function safely under pressure six times that of the surface, was lowered to the bottom Thursday after a 12-day delay due to technical problems.

A long series of safety checks followed, and finally Sealab 2 was reported ready for the divers to enter.

Carpenter, a veteran diver as well as astronaut, will try to stay down 30 days and set a record. Last year four men spent 13 days at a depth of 160 feet in the smaller Sealab 1, off Bermuda.

All the divers will work outside the underwater base at least two hours a day, studying marine specimens and mapping the ocean floor off this Southern California resort. Sealab 2 is on the edge of a deep marine canyon, which the divers probably will explore.

The second team down was provided with a pet — a 270-pound porpoise named Tuffy, trained to carry tools and rescue lines.

Sharks seldom appear in these waters during August, but if one does Tuffy will be released from his pen to see if he lives up to his name — and to the numerous shark-bite scars on his rubbery skin.

George Bryan Brummell, an Englishman known as Beau Brummell, set England's styles for men's clothes and manners for 21 years.

Superior (Wis.) Evening Telegram 28 Aug 1965

Astronaut Leads Aquanaut Team to Bottom of Sea for 45-Day Stay

BY CHARLES HILLINGER
Times Staff Writer

M. Scott Carpenter, the world's first astro-aquanaut, descended 205 feet to the floor of the ocean off La Jolla Saturday afternoon to launch Sealab II—one of this nation's most ambitious efforts in its conquest of the sea.

Sealab is the Navy's 45-day experiment to test how well man can function under pressure six times that at the surface.

As Carpenter dived in a heavy black wet suit with SCUBA tanks strapped to his back from the Sealab surface vessel Berkoni, astronauts L. Gordon Cooper Jr. and Charles Conrad Jr. were waiting in Gemini 5 for what will be the highest pitched voice ever heard in space.

Their space buddy Carpenter, who will sound like Alvin of chipmunk fame because of the exotic atmosphere breathed in the Sealab capsule, was to salute the space twins late Saturday night from the bottom of the sea.

First Such Link

It was to be the first ocean bottom-outer space radio hookup in history.

Carpenter dived from the deck of the Berkoni at 1:45 p.m. Saturday and swam through the murky sea to take up residence in a three-room undersea apartment for a month.

Following Carpenter in rapid order were fellow aquanauts Wilbur H. Eaton, a Navy gunners mate; Cyril A. Tuckfield, Navy engineer, and Barry Canon, a veteran civilian diver from Panama City, Fla.

The quartet spent five minutes swimming through schools of fish to their snow-white home, a 57-foot steel, cigar-shaped capsule anchored on a ledge 205 feet beneath the Berkoni.

They were seen on closed-circuit TV monitors as they entered an open-bottom hatch, stuck their heads into the capsule, climbed inside and grinned at the cameras.

"We four are aboard. All systems seem to be functioning normally," Carpenter radioed Capt. George F. Bond in charge of surface control center aboard the Berkoni.

Minutes later the aquanauts removed their wet suits and began checking out the mass of electronic equipment inside the capsule.

"It's very comfortable in here. The temperature is about 80 degrees," reported Eaton.

During the next three hours the six other members of the Sealab team entered the water and swam to the capsule. They were Navy Dr. Robert E. Sonnenburg, Navy divers Billie L. Coffman, Jay Dee Skidmore and Fred J. Johler and civilian divers Earl A. Murray and Thomas A. Clarke.

Picked as Chef

Tuckfield, 44 and oldest of the aquanauts, was tapped by the team almost immediately to serve as chef the first night down.

Speaking through the helium speech unscrambler that fits over each aquanaut's head like a pair of earphones and makes them reasonably understandable to those on the surface, Tuckfield said:

"Being that this is a Navy operation, I am now going to the stove, as you will observe on your monitor, to whip up a dandy dinner of wieners, beans and potato salad."

The aquanauts are breathing an exotic mixture of gases made up of 85% helium, 11% nitrogen and 4% oxygen.

Because pressure inside Sealab is slightly higher than the outside water pressure, a 4-foot-wide bottom hatch is open at all times in the capsule with no fear of the ocean flooding the undersea apartment.

Through the surface television monitors the aquanauts looked like a group of men on a camping trip securing their gear in a large trailer.

Their deep-sea apartment consists of a bedroom-dining room with Pullman type bunks, a scientific laboratory and a galley with stove, freezer and refrigerator. There are 11 large picture windows providing an enchanting view of the sea around them.

During the next 45 days three teams of 10 aquanauts each will live in Sealab II for periods of 15 days per team. Plans are for Carpenter to remain beneath the sea twice as long as any of the others.

Loaned to Project

NASA loaned Carpenter, a long-time skindiver, to the Sealab project to compare his reactions and physiological data in the hostile environments of inner and outer space.

"Equal dangers exist in whirling around the planet in a small capsule and living at the bottom of the sea," Carpenter told newsmen Saturday before making his descent.

"Both are new frontiers being conquered for the first time by man."

The astro-aquanaut's attractive blond wife, Rene, is taking her husband's stay at the bottom of the sea with some apprehension.

"It's a lot easier going into space," she told newsmen minutes after embracing her husband and saying goodby.

In his Mercury space capsule when Carpenter orbited the earth three times on May 24, 1962, the atmosphere was similar to that on the surface of the earth.

Living beneath the sea, aquanauts will exist in an environment where pressure will be 6½ times that at the surface.

Carpenter's swim fins as he floats free in the ocean's depths will serve as his power of motivation just as Ed White's astro gun did during his historic walk in space.

Aquanauts will free swim from their apartment two hours each day, performing 47 experiments.

They will mine ore on the sea's bottom; harvest fish; salvage and refloat a sunken jet fighter and build an undersea petroleum platform.

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SeaLab Aquanauts To Descend Today

By BRYANT EVANS AUG. 28 1965
The San Diego Union's Science Writer

The first team of SeaLab II aquanauts, headed by Cmdr. M. Scott Carpenter, will start their sojourn in their undersea home today, Capt. Lewis Melson, project director, said last night.

He estimated dive time at 11 a.m.

Nine members of the 10-man team are to stay in the 58-foot-long cylinder 202 feet under the ocean for 15 days. Carpenter will stay 30 and also captain the second team to descend Sept. 5.

Carpenter and SeaLab officials were still hoping yesterday that it will be possible for him to have a conversation with Gordon Cooper in the Gemini 5 spaceship before the Gemini 5 splashes down tomorrow.

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The SeaLab was reoriented slightly from its original position to correct its inclination and list. It still tilts so that aquanatus will have to walk up a 6 per cent grade when they walk from the laboratory to their living quarters.

It also still lists about 3 degrees to port. Any further improvements in the site will depend on the aquanauts after they move in.

The package of electric transformers that will distribute power from shore to the SeaLab and other installations was put in place on the ocean bottom yesterday.

Aboard the staging vessel, the Berkone, Carpenter put his team through the last drill for boarding the personnel transport capsule, the aquanauts' pressurized elevator to bring them back to the surface.

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Good news for the aquanauts was received from the Scripps Institution of Oceanography yesterday. They were told that there is a body of clear, blue water off Point Loma moving north. It should increase visibility around the SeaLab to 100 feet or more.

This is at least twice the visibility reported by two members of the aquanaut squad who went down to the SeaLab yesterday to remove the lowering cable and other lines no longer needed.

They were Rick Grigg, a graduate student at the Scripps institution, and Bob Barth of Panama City, Fla., the only SeaLab II diver who also served on SeaLab I off the Bahamas last year.

8 MINUTES

They went down at 10:07 a.m. and spent eight minutes on the outside of the SeaLab.

Grigg said the lab was resting on a flat patch of sand. On top of the sand he saw some giant kelp lying on the bottom but not growing there. There was also some matted surf grass. He reported seeing small fish which, he said, were probably anchovies.

Barth said that he could see the ends of the SeaLab clearly from amidships. There was no artificial illumination at the time. Barth said he was surprised at how much light filtered down from the surface.

LIKE MOONLIGHT

"It was like a bright moonlight night," he said.

Two jobs remained to be done before the aquanauts can move into the SeaLab.

The personnel transport capsule to bring the divers back will have to be installed on the bottom. Although it is not planned to use it for 15 days, it has to be ready.

A diver will have to go to the SeaLab, blow the entry well and open the hatch for the aquanauts to enter.

Persons who hoped to see closed-circuit television pictures of the aquanauts in the SeaLab over this weekend in Sumner Auditorium will be disappointed. The pictures will not be available until after the placing of the benthic laboratory to relay signals. This should be put on the ocean bottom Monday.

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

AUG 28 1965

Hello Space, Ocean Floor Calling—By Private Line

By S. A. DESICK

Within a few hours after the aquanauts enter SeaLab II today, they will try to talk with the astronauts in Gemini 5 by telephone and radio.

When they do, it will be a toll call.

Aside from the drama of having men beneath the sea talk with men in space for the first time, the experiment will have its scientific value. It will be a further test of a gadget called a helium voice unscrambler, which Navy scientists developed for SeaLab I last year.

BREATHE MIXTURE

In a SeaLab, aquanauts breathe a mixture of 80 per cent helium and 20 per cent oxygen and nitrogen. The reason for this is that if they were to breathe normal air, the high nitrogen content would put them to sleep at the pressure (seven atmospheres) they are under. So helium is used to substitute for much of the nitrogen.

"However, helium has a strange effect on the vocal cords. It causes them to vibrate so that the most masculine of men sounds high-pitched. Over a telephone line his voice comes out garbled.

The unscrambler makes his speech comprehensible by reducing it to normal pitch. When the device was tested on SeaLab I, it worked well. "But," a Navy spokesman said yesterday, "we want to know if it works just as well when the voice is transmitted into space."

STAGING VESSEL

The unscrambler sits on the Berkone, SeaLab II's staging vessel, which connects with the undersea tank through an umbilical cord.

Strung through the cord is a Pacific Telephone Co. circuit. The company calls it a private line. This has nothing to do with preventing busy signals aboard Gemini 5. That is just its name.

From the Berkone, the line connects, via a Navy underwater cable, to phone lines at the foot of Scripps Pier.

If Cmdr. Scott M. Carpenter, astronaut-t-u r n e d-aquanaut, is the one picked to talk from SeaLab II to Gemini 5, his voice will then travel to the phone company's San Diego toll (long distance) office.

From here, his voice will go by land lines to Pt. Arguello, on California's central coast, to hook up with the space agency's worldwide network. The network will then transmit Carpenter's voice to Gemini 5.

When Carpenter asks to talk to Gordon Cooper, his former sidekick, Pete Conrad better not say he's out.



Herald Tribune—UPI telephoto

AN ASTRONAUT AT SEA—While Gemini-5 orbits high above the earth, the Navy sends its Sealab into the ocean depths off La Jolla, Calif., yesterday. Cmdr. Scott Carpenter gives the signal for the descent while standing atop the underwater device.

Scot's Holy Loch Is Radioactive Due to Polaris

LONDON (AP) — The British Ministry of Defense said today that a joint U.S.-British survey has found the waters of the Holy Loch in Scotland are slightly radioactive because of the presence of atomic-powered American Polaris submarines.

The Holy Loch is a Polaris base, and the radioactivity was traced to the coolant discharge from the submarines' reactor plants.

The ministry said radiation levels were far below the danger point.

From AUG 29 1965
CONSTITUTION Atlanta, Ga.

Astronaut Descending —205 Ft. Under Water

By United Press International

LA JOLLA, Calif.

Astronaut Scott Carpenter will be one of four men who will swim 205 feet down to the submerged Sealab 2 today in the first phase of a 45-day test of man's ability to survive in an underwater environment.

Heavy sea swells yesterday delayed the descent of the aquanautic team, although the 200-ton, 57-foot-long steel Sealab cylinder itself was dropped by cable to a ledge in Scripps Canyon about one-half mile offshore.

The swells also were partially responsible for postponing from Thurday night until yesterday connecting power cables to Sealab 2.

Lt. Cmdr. Carpenter, second U. S. astronaut to orbit the earth, and nine others will spend the first 15 days in the tube to make 44 experiments. Their reactions and every aspect of everyday behavior will be under the same scrutiny that orbiting astronauts get.

A porpoise named Tuffy on the 16th day will be used with a second team of aquanauts to see if he can assist them in returning to Sealab 2 and perhaps to take messages.

Lt. Cmdr. Carpenter himself will spend 30 consecutive days 205 feet below the surface. His descent today with frogman gear will take six minutes—about 12 times as long as it takes a porpoise like Tuffy.

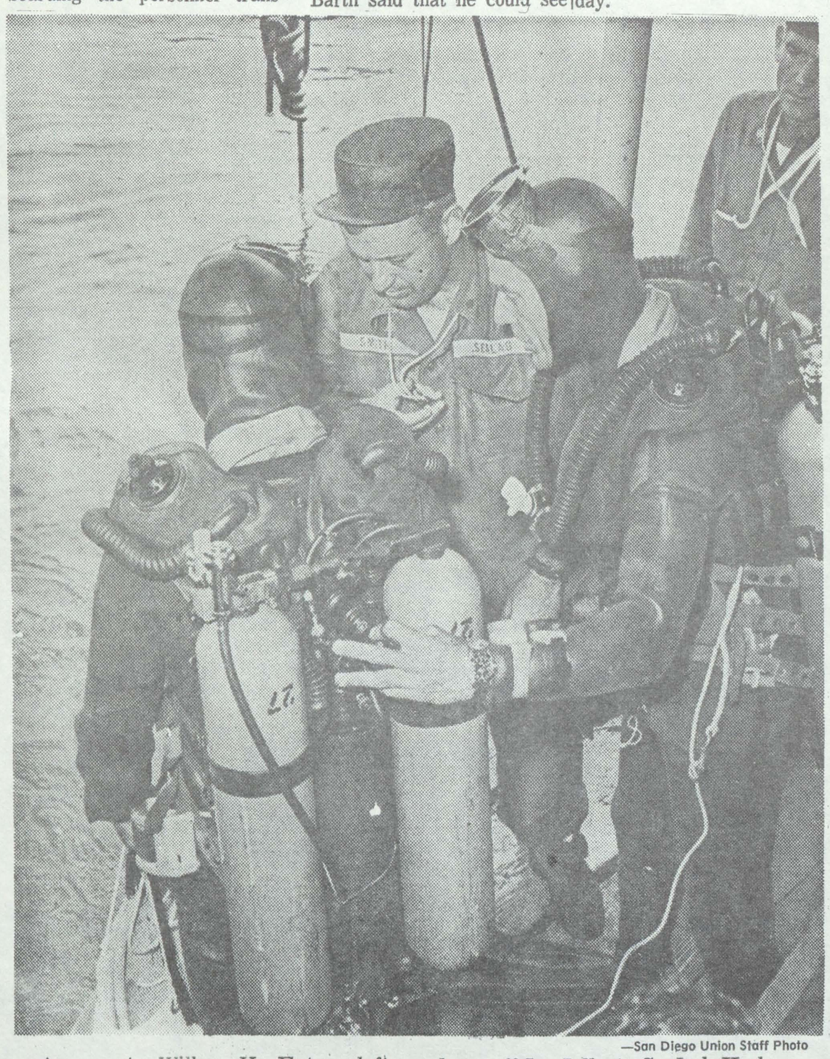
He and his teammates will enter from a hole under the Sealab. Pressure inside the cabin keeps water out. The other six men will descend by a diving bell, three at a time.

A safety capsule will be lowered and kept outside the main chamber.

Robert Moore, Assistant Secretary of the Navy, termed the project a key to American exploration of more than 1 million square miles of submerged area.

Lt. Comdr. Carpenter and others will be outside the cylinder much of the time for their experiments and to find out what their reactions are.

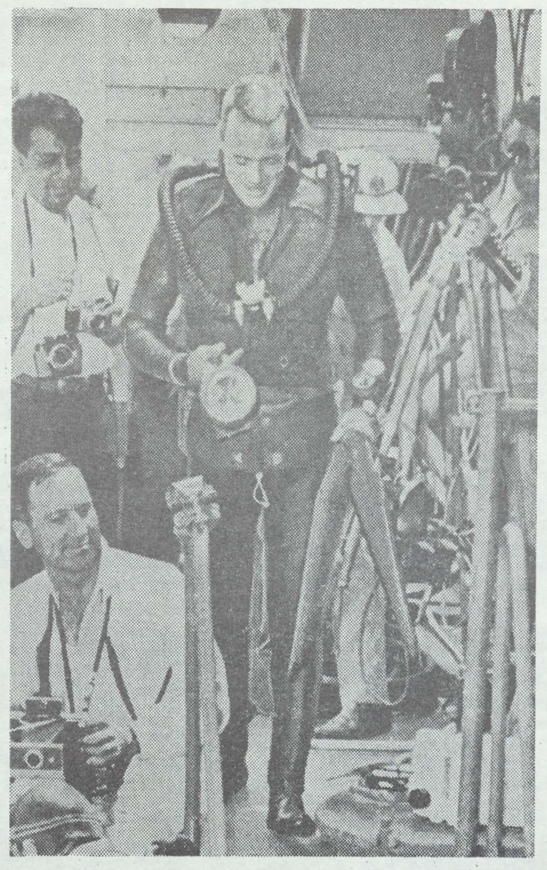
An attempt will be made to set up the first underwater weather station and to salvage a sunken Navy fighter plane, among other things.



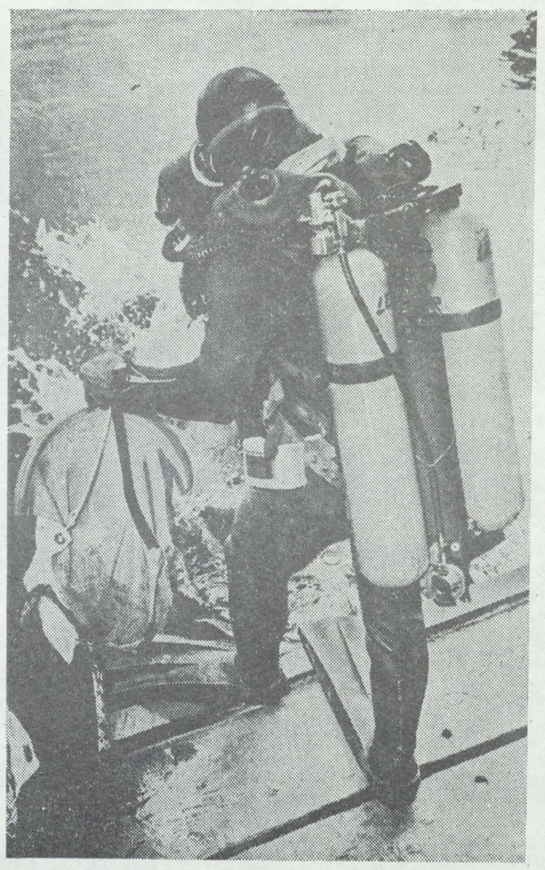
—San Diego Union Staff Photo

Aquanauts Wilbur H. Eaton, left, and Scott Carpenter make last check of equipment before diving 205 feet down off La Jolla to SeaLab II chamber. Carpenter will stay in craft for 30 days. (Other photos, Page B.)

SAN DIEGO UN
AUG 29 1965



READY TO DIVE—Astro-aquanaut M. Scott Carpenter is surrounded by photographers as he prepares to dive to the ocean floor to board Sealab II.
(AP) Wirephoto



JUMP TO DEPTHS—Other members of the aquanaut team follow Carpenter in the dive to Sealab, where they will test man's undersea capabilities.
UPI Telephoto

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CHILDREN RETURN TO SCHOOL

Family To Head For Texas As Carpenter Enters Sea

By JUDITH MORGAN

Rene Carpenter and her husband, Cmdr. Scott Carpenter, both have trips scheduled today—but in different directions.

Cmdr. Carpenter will travel downward through 210 feet of water off Scripps Pier as chief aquanaut in the SeaLab II project.

Mrs. Carpenter, with her four children, Scott, 15; Jay, 13; Kris, 10 and Candy, 9, plus a 3-year-old nephew and a stray cat, will head east by car for home and the opening of school in Timber Cove, Tex.



RENE CARPENTER
. . . delay disappointing

The wife of the astronaut-aquanaut said she was not sure how early the family would leave La Jolla, where they have lived for two months.

"I'm really waiting to hear the latest on what time Scott will go down," she said yesterday. "We are packing the station wagon — and putting the surfboard on top — tonight. I would like to be here when Scott goes down but the children start school Wednesday."

Young Scott and his brother Jay aren't ready to leave the ocean. "We've been surfing and swimming and skateboarding," Jay, an eighth grader, said.

Sea, Space More Exciting?

"I'd like to be in SeaLab," he added, "but I don't know if it's more exciting than being in space."

Mrs. Carpenter doesn't share her son's enthusiasm for the sea.

"I'm not at home in water," she said. "We live on a lake in Texas, though, so I'm learning to water ski. It's quite a challenge because I'm scared of water and don't like the speed and I'm so nearsighted I can't see the signals from the boat."

Mrs. Carpenter is concerned about her husband's 30-day stay on the ocean bottom but her training as a Navy wife and, more particularly an astronaut's wife, is evident in her restraint in commenting on the mission.

"We have watched SeaLab preparations for so long," she said. "When you are waiting like this each day's delay is disappointing, yet they have problems and they have to be so careful."

She said her husband is the type of man who is good at making various factions within a group cooperate. As chief aquanaut he will be working with Navy divers and Scripps oceanographers in the confines of a 57-foot-long tank.

"Scott's a great guy," she said. "He hates to fight or argue. In fact, it makes him ill. He gets along well with people."

To Return In 30 Days

Mrs. Carpenter said she will return to La Jolla when her husband surfaces after his 30-day stay but the children will stay in Texas.

Meanwhile, she has subscribed to San Diego newspapers to keep up to date on SeaLab's daily reports.

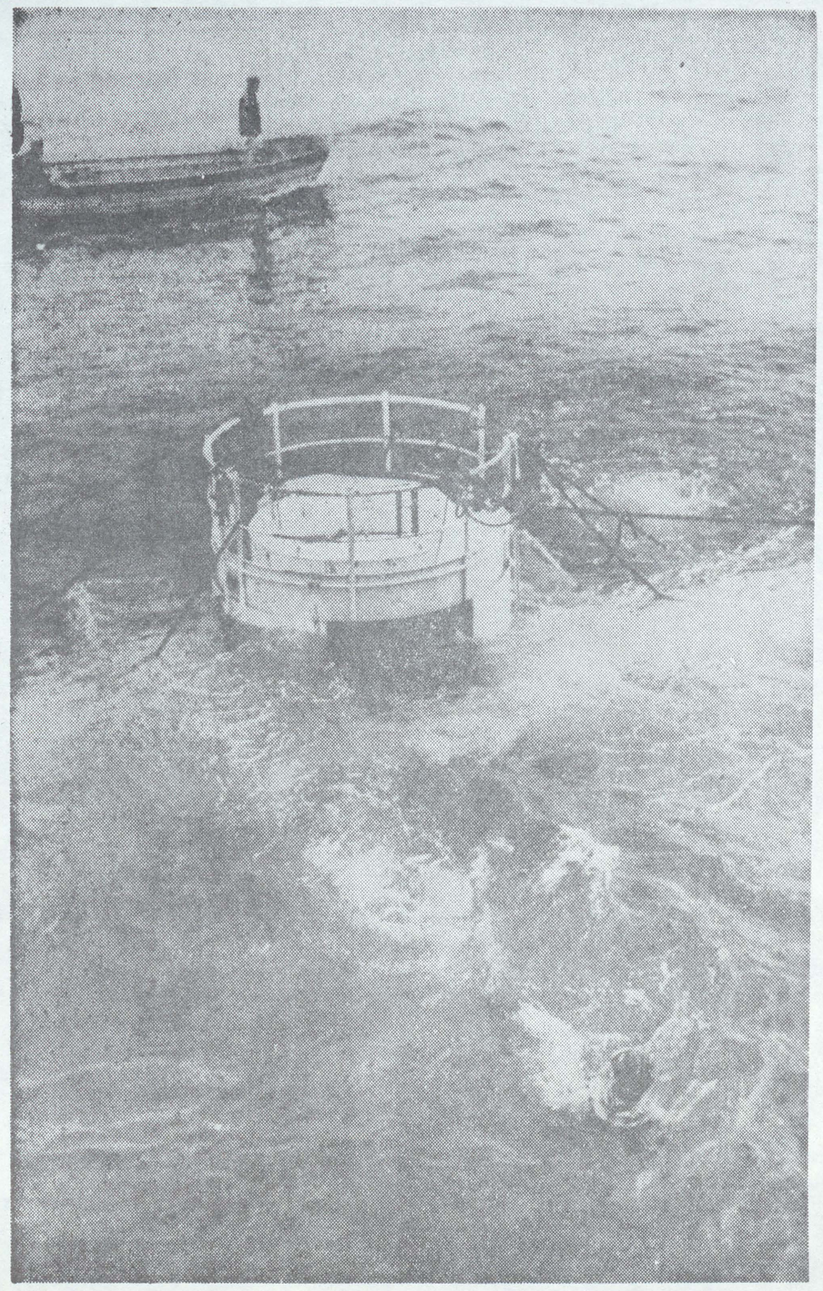
Mrs. Carpenter majored in European history at the University of Colorado but said she always has wanted to write.

"I'd rather have a job on a newspaper than any job going," she said.

Mrs. Carpenter is the only one of the astronaut's wives—or astronauts to her knowledge—to write her own story for Life magazine. The others were ghost written, she said. A syndicated family-type column might be a future project, she said.

She also found she enjoyed making speeches when she hit the campaign trail with Col. John Glenn's wife, Annie, when the nation's first astronaut was running for the U.S. Senate. Glenn later was injured and had to abandon the race.

"I hope John hasn't given up politics," Mrs. Carpenter said. "He's in perfect physical condition."



United Press International

Astronaut Scott Carpenter swims away from Sealab II as it descends to the ocean floor.

Astronaut Leads Nine Aquanauts Into Sealab for 45 Days of Tests

LA JOLLA, Calif., Aug. 28 (AP)—Four aquanauts led by astronaut M. Scott Carpenter dropped over the side of a navy barge today and eight minutes later were inside Sealab 2, where they will conduct a long experiment in underwater living.

Carpenter and Navy Engineman Wilbur H. Eaton of Ft. Lauderdale, Fla., were the first two into the water. They were followed immediately by Chief Engineman Cyril Tuckfield and Barry L. Cannon, both of Panama City, Fla. Six more followed later in the day.

The aquanauts' 12x58-foot steel cylinder rests at the bottom of the ocean at a depth of 205 feet, 1000 yards offshore. The aquanauts' first chore upon reaching Sealab 2 was to turn two valves to release a blast of air that took sea pressure off the hatch—a procedure called "blowing the skirt."

Sea pressure on the hatch is 10 tons, the Navy spokesman said, and blasts of air from tanks inside Sealab 2 will be loosed every time the aquanauts enter or leave.

Sealab 2 is a 45-day experiment to test how well men can function safely under pressure six times that at the surface. Carpenter, a Navy commander, will try to stay down 30 days to set a record. Four men spent 13 days at a depth of 160 feet last year in Sealab 1 off Bermuda.

The other aquanauts will remain below for varying periods.

They include Navy Dr. Robert E. Sonnenburg of San Diego, Calif.; Torpedoman's Mate Billie L. Kaufman, Tucson, Ariz.; Chief Photographer Jay D. Skidmore, Chula Vista, Calif.; Chief Engineman Frederick Johler, Groton, Conn.; Earl A. Murray, Del Mar, Calif., and Thomas A. Clark, La Jolla.

Each diver, wearing skin-diving gear, will spend two hours a day or more working outside the submerged dwelling. The group will collect and study marine specimens, map the ocean floor and perhaps explore a deep marine canyon.

The aquanauts will have with them a trained porpoise, "Tuffy", to pack tools and rescue lines.

Aquanauts Begin Sea-Bottom Vigil

10 On 1st Team Dive To Enter Ocean Capsule

Carpenter Leads Group; Reports Connections OK

By BRYANT EVANS
The San Diego Union's Science Writer

Two aquanauts in black, wet diving suits opened the hatch to SeaLab II at 1:53 p.m. yesterday to start the largest and most elaborate effort ever tried to test the ability of man to work under the sea.

They were followed by eight others of the first SeaLab team, which is to spend 15 days under 205 feet of water, 3,000 feet off the Scripps Institute of Oceanography at La Jolla.

By 6 p.m. all 10 were aboard — testing their utilities and looking very much at home, over the closed circuit television aboard the SeaLab's mother ship, SS Berkone.

The first two to enter the habitat were Cmdr. M. Scott Carpenter, team captain and former astronaut and Wilbur Eaton, first class gunner's mate of Panama City, Fla. They reported that the freshwater line from the surface was working, and that the temperature inside the SeaLab was a comfortable 90 degrees Fahrenheit.

HIGH-PITCHED VOICES

An effect of the helium-rich atmosphere was noticed in the high pitch of their voices.

Helium is used in place of most of the nitrogen in air to prevent the drunken-like, often fatal sleep that attacks divers breathing nitrogen under pressure.

The other two divers of the first four to enter the water were Cyril Tuckfield, chief engineman, and Berry L. Cannon, electrical engineer, both of Panama City, Fla. Their first assignment on reaching the bottom was to check the exterior lines to both the SeaLab and the personnel transport capsule 30 feet away. Then they joined Carpenter and Eaton inside the SeaLab.

DESCENT TIME

It had taken Carpenter and Eaton just eight minutes to appear on the television camera connected to SeaLab after they disappeared from the surface off the fantail of the Berkone. After the first four, the next two to dive were Lt. Robert Sonnenburg, medical officer attached to mine defense laboratory at Panama City, and Billie L. Coffman, torpedoman's mate first class, of Willimanite, Conn.

They were followed by J. D. Skidmore, chief photographer, of Chula Vista, and Earl A. Murray, a diver at the Scripps Institution of Oceanography.

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PUBLIC INFORMATION OI
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San Diego, Californ

Craft Waits In Deep For Living Test

10 Set To Drop Onto Bottom By Diving, With Bell

Astronaut-aquanaut's wife interviewed — Page b-3

Gemini 5 phone call planned — Page a-8

By BRYANT EVANS
The San Diego Union's Science Writer

The first team of SeaLab II aquanauts, headed by Cmdr. M. Scott Carpenter, will start their sojourn in their undersea home today, Capt. Lewis Melson, project director, said last night.

He estimated dive time at 11 a.m.

Nine members of the 10-man team are to stay in the 58-foot-long cylinder 202 feet under the ocean for 15 days. Carpenter will stay 30 and also captain the second team to descend Sept. 5.

Carpenter and SeaLab officials were still hoping yesterday that it will be possible for him to have a conversation with Gordon Cooper in the Gemini 5 spaceship before the Gemini 5 splashes down tomorrow.

Yesterday was spent by engineers and divers in completing all arrangements for the new tenants to move into the habitat 3,000 feet off Scripps Pier in La Jolla.

HISTORIC EVENT

SeaLab Man, Astronaut Have A Talk

By BRYANT EVANS
The San Diego Union's Science Writer

Cmdr. M. Scott Carpenter leaned against the sink in SeaLab II at 11:28 last night and carried on the first conversation between a man at the bottom of the sea and a man in space. He talked with his old colleague, Gordon Cooper in Gemini 5.

The conversation, recorded at SeaLab headquarters at La Jolla, was as follows:

Cooper: Hello, SeaLab. Do you read me?

Carpenter: Roger. We are in SeaLab 200 feet down and wish you luck on your re-entry. How do you read me, Gordo?

'DOING GOOD'

Cooper: Fine. How are you doing, Scott?

Cooper: Guess so. How are things going?

Carpenter: Roger. We got down six or eight hours ago. We have been busy getting settled. Lot of life to study. Looks like our mission will be a success.

After the phrase "Sea life to study," Cooper said, "We're breaking up. We can't hear you."

OTHERS LISTEN IN

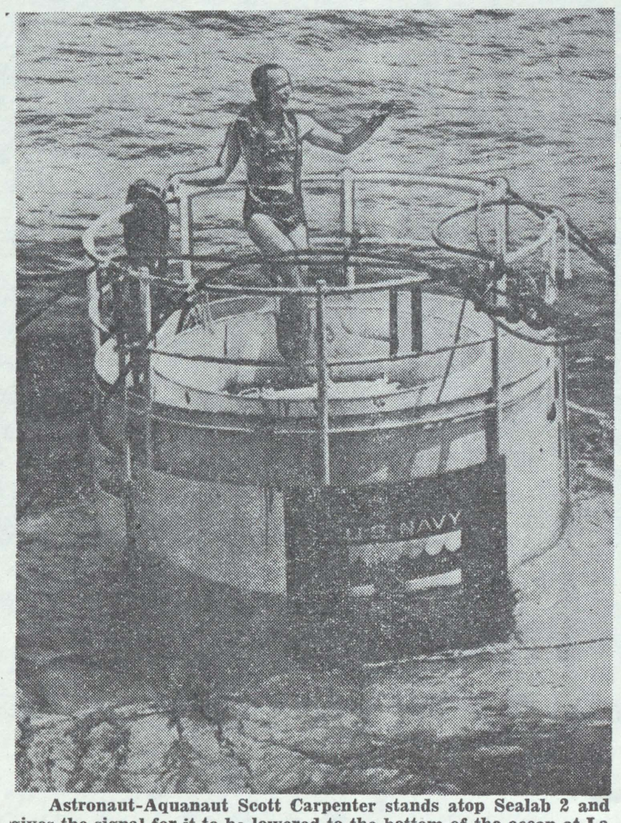
Observers at the SeaLab center in La Jolla listened to and watched the conversation over closed circuit television from the laboratory - kitchen area of the SeaLab. Carpenter appeared dressed in a bathrobe wearing headphones and a connected microphone.

Off and on for an hour before the call came through, Carpenter had practiced speaking through an unscrambling device to lower the pitch of his voice. All voices in a helium atmosphere suffer a sharp rise in pitch.

Cooper's partner in the Gemini 5 flight, Charles Conrad Jr., was awake in the spacecraft at the time of the conversation but Cooper did all the talking in the historic communications link.

Carpenter: Doing good. I guess I will be seeing you in Houston soon.

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Astronaut-Aquanaut Scott Carpenter stands atop Sealab 2 and gives the signal for it to be lowered to the bottom of the ocean at La Jolla, Calif. —*UPI Telephoto.*

Descent to Launch Man in Sea Study

LA JOLLA, Calif., Aug. 27—(AP)—Ten aquanauts will descend 205 feet to Sealab 2 on the ocean bottom Saturday, the Navy said. The descent will launch the nation's biggest test of man in the sea.

Problems awaiting the undersea pioneers in the 45-day project will be analyzed by scientists to determine man's ability to live and work in the oceans.

The wife of astro-aquanaut M. Scott Carpenter is taking her husband's planned 30-day stay in Sealab 2 with some apprehension.

"If people only knew all the problems they face out there," Mrs. Carpenter said, as her husband prepared to lead the first team of 10 divers.

"It's a lot easier going into space," she said, "but this is what Scott wants to do."

Navy Cmdr. Carpenter, 39, was in the Mercury capsule that made three orbits in 1962. He is on loan from the National Aeronautics and Space Administration for the Navy's man-in-the sea program.

Aside from Carpenter, the members of three 10-man teams of aquanauts each will spend 15 days at the bottom.

The aquanauts will go down early in the afternoon, barring difficulties that have repeatedly delayed the start originally scheduled for 13 days ago.

Divers have been busy with air hoses to move sand and get Sealab 2 on an even keel at the bottom. The time used to correct a 10-degree floor slant ruled out the divers' descent Friday.

Divers also were connecting the power package to the 12x58-foot steel cylinder and positioning the personnel transport capsule, which is an underwater elevator that is pressurized and can whisk troubled aquanauts to the surface.

New York 38, N. Y.

From AUG 25 1965
ROCKY MOUNTAIN NEWS
Denver, Colo.

First Day Is 'Light' For SeaLab Team

By BRYANT EVANS
The San Diego Union's Science Writer

Clearing water and large numbers of fish were reported by SeaLab II aquanauts yesterday, their first day of residence under 205 feet of water off Scripps Pier.

Capt. George Bond, topside commander of the operation, said that the aquanauts purposely were given a light program on this first day. They spent it getting accustomed to their new habitat, checking out life support systems and checking gear both inside and outside the 58-foot long cylinder.

The 10 aquanauts were all up and about at 6 a.m. Bond said that all of them had stayed up for the conversation between the group captain, Cmdr. M. Scott Carpenter, and L. Gordon Cooper Jr. in Gemini 5 at 11:28 Saturday night. But, except for two who had the watch, all were in bed by midnight.

Some of them during the day began cautious explorations outside the 12-by-58 foot steel cylinder which will be their home for the next 15 days.

They left the chamber through a shark - proof cage from which they will harvest fish and other marine life for study. They reported clearer water, and better visibility, than expected.

Although the project will last 45 days, each of the aquanauts, except Carpenter, will stay below for only 15 days. Carpenter will make the chamber his "home" for 30 days.

During the day a trolley supply system was rigged between SeaLab and the mother ship, the Berkone. An airtight canister is raised and lowered along a taut guideline that connects the cage around the entry of the SeaLab with the fantail of the Berkone.

One of the first shipments to be sent down contained equipment to record the brain waves of four of the aquanauts — Wilbur H. Eaton, Berry L. Cannon, Billie Coffman and Earl A. Murray. All four had had electrode leads attached to their scalp before leaving the surface.

The electro-encephalograph tracing to be recorded will be studied by Dr. C. W. Sem-Jacobsen, Oslo, Norway, who is here to make the study.

Sunday was observed with the reciting of the SeaLab prayer by Bond over the communication link to the SeaLab. Bond wrote the prayer for SeaLab I last year. It is as follows: "Almighty God, who declared through Holy Scripture that mankind would one day acquire dominion over the seas, and the creatures therein, grant that this day fulfillment of Thy word is at hand. To the brave and dedicated men who have committed themselves to this project, grant Thine unending watch and safeguarding care in all of the many hours of their life under the sea. Give unusual wisdom to each of us topside who might somehow control their work and safety as they perform their duties below. And when their work and Thy will together be done, grant us all a safe, worthy respite from our labors for a time to come. We ask all of this in the name of Jesus Christ our Lord."

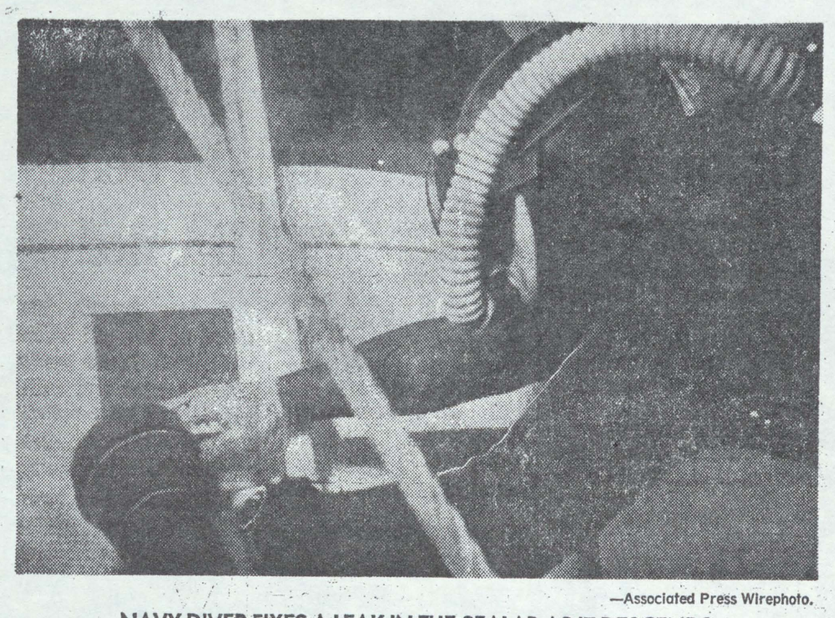
On the lighter side the day was marked by the project's first undersea haircut. Eaton performed on the locks of Cyril Tuckfield. Persons who watched the result over closed circuit television said it is just as well that Tuckfield has two weeks to grow new hair before coming up.

Bond reported that the temperature was 75 degrees and comfortable.

The entire SeaLab project passed under the local command of Capt. Ray Sencer of the Office of Naval Research. He will act in place of Capt. Lewis Melson, who returned to Washington yesterday. Melson remains project director.

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AUG 2[illegible] 196[illegible]



—Associated Press Wirephoto.

NAVY DIVER FIXES A LEAK IN THE SEALAB AS IT DESCENDS
The steel cylinder will be home for three teams af aquanauts for 45-days

Ten Aquanauts Ready

LA JOLLA — (AP) — Ten aquanauts awaited word yesterday on when they will begin their underwater living experiment in Sealab 2.

The 12x58-foot steel capsule was lowered to the ocean floor at a depth of 205 feet and Navy officials said they hoped the divers would be able to enter the chamber not later than today.

Minor problems developed during the descent of the Sealab and three tasks had to be completed before the tank would be ready for occupancy.

HISTORIC EVENT

SeaLab Man, Astronaut Have A Talk

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Carpenter: Doing good. I guess I will be seeing you in Houston soon.

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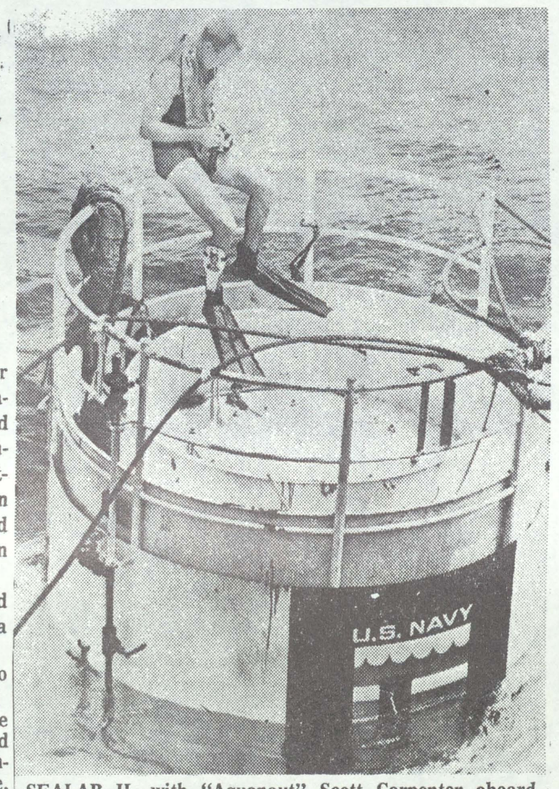
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OTHERS LISTEN IN

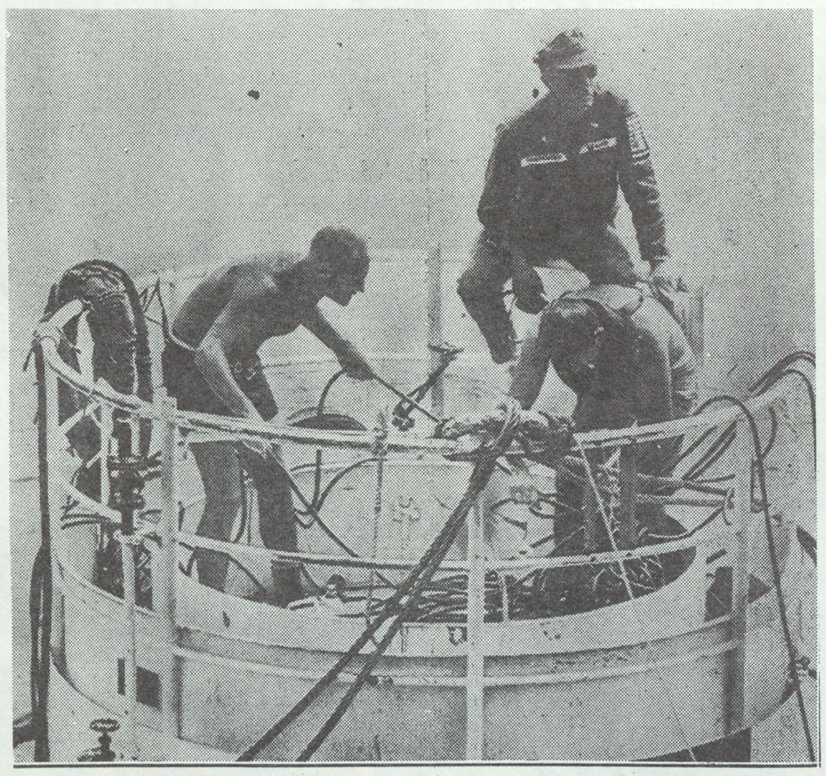
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Cooper's partner in the Gemini 5 flight, Charles Conrad Jr., was awake in the spacecraft at the time of the conversation but Cooper did all the talking in the historic communications link.



SEALAB II, with "Aquanaut" Scott Carpenter aboard went under water off La Jolla, Calif., Friday. Capsule was placed on bottom at depth of 205 feet in preparation for 45-day experiment of living under sea. (AP Photo)



(Associated Press Wirefoto)

Deeply Involved. Astronaut Scott Carpenter sits on Sealab 2 as preparations are made to sink it off La Jolla, Calif. He is to live 205 feet under water for 30 days.

BALTIMORE SUN 31 AUGUST 1965 P-1

CREW OF SEALAB EXPLORING DEEP

La Jolla, Cal., Aug. 30 (AP)—Exploration parties moved in and out of Sealab 2 today as ten aquanauts settled down to work in their dark and dangerous world 205 feet below the surface of the Pacific.

"Reconnaissance sorties" was the phrase a Navy spokesman used for the trips the rubber-suited divers made from the 12-by-58-foot steel cylinder which will be an underwater barracks for three 10-man teams in rotation for 45 days.

Sealab 2 was lowered to the bottom 1,000 yards off this Southern California resort last Thursday and the first team took up residence late Saturday.

Various Chores Planned

They took it easy yesterday but were up for reveille at 7 A.M. today. After breakfast—Western omelettes—they donned diving gear and went outside to hook up the bright lights needed to illuminate the depths.

Other chores planned today:

1. Connection of cables from Sealab 2 to a 7-ton, beehive-shaped Benthic (deep) laboratory, a multi-channeled television and telephone station which will provide the primary communications between the underwater base and a twin-hulled crane barge serving as the mother ship on the surface. This will take over the function of a network of direct cables used until the pod could be lowered.

Lettuce, Bread Requested

2. Mapping of the ocean floor near Sealab 2 and study of fish and other marine life.

3. This is a Navy project, so some of the divers drew "clean-up duty," the duration depending on how much debris there is on the sea floor which might interfere with work.

The team leader, astronaut M. Scott Carpenter, a Navy commander and expert diver, reported the men were in good condition but made one request: more fresh lettuce and bread. He was assured it would be dispatched in a waterproof box that makes several trips daily via a small cable trolley.

Navy officials said entering and leaving Sealab 2 is "as easy as falling off a log."

The vessel, about the size and shape of an oil tank car, has three access hatches. One is at the top of a conning tower-like structure extending upward from the middle of the tank, which rests horizontally in a cradle on the bottom. The others are on the floor, one at each end.

The hatch used ordinarily is a lidded four-foot hole in the floor of a room equipped with hot showers where divers can wash off salt water and warm up after trips out into the 50-degree ocean.

Because atmospheric pressure inside Sealab 2 is slightly greater than ocean pressure at that depth—more than six times that at the surface—the hatches can be opened at any time. The air pressure—about 100 pounds per square inch—keeps the water out.

Below the main hatch is a wire mesh cage with a door. This protects the divers against possible attack by sharks when they would be most vulnerable—entering and leaving.

So far the divers have reported seeing only one shark, a small one with which they played tag for a while before chasing it away.

Divers keep their rubber suits and air tanks in the shower room. They wear a minimum of clothing, usually just trunks, when they enter the laboratory, which is next to the shower room.

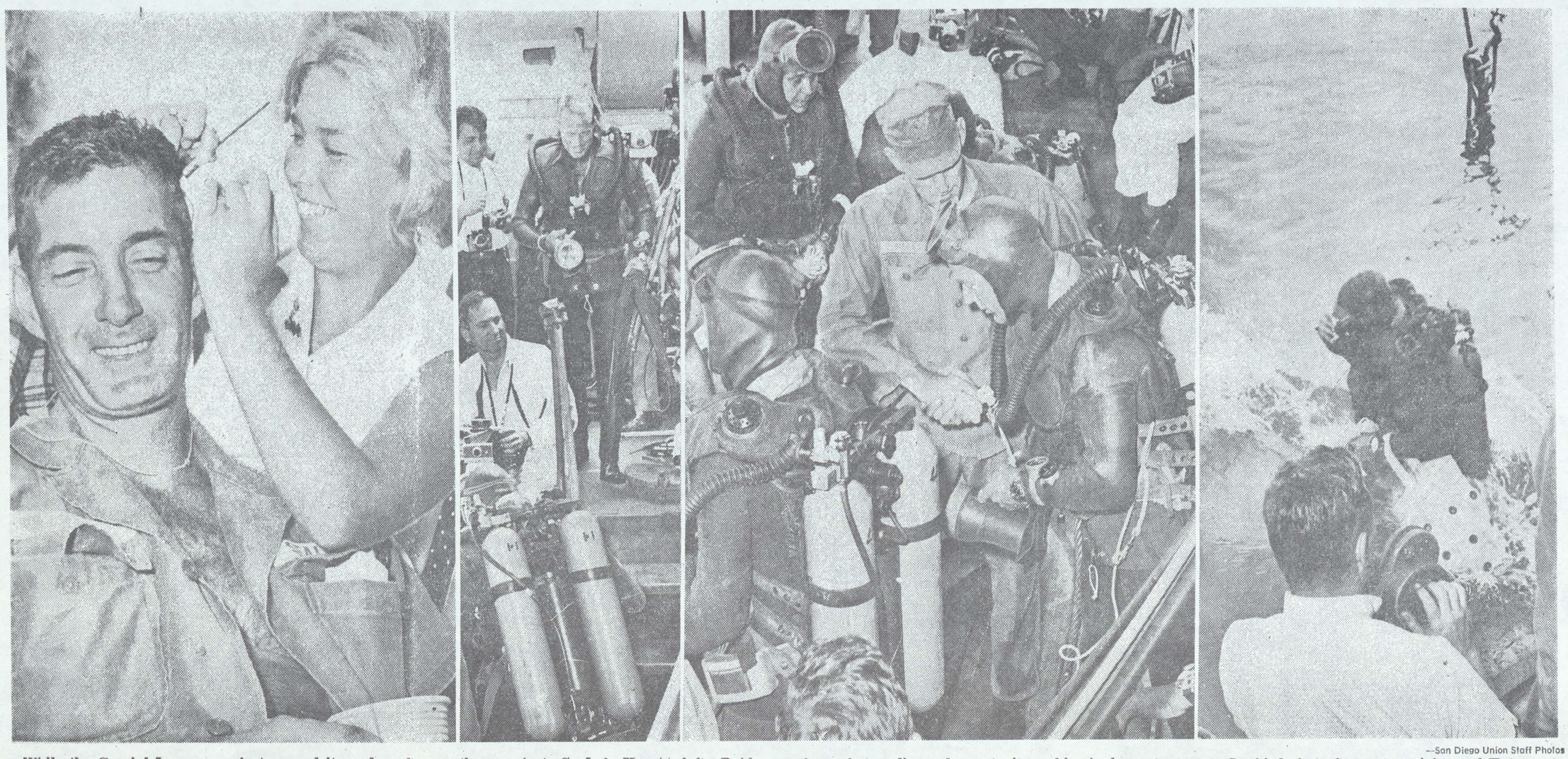
SUBMERGED — M. Scott Carpenter and three other men entered Sealab II for the start of a 45-day underwater experiment. Carpenter, the second U.S. astronaut to orbit the earth, will stay in the craft, moored 205 feet below the surface of the Pacific Ocean off La Jolla, Calif., for 30 days in a test of man's ability to survive for long periods under extreme pressure. They will also set up the world's first underwater weather station.

Carpenter

Minneapolis (Minn) Sunday Tribune
SUNDAY, AUGUST 29, 1965

57

It's Splashdown Time—But For Aquanauts



—San Diego Union Staff Photos

While the Gemini 5 space project neared its end yesterday, a group of San Diego aquanauts began their preparation and descent into "inner space" for another project—SeaLab II. At left, Reidun Bahkehoei places electrodes, which will transmit medical data to surface, on Wilbur Eaton. In last three photos, divers don wetsuits and begin descent. In second photo, man facing camera, Astronaut-aquanaut Scott Carpenter, prepares to leap into sea. In third photo Carpenter, right, and Eaton get farewell handshakes. At right, Carpenter takes plunge. (Story, Page a-1.)

Divers Get in Swim Of Sealab Routine

Aquanauts Find Time to Rest, Explore Ocean, Even Cut Hair

By LEO BOWLER
EVENING TRIBUNE Science Writer

The 10 aquanauts in Sealab II completed checks of their undersea home today and began installing more equipment on the ocean floor around them.

The 10, led by Navy Cdr. Scott Carpenter, 40, entered their new quarters Saturday afternoon and spent a relatively uneventful day 205 feet beneath the sea yesterday.

They had time for Sunday prayers, an undersea haircut, regular meals, sorties into the sea around them, and a little rest from the long hours of work spent over the past few weeks getting ready for their stay under water.

If all goes well, the 10 will stay down until Sept. 12. All but Carpenter will then come to the surface and other divers will take their place. Carpenter will stay down 30 days.

Sealab, located 3,000 feet off Scripps Pier in La Jolla, will be occupied continuously until Oct. 12.

Hear Cooper Talk

The aquanauts stayed up Saturday night to listen to Carpenter's historic conversation with Gordon Cooper, a fellow astronaut, orbiting the earth in the Gemini 5 space capsule.

The conversation was at 11:26 p.m. and was brief. Carpenter told Cooper that it "looks like our mission will be a success."

The aquanauts, with the exception of two on watch, were asleep by midnight Saturday, and got up Sunday at 6 a.m.

They were led in a brief prayer by Capt. George Bond, principal investigator for the project. Bond sat in his control center aboard the mother ship Berkone for the service. He can watch the aquanauts by closed-circuit television from the center, and communicate with them in writing as well as by telephone.

Yesterday, Chief Engineman Cyril J. Tuckfield, 43, had his hair cut by fellow aquanaut Gunner's Mate Wilbur H. Eaton, 39. Tuckfield had planned to have his hair cut as soon as possible after entering Sealab.

"It's cheaper down there," he told reporters before leaving the Berkone.

Bond reported today that Tuckfield got his money's worth.

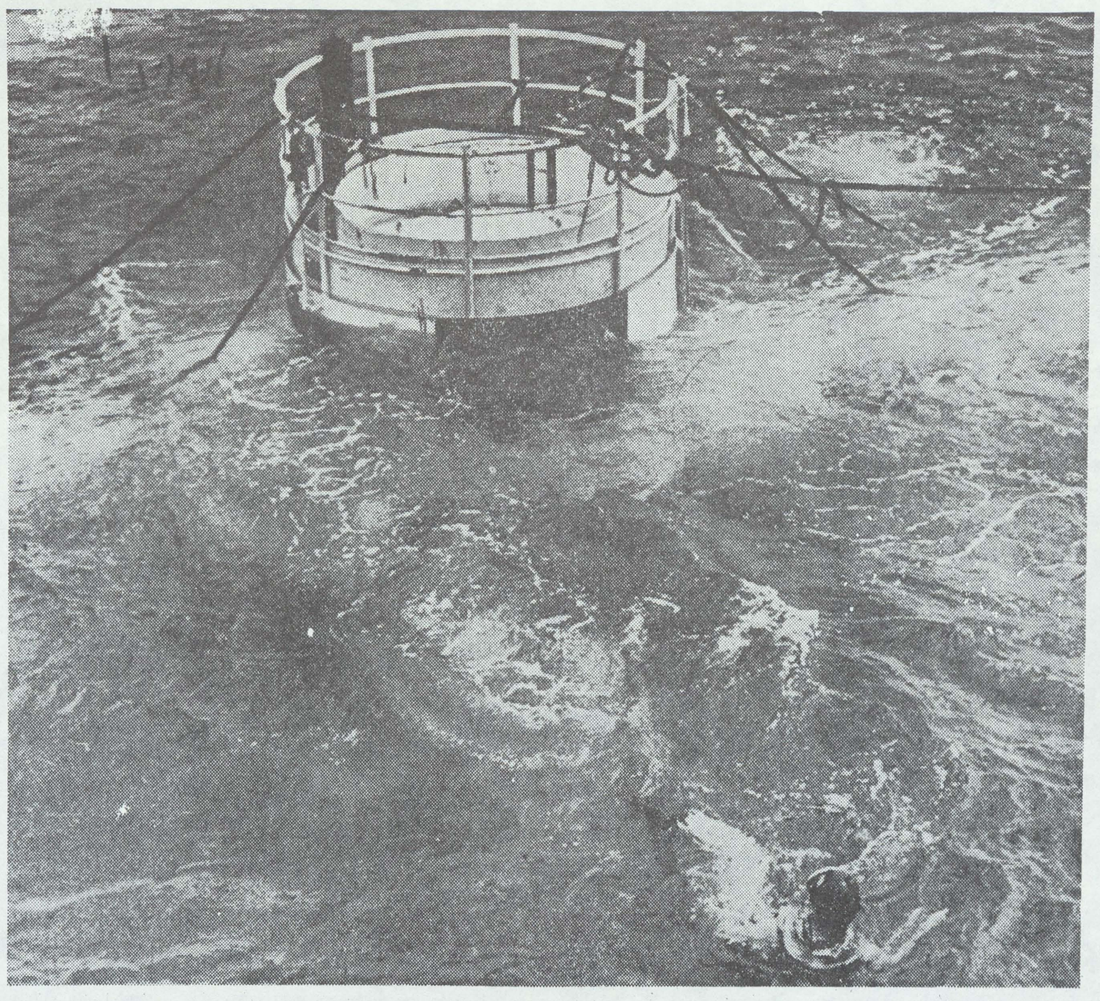
"Tuck really got skinned," Bond said. "But there will be plenty of time for it to grow back. He won't be going anywhere for two weeks, anyway."

Bond said he left the aquanauts alone as much as possible yesterday so they could rest for the week's work coming up.

However, the men completed checks on the personnel transfer capsule in which they will ride to the surface two weeks from now, and completed installation of a dumb waiter in which they can receive needed items from the surface.

One of the first items sent down was a machine to take brain wave patterns. Four of the aquanauts, Eaton, Berry L. Cannon, 30, an electronics engineer, Torpedoman's Mate Billie L. Coffman, 36, and Earl Murray, 37, a lab assistant from Scripps Institution of Oceanography, had electrodes taped to their heads before leaving the Berkone.

The machine was hooked to the electrodes last night for the test. It was to be returned to the Berkone by way of the dumb waiter after completion of the tests.



GOING DOWN—Aquanaut (and former astronaut Scott Carpenter swims away from Sealab 2 as it begins its descent into the ocean at La Jolla. Ten men will live and work in the underwater laboratory.
UPI Telephoto

AQUANAUTS START MONTH IN SEALAB 2

Scott Carpenter Leads Unit 200 Feet Under Water

LA JOLLA, Calif., Aug. 28 (UPI)—Lieut Comdr. M. Scott Carpenter and three other men descended 200 feet down today and entered Sealab 2, a 57-foot steel cylinder that will be the ocean "home" for the astronaut for a month.

Six more "aquanauts" are to enter the Sealab in pairs later.

A conversation between the aquanaut and the orbiting Gemini 5 astronauts was postponed this afternoon until a time when the most favorable conditions will prevail.

The project and its experiments will officially begin tomorrow and end Oct. 12. Commander Carpenter, the second United States astronaut to orbit the earth, will remain in the cigar-shaped steel cylinder two longest. The Sealab project will last 45 days.

The experiment was designed to test man's ability to live and work underwater for extended periods.

The depth of Sealab, 205 feet and about 3,000 feet offshore, requires breathing mixtures of 85 per cent helium, 11 per cent nitrogen and 4 per cent oxygen to survive the pressure.

A trained dolphin will go to work on the 16th day of the project, handling hoses and other equipment and guiding aquanauts back to the capsule.

Included in the tests will be an attempt to set up the first underwater weather station and to salvage a sunken Navy fighter plane. A team of psychiatrists, using closed-circuit television, will study the aquanauts' strength and efficiency.

Sealab 1 was submerged 196 feet in the Atlantic near Bermuda last year. Four Navy divers stayed in it for 11 days. Previous underwater explorers have gone as deep as 35,000 feet and remained submerged for as long as a month.

NEW YORK TIMES
New York, N. Y.
AUG 29 '65

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Astronaut Leads Descent to Sealab

LA JOLLA—(AP)—Astronaut M. Scott Carpenter and three other divers plunged into the Pacific yesterday to start a 45 day underwater experiment which Carpenter said could be "more damaging than space flight."

Before beginning the 205 foot dive to Sealab 2 on the ocean floor 1,000 yards off this Southern California resort, Carpenter told newsmen "the excessive pressure at which we will live is a little more rigorous than space flight."

TRY FOR RECORD

Asked what he meant by rigorous, Carpenter said:

"More damaging."

Carpenter will try to stay 30 days in the 12-by-58 foot steel cylinder as part of a Navy experiment to see how long men can function at extreme depths.

Six more men were to join the first four.

A Navy spokesman said 30 days would be a record at such depth. Four men spent 11 days at a depth of 192 feet last year in Sealab 1 off Bermuda. Seven Frenchmen spent 30 days living under water in the summer of 1963 at a depth of 30 feet.

ROTATION

The nine others of his team will be relieved at the end of 15 days. In all, three teams will man the underwater base in rotation over the next 45 days.

Carpenter entered the water at 1:43 p.m. with the navy divers.

Nine minutes later they started popping up through a hatch in the bottom of Sealab 2.

WATER LEAK

Among the divers following at intervals were: Lt. Robert E. Sonnenburg, a Navy doctor of San Dieg; Thomas A. Clarke of the Scripps Institution of Oceanography, La Jolla, and Navy photographer Jay Dee Skidmore of Chula Vista, Calif.

Carpenter reported some water had leaked into Sealab 2 around a port but he said, "This is a condtion we can live with for a while."

The excessive pressure which Carpenter called damaging forces atmospheric gases deep into human tissues. This can cause the crippling disease known as "the bends."

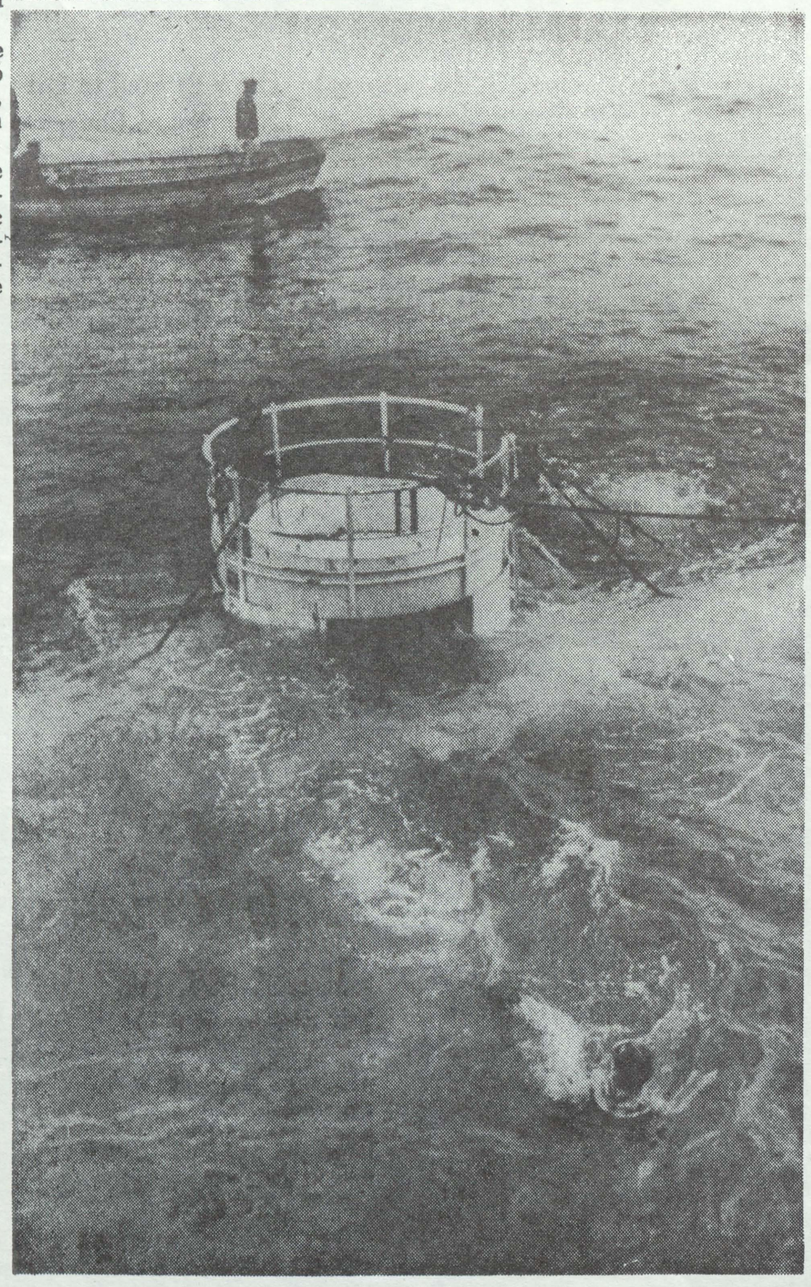
San Francisco, Calif.
Examiner
(Cir. D. 292,539 - S. 435,887)

AUG 29 1965



—Associated Press Wirephoto.

AQUANAUT SCOTT CARPENTER PREPARES TO DIVE
He'll live in Sealab 205 feet underwater



United Press International

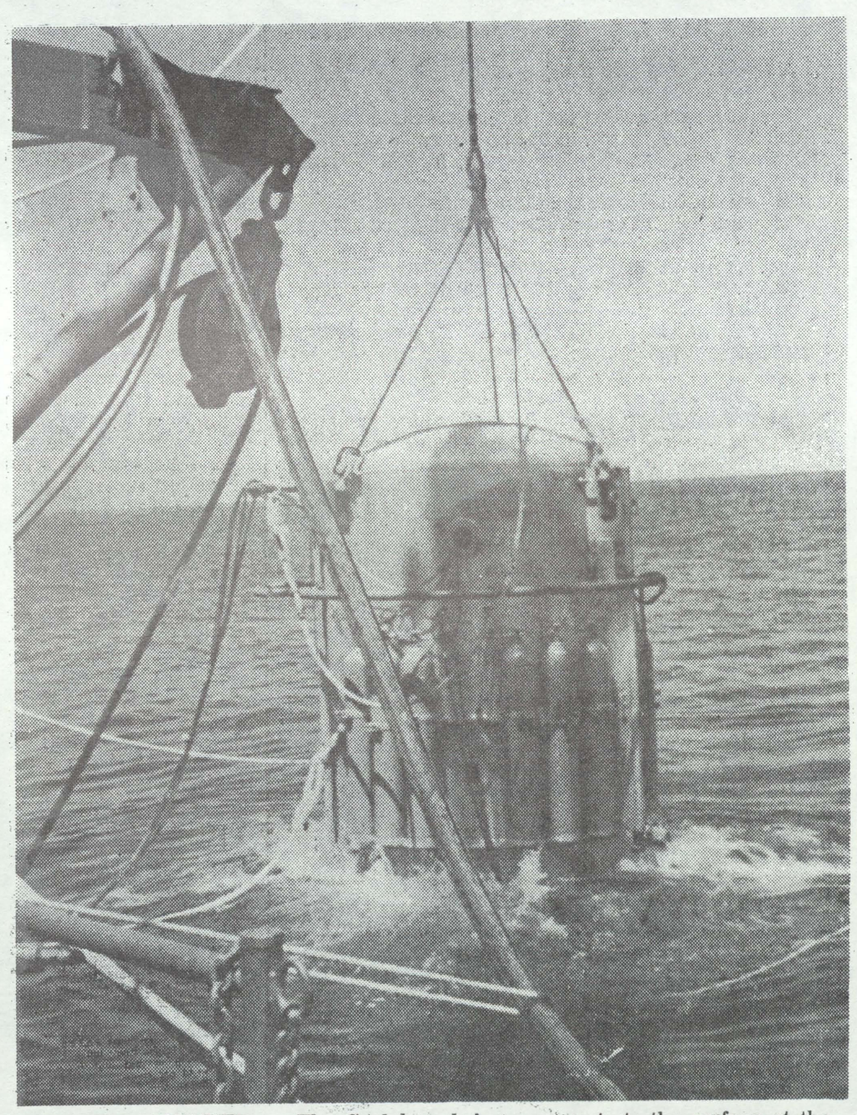
Astronaut Scott Carpenter swims away from Sealab II as it descends to the ocean floor

Recovery Team Rehearses



—Associated Press Wirephotos

Members of Gemini 5 recovery team hold drills in preparation for pickup of astronauts. At left, Lt. (j.g.) John Hunt, left, team leader, instructs crew aboard carrier Lake Champlain. At right, Dr. William Carpenter makes practice jump from helicopter in rehearsal for the Gemini splashdown. Model of Gemini capsule is in distance. (Story on Page a-1.)



SAFETY CHAMBER — The Sealab transfer capsule is lowered today to its assigned place near the underwater laboratory. It will be used to bring aquanauts to the surface at the end of their underwater stay or to evacuate divers in emergencies. Transfer capsule has own pressure.

Line Open for Talk

29 Aug

By LEO BOWLER
EVENING TRIBUNE Science Writer

Sealab and federal space agency officials were joining forces today to make possible the long delayed conversation between Scott Carpenter and Gordon Cooper.

They were putting the final splices in an electronic link between Sealab which is 202 feet beneath the ocean off La Jolla and the Gemini 5 capsule which is whizzing through space.

Cooper and his space mate, Charles Conrad, are to land tomorrow.

Sealab officials were hopeful that the conversation would take place at 3:10 a.m. tomorrow.

They were holding open a special circuit between Sealab and the mothership Berkone moored above it. The circuit was spliced with a land line directly to the Gemini tracking station at Point Arguello.

From Point Arguello, the conversation will be relayed over the regular radio communications link with Gemini 5.

The purpose of the conversation, Sealab officials said, was to dramatize Sealab, prove that such a conversation could be held, and allow two old friends to keep track of each other's adventures.

Carpenter, a Navy commander and chief aquanaut for the Sealab project, made three orbits around the earth in a Mercury space capsule in 1962. He has been on loan to Sealab from the space program.

Three teams of 10 men each will man Sealab for 15-day periods. Carpenter, a member of each of the first two teams, will stay down for 30 days. The only other aquanaut to remain in Sealab this long will be Lt. Robert E. Sonnenburg, a Navy doctor, who will be a member of the first and third teams.

The other first team members are: Berry L. Cannon, 30, of Panama City, Fla.; Thomas A. Clarke, 24, of La Jolla; Torpedoman's Mate Billie L. Coffman, 36, of Tucson; Gunner's Mate Wilbur H. Eaton, 39, of Ft. Lauderdale, Fla.; Chief Engineman Frederick J. Johler, 39, of Groton, Conn.; Earl A. Murray, 37, of Del Mar; Chief Photographer, Jay D. Skidmore, of Chula Vista; and Chief Engineman Cyril J. Tuckfield, of Panama City.

Today, Eaton, Cannon and Tuckfield were to swim with Carpenter from the mothership Berkone to the Sealab, to check it and the transfer capsule, then call for the other aquanauts.

The remaining six were to ride down in a standard diving bell.

Capt. Lewis B. Melson said two divers, Chief Quartermaster Robert A. Barth of Panama City and Richard Grigg of La Jolla, visited the capsule yesterday.

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Aquanauts Begin Sea-Bottom Vigil



—San Diego Union Staff Photo

Aquanauts Wilbur H. Eaton, left, and Scott Carpenter make last check of equipment before diving 205 feet down off La Jolla to SeaLab II chamber. Carpenter will stay in craft for 30 days. (Other photos, Page B.)

10 On 1st Team Dive To Enter Ocean Capsule

Carpenter Leads Group; Reports Connections OK

By BRYANT EVANS
The San Diego Union's Science Writer

Two aquanauts in black, wet diving suits opened the hatch to SeaLab II at 1:53 p.m. yesterday to start the largest and most elaborate effort ever tried to test the ability of man to work under the sea.

They were followed by eight others of the first SeaLab team, which is to spend 15 days under 205 feet of water, 3,000 feet off the Scripps Institute of Oceanography at La Jolla.

By 6 p.m. all 10 were aboard — testing their utilities and looking very much at home, over the closed circuit television aboard the SeaLab's mother ship, SS Berkone.

The first two to enter the habitat were Cmdr. M. Scott Carpenter, team captain and former astronaut and Wilbur Eaton, first class gunner's mate of Panama City, Fla. They reported that the freshwater line from the surface was working, and that the temperature inside the SeaLab was a comfortable 90 degrees Fahrenheit.

HIGH-PITCHED VOICES

An effect of the helium-rich atmosphere was noticed in the high pitch of their voices. Although the voices had gone through a device called an unscrambler, they still sounded like Mickey Mouse to topside listeners.

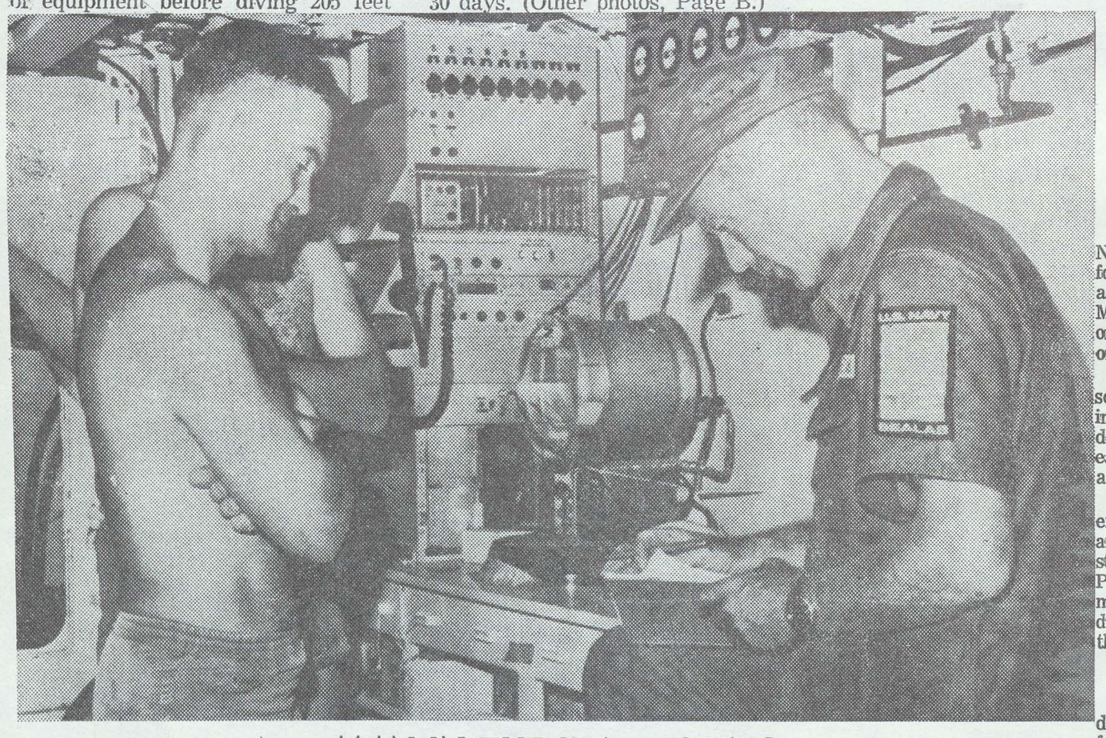
Helium is used in place of most of the nitrogen in air to prevent the drunken-like, often fatal sleep that attacks divers breathing nitrogen under pressure.

The other two divers of the first four to enter the water were Cyril Tuckfield, chief engineman, and Berry L. Cannon, electrical engineer, both of Panama City, Fla. Their first assignment on reaching the bottom was to check the exterior lines to both the SeaLab and the personnel transport capsule 30 feet away. Then they joined Carpenter and Eaton inside the SeaLab.

DESCENT TIME

It had taken Carpenter and Eaton just eight minutes to appear on the television camera connected to SeaLab after they disappeared from the surface off the fantail of the Berkone. After the first four, the next two to dive were Lt. Robert Sonnenburg, medical officer attached to mine defense laboratory at Panama City, and Billie L. Coffman, torpedoman's mate first class, of Willimanite, Conn.

They were followed by J. D. Skidmore, chief photographer, of Chula Vista, and Earl A. Murray, a diver at the Scripps Institution of Oceanography. The last two to dive were Thomas Clarke, a graduate student at Scripps, and Frederick Johler, chief engineman from Groton, Conn.



MAN-IN-THE-SEA TESTING

Astro-aquanaut M. Scott Carpenter (right), checks the diving schedule with diver W. H. Eaton prior to descending today for the beginning of the Navy's 45-day Main-In-The-Sea Project. (Story on Page 1.)—AP Wirephoto.

WASH. STAR 8/28/65

Aquanauts Set to Live On Sea Floor 15 Days

First Team of 10 Goes Down Today; Carpenter Aiming for Record 30 Days

Picture on Page A-3

LA JOLLA, Calif. (AP)—The Navy says all systems are "go" for the descent today of 10 aquanauts, including Astronaut M. Scott Carpenter, to Sealab 2 on the ocean bottom 1,000 yards off shore.

Three teams of 10 divers are scheduled to spend 15 days each in the 12-by-58-foot steel cylinder over the next 45 days, eating, sleeping and working at a depth of 205 feet.

Carpenter, a Navy commander, and nine other Navy divers and scientists, are expected to start descending about 11 a.m., Pacific daylight time. Some may go down in a three-man diving bell, others may make the trip in skindiver gear.

Safety Checks Made

Sealab 2, an experiment to determine how long men can function safely under pressure six times that at the surface, was lowered to the bottom Thursday after a 12-day delay due to technical problems.

A long series of safety checks followed, and finally Sealab 2 was reported ready for the divers to enter. Power and communications lines were connected. A closed-circuit television system between the underwater base and the surface ship showed the hands of two clocks moving.

Carpenter, a veteran diver as well as astronaut, will try to stay down 30 days and set a record. Last year four men spent 13 days at a depth of 160 feet in the smaller Sealab 1, off Bermuda.

May Explore Canyon

All the divers will work outside the underwater base at least two hours a day, studying marine specimens and mapping the ocean floor off this Southern California resort. Sealab 2 is on the edge of a deep marine canyon, which the divers probably will explore.

The second team down was provided with a pet — a 270-pound porpoise named Tuffy, trained to carry tools and rescue lines.

Sharks seldom appear in these waters during August, but if one does Tuffy will be released from his pen to see if he lives up to his name — and to the numerous shark-bite scars on his rubbery skin.

Stay of 45 Days Is Set In Sealab 2

LA JOLLA, Calif. (AP) — Astronaut Scott Carpenter and three other divers plunged into the Pacific Saturday to start a 45-day underwater experiment Carpenter said could be "more damaging than space flight."

Before beginning the 205-foot dive to Sealab 2 on the ocean floor 1,000 yards off this southern California resort, Carpenter told newsmen "the excessive pressure at which we will live is a little more rigorous than space flight."

Asked what he meant by rigorous, Carpenter said: "more damaging."

Carpenter will try to stay 30 days in the 12-by-58 foot steel cylinder as part of a navy experiment to see how long men can function at extreme depths.

A Record

A navy spokesman said 30 days would be a record at such depth. Four men spent 11 days at a depth of 192 feet last year in Sealab 1 off Bermuda. Seven Frenchmen who spent 30 days living under water in the summer of 1963 were at a depth of 30 feet, the spokesman said.

The nine others of his team will be relieved at the end of 15 days. In all, three teams will man the underwater base in rotation over the next 45 days.

Carpenter entered the water at 1:43 p.m. with navy divers Berry Cannon of Panama City, Fla.; Cyril Tuckfield of Panama City, and Wilbur Eaton of Fort Lauderdale.

Nine minutes later they started popping up through a hatch in the bottom of Sealab 2.

Others Follow

Others following at intervals were:

Lt. Robert Sonnenburg, a navy doctor of San Diego; Thomas Clarke of th Scripps Institution of Oceanography, La Jolla; Earl Murray of Scripps; navy diver Frederick Johler of Groton, Conn.; navy photographer Jay Dee Skidmore of Chula Vista, Calif., and navy diver Billie Coffman of Willimantic, Conn.

Carpenter reported some water had leaked into Sealab 2 around a port but said "this is a condition we can live with for a while."

There was little danger that a great amount of water would seep in. Sealab 2 is pressurized at slightly more than ocean pressure at that depth—100 pounds per square inch, or about six times the pressure at sea level.

New York 38, N. Y.
From AUG 29 1965
TRIBUNE
Chicago, Ill.

ASTRONAUT HEADS NAVY'S OCEAN PROBE

Carpenter Leads 9 into Sea

By SEYMOUR KORMAN
(Picture on Page 2)
[Chicago Tribune Press Service]

La Jolla, Cal., Aug. 28—Comdr. M. Scott Carpenter, one of America's seven original astronauts, turned aquanaut today. He led a team of 10 men on a 205-ft. dive into the Pacific ocean. At that depth, the ten entered the Sealab 2, their underwater house and began what is planned as a 45-day exploration of the sea.

Carpenter is scheduled to remain below 30 days. The nine others will come up after 15 days. Nine others will be sent to join Carpenter for his second 15-day period. A third team of 10 will go down for the final 15 days.

Leaps From Barge

It was 1:43 p.m. [3:43 p.m. Chicago time] when Carpenter, 40, leaped from the barge Berkone, into the ocean 3,000 feet offshore. He and his companions wore scuba [self-contained underwater breathing apparatus] gear.

With Carpenter was Cyril J. Tuckfield, 43, a navy enlisted man from Miami. A moment later, two others hit the water.

Nine minutes after Carpenter and Tuckfield entered the water, they were seen over the Berkone's closed circuit television entering Sealab 2. They secured the hatch on the 200-ton craft. The underwater lab was moored on a ledge two days ago.

Report All's Well

Carpenter and Tuckfield could be seen getting out of their suits and moving around in shorts, which will be the usual attire.

Carpenter reported to Capt. George Bond, director of the navy's man-in-the-sea project, that all was satisfactory.

After an hour, two more aquanauts came down. Following them came the fast four.

Tells of Experiment

Carpenter, in an interview before the test began, said the experiments involving currents, velocities, marine life, and establishment of underwater weather stations will be basically scientific, but also could have military significance.

Carpenter, who orbited the earth three times May 24, 1962, was asked if he considered his present adventure more hazardous than that in outer space.

"I do not think so," he replied. "There are different types of hazards, of course. It is true that excessive pressure, such as is encountered as one goes deep in water, is potentially more damaging to human organism than experiencing zero gravity in space flight. I'm certain, tho, the Sealab project will be conducted safely."

The aquanauts will swim out at regular intervals for their experiments. At least two of them, and usually four, will be in the Sealab at all times.

The swims will last up to two hours in water temperature of about 50 degrees. Upon reentry, the aquanauts will take hot showers.

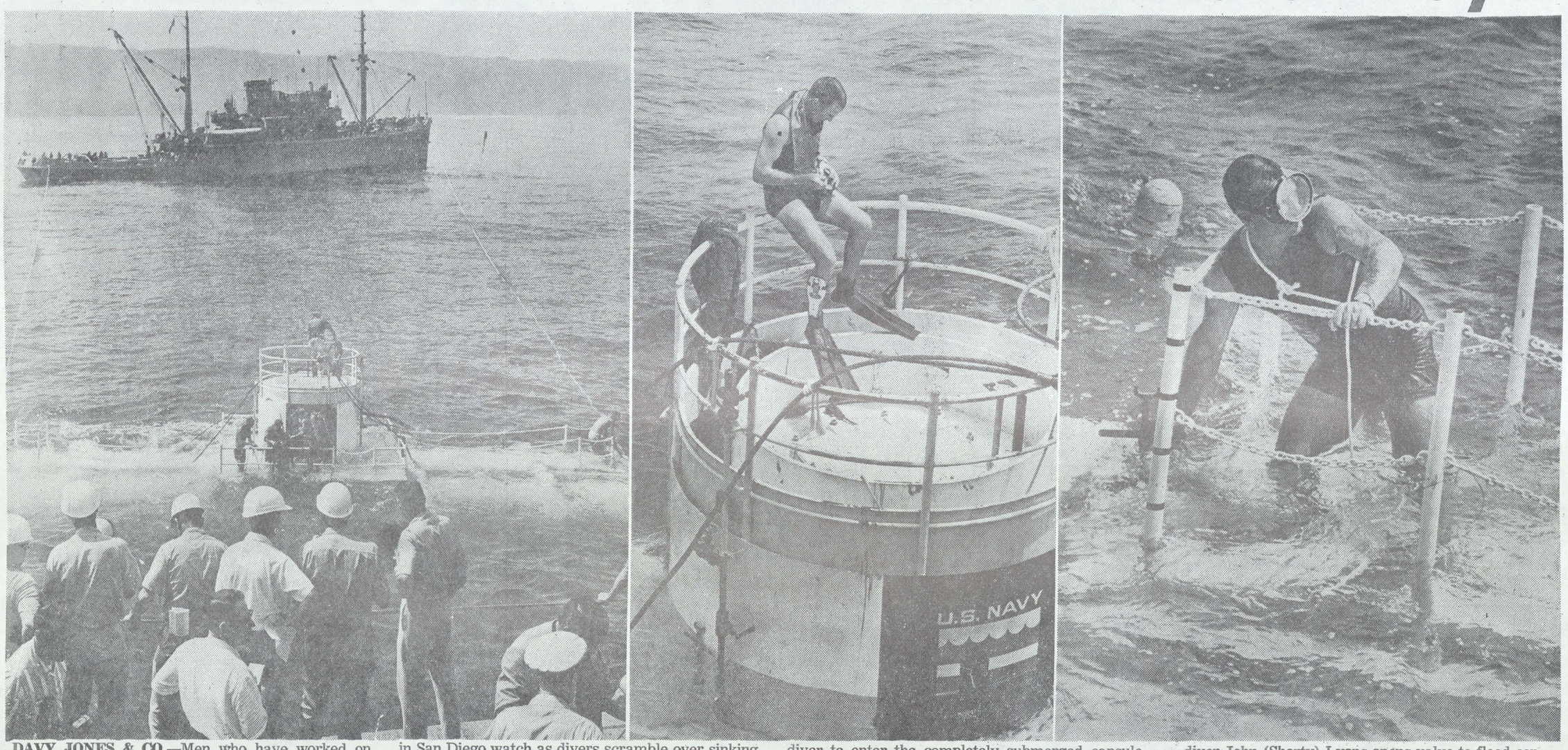
The Sealab is 57 feet long. The living compartment, 12 feet in diameter, is divided into a laboratory, a galley, and a bunk room.

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SeaLab Is Lowered To Ocean Bottom

The San Diego Union

Sealab II Takes Off on a Winch and a Prayer



DAVY JONES & CO.—Men who have worked on project Sealab II since underwater capsule arrived in San Diego watch as divers scramble over sinking lab. Astronaut Scott Carpenter, who will be the first diver to enter the completely submerged capsule, balances on rail as it settles toward bottom, while diver John (Shorty) Lyons opens valve to flood container's ballast tanks. Staff Photos by Roger Wrenn.

THE SAN DIEGO UNION
A12① Tues., Aug. 10, 1965
SAN DIEGO, CALIFORNIA

Sea Lab Leaves S.D. For Long Beach Visit

The Sea Lab II, the 57-foot long tank to provide a home under the sea for aquanauts later this month, was in Long Beach last night after being brought here for fitting.

The lab was brought here and taken back aboard a barge. It left at 10 p.m. Sunday night and arrived at the Long Beach Naval Shipyard at 11:50 a.m. yesterday.

Sea Lab II will be brought back to San Diego and lowered to the sea bottom about a mile off the Scripps Pier, La Jolla, next Tuesday, according to present plans. Ten divers are expected to move into the lab in position 210 feet below the surface on Aug. 18.

On its return from Long Beach the lab will be towed as it is supported in the water by its own buoyancy. The lack of a large enough marine crane in San Diego made it impossible to transfer the lab from a barge to the water here.

Meanwhile the class of Sea Lab II aquanauts was continuing training at Long Beach. Also at Long Beach are Capt. Lewis B. Melson, USN, director of the Sea Lab project, and Capt. George F. Bond, (MC) USN, head of the Navy's Man-in-the-Sea program.

Lt. Cdr. H. H. Golightly, USN, yesterday set up an information bureau for the project on the Scripps Institution of Oceanography campus.

The project, designed to determine how men can live and work under the sea, is expected to go on for at least 30 days. Two or more teams of 10 men each are expected to participate in the underwater phase of the project.

CHAT ON TAP 8/28/65

Hello Space, Ocean Floor Calling—By Private Line

By S. A. DESICK

Within a few hours after the aquanauts enter SeaLab II today, they will try to talk with the astronauts in Gemini 5 by telephone and radio.

When they do, it will be a toll call.

Aside from the drama of having men beneath the sea talk with men in space for the first time, the experiment will have its scientific value. It will be a further test of a gadget called a helium voice unscrambler, which Navy scientists developed for SeaLab I last year.

BREATHE MIXTURE

In a SeaLab, aquanauts breathe a mixture of 80 per cent helium and 20 per cent oxygen and nitrogen. The reason for this is that if they were to breathe normal air, the high nitrogen content would put them to sleep at the pressure (seven atmospheres) they are under. So helium is used to substitute for much of the nitrogen.

"However, helium has a strange effect on the vocal cords. It causes them to vibrate so that the most masculine of men sounds high-pitched. Over a telephone line his voice comes out garbled.

The unscrambler makes his speech comprehensible by reducing it to normal pitch. When the device was tested on SeaLab I, it worked well. "But," a Navy spokesman said yesterday, "we want to know if it works just as well when the voice is transmitted into space."

STAGING VESSEL

The unscrambler sits on the Berkone, SeaLab II's staging vessel, which connects with the undersea tank through an umbilical cord.

Strung through the cord is a Pacific Telephone Co. circuit. The company calls it a private line. This has nothing to do with preventing busy signals aboard Gemini 5. That is just its name.

From the Berkone, the line connects, via a Navy underwater cable, to phone lines at the foot of Scripps Pier.

If Cmdr. Scott M. Carpenter, astronaut-turned-aquanaut, is the one picked to talk from SeaLab II to Gemini 5, his voice will then travel to the phone company's San Diego toll (long distance) office.

From here, his voice will go by land lines to Pt. Arguello, on California's central coast, to hook up with the space agency's worldwide network. The network will then transmit Carpenter's voice to Gemini 5.

When Carpenter asks to talk to Gordon Cooper, his former sidekick, Pete Conrad better not say he's out.

DAILY NEWS
New York, N. Y.
AUG 28 1965

Life in Sealab II

LA JOLLA, Calif. — As officials watched on closed circuit television, the ten aquanauts ate, washed the dishes, ate and held a reinlistment ceremony in Sealab 2, which is 205 feet under the surface of the Pacific. Astronaut Scott Carpenter, the team leader in Sealab, administered the reinlistment oath to Navy Topedoman 1c Billie Coffman. Coffman's hitch was up and regulations gave him 24 hours to reenlist. He isn't scheduled to come out of Sealab, which is testing men's ability to live in an underwater environment, until Sept. 12.

WASH. POST 9/1/65

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SEALAB'S AQUANAUTS WILL DESCEND TODAY

SAN DIEGO UN

AUG 2[illegible] 196[illegible]

SeaLab Aquanauts To Descend Today

By BRYANT EVANS
The San Diego Union's Science Writer

The first team of SeaLab II aquanauts, headed by Cmdr. M. Scott Carpenter, will start their sojourn in their undersea home today, Capt. Lewis Melson, project director, said last night.

He estimated dive time at 11 a.m.

Nine members of the 10-man team are to stay in the 58-foot-long cylinder 202 feet under the ocean for 15 days. Carpenter will stay 30 and also captain the second team to descend Sept. 5.

Carpenter and SeaLab officials were still hoping yesterday that it will be possible for him to have a conversation with Gordon Cooper in the Gemini 5 spaceship before the Gemini 5 splashes down tomorrow.

Yesterday was spent by engineers and divers in completing all arrangements for the new tenants to move into the habitat 3,000 feet off Scripps Pier in La Jolla.

The SeaLab was reoriented slightly from its original position to correct its inclination and list. It still tilts so that aquanatus will have to walk up a 6 per cent grade when they walk from the laboratory to their living quarters.

It also still lists about 3 degrees to port. Any further improvements in the site will depend on the aquanauts after they move in.

The package of electric transformers that will distribute power from shore to the SeaLab and other installations was put in place on the ocean bottom yesterday.

Aboard the staging vessel, the Berkone, Carpenter put his team through the last drill for boarding the personnel transport capsule, the aquanauts pressurized elevator to bring them back to the surface.

Melson said that when the aquanauts go down today they will not ride in the capsule as originally planned, but some will descend as free swimmers and others in a small diving bell. They will wear Mark V underwater breathing gear and wet diving suits to protect them from the deep, cold water.

Good news for the aquanauts was received from the Scripps Institution of Oceanography yesterday. They were told that there is a body of clear, blue water off Point Loma moving north. It should increase visibility around the SeaLab to 100 feet or more.

This is at least twice the visibility reported by two members of the aquanaut squad who went down to the SeaLab yesterday to remove the lowering cable and other lines no longer needed.

They were Rick Grigg, a graduate student at the Scripps institution, and Bob Barth of Panama City, Fla., the only SeaLab II diver who also served on SeaLab I off the Bahamas last year.

8 MINUTES

They went down at 10:07 a.m. and spent eight minutes on the outside of the SeaLab.

Grigg said the lab was resting on a flat patch of sand. On top of the sand he saw some giant kelp lying on the bottom but not growing there. There was also some matted surf grass. He reported seeing small fish which, he said, were probably anchovies.

Barth said that he could see the ends of the SeaLab clearly from amidships. There was no artificial illumination at the time. Barth said he was surprised at how much light filtered down from the surface.

LIKE MOONLIGHT

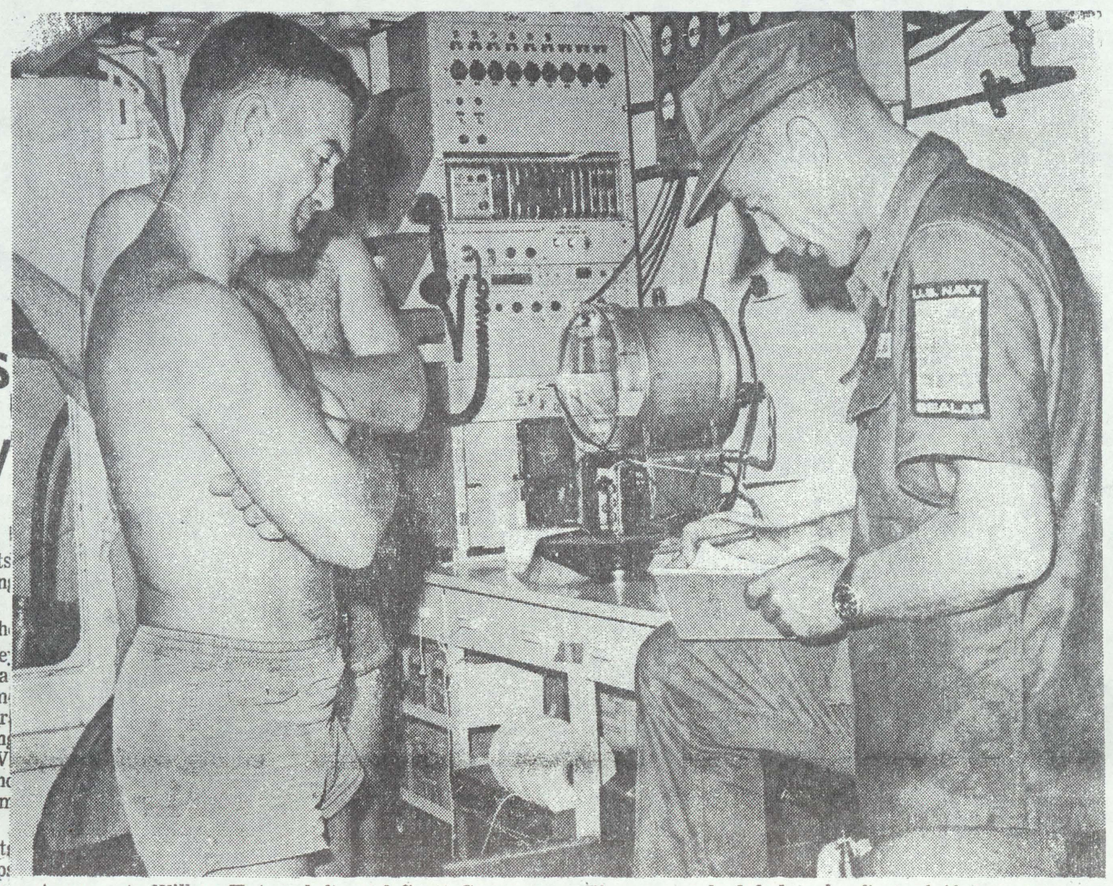
"It was like a bright moonlight night," he said.

Two jobs remained to be done before the aquanauts can move into the SeaLab.

The personnel transport capsule to bring the divers back will have to be installed on the bottom. Although it is not planned to use it for 15 days, it has to be ready.

A diver will have to go to the SeaLab, blow the entry well and open the hatch for the aquanauts to enter.

Persons who hoped to see closed-circuit television pictures of the aquanauts in the SeaLab over this weekend in Sumner Auditorium will be disappointed. The pictures will not be available until after the placing of the benthic laboratory to relay signals. This should be put on the ocean bottom Monday.



Aquanauts Wilbur Eaton, left, and Scott Carpenter go through checklist before diving to SeaLab. They are scheduled to be first of 10-man team to enter deep sea chamber for deep sea exploration.

'WEATHER STATION' SET UP NEAR SEALAB

LA JOLLA, Calif., Sept. 1 (AP)—Navy divers and scientists living in Sealab 2 at a depth of 205 feet 1,000 yards off the southern California coast, started setting up a "weather station" today 175 feet from the trailer-sized laboratory.

The station will record water temperatures and currents, which have a bearing on how well men can operate at the ocean's bottom.

With the weight of the ocean on their bodies creating a pressure six times that at the surface, they expect it will take four or five men two days to complete the fairly simple task. The ten aquanauts began their experiments Saturday.

A Navy spokesman said each man had averaged more than 47 minutes of outside work yesterday and this was expected to increase to two or more hours a day.

Inside the laboratory they are busy with research projects, such as cataloging marine life in the area and measuring their own heart beat and brain wave patterns to see if there are any changes due to the stress of living in an underwater world.

Three teams of 10 men will rotate in 15-day tours on the bottom to test the endurance of men in the sea.

PHILADELPHIA INQ.
29 AUGUST 1965 P-1

Aquanauts Get 'Go' for Descent To Sealab 2

LA JOLLA, Calif., Aug. 28 (AP).—The Navy says all systems were "go" for the descent Saturday of 10 aquanauts, including astronaut M. Scott Carpenter, to Sealab 2 on the ocean bottom, 1000 yards off shore.

Three teams of 10 divers are to spend 15 days each in the 12x58-foot steel cylinder over the next 45 days, eating, sleeping and working at a depth of 205 feet.

Carpenter, a Navy commander, and nine other Navy divers and scientists were to descend. Some were to go down in a three-man diving bell, others in skin-diver gear.

Still uncertain was Carpenter's planned talk via radio-telephone with fellow astronaut L. Gordon Cooper in the orbiting Gemini 5 spacecraft.

It's up to the space agency," said a Navy spokesman, "if officials at Houston give their okay, all Carpenter will have to do is pick up a phone in Sealab 2 and start talking."

If it takes place, the conversation would be relayed through a tracking station at Point Arguello, Calif., while the spacecraft is overhead.

Space agency officials previously indicated, however, that the sea-floor-to-space chat had a low priority on a busy schedule.

Sealab 2, an experiment to determine how long men can function safely under pressure six times that of the surface, was lowered to the bottom Thursday after a 12-day delay caused by technical problems.

A long series of safety checks followed, and finally Sealab 2 was reported ready for the divers to enter. Power and communications lines were connected. A closed-circuit television system between the underwater base and the surface ship showed the hands of two clocks moving.

The "Sea Lab II" Project

EXTENSION OF REMARKS
OF
HON. HASTINGS KEITH
OF MASSACHUSETTS
IN THE HOUSE OF REPRESENTATIVES
Tuesday, August 24, 1965

Mr. KEITH. Mr. Speaker, the bright glitter of NASA's silver suited Gemini astronauts has almost completely stolen the headlines from what may be the greatest undersea adventure ever known to man. While the world press focuses its attention an orbiting spacecraft, a team of skindivers is quietly preparing to swim down to the bottom of the Pacific Ocean to live in a house under the sea.

The house is a 12-by-58-foot cylinder called *Sea Lab II* in which the daring aquanauts are able to work and sleep for up to 45 days at a depth of 210 feet.

Leading the team of divers is Astronaut Comdr. M. Scott Carpenter, who has temporarily turned his back on outer space to submerse himself in the even more rewarding world of inner space. About 60 percent of Commander Carpenter's teammates are Navy divers. The remaining men are ocean scientists, mechanical and electrical engineers.

Unlike their brothers who ride through the skies in space capsules, these brave aquanauts will actually occupy a piece of the Pacific Ocean.

As part of the Navy's man-in-the-sea program, they will swim in and out of their ocean bottom habitat. These adventurous inhabitants of the sea will not only eat and sleep in their watery home, but clad only in their wet suits and aqualungs, they will actually perform useful work such a building an underwear weather station, attempting to float a sunken airplane, and conducting studies of the forms of life and minerals on or near the sea floor.

While accomplishing these difficult tasks, the aquanauts will be under the added tension of having to be on the look-out for attacking sharks.

Navy doctors, headed by Captain George F. Bond, will analyze the physiological and psychological reactions of the divers to prolonged exposure to the depths. Tests will be made to determine the effect of the *Sea Lab II* tenants breathing a mixture of helium, nitrogen, and oxygen at a sustained pressure of 112 pounds per square inch.

Mr. Speaker, the foresight, the imagination, and daring of the people working on the *Sea Lab II* project deserve the praise of all of America. This country has been spending billions of dollars for space programs but has not yet been able to land a man on the moon, to construct a building on the moon, to bring back samples of the moon's barren surface. But on this very day, and with comparatively modest sums, this Nation's ocean scientists are occupying the sea, living in it, working in it—conquering it.

History may, indeed, prove that their work will be at least as significant as 100 outer space projects. I say this because, even though our effort to land a man on the moon is receiving worldwide attention and has great propagandistic value, this effort has not yet even suggested the possibility of an economic return. On the other hand, the oceans with their wealth of food and minerals are ripe for harvesting. It is through projects like *Sea Lab II* that we may find the key to exploiting the sea.

Mr. Speaker, with the future needs for various resources being created by the world population explosion, the generations of tomorrow, in my view, will be most grateful for and dependent upon the work being done by our ocean scientists today. For these reasons, therefore, I call the attention of my colleagues to the dramatic contribution that *Sea Lab II* is making to our fund of useful knowledge. I suggest that these men of inner space are deserving of support and praise at least comparable to that given our men of outer space.

DAILY NEWS
New York, N. Y.

AUG [illegible]

10 Aquanauts Enter Sealab

La Jolla, Calif., Aug. 28 (AP) —Ten aquanauts, led by astronaut M. Scott Carpenter, descended from a Navy Barge today and entered Sealab 2, where they'll conduct a long experiment in underwater living.

Sealab 2 is a 45-day experiment to test how well men can function safely under pressure six times that at the surface. Carpenter, a Navy commander, will try to stay down 30 days to set a record. Four men spent 13 days at a depth of 160 feet last year in Sealab 1 off Bermuda.

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Astronaut Leads Aquanaut Team to Sea Bottom for 45-Day Stay

BY CHARLES HILLINGER
Times Staff Writer

M. Scott Carpenter, the world's first astro-aquanaut, descended 205 feet to the floor of the ocean off La Jolla Saturday afternoon to launch Sealab II—one of this nation's most ambitious efforts in its conquest of the sea.

Sealab is the Navy's 45-day experiment to test how well man can function under pressure six times that at the surface.

As Carpenter dived in a heavy black wet suit with SCUBA tanks strapped to his back from the Sealab surface vessel Berkoni, astronauts L. Gordon Cooper Jr. and Charles Conrad Jr. were waiting in Gemini 5 to hear what will be the highest pitched voice ever heard in space.

Their space buddy Carpenter, who will sound like Alvin of chipmunk fame because of the exotic atmosphere breathed in the Sealab capsule, was to salute the space twins late Saturday night from the bottom of the sea.

First Such Link

It was to be the first ocean bottom-outer space radio hookup in history.

Carpenter dived from the deck of the Berkoni at 1:45 p.m. Saturday and swam through the murky sea to take up residence in a three-room undersea apartment for a month.

Following Carpenter in rapid order were fellow aquanauts Wilbur H. Eaton, a Navy gunners mate; Cyril A. Tuckfield, Navy engineer, and Barry Canon, a veteran civilian diver from Panama City, Fla.

The quartet spent five minutes swimming through schools of fish to their snow-white home, a 57-foot steel, cigar-shaped capsule anchored on a ledge 205 feet beneath the Berkoni.

They were seen on closed-circuit TV monitors as they entered an open-bottom hatch, stuck their heads into the capsule, climbed inside and grinned at the cameras.

"We four are aboard. All systems seem to be functioning normally," Carpenter radioed Capt. George F. Bond in charge of surface control center aboard the Berkoni.

Minutes later the aquanauts removed their wet suits and began checking out the mass of electronic equipment inside the capsule.

"It's very comfortable in here. The temperature is about 80 degrees," reported Eaton.

During the next three hours the six other members of the Sealab team entered the water and swam to the capsule. They were Navy Dr. Robert E. Sonnenburg, Navy divers Billie L. Coffman, Jay Dee Skidmore and Fred J. Johler and civilian divers Earl A. Murray and Thomas A. Clarke.

Picked as Chef

Tuckfield, 44 and oldest of the aquanauts, was tapped by the team almost immediately to serve as chef the first night down.

Speaking through his helium speech unscrambler that fits over each aquanaut's head like a pair of earphones and makes them reasonably understandable to those on the surface, Tuckfield said:

"Being that this is a Navy operation, I am now going to the stove, as you will observe on your monitor, to whip up a dandy dinner of wieners, beans and potato salad.

The aquanauts are breathing an exotic mixture of gases made up of 85% helium, 11% nitrogen and 4% oxygen.

Because pressure inside Sealab is slightly higher than the outside water pressure, a 4-foot-wide bottom hatch is open at all times in the capsule with no fear of the ocean flooding the undersea apartment.

From the surface through the television monitors the aquanauts looked like a group of men on a camping trip securing their gear in a large trailer.

Their deep-sea apartment consists of a bedroom-dining room with Pullman type bunks, a scientific laboratory and a galley with stove, freezer and refrigerator. There are 11 large picture windows providing an enchanting vista to the sea around them.

During the next 45 days three teams of 10 aquanauts each will live in Sealab II for periods of 15 days per team. Plans are for Carpenter to remain beneath the sea twice as long as any of the others.

Loaned to Project

NASA loaned Carpenter, a long-time skindiver, to the Sealab project to compare his reactions and physiological data in the hostile environments of inner and outer space.

"Equal dangers exist in whirling around the planet in a small capsule and living at the bottom of the sea," Carpenter said Saturday.

"Both are new frontiers being conquered for the first time by man."

The astro-aquanaut's attractive blond wife, Rene, is taking her husband's stay at the bottom of the sea with some apprehension.

"It's a lot easier going into space," she told newsmen minutes after embracing her husband and saying goodby.

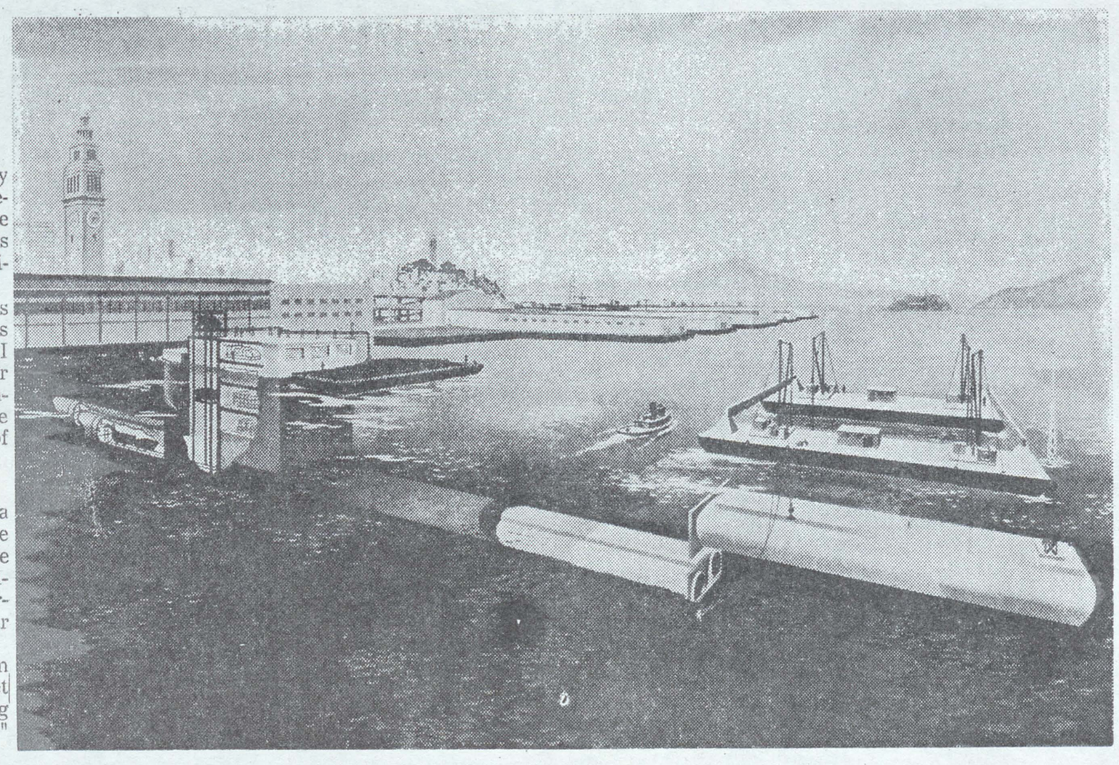
In his Mercury space capsule when Carpenter orbited the earth three times on May 24, 1962, the atmosphere was similar to that on the surface of the earth.

Living beneath the sea, aquanauts will exist in an environment where pressure will be 6½ times that at the surface.

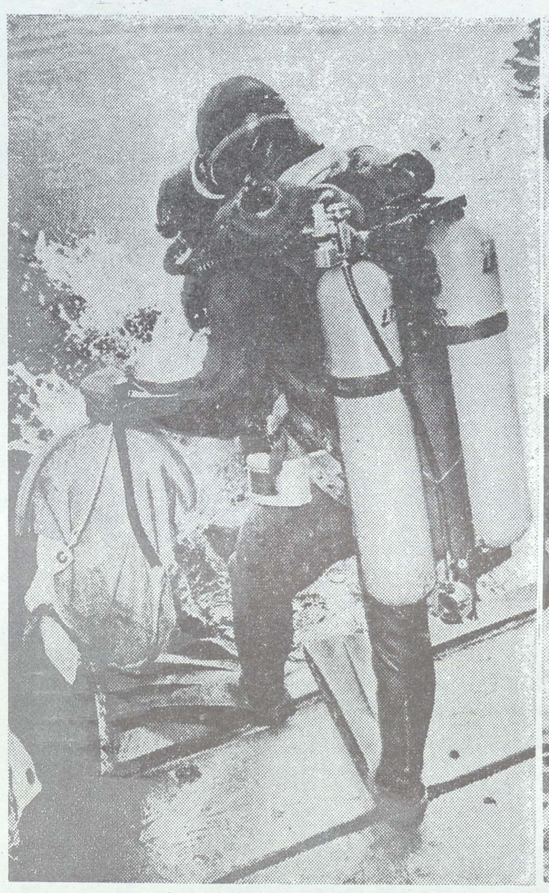
Carpenter's swim fins as he floats free in the ocean's depths will serve as his power of motivation just as Ed White's astro gun did during his historic walk in space.

Aquanauts will free swim from their apartment two hours each day, performing 47 experiments and work projects in the sea surrounding the capsule.

Aquanauts will mine ore on the sea's bottom; harvest fish; salvage and refloat a sunken jet fighter and build an undersea petroleum platform.



UNDERWATER RAILROAD—Artist's sketch shows how binocular-shaped lengths of steel tube will be lowered by barge to pre-dredged trench under San Francisco Bay for rapid transit train route between San Francisco and Oakland. Work on caisson, at right of towered ferry building on left, will begin next month. From the caisson a tunnel will be drilled to Market St., with the tube going seaward.



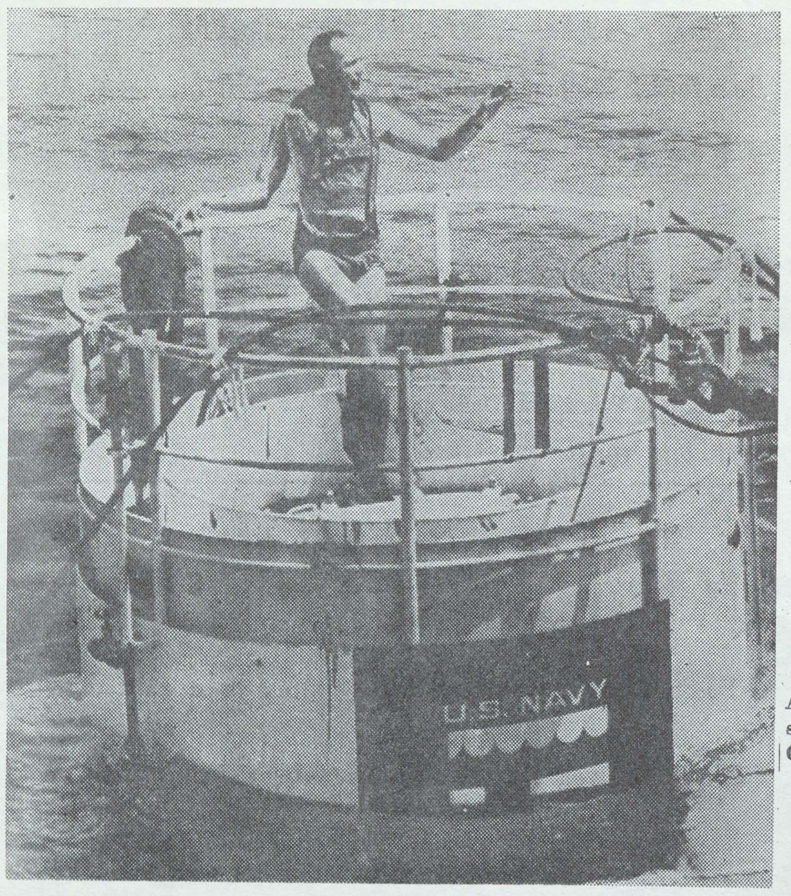
JUMP TO DEPTHS — Members of the aquanaut team start their dive to Sealab, where they will test man's ability to function under extreme pressure.
UPI Telephoto



READY TO DIVE—Astro-aquanaut M. Scott Carpenter is surrounded by photographers as he prepares to dive to the ocean floor to board Sealab II.
(P) Wirephoto

the Post Office at New York as Second Class Mail Matter

New York Herald Tribune — Saturday, August 28, 1965



Astronaut Descending —205 Ft. Under Water

By United Press International

LA JOLLA, Calif.

Astronaut Scott Carpenter will be one of four men who will wim 205 feet down to the submerged Sealab 2 today in the first phase of a 45-day test of man's ability to survive in an underwater environment.

Heavy sea swells yesterday delayed the descent of the aquanautic team, although the 200-ton, 57-foot-long steel Sealab cylinder itself was dropped by cable to a ledge in Scripps Canyon about one-half mile offshore.

The swells also were partially responsible for postponing from Thurday night until yesterday connecting power cables to Sealab 2.

Lt. Cmdr. Carpenter, second U. S. astronaut to orbit the earth, and nine others will spend the first 15 days in the tube to make 44 experiments. Their reactions and every aspect of everyday behavior will be under the same scrutiny that orbiting astronauts get.

A porpoise named Tuffy on the 16th day will be used with a second team of aquanauts to see if he can assist them in returning to Sealab 2 and perhaps to take messages.

Lt. Cmdr. Carpenter himself will spend 30 consecutive days 205 feet below the surface. His descent today with frogman gear will take six minutes —about 12 times as long as it takes a porpoise like Tuffy.

He and his teammates will enter from a hole under the Sealab. Pressure inside the cabin keeps water out. The other six men will descend by a diving bell, three at a time.

A safety capsule will be lowered and kept outside the main chamber.

Robert Moore, Assistant Secretary of the Navy, termed the project a key to American exploration of more than 1 million square miles of submerged area.

Lt. Comdr. Carpenter and others will be outside the cylinder much of the time for their experiments and to find out what their reactions are.

An attempt will be made to set up the first underwater weather station and to salvage a sunken Navy fighter plane, among other things.

Herald Tribune—UPI telephoto

AN ASTRONAUT AT SEA—While Gemini-5 orbits high above the earth, the Navy sends its Sealab into the ocean depths off La Jolla, Calif., yesterday. Cmdr. Scott Carpenter gives the signal for the descent while standing atop the underwater device.

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From AUG 29 1965
SUN-TIMES Chicago, Ill.

Astronaut Joins Divers In Sealab For 45-Day Underwater Experiment



M. Scott Carpenter adjusts valves on oxygen tanks of fellow aquanaut before they take plunge for swim down to Sealab II off La Jolla, Calif. (UPI)

LA JOLLA, Calif. (AP)—Astronaut M. Scott Carpenter and other divers plunged into the Pacific Saturday to start a 45-day underwater experiment that Carpenter said could be "more damaging than space flight."

Before beginning the 205-foot dive to Sealab 2 on the ocean floor 1,000 yards off this Southern California resort, Carpenter told newsmen that "the excessive pressure at which we will live is a little more rigorous than space flight."

Asked what he meant by rigorous, Carpenter said:

"More damaging."

Carpenter will try to stay 30 days in the 12-by-58-foot steel cylinder as part of a Navy experiment to see how long men can function at extreme depths.

A Navy spokesman said 30 days would be a record at such depth. Four men spent 11 days at a depth of 192 feet last year in Sealab 1 off Bermuda. Seven Frenchmen who spent 30 days living under water in the summer of 1963 were at a depth of 30 feet, the spokesman said.

The nine others of Carpenter's team will be relieved at the end of 15 days.

Carpenter entered the water with Navy divers Berry L. Cannon and Cyril J. Tuckfield of Panama City, Fla., and Wilbur H. Eaton of Fort Lauderdale, Fla.

Nine minutes later they entered a hatch in the bottom of Sealab 2.

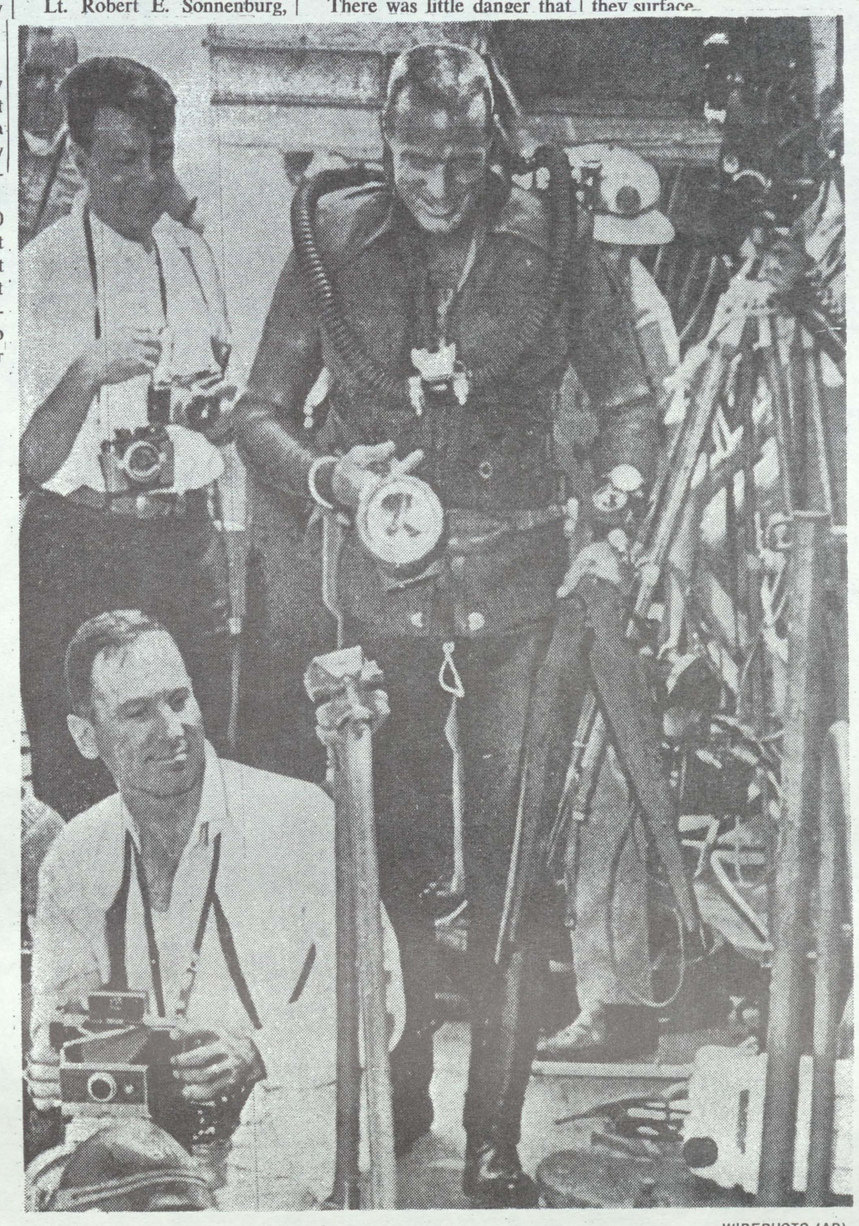
Others following at intervals were:

Lt. Robert E. Sonnenburg, a Navy doctor of San Diego, Calif.; Thomas A. Clarke of the Scripps Institution of Oceanography, La Jolla; Earl Murray of Scripps; Navy diver Frederick J. Johler of Groton, Conn.; Navy photographer Jay Dee Skidmore of Chula Vista, Calif., and Navy diver Billie L. Coffman of Willimantic, Conn.

Carpenter reported that some water had leaked into Sealab 2 around a port but said "this is a condition we can live with for a while."

There was little danger that a great amount of water would seep in. Sealab 2 is pressurized at slightly more than ocean pressure at that depth —100 pounds a square inch, or about six times the pressure at sea level.

This is the excessive pressure Carpenter called damaging. He did not elaborate, but Navy officials said such extreme pressure forces atmospheric gases deep into human tissues. That can cause the crippling disease known as the bends unless divers take care in decompressing slowly after they surface.



WIREPHOTO (AP)

Down to Davy Jones

Scott Carpenter is the center of attention Saturday just before he took a 200-foot swim to the bottom of the ocean floor in the Pacific off San Diego, Calif. He is the leader in the ocean-floor experiment of Sealab II—a sort of under water space exploration experiment.

LIVING IN LAB ON SEA FLOOR

LA JOLLA, CALIF. (AP)—Four aquanauts led by Astronaut M. Scott Carpenter dropped over the side of a Nsvy barge at 1:45 p. m. (P. D. T.) Saturday and eight minutes later were inside Sealab 2, where they'll conduct a long experiment in underwater living.

Carpenter and Navy Engineman Wilbur H. Eaton of Ft. Lauderdale, Fla., were the first two into the water. They were followed immediately by Chief Engineman Cyril Tuckfield and Barry L. Cannon, both of Panama City, Fla.

Six more were to join the first four.

The aquanauts hadn't been expected to get into the 12 by 58-foot steel cylinder, Sealab 2, until 15 or 20 minutes after they left the barge, a Navy spokesman said.

The cylinder rests at the bottom of the ocean, a depth of 205 feet 1,000 yards offshore.

Sealab 2 is a 45-day experiment to test how well men can function safely under pressure six times that at the surface. Carpenter, a Navy commander, will try to stay down 30 days to set a record. Four men spent 13 days at a depth of 160 feet last year in Sealab 1 off Bermuda.

The other aquanauts will remain below for varying periods.

They include Navy Dr. Robert E. Sonnenburg of San Diego, Calif.; Navydiver Billie L. Coffman, Willimantic, Conn.; Chief Photographer Jay D. Skidmore, Chula Vista, Calif.; Chief Engineman Frederick Johler, Groton, Conn.; Earl A. Murray, Del Mar, Calif., and Thomas A. Clark, La Jolla.

Each diver, wearing skin-diving gear, will spend two hours a day or more working outside the submerged dwelling. The group will collect and study marine specimens and map the ocean floor.



Astro-Aquanaut Scott Carpenter adjusts valves on the oxygen tanks of a fellow aquanaut before they plunge into the ocean for a dive to Sealab 2 chamber at the bottom of submarine canon near La Jolla, Calif.

—UPI Telephoto.

Carpenter in Lab Test Deep in Sea

LA JOLLA, Calif., Aug. 28—(UPI)—M. Scott Carpenter and three other men swam down 200 feet Saturday and entered Sealab 2, a 57-foot steel cylinder that will be the ocean "home" for the astronaut for a month.

Six more "aquanauts" were to enter the sealab in pairs later Saturday.

A conversation from the "inner space" depths to outer space with the orbiting Gemini 5 astronauts was postponed from Saturday afternoon to 10:54 p.m. Denver time when the most favorable conditions were expected.

Begins Sunday

The project and its experiments will begin officially Sunday and will end Oct. 12.

Carpenter, the second U.S. astronaut to orbit the Earth, will remain the longest time in the cigar-shaped steel cylinder. The sealab project will last 45 days.

The experiment was designed to test man's ability to live and work underwater for extended periods.

The depth of Sealab—205 feet and about 3000 feet offshore—requires breathing mixtures of 85 percent helium, 11 percent nitrogen and 4 percent oxygen to survive the pressure.

A trained dolphin named Tuffy will go to work on the 16th day of the project, handling hoses and other equipment and guiding aquanauts back to the capsule.

Included in the tests will be an attempt to set up the first underwater weather station and to salvage a sunken Navy fighter plane.

A team of psychiatrists, using closed-circuit television, will study the aquanauts' strength and efficiency.

No Record

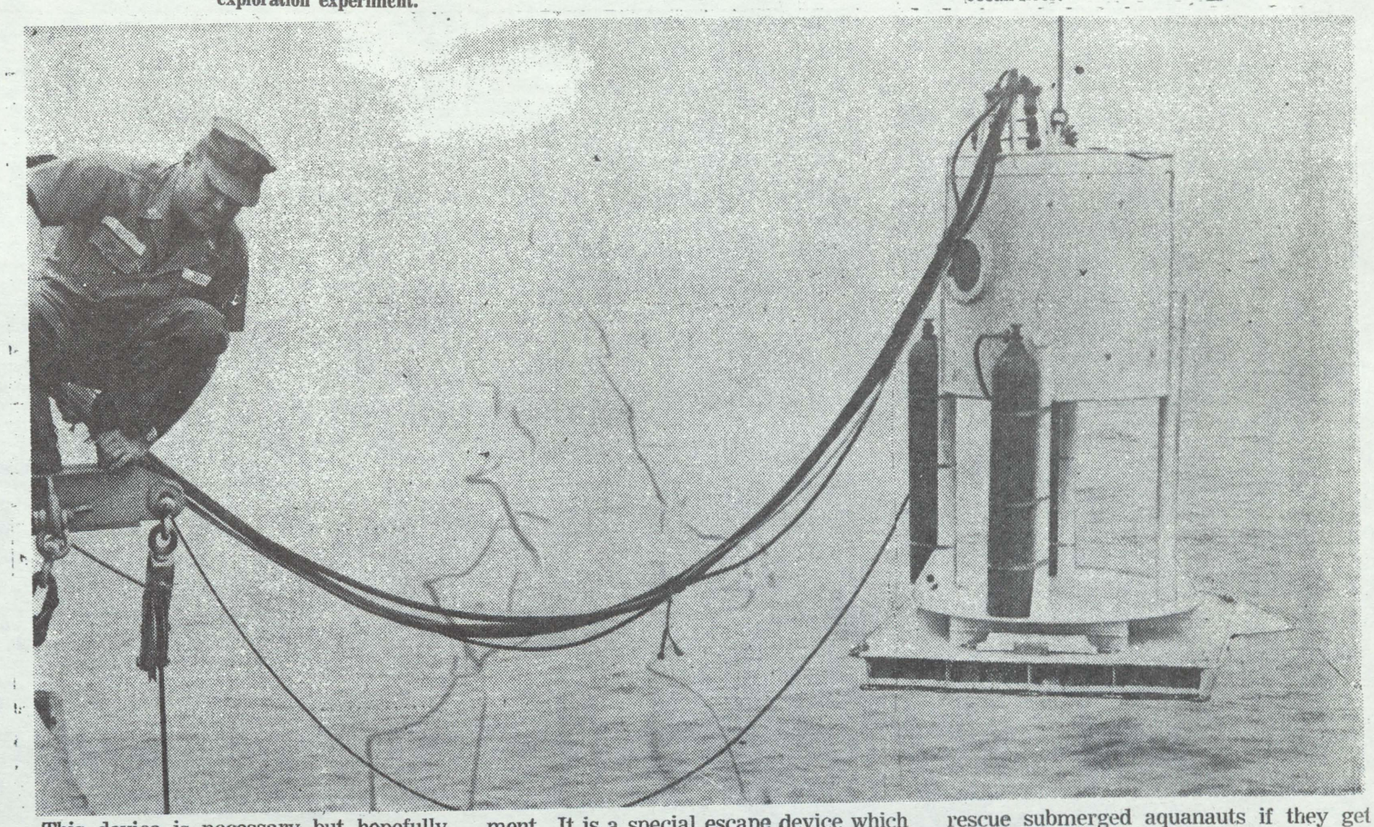
The Sealab 2 project will not be a record setter. Officials emphasized the purpose was to determine how well humans can perform useful work underwater.

Sealab 1 was submerged 196 feet under the surface of the Atlantic Ocean near Bermuda last year. Four Navy divers stayed in it for 11 days.

Previous underwater explorers have gone as deep as 35,000 feet and remained submerged for as long as one month.

ROCKY MOUNTAIN NEWS
Denver, Colo.

AUG 29 1965



This device is necessary but hopefully it will not be used in SeaLab II experiment. It is a special escape device which can be lowered to ocean floor off La Jolla, rescue submerged aquanauts if they get into trouble.

Des Moines (Ia.) Register
SUNDAY, AUGUST 29, 1965

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Aquanauts Begin Sea-Bottom Vigil

THE SAN DIEGO UNION
A2 ① Sun., Aug. 29, 1965
SAN DIEGO, CALIFORNIA



—San Diego Union Staff Photo

Aquanauts Wilbur H. Eaton, left, and Scott Carpenter make last check of equipment before diving 205 feet down off La Jolla to SeaLab II chamber. Carpenter will stay in craft for 30 days. (Other photos, Page B.)

10 On 1st Team Dive To Enter Ocean Capsule

Carpenter Leads Group; Reports Connections OK

By BRYANT EVANS
The San Diego Union's Science Writer

Two aquanauts in black, wet diving suits opened the hatch to SeaLab II at 1:53 p.m. yesterday to start the largest and most elaborate effort ever tried to test the ability of man to work under the sea.

They were followed by eight others of the first SeaLab team, which is to spend 15 days under 205 feet of water, 3,000 feet off the Scripps Institute of Oceanography at La Jolla.

By 6 p.m. all 10 were aboard — testing their utilities and looking very much at home, over the closed circuit television aboard the SeaLab's mother ship, SS Berkone.

The first two to enter the habitat were Cmdr. M. Scott Carpenter, team captain and former astronaut and Wilbur Eaton, first class gunner's mate of Panama City, Fla. They reported that the freshwater line from the surface was working, and that the temperature inside the SeaLab was a comfortable 90 degrees Fahrenheit.

HIGH-PITCHED VOICES

An effect of the helium-rich atmosphere was noticed in the high pitch of their voices.

Helium is used in place of most of the nitrogen in air to prevent the drunken-like, often fatal sleep that attacks divers breathing nitrogen under pressure.

The other two divers of the first four to enter the water were Cyril Tuckfield, chief engineman, and Berry L. Cannon, electrical engineer, both of Panama City, Fla. Their first assignment on reaching the bottom was to check the exterior lines to both the SeaLab and the personnel transport capsule 30 feet away. Then they joined Carpenter and Eaton inside the SeaLab.

DESCENT TIME

It had taken Carpenter and Eaton just eight minutes to appear on the television camera connected to SeaLab after they disappeared from the surface off the fantail of the Berkone. After the first four, the next two to dive were Lt. Robert Sonnenburg, medical officer attached to mine defense laboratory at Panama City, and Billie L. Coffman, torpedoman's mate first class, of Willimanite, Conn.

They were followed by J. D. Skidmore, chief photographer, of Chula Vista, and Earl A. Murray, a diver at the Scripps Institution of Oceanography. The last two to dive were Thomas Clarke, a graduate student at Scripps, and Frederick Johler, chief engineman from Groton, Conn.

Before his dive to the SeaLab, Carpenter summed up his own version of the contrasts between life in space and life under the ocean.

Neither is dangerous, if it is done properly, Carpenter said. The stresses under which it puts men are different. In space the stress comes from weightlessness and in the SeaLab from the high atmospheric pressure under which men live.

It is possible that the high pressure may do more ultimate physical harm to a man than weightlessness, he said.

Capt. George Bond, the doctor in whose hands the scientific investigation and the responsibility for the welfare of the aquanauts rests, said that today would be devoted to "housekeeping" in the SeaLab.

It will be tomorrow when the heavy load of work and tests starts to effect the principal purpose of the operation. The men will do a multitude of tasks ranging from high speed arithmetic to trials of strength with a wrench and the performance of actual heavy construction on the sea floor.

A team of psychologists will constantly monitor the work by television and the men will fill out questionnaires to tell what part was hard and what was easy. The purpose is to find out what they can do and what changes are needed to make undersea work easier.

Water temperature in the vicinity of the SeaLab was reported by aquanauts as 50

From AUG 29 1965
INQUIRER
Philadelphia, Pa.

10 Men Enter Sealab, Hope For Gemini Chat

LA JOLLA, Calif., Aug. 28 (UPI).—Ten "aquanauts," including astronaut M. Scott Carpenter, on Saturday entered Sealab 2 at 205 feet below the Pacific Ocean's surface and hoped for a chat with the Gemini 5 astronauts.

The inner space-outer space chat was scheduled for 9:54 P.M. PDT (12:54 A.M. EDT).

Officials of the Sealab project, which will begin 45 days of underwater tests Sunday, said that before Carpenter's voice can be heard by the orbiting astronauts the Navy commander's voice must go through a "helium voice unscrambler."

VOICE AFFECTED

The pressure in the 57-foot steel cylinder is 6½ times greater than on the surface. This pressure affects the vocal cords and makes an aquanaut's voice high-pitched.

Carpenter, who will make the capsule his "home" for a month, was embraced by his wife, Rene, just prior to his descent to Sealab in a heavy black wet suit and SCUBA diving gear.

"It's a lot easier going into space," Mrs. Carpenter told newsmen.

45-DAY PROJECT

Carpenter, the second U. S. astronaut to orbit the earth, will remain the longest time in the cigar-shaped steel cylinder. The Sealab project will last 45 days.

The experiment was designed to test man's ability to live and work underwater for extended periods.

The depth of Sealab—205 feet and about 3000 feet offshore — requires breathing mixtures of 85 percent helium, 11 percent nitrogen and 4 percent oxygen to survive the pressure.

ROLE FOR TUFFY

A trained dolphin named Tuffy will go to work on the 18th day of the project, handling hoses and other equipment and guiding aquanauts back to the capsule.

Aquanauts will leave the chamber via a shark-proof cage to harvest fish and other marine life for study in aquariums attached to the cylinder.

Included in the tests will be an attempt to set up the first underwater weather station and to salvage a sunken Navy fighter plane.

10 AQUANAUTS BEGIN UNDER-OCEAN LIVING

Exclusive to The Times from a Staff Writer

LA JOLLA — Scott Carpenter, the world's first astro-aquanaut, descended 210 feet to the floor of the ocean here Saturday to launch Sealab 2—an ambitious effort to conquer the sea.

Carpenter, in a heavy black wet suit with SCUBA tanks strapped to his back, dived from the Sealab surface vessel, the USS Berkoni, at 1 p.m. and disappeared beneath the water less than a mile offshore. He will live in a three-room underseas apartment for a month.

Seconds later he was joined by fellow aquanauts Wilbur H. Eaton, Cyril A. Tuckfield and Barry Canon.

The four divers spent two minutes swimming to their glistening white home, a 57-foot steel, cigar-shaped capsul anchored on a ledge 210 feet beneath the catamaran tender Berkoni.

Forty minutes later the balance of the initial 10-ma Sealab team entered the wa ter. They were:

Navy Dr. Robert E. Sonnenburg, Billie L. Coffman Jay Dee Skidmore, Earl A Murray, Thomas A. Clark and Fred J. Johler.

The 10 aquanauts checke all systems aboard Sealab as they breathed the exot atmosphere of their unde seas home — 85% heliun 11% nitrogen and 4% oxygen.

Then Carpenter, a 39-yea old Navy commander, pr pared for the first radi hookup from the bottom the sea to outer space.

To Gemini 5

Carpenter, second Ameri can to orbit the earth, was set to salute his space buddies L. Gordon Cooper Jr and Charles Conrad Jr. saturday afternoon as they whizzed around the earth in their record-breaking flight aboard Gemini 5.

During the next 45 days the Navy will send three teams of 10 aquanauts each to live in Sealab 2 for periods of 15 days per team. Plans are for Carpenter to remain beneath the sea twice as long as any of the others.

NASA loaned Carpenter, a long-time skin diver, to the Sealab project to compare his reactions and physiological data in the hostile environments of inner and outer space.

"Equal dangers exist in whirling around the planet in a small capsule and living at the bottom of the sea," Carpenter said Saturday.

"Both are new frontiers being conquered for the first time by man."

The astro-aquanaut's attractive blond wife, Rene, is taking her husband's stay at the bottom of the sea with some apprehension.

"It's a lot easier going into space," she told newsmen minutes after embracing her husband and saying goodby.

In his Mercury space capsule when Carpenter orbited the earth three times on May 24, 1962, the atmosphere was similar to that on the surface of the world.

Living beneath the sea, aquanauts will exist in an environment where pressure will be 6½ times that at the surface.

Because the pressure inside Sealab is slightly higher than the outside water pressure, a 4-foot-wide bottom hatch will be open at all times in the capsule with no fear of the sea flooding the ocean apartment.

Seven of the 10 aquanauts who will live in Sealab are Navy divers. The three civilians aboard are Clarke and Murray, Scripps Institution of Oceanography divers and lab assistants, and Canon, diver and electronic engineer of Panama City, Fla.

Besides Clarke and Murray, one other Californian is in the initial aquanaut group, Skidmore, a Navy photographer who lives in Chula Vista.

Clarke at 25 is the youngest of the aquanauts in the first team, and Tuckfield, at 44, the oldest.

Aquanauts will free swim from their apartment two hours each day, performing 47 experiments and work projects in the sea surrounding the capsule.

They will exit through the bottom hatch into a screened "back porch"—a 30-foot cage into which aquanauts may take refuge if threatened by sharks.

Tuffy, an educated dolphin from the Navy's Point Mugu, will join the second team when the descend in two weeks. The 270-pound dolphin will be pressed into service in the ocean's depths as man's first non-human assistant trained to carry tools and rescue lines to aquanauts.

Aquanauts will mine ore on the sea's bottom; harvest fish; salvage and refloat a sunken jet fighter and build an undersea petroleum platform.

Their apartment consists of a bedroom-dining room with Pullman-type bunks, a scientific laboratory and a galley with stove, freezer and refrigerator. The aquanauts have 11 picture windows to look through to the sea.

Los Angeles, Calif.
Times
(Cir. D. 812,147 Sun. 1,149,295)

AUG 2 9 1965

Astronaut, Divers Begin 45-Day Tour In Steel Cylinder On Floor Of Pacific

Oregonian
Portland, Oregon
(Cir. D. 223.792 - S. 365,733)
AUG 29 1965

LA JOLLA, Calif. (AP) — Astronaut M. Scott Carpenter and three other divers plunged into the Pacific Saturday to start a 45-day underwater experiment Carpenter said could be "more damaging than space flight."

Before beginning the 205-foot dive to Sealab 2 on the ocean floor 1,000 yards off this southern California resort, Carpenter told newsmen "the excessive pressure at which we will live is a little more rigorous than space flight."

Asked what he meant by rigorous, Carpenter said:

"More damaging."

Carpenter will try to stay 30 days in the 12-by-58 foot steel cylinder as part of a Navy experiment to see how long men can function at extreme depths.

Record Predicted

A Navy spokesman said 30 days would be a record at such depth. Four men spent 11 days at a depth of 192 feet last year in Sealab 1 off Bermuda. Seven Frenchmen who spent 30 days living under water in the summer of 1963 were at a depth of 30 feet, the spokesman said.

The nine others of his team will be relieved at the end of 15 days. In all, three teams will man the underwater base in rotation over the next 45 days.

Carpenter entered the water at 1:43 p.m. with Navy divers Berry L. Cannon of Panama City, Fla.; Cyril J. Tuckfield of Panama City, and Wilbur H. Eaton of Ft. Lauderdale, Fla.

Nine minutes later they started popping up through a hatch in the bottom of Sealab 2.

Others following at intervals were:

Lt. Robert E. Sonnenburg, a Navy doctor of San Diego, Calif.; Thomas A. Clarke of the Scripps Institute of Oceanography, La Jolla; Earl Murray of Scripps; Navy diver Frederick J. Johler of Groton, Conn.; Navy photographer Jay Dee Skidmore of Chula Vista, Calif., and Navy diver Billie L. Coffman of Williamantic, Conn.

Carpenter reported some water had leaked into Sealab 2 around a port but said "this is a condition we can live with for a while."

There was little danger that a great amount of water would seep in. Sealab 2 is pressurized at slightly more than ocean pressure at that depth — 100 pounds per square inch, or about six times the pressure at sea level.

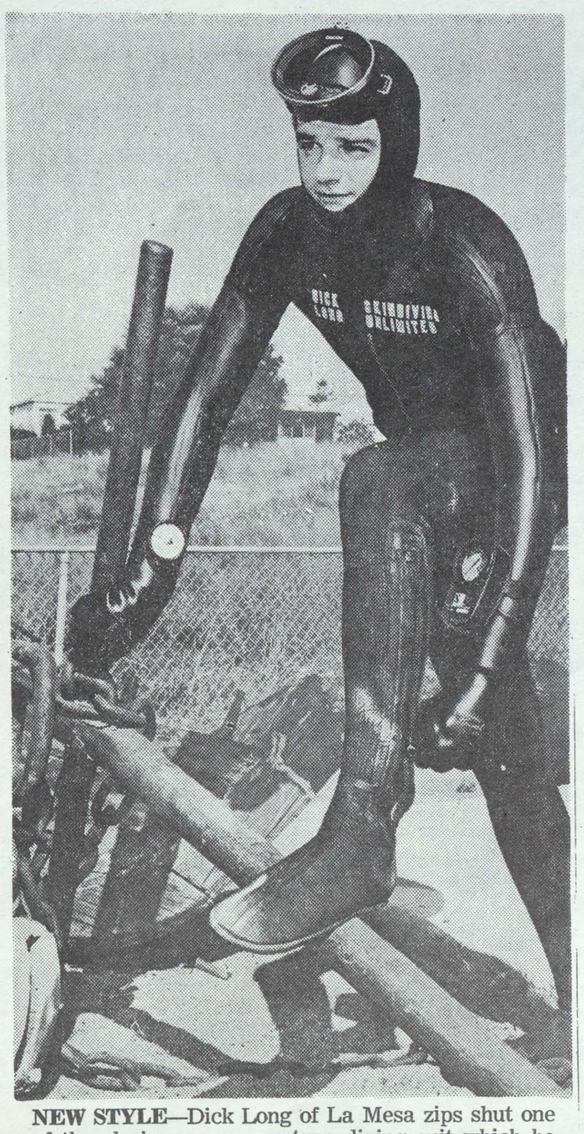
This is the excessive pressure Carpenter called damaging. He did not elaborate, but Navy officials said such extreme pressure forces atmospheric gases deep into human tissues. This can cause the crippling disease known as "the bends" unless divers take great care in decompressing slowly after they surface.



SCOTT CARPENTER, amidst battery of photographers on boat near San Diego, Calif., Saturday, prepares for 200-foot swim to Sealab II chamber on ocean floor. (AP)

65

SAN DIEGO
EVENING TRIBUNE
AUG 30 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California



NEW STYLE—Dick Long of La Mesa zips shut one of the closings on a new-type diving suit which he designed. The boots are attached directly to suit.

Dry Wetsuits Keep Aquanauts Warm

By BOB RODRIGUEZ
EVENING TRIBUNE Staff Writer

One problem facing Sealab II aquanauts is how to keep warm under water.

Dick Long of La Mesa has approached this problem in a unique way with a wetsuit he has been developing and testing since he began diving seven years ago near San Jose.

He has made wetsuits for 23 of the aquanauts, including Scott Carpenter and Bob Sheats. In addition, he has outfitted several topside men, such as Capt. George F. Bond, senior investigator, and Capt. Walter F. Mazzone, physiological measurements and atmosphere control officer.

Long's suits are like no others.

Boots Attached

"The boots are attached directly to the suit," he said. "The sole is stitched on so that it can easily be replaced when it wears out. Gussets in the legs allow easier entry and when the zipper is closed the legs fit snugly."

Long has found a way to use suspenders on the suit top, resulting in a better fit and enabling the bottom half of the suit to reach above the divers' chest. The hood and chin pocket on the jacket forms a water-tight seal around the face and alleviates tension around the neck.

No water may enter the suit unless the operator so desires.

"You could say that we no longer have a 'wet' wetsuit, but a dry wetsuit," Long said. "This adds to the heat-holding capability, a problem that has presented many difficulties."

One Solid Piece

Long has put zippers in his suits in such a way that when unzipped, there still is no break in the material. It is one solid piece.

The suits are made of quarter-inch oil-resistant neoprene, with vulcanized nylon. They are hand-made, custom-designed and tailored to meet individual preference.

Each suit is the result of 18-man hours. A sport diver's suit required three hours.

A further aid to warmth is an eighth-inch hood and jacket which goes under the regular suit.

Long said the suit couldn't have reached its present evolutionary stage without the help of others.

"One man couldn't have done it himself," he said. "John Beagles, diving officer for the Navy Electronics Laboratory, has helped me greatly. He tested the suit in arctic waters and has suggested many important changes."

How He Started

Long has been working also with Underwater Demolition Team divers under Chief Warrant Officer Kenneth Specht of El Cajon. The group tests equipment for UDT-11 and 12 and the Seal Team, based at the Coronado Amphibious Base.

Why did Long begin working with wetsuits?

"I was cold," he said. "The temperature of the water I first dived in was 50 degrees. So I started experimenting."

AUG 30 1965
POST-GAZETTE
Pittsburgh, Pa.

Endurance 205 Ft. Down

Aquanauts Keep House On Floor of Pacific

By RALPH DIGHTON
Associated Press Staff Writer

LA JOLLA, Calif., Aug. 29—Ten divers held a brief prayer service today in Sealab 2—205 feet below the surface of the Pacific at the start of a 45-day test of man's underwater endurance.

The men piled into their bunks last night shortly after team leader M. Scott Carpenter talked by radiophone hookup with astronaut L. Gordon Cooper in the then orbiting Gemini 5 spacecraft at 11:28 p. m.

Carpenter, a Navy commander who is a veteran in both space and the deep sea, wished a safe re-entry to Cooper and his partner, Charles Conrad Jr., and reported: "Looks like our mission will be a success."

The divers entered their 12-by-58-foot steel cylinder abode yesterday on the ocean floor 1,000 yards from this Southern California resort and immediately started housekeeping.

Like a Camp-Out

On closed-circuit television screens in the support vessel above, the scene was remarkably like a group of men camping out in a house trailer.

Today, after six hours' sleep, the aquanautst reported they were rested and that "everything is going well."

Capt. George Bond, medical director of the project, said there was only one significant change from the original schedule: The men were keeping the temperature in the Sealab 15 degrees lower than planned—at 75 degrees fahrenheit instead of 90.

Four other divers, who spent 11 days in Sealab 1 at 193 feet off Bermuda last year, needed 90 degrees for comfort. this had been expected in Sealab 2.

Dr. Bond said it was "remarkable" that the divers preferred 75 degrees this time but had no explanation. The waters off Bermuda average 30 degrees warmer than the 50-degree water outside Sealab 2.

The temperature can be raised at any time by electric heaters in Sealab 2.

Bond said the divers made made short exploratory trips outside their sea floor hut and found the water much clearer than they had expected.

"The visibility is surprisingly good," Bond said, "and there is an abundance of sea life for them to study."

He said the men would be mostly on their own during the day, with a few going through tests of manipulative ability in deep water.

Brain Waves Checked

Four men who had electrodes attached to their heads prior to the descent were scheduled to connect them to a device which records brain waves.

Scientists ashore will study the wave patterns to see if there are any changes due to living and working at pressure six times that of sea level.

The four are Navy divers Wilbur Eaton and Berry L. Cannon of Panama City, Fla.; Billy L. Coffman of Willimantic, Conn., and Earl Murray, a diver at Scripps Institution of Oceanography at La Jolla.

Other in Sealab 2 include Lt. Robert Sonnenburg of nearby San Diego, a medical officer; Thomas Clarke, a graduate student at Scripps, and Navy divers Cyril Tuckfield of Panama City, J. D. Skidmore of Chula Vista, Calif., and Frederick Johler of Groton, Conn.

Carpenter will try to stay down 30 days. Other members of his team will be relieved at the end of 15 days by nine others, who in turn will yield their places 15 days later to 10 more. Sonnenburg expects to go down for a second 15-day tour with the third team.

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)
AUG 30 1965

Sealab—Prayers And Tests

LA JOLLA — (AP) — Ten divers held a brief prayer service yesterday in Sealab face of the Pacific — at the startof a 45-day test of man's underwater endurance.

The men piled into their bunks Saturday night shortly after team leader M. Scott Carpenter talked by radiophone hookup with Astronaut L. Gordon Cooper in the then orbiting Gemini-5 spacecraft.

Carpenter, a veteran both in space and in the deep sea, wished a safe re-entry to Cooper and his partner, Charles Conrad Jr., and reported: "Looks like our mission will be a success.

After six hours' sleep, the aquanauts reported they were rested and that "everything is going well."

Capt. George Bond, medical director of the project, said the men were keeping the temperature 15 degrees lower than planned—at 75 degrees Fahrenheit instead of 90.

Four other divers, who spent 11 days in Sealab-1 at 193 feet off Bermuda last year, needed 90 degrees for comfort. This has been expected in Sealab-2.

Dr. Bond had no explanation of the temperature change. The waters off Bermuda average 30 degrees warmer than the 50-degree water outside Sealab-2.

Temperature is regulated by electric heaters.

Bond said the divers made short exploratory trips outside their sea floor hut and found the water much clearer than they had expected.

"There is an abundance of sea life for them to study," Bond said.

Aquanauts Begin 2nd Day in Sea

LA JOLLA (UPI)—Ten aquanauts, including astronaut M. Scott Carpenter, today began their second consecutive day underwater in Sealab 2 to determine how man can live and function during prolonged periods below the sea.

A spokesman for the Man-in-the-Sea Project said the condition of the 10 aquanauts was "very good. The atmosphere inside the Sealab is well within the normal limits. They're very comfortable at 75 degrees Fahrenheit."

The aquanauts today were completing scientific checkouts of the 200-ton, 57-foot-long Sealab 2 and planned to assist in installation of the communications module in the Benthic Laboratory.

The Benthic Laboratory, which looks like the top of a mushroom, contains an underwater telemetry system for relaying to the surface all auxiliary communications between the aquanauts and scientists above.

Rig Up System

Yesterday, the aquanauts rigged up a trolley car system between the staging vessel and Sealab 2. They also checked out the personnel transfer capsule.

The aquanauts will use the capsule to return to the surface at the end of their undersea stints, ranging from 15-30 days. The capsule—a portable decompression chamber—also would serve in an emergency should it become necessary for one of the aquanauts to be taker to the surface in a hurry.

At the end of their stints, the aquanauts were expected to undergo at least 33 hours decompression to prevent bends, a diver's illness caused by pressure differences in going from the depths to sea level and above.

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EVENING TRIBUNE
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Eleventh Naval District
San Diego, California

AUG 30 1965
FREE PRESS
Detroit, Mich.

10 Divers Begin Test In Sealab

LA JOLLA, Calif. — (AP) — Ten divers held a brief prayer service Sunday in Sealab 2,205 feet below the surface of the Pacific at the start of a 45-day test of man's underwater endurance.

The men piled into their bunks Saturday night shortly after team leader M. Scott Carpenter talked by radiophone hookup with Astronaut L. Gordon Cooper in the then-orbiting Gemini 5 spacecraft.

* * *

THE DIVERS entered their 12-by-58-foot steel cylinder Saturday on the ocean floor 1,000 yards from this Southern California resort and immediately started housekeeping.

After six hours' sleep, the aquanauts reported Sunday that they were rested and that "everything is going well."

Capt. George Bond, medical director of the project, said there was only one significant change from the original schedule: the men were keeping the temperature in the Sealab 15 degrees lower than planned — at 75 degrees fahrenheit instead of 90.

Bond said the divers made short exploratory trips outside their sea floor hut and found the water much clearer than they had expected.

"The visibility is surprisingly good," Bond said, "and there is an abundance of sea life for them to study."

He said the men would be mostly on their own during the day, with a few going through tests of manipulative ability in deep water.

Carpenter will try to stay down 30 days. Other members of his team will be relieved at the end of 15 days by nine others, who in turn will yield their places 15 days later to others.

— TIMES STAR 8/30/65 —

Another First: Astronaut Talks With an Aquanaut

HOUSTON, Tex. (AP)—An asttronaut in the Geminin 5 space capsule and an aquanaut in the Sealab 2 beneath the Pacific talked to each other early yesterday—the first conversation between a man in space and a man on the floor of the ocean.

The conversation was between L. Gordon (Gordo) Cooper Jr. in the Gemini 5 and M. Scott Carpenter in the Sealab 2.

Carpenter, himself an astronaut, has flown in space.

The Sealab was resting on the floor of the Pacific Ocean, 205 feet beneath the surface and about 1,000 yards off the shores of La Jolla, Calif.

Carpenter in Falsetto

From deep beneath the surface of the ocean, Carpenter's voice came through in falsetto. Space agency officials said this was caused by the effect on the vocal chords of the Sealab 2's mixture of oxygen and helium for breathing.

The conversation, on the 117th orbit of the gemini 5 went like this:

Cooper — "Hello Selab. Gemini 5."

Carpenter — "Hello. . . . How do you read, Gordo?

Cooper — "Good, how you doing, Scott?"

Carpenter — "Roger, Gordo. You're doing a great job. We just got down this afternoon and we haven't had a chance to tell you what a great job you guys are doing. We hope you have a very pleasant re-entry shortly. Over."

"Things Going Well"

Cooper—"Fine. Very shortly."

Carpenter — (Answer garbled).

Cooper — "Oh, good to hear from you down there. How are you doing?"

Carpenter — "Roger, Gordo. Things are going very well. We occupied Sealab about six hours ago . . . eight hours ago. It took us a little while to get set up and (fade) a lot of sea life to study. The Sealab is in good condition and we're looking forward to (fade)."

Cooper — "What did he say? I'm getting where I can't here him."

Aquanauts Say View Is Tremendous

LA JOLLA, Calif. (AP)—Ten aquanauts finish setting up housekeeping today for their 15 days of a 45-day endurance test in Sealab 2, 205 feet below the Pacific Ocean surface.

Then they'll swim out to help hook up a communications and data- gathering unit on the side of their undersea trailer.

"Our views of marine life are tremendously exciting," team leader M. Scott Carpenter reported to the surface Sunday.

"Visibility down here is much greater than we had hoped for," he said. "We should be extremely successful with our marine biology experiments."

Unusually clear water now surrounds the undersea craft, giving the aquanauts 60 to 70 feet visibility, a Navy spokesman said.

The divers descended Saturday to their 12 x 58-foot steel cylinder on the ocean floor 1,000 yards from this Southern California resort. They wore skin-diving gear.

Using underwater breathing apparatus, they later swam to a rocket-shaped personnel transfer capsule 30 feet away to inspect its workings. The capsule will be used to bring the aquanauts to the surface in emergencies or for final decompression on ascending at the end of their tours.

SAN DIEGO
EVENING TRIBUNE
AUG 30 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

Divers Get in Swim Of Sealab Routine

By LEO BOWLER
EVENING TRIBUNE Science Writer

The 10 aquanauts in Sealab II completed checks of their undersea home today and began installing more equipment on the ocean floor around them.

The 10, led by Navy Cdr. Scott Carpenter, 40, entered their new quarters Saturday afternoon and spent a relatively uneventful day 205 feet beneath the sea yesterday.

They had time for Sunday prayers, an undersea haircut, regular meals, sorties into the sea around them, and a little rest from the long hours of work spent over the past few weeks getting ready for their stay underwater.

If all goes well, the 10 will stay down until Sept. 12. All but Carpenter will then come to the surface and other divers will take their place. Carpenter will stay down 30 days.

Sealab, located 3,000 feet off Scripps Pier in La Jolla, will be occupied continuously until Oct. 12.

The aquanauts stayed up Saturday night to listen to Carpenter's historic conversation with Gordon Cooper, a fellow astronaut, orbiting the earth in the Gemini 5 space capsule.

The conversation was at 11:26 p.m. and was brief. Carpenter told Cooper that it "looks like our mission will be a success."

The aquanauts, with the exception of two on watch, were asleep by midnight Saturday, and got up Sunday at 6 a.m.

They were led in a brief prayer by Capt. George Bond, principal investigator for the project. Bond sat in his control center aboard the mother ship Berkone for the service. He can watch the aquanauts by closed-circuit television from the center, and communicate with them in writing as well as by telephone.

Yesterday, Chief Engineman Cyril J. Tuckfield, 43, had his hair cut by fellow aquanaut Gunner's Mate Wilbur H. Eaton, 39. Tuckfield had planned to have his hair cut as soon as possible after entering Sealab.

"It's cheaper down there," he told reporters before leaving the Berkone.

Bond reported today that Tuckfield got his money's worth.

"Tuck really got skinned," Bond said. "But there will be plenty of time for it to grow back. He won't be going anywhere for two weeks, anyway."

Bond said he left the aquanauts alone as much as possible yesterday so they could rest for the week's work coming up.

However, the men completed checks on the personnel transfer capsule in which they will ride to the surface two weeks from now, and completed installation of a dumb waiter in which they can receive needed items from the surface.

One of the first items sent down was a machine to take brain wave patterns. Four of the aquanauts, Eaton, Berry L. Cannon, 30, an electronics engineer, Torpedoman's Mate Billie L. Coffman, 36, and Earl Murray, 37, a lab assistant from Scripps Institution of Oceanography, had electrodes taped to their heads before leaving the Berkone.

The mahine was hooked to the electrodes last night for the test. It was to be returned to the Berkone by way of the dumb waiter after completion of the tests.

During their first hours underwater, the aquanauts ate the standard meals served aboard submarines. Some of the food is canned and much of it is frozen. They have an electric stove and a refrigerator in the galley aboard Sealab. Tuckfield was the first cook. The duty will be rotated.

The aquanauts reported that the water was much clearer than they had expected. Officials of the project explained that a mass of especially clear water had moved into the area during the first hours of the project.

SEA FLOOR SERVICES INCLUDE NEW PRAYER

Here is the special Sealab prayer around which the aquanauts built their Sunday service yesterday. It was written by Navy Capt. George Bond, who conducted the service from the mothership Berkone.

"Almighty God, who declared through Holy Scripture that mankind would one day acquire dominion over the seas and the creatures therein, grant that this day fulfillment of Thy word is at hand.

"To the brave and dedicated men who have committed themselves to this project, grant Thine unending watch and safeguarding care in all the hours of their life under the sea. Give unusual wisdom to each of us topside who might somehow control their work and safety as they perform their duties below.

"And when their work and Thy will together be done, grant us all a safe and worthy respite from our labors for a time to come. We ask all of this in the name of Jesus Christ our Lord, Amen."

Hold Sealab Prayer Service On Ocean Floor

LA JOLLA, Calif. (AP)—SUN-TIMES Chicago, Ill.

Ten divers held a brief prayer service Sunday 205 feet below the surface of the Pacific at the start of a 45-day test on man's underwater endurance.

The men piled into their bunks in Sealab 2 Saturday night shortly after team leader M. Scott Carpenter talked by radiophone hookup with astronaut Leroy Gordon Cooper Jr. in the then orbiting Gemini 5 spacecraft.

Carpenter, a Navy commander who is a veteran in both space and the deep sea, wished a safe re-entry to Cooper and his partner, Charles (Pete) Conrad Jr., and reported: "Looks like our mission will be a success.

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Like Camping Out

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Capt. George Bond, medical director of the project, said there was only one significant change from the original schedule: the men were keeping the temperature in the Sealab 15 degrees lower than planned—at 75 degrees fahrenheit instead of 90.

Four other divers, who spent 11 days in Sealab 1 at 193 feet off Bermuda last year, needed 90 degrees for comfort. This had been expected in Sealab 2.

No Explanation

Dr. Bond said it was "remarkable" that the divers preferred 75 degrees this time but had no explanation. The waters off Bermuda average 30 degrees warmer than the 50-degree water outside Sealab 2.

The temperature can be raised at any time by electric heaters in Sealab 2.

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"The visibility is surprisingly good," Bond said, "and there is an abundance of sea life for them to study."

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Scientists ashore will study the wave patterns to see if there are any changes due to living and working at pressure six times that of sea level.

Aquanauts Listed

The four are Navy divers Wilbur Eaton and Berry L. Cannon of Panama City, Fla.; Billy Lo Coffman of Willimantic, Conn., and Earl Murray, a diver at Scripps Institution of Oceanography at La Jolla.

AUG 30 1965

Others in Sealab 2 include Lt. Robert Sonnenburg of nearby San Diego, a medical officer; Thomas Clarke, a graduate student at Scripps, and Navy divers Cyril Tuckfield of Panama City, J. D. Skidmore of Chula Vista, Calif., and Frederick Johler of Groton, Conn.

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10 Aquanauts Enter Sealab In Pacific

LA JOLLA, Calif., Aug. 28 (UPI) — Ten "aquanauts," including astronaut M. Scott Carpenter, entered Sealab 2 at 205 feet below the Pacific Ocean's surface.

Carpenter, the second U.S. astronaut to orbit the earth, will remain the longest time in the cigar-shaped steel cylinder. The Sealab project will last 45 days.

The experiment was designed to test man's ability to live and work underwater for extended periods.

The depth of Sealab—205 feet and about 3,000 feet offshore—requires breathing mixtures of 85 per cent helium, 11 per cent nitrogen and 4 per cent oxygen to survive the pressure.

A trained dolphin named Tuffy will go to work on the 16th day of the project, handling hoses and other equipment and guiding aquanauts back to the capsule.

INCLUDED IN the tests will be an attempt to set up the first underwater weather station and to salvage a sunken Navy fighter plane.

A team of psychiatrists, using closed-circuit television, will study the aquanauts' strength and efficiency.

The Sealab 2 project will not be a record setter. Officials emphasized the purpose was to determine how well humans can perform useful work underwater.

Sealab 1 was submerged 196 feet under the surface of the Atlantic Ocean near Bermuda last year. Four Navy divers stayed in it for 11 days.

Previous underwater explorers have gone as deep as 35,000 feet and remained submerged for as long as one month.

From AUG 29 1965

From AUG 29 1965
PRESS
PITTSBURGH, P

4 Aquanauts Begin Voyage Down Under

Carpenter Swims 200 Feet Below For Sealab Trip

LA JOLLA, Calif., Aug. 28 (UPI) — M. Scott Carpenter and three other men swam down 200 feet today and entered Sealab-2, a 57-foot steel cylinder that will be the ocean "home" for the astronaut for a month.

Six more "aquanauts" were to enter the Sealab in pairs later today.

A conversation from the "inner space" depths to outer space with the orbiting Gemini-5 astronauts was postponed from this afternoon to a time when the most favorable conditions were expected.

Astronaut Carpenter, the second American to orbit the earth, will remain the longest time in the cigar-shaped steel cylinder. The project will last 45 days.

The experiment was designed to test man's ability to live and work under water for extended periods.

The depth of Sealab — 205 feet and about 3000 feet offshore — requires breathing mixtures of 85 per cent helium, 11 per cent nitrogen and 4 per cent oxygen because of the pressure.

A trained dolphin named "Tuffy" will go to work on the 16th day of the project, handling hoses and other equipment and guiding aquanauts back to the capsule.

Included in the test will be an attempt to set up the first underwater station and to salvage a sunken Navy fighter plane.

A team of psychiatrists, using closed-circuit television, will study the aquanauts' strength and efficiency.

The Sealab-2 project will not be a record setter. Officials emphasized the purpose was to determine how well humans can perform useful work under water.

Sealab-1 was submerged 196 feet under the surface of the Atlantic Ocean near Bermuda last year. Four Navy divers stayed in it for 11 days.

Previous underwater explorers have gone as deep as 35,000 feet and remained submerged for as long as one month.

TEST BEGINS IN SEALAB 2

8/31/65
Baltimore Sun

Carpenter And Companions Start Long Experiment

La Jolla, Cal., Aug. 28 (AP) — Astronaut M. Scott Carpenter and three other divers plunged into the Pacific today to start a 45-day underwater experiment Carpenter said could be "more damaging than space flight."

Before beginning the 205-foot dive to Sealab 2 on the ocean floor 1,000 yards off this Southern California resort, Carpenter said "the excessive pressure at which we will live is a little more rigorous than space flight."

Asked what he meant by rigorous, Carpenter said:

"More damaging."

Carpenter will try to stay 30 days in the 12-by-58-foot steel cylinder as part of a Navy experiment to see how long men can function at extreme depths.

Other Experiments

A Navy spokesman said 30 days would be a record at such depth. Four men spent 11 days at a depth of 192 feet last year in Sealab 1 off Bermuda. Seven Frenchmen who spent 30 days living under water in the summer of 1963 were at a depth of 30 feet, the spokesman said.

The nine others of his team will be relieved at the end of fifteen days. In all, 3 teams will man the underwater base in rotation over the next 45 days.

Carpenter's planned talk by radio-telephone with fellow astronaut L. Gordon Cooper in the orbiting Gemini 5 spacecraft was delayed to 9.54 P.M.

Carpenter entered the water at 1.43 P.M. with Navy divers Berry L. Cannon, of Panama City, Fla.; Cyril J. Tuckfield of Panama City, and Wilbur H. Eaton, of Fort Lauderdale, Fla.

Nine munutes later they started popping up through a hatch in the bottom of Sealab 2.

Others following at intervals were:

Lt. Robert E. Sonnenburg, a Navy doctor of San Diego, Cal.; Thomas A. Clarke, of the Scripps Institution of Oceanography, La Jolla; Earl Murray, of Scripps; Navy diver Frederick J. Johler, of Groton, Conn.; Navy photographer Jay Dee Skidmore, of Chula Vista, Cal., and Navy diver Billie L. Coffman, of Willimantic, Conn.

Little Danger Seen

Carpenter reported some water had leaked into Sealab 2 around a port but said "this is a condition we can live with for a while."

There was little danger that a great amount of water would seep in. Sealab 2 is pressurized at slightly more than ocean pressure at that depth—100 pounds a square inch, or about 6 times the pressure at sea level.

This is the excessive pressure Carpenter called damaging. He did not elaborate, but Navy officials said such extreme pressure forces atmospheric gases deep into human tissues. This can cause the crippling disease known as "the bends" unless divers take great care in decompressing slowly after they surface.

Sealab Checked

Before entering the water, Carpenter, a Navy commander and a veteran diver, said "I don't think it will be very hard to stay down 15 to 30 days. You make this sort of thing as safe as you want to."

The divers planned to spend the first 24 hours in what they called housekeeping duties, checking the Sealab's power and communications lines and getting it ready for the long occupancy.

First Day Is 'Light' For SeaLab Team

By BRYANT EVANS
The San Diego Union's Science Writer

Clearing water and large numbers of fish were reported by SeaLab II aquanauts yesterday, their first day of residence under 205 feet of water off Scripps Pier.

Capt. George Bond, topside commander of the operation, said that the aquanauts purposely were given a light program on this first day. They spent it getting accustomed to their new habitat, checking out life support systems and checking gear both inside and outside the 58-foot long cylinder.

The 10 aquanauts were all up and about at 6 a.m. Bond said that all of them had stayed up for the conversation between the group captain, Cmdr. M. Scott Carpenter, and L. Gordon Cooper Jr. in Gemini 5 at 11:28 Saturday night. But, except for two who had the watch, all were in bed by midnight.

Some of them during the day began cautious explorations outside the 12-by-58 foot steel cylinder which will be their home for the next 15 days.

They left the chamber through a shark - proof cage from which they will harvest fish and other marine life for study. They reported clearer water, and better visibility, than expected.

Although the project will last 45 days, each of the aquanauts, except Carpenter, will stay below for only 15 days. Carpenter will make the chamber his "home" for 30 days.

During the day a trolley supply system was rigged between SeaLab and the mother ship, the Berkone. An airtight canister is raised and lowered along a taut guideline that connects the cage around the entry of the SeaLab with the fantail of the Berkone.

One of the first shipments to be sent down contained equipment to record the brain waves of four of the aquanauts — Wilbur H. Eaton, Berry L. Cannon, Billie Coffman and Earl A. Murray. All four had had electrode leads attached to their scalp before leaving the surface.

The electro-encephalograph tracing to be recorded will be studied by Dr. C. W. Sem-Jacobsen, Oslo, Norway, who is here to make the study.

Sunday was observed with the reciting of the SeaLab prayer by Bond over the communication link to the SeaLab. Bond wrote the prayer for SeaLab I last year. It is as follows: "Almighty God, who declared through Holy Scripture that mankind would one day acquire dominion over the seas, and the creatures therein, grant that this day fulfillment of Thy word is at hand. To the brave and dedicated men who have committed themselves to this project, grant Thine unending watch and safeguarding care in all of the many hours of their life under the sea. Give unusual wisdom to each of us topside who might somehow control their work and safety as they perform their duties below. And when their work and Thy will together be done, grant us all a safe, worthy respite from our labors for a time to come. We ask all of this in the name of Jesus Christ our Lord."

On the lighter side the day was marked by the project's first undersea haircut. Eaton performed on the locks of Cyril Tuckfield. Persons who watched the result over closed circuit television said it is just as well that Tuckfield has two weeks to grow new hair before coming up.

Bond reported that the temperature was 75 degrees and comfortable.

The entire SeaLab project passed under the local command of Capt. Ray Sencer of the Office of Naval Research. He will act in place of Capt. Lewis Melson, who returned to Washington yesterday. Melson remains project director.

From AUG 29 1965

POST, Denver, Colo.

AUG 30 1965

Aquanauts Prepare Sea Home

LA JOLLA, Calif. — (AP) — Ten aquanauts finish setting up housekeeping Monday for their 45-day endurance test in Sealab 2, 205 feet below the Pacific Ocean surface.

Then they'll swim out to help hook up a communications and data-gathering unit on the side of their undersea trailer.

"Our views of marine life are tremendously exciting," team leader M. Scott Carpenter radioed to the surface Sunday.

"Visibility down here is much greater than we had hoped for," he said. "We should be extremely successful with our marine biology experiments."

A mass of unusually clear water now surrounds the undersea craft, giving the aquanauts 60 to 70 feet visibility, a Navy spokesman said.

"During preliminary dives, the water was so murky, they could see only about 20 feet," he said.

The divers descended Saturday to their 12-by-58-foot steel cylinder on the ocean floor 1,000 yards from this Southern California resort. They dove down wearing skin-diving gear.

Using underwater breathing apparatus, they later swam to a rocket-shaped personnel transfer capsule 30 feet away to inspect its workings. The capsule, clearly visible from Sealab 2, will be used to bring the aquanauts to the surface in emergencies or for final decompression on ascending at the end of their tours.

Four men who had electrodes attached to their heads prior to descent plugged them into black boxes to record their brain waves Sunday.

The test was the first of a series scientists will conduct to see whether wave patterns vary due to living and working at pressure six times that of sea level.

Los Angeles, Calif.
Times
(Cir. D. 812,147 Sun. 1,149,295)

AUG 30 1965

AQUANAUTS COMPLETE FIRST DAY IN SEALAB

Exclusive to The Times from a Staff Writer

LA JOLLA — Ten aquanauts completed their first day aboard Sealab 2, 205 feet below the surface of the Pacific here Sunday, delighted with the start of their undersea adventure.

"Our views of marine life are tremendously exciting," said astronaut M. Scott Carpenter, leader of the project, in a message to the surface.

"Visibility down here is much greater than we had hoped for. We should be extremely successful with our marine biology experiments."

The project, said Capt. George Bond, medical director, was proceeding according to schedule, with only one significant change—the temperature aboard the 12-foot by 58-foot cylinder was reduced from the preselected 90 degrees Fahrenheit to 75 degrees at the request of the aquanauts.

The 10 aquanauts entered the undersea capsule Saturday for the 45-day test of underwater endurance.

AUG 30 1965
POST-DISPATCH
St. Louis, Mo.

WASH STAR Sunday 8/29/65

Astronaut, Divers Start 45-Day Undersea Test

LA JOLLA, Calif. (AP)— Astronaut M. Scott Carpenter and three other divers plunged into the Pacific Saturday to start a 45-day underwater experiment Carpenter said could be "more damaging than space flight."

Before beginning the 205-foot dive to Sealab 2 on the ocean floor 1,000 yards off this Southern California resort, Carpenter told newsmen, "The excessive pressure at which we will live is a little more rigorous than space flight."

Asked what he meant by rigorous, Carpenter said:

"More damaging."

Carpenter will try to stay 30 days in the 12-by-58 foot steel cylinder as part of a Navy experiment to see how long men can function at extreme depths.

A Navy spokesman said 30 days would be a record at such depth. Four men spent 11 days at a depth of 192 feet last year in Sealab 1 off Bermuda. Seven Frenchmen who spent 30 days living under water in the summer of 1963 were at a depth of 30 feet, the spokesman said.

The nine others of Carpenter's team will be relieved at the end of 15 days. In all, three teams will man the underwater base in rotation over the next 45 days.

Carpenter entered the water at 1:43 p.m. with Navy divers Berry L. Cannon of Panama City, Fla.; Cyril J. Tuckfield of Panama City, and Wilbur H. Eaton of Ft. Lauderdale, Fla.

Nine minutes later they started popping up through a hatch in the bottom of Sealab 2.

Others following at intervals were:

Lt. Robert E. Sonnenburg, a Navy doctor of San Diego, Calif.; Thomas A. Clarke of the Scripps Institute of Oceanography, La Jolla; Earl Murray of Scripps; Navy diver Frederick J. Johler of Groton, Conn.; Navy photographer Jay Dee Skidmore of Chula Vista, Calif., and Navy diver Billie L. Coffman of Willimantic, Conn.

INTREPID AQUA-MOUSE

Hero Diverodent In SeaLab (j.g.)

Picture—Page B

". . . In last week's adventure Aqua-Mouse had just finished being briefed before his descent to the watery depths. His air supply, food rations and protection against narcosis — rapture of the deep — were inspected and approved by the science team of Combes and Grabow . . . all was in readiness for H-Hour."

And H-Hour has been going on several times in the past week at the residence of Guy Combes, 2528 Burgener Blvd., where Charles (Corky) Combes, 10, and Robert (Robin) Grabow, 13, 2516 Burgener Blvd., have been experimenting with their backyard SeaLab in the Combes' pool.

Their diving chamber is a 20-ounce pickle jar. The ballast is three inches of concrete in the bottom of the jar. They've installed an air input line and an exhaust line for returning used air to the surface. The air is pumped down to the diving chamber by a miniature air compressor formerly used to aerate an aquarium. And their aquanaut . . . er . . . uh . . . aqua-mouse . . . is a tiny gray fieldmouse named "Daffy."

Daffy has been to the bottom of the pool so many times it isn't even interesting any more. Daffy has been more than 20 times. He thrives well in his submarine environment, even eats and sleeps down there.

How is this known? Simple. The boys lower him to the bottom of the pool, check to make sure everything is going OK, and then dive down with masks and swim fins to observe just what is going on.

So far, everything is going well. And how does Daffy like it down there?

Fine, man, fine.

No cats to worry about in nine feet of water.

10 Aquanauts in Sealab 2 Begin Exploration on Floor of Ocean

LA JOLLA, Calif., Aug. 30 (UPI)—Ten aquanauts, including astronaut M. Scott Carpenter, left their underwater laboratory, Sealab 2, today to explore the ocean floor.

The Sealab is submerged 205 feet beneath the ocean's surface in a 45-day test to determine how man can live and function in prolonged periods below the sea.

The aquanauts, wearing scuba gear, left the Sealab this morning to conduct what project officials called area cleanup and general area reconnaissance of the ocean floor.

They were expected to spend a total of 7½ hours outside the cylinder today.

A spokesman for the man-in-the-sea project said the condition of the 10 aquanauts was "very good. The atmosphere inside the Sealab is well within the normal limits. They're very comfortable at 75 degrees fahrenheit."

The aquanauts were completing scientific checkouts today of the 200-ton, 57-foot-long Sealab 2 and planned to assist in installation of a communications module in the benthic (sea bottom) laboratory.

The benthic laboratory, which looks like the top of a mushroom, contains a telemetry system for relaying to the surface all auxiliary communications between the aquanauts and scientists above.

Yesterday, the aquanauts rigged up a trolley car system between the staging vessel and Sealab 2. They checked out the personnel transfer capsule.

The aquanauts will use the capsule to return to the surface at the end of their undersea stints, ranging from 15 to 30 days. The capsule—a portable decompression chamber—would also serve in an emergency should it become necessary for one of the aquanauts to be taken to the surface in a hurry.

The aquanauts were split into three teams for the 45-day experiment. Carpenter is to be the only aquanaut to spend 30 consecutive days underwater. He will remain submerged 15 days with team No. 1 and 15 days with team No. 2. Lt. Robert E. Sonnenburg, a Navy doctor from Panama City, Fla., was to spend a total of 30 days undersea, 15 with team No. 1 and 15 with team No. 3.

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...And Aqua-Mouse, Too



—San Diego Union Staff Photo

Backyard "SeaLab" experiment features "Daffy," the aqua-mouse, and scientist Robert Grabow, 13, and his assistant, Charles (Corky) Combes, 10. Daffy has been to bottom of pool often. (Story on a-40.)

Wash Post 8/30/65

Space-to-Ocean Floor Conversation Is Held

Astronauts L. Gordon Cooper Jr. and Charles (Pete) Conrad Jr. spent the last hours of their Gemini 5 mission, like any returning traveler, packing their gear and saying goodby to those they had met on their journey. Here is a chronological account of their final orbits, with times in Eastern Daylight:

113th through 116th Orbits

This period from 8:03 p.m. Saturday to 2:24 a.m. Sunday was generally quiet, as the spacecraft drifted toward the end of its 3,338,200-mile flight. The astronauts concluded their last experiments and prepared for their landing.

117th Orbit—2:24 a.m.

The first conversation between space and the ocean floor was recorded as Cooper in Gemini 5 talked with astronaut-aquanaut M. Scott Carpenter in the Sealab 2, which is 205 feet down in the Pacific off LaJolla, Calif. Carpenter, who made one of the earlier solo Mercury space flights, is conducting tests in underwater living. His voice came through in a falsetto, caused, space officials said, by the effect on vocal cords of the sealab's mixture of oxygen and helium for breathing.

Cooper: "Hello Sealab. Gemini 5."

Carpenter: "Hello. How do you read Gordo?"

Cooper: "Good. How you doing, Scott?"

Carpenter: "Roger, Gordo. You're doing a great job. We just got down this afternoon and we haven't had a chance to tell you what a great job you guys are doing. We hope you have a very pleasant reentry shortly."

Cooper: "Fine. Very shortly."

Midway through the 117th orbit, the Carnarvon tracking station in Australia ran a radar re-entry test with Gemini 5 and said all systems looked good on the ground. Conrad reported:

"Everything is go up here."

118th Orbit—4 a.m.

Ground control at Houston recommended that the astronauts begin stowing their gear in preparation for landing. Cooper reported that the fuel gauge for maneuvering the spacecraft in its orbit showed empty, as it must before reentry. Cooper also reported that he had had a two-hour nap, eaten a meal and felt fine.

119th Orbit—5:35 a.m.

Cooper told a tracking station in Mexico that everything in Gemini 5 was "peachy keen" and thanked the ground crew for their help during the eight-day flight.

Conrad told Houston the Gemini 5 was all set to come down after the next orbit.

Conrad: "And we even got everything stowed."

From ROCKY MOUNTAIN NEWS Denver, Colo. AUG 31 1965

10 Sealab Aquanauts Spend Working Day Under Water

SAN DIEGO, Calif., Aug. 30 —(UPI)—Ten Sealab 2 aquanauts, including Astronaut M. Scott Carpenter, spent an unconventional 8-hour work day in a Jules Verne underwater setting Monday.

It was the second full day of experimentation planned for Sealab 2 over a 45-day span. Purpose of the project, which also will involve a porpoise named Tuffy, is to determine man's ability to adapt to an underwater environment.

The 10 actually descended Saturday, but Navy spokesman said this will not count as one day as far as the project is concerned.

Sealab 2, a cylinder-like laboratory resting on a shelf 205 feet below the surface, is to be Carpenter's home for 30 consecutive days. No other man will spend more than 15 days at one time.

Today's schedule called for the team to spend 7½ hours outside of the chamber. For 3½ hours Monday morning, the divers—out-fitted in scuba gear —conducted what the Navy termed "sorties" outside the Sealab.

They also conducted "area cleanup" and "general reconnaissance."

From DAILY NEWS New York, N. Y. AUG 31 1965

Aquas Begin Exploring Life Under Pacific

La Jolla, Calif., Aug. 30 (AP) —Exploration parties moved in and out of Sealab 2 today as 10 aquanauts settled down to work in their dark and dangerous world 205 feet below the surface of the Pacific.

"Reconnaissance sorties" was the phrase a Navy spokesman used for the trips the rubber-suited divers made from the 12-by-58-foot steel cylinder which will be an underwater barracks for three 10-man teams in rotation for 45 days. The first team led by astronaut Scott Carpenter, took up residence late Saturday.

Illume Sea Depths

After breakfast today they donned diving gear and went outside to hook up the bright lights needed to illuminate the depths.

Other chores carried out today:

- Connection of communications cables from Sealab 2 to a 7-ton, beehive-shaped benthic (deep) laboratory.
- Mapping of the ocean floor near Sealab 2 and study of fish and other marine life.
- Cleaning up debris on the ocean floor that might interfere with work.

Carpenter, a Navy commander and expert diver, reported the men were in good condition but made one request: more fresh lettuce and bread.

DAILY NEWS New York, N. Y. AUG 30 1965

Service Held By Aquanauts On Sea Floor

La Jolla, Calif., Aug. 29 (AP) —Ten divers held a brief prayer service today in Sealab 2—205 feet below the surface of the Pacific—at the start of a 45-day test of man's underwater endurance.



M. Scott Carpenter

The aquanauts reported to their support vessel above that they were rested and "everything is going well."

Team leader M. Scott Carpenter talked by radiophone with astronaut L. Gordon Cooper in the then-orbiting Gemini 5 spacecraft at 11:28 P.M. yesterday.

Carpenter, a Navy commander who is a veteran in both space and the deep sea, wished a safe landing to Cooper and his partner, Charles Conrad Jr., and reported: "Looks like our mission will be a success."

The divers entered their 12-by-58-foot steel cylinder abode yesterday on the ocean floor 1,000 yards from this southern California resort and immediately started housekeeping.

Some Like It Cool

Capt. George Bond, project medical director, said there was ony one significant change from the original plan: The men were keeping the temperature in the Sealab at 75 degrees instead of 90.

Four other divers, who spent 11 days in ealab 1 at 193 feet off Bermuda last year, needed 90 degrees for comfort. This had been expected in Sealab 2, but the men preferred 75.

Oregonian Portland, Oregon (Cir. D. 223,792 - S. 365,733)

AUG 30 1965

Astronaut In Space Talks By Radio To Aquanaut Living On Ocean Floor

HOUSTON, Tex. (AP) — An astronaut in the Gemini 5 space capsule and an aquanaut in the Sealab 2 beneath the sea talked to each other early Sunday — the first conversation between a man in space and a man on the floor of the ocean.

The conversation was between L. Gordon Cooper Jr. in the Gemini 5 and M. Scott Carpenter in the Sealab 2.

Carpenter, himself an astronaut, has flown in space.

The Sealab was resting on the floor of the Pacific, 205 feet beneath the surface and about 1,000 yards off the shores of La Jolla, Calif.

Cooper's partner in the Gemini 5 flight, Charles Conrad Jr. was awake in the spacecraft at the time of the conversations but Cooper did all the talking in the historic communications link.

From deep beneath the surface of the ocean, Carpenter's voice came through in falsetto. Space agency officials said this was caused by the effect on the vocal chords of the Sealab 2's mixture of oxygen and helium for breathing.

The conversation, on the 117th orbit of the Gemini 5 went like this:

Cooper: "Hello Sealab. Gemini 5."

Carpenter: "Hello . . . How do you read, Gordo?

Cooper: "Good, how you doing, Scott?"

Carpenter: "Roger, Gordo. You're doing a great job. We just got down this afternoon and we haven't had a chance to tell you what a great job you guys are doing. We hope you have a very pleasant reentry shortly. Over."

Cooper: "Fine. Very shortly."

Carpenter: (Answer garbled).

Cooper: "Oh, good to hear from you down there. How are you doing?"

Carpenter: "Roger, Gordo. Things are going very well. We occupied Sealab about six hours ago . . . eight hours ago. It took us a little while to get set up and (fade) a lot of sea life to study. The Sealab is in good condition and we're looking forward to (fade)."

Cooper: "What did he say? I'm getting where I can't hear him."

The Gemini 5 then streaked out of radio range from the Antigua tracking station, which was relaying the communication.

NY TIMES 8/30/65

Aquanauts Begin Sealab Tests; Carpenter Speaks to Gemini 5

LA JOLLA, Calif., Aug. 29 (UPI)—Ten aquanauts began 45 days of testing today in Sealab 2, at 205 feet below the Pacific Ocean's surface, to see how well man can live and work under pressure 6½ times that on land.

The aquanauts, who include Lieut. Comdr. M. Scott Carpenter, the astronaut, entered the inner space 57-foot steel cylinder yesterday but the operation did not formally begin until today.

Last night Commander Carpenter conducted an informal experiment—not on the original Sealab 2 program—when he exchanged greetings with Lieut. Col. L. Gordon Cooper Jr. as Colonel Cooper passed by more than 100 miles above the earth in the Gemini 5 spacecraft.

The voices of both were audible although the high pressure beneath the ocean surface tends to make the voice high pitched.

Dr. George Bond, senior medical officer for the Sealab 2 project, said that all of the aquanauts were tired last night after swimming the 200 feet down to Sealab 2 in scuba diving gear. He said all had slept well, taking turns in pairs on two-hour watches. They were up at 6 A.M. and ate breakfast.

Mr. Bond said that brief prayer services had been held and that some of the aquanauts had begun cautious explorations outside the Sealab. They left the chamber in a shark-proof cage from which they will seek fish and other marine life for study.

Although the Sealab project will last 45 days, each of the aquanauts, except Commander Corpenter, will stay below for only 15 days. Commander Carpenter will live in the cigar-shaped cylinder for 30 days.

Officials of the Sealab 2 project emphasize that it is not being conducted to establish any records. They said that other underwater explorers had remained submerged for as long as a month at depths up to 35,000 feet.

Sealab 2 is resting on the continental shelf about 3,000 feet off shore. The pressure at that depth required a breathing mixture of 85 per cent helium, 11 per cent nitrogen and 4 per cent oxygen.

In addition to taking specimens from the ocean depths, the Sealab project calls for attempts to establish the first underwater weather station and to salvage a sunken Navy fighter airplane.

On the 16th day of the project the aquanauts will be joined outside Sealab by a trained dolphin named Tuffy. The dolphin will guide the aquanauts and handle hoses and other equipment.

Balt Sun 8/30/65

10 In Sealab Hold Brief Prayers

La Jolla, Cal., Aug. 29 (AP)—Ten divers held a brief prayer service today in Sealab 2—205 feet below the surface of the Pacific at the start of a 45-day test of man's underwater endurance.

The men piled into their bunks last night shortly after Team Leader M. Scott Carpenter talked by radiophone hookup with Astronaut L. Gordon Cooper in the then-orbiting Gemini 5 spacecraft at 11.23 P.M.

Carpenter, a Navy commander who is a veteran in both space and the deep sea, wished a safe reentry to Cooper and his partner, Charles Conrad, Jr., and reported: "Looks like our mission will be a success."

12-By-58-Foot Cylinder

The divers entered their 12-by-58 foot steel cylinder abode yesterday on the ocean floor 1,000 yards from this Southern California resort and immediately started housekeeping.

On closed-circuit television screens in the support vessel above, the scene was remarkably like a group of men camping out in a house trailer.

Today, after six hours' sleep, the aquanauts reported they were rested and, "Everything is going well."

Keeping Cooler Than Last Year

Capt. George Bond, medical director of the project, said there was only one significant change from the original schedule: the men were keeping the temperature in the Sealab 15 degrees lower than planned—at 75 degrees Fahrenheit instead of 90.

Four other divers, who spent eleven days in Sealab 1 at 193 feet off Bermuda last year, needed 90 degrees for comfort. This had been expected in Sealab 2.

Dr. Bond said it was "remarkable" that the divers preferred 75 degrees this time but had no explanation. The waters off Bermuda average 30 degrees warmer than the 50-degree water outside Sealab 2.

Short Trips Outside

The temperature can be raised at any time by electric heaters in Sealab 2.

Bond said the divers made short exploratory trips outside their sea-floor hut and found the water much clearer than they had expected.

"The visibility is surprisingly good," Bond said, "and there is an abundance of sea life for them to study."

He said the men would be mostly on their own during the day, with a few going through tests of manipulative ability in deep water.

To Study Brain Waves

Four men who had electrodes attached to their heads before the descent were scheduled to connect them to a device which records brain waves.

Scientists ashore will study the wave patterns to see if there are any changes due to living and working at pressure six times that of sea level.

The four are two Navy divers, Wilbur Eaton and Berry L. Cannon, of Panama City, Fla.; Billy L. Coffman, of Willimantic, Conn., and Earl Murray, a diver at Scripps Institution of Oceanography at La Jolla.

Others in Sealab 2 include Lt. Robert Sonnenburg, of nearby San Diego, a medical officer; Thomas Clarke, a graduate student at Scripps, and Cyril Tuckfield, of Panama City; J. D. Skidmore, of Chula Vista, Cal., and Frederick Johler, of Groton, Conn., Navy divers.

Carpenter will try to stay down 30 days. Other members of his team will be relieved at the end of 15 days by 9 others, who in turn, with Carpenter, will yield their places 15 days later to 10 more.

PESCA Y MARINA - 27
705 N. Windsor Blvd. Bi-M
Los Angeles 38, Calif.
Circ. 7,150
AUG '65

Experiencias Bajo el Agua

⚓ UN CILINDRO DE ACERO que pesa 298 toneladas y que se llama "Sealab II" va a servir de vivienda a un equipo de "acuanautas" que piensa estar un mes bajo el agua, ha llegado a San Diego, California y está listo para ser fondeado en la Jolla.

Fue remolcado desde Long Beach hasta el muelle del Laboratorio de Electrónica de la Armada, donde los técnicos instalaron todas las comodidades necesarias para la vida.

WASH POST 8/31/65

Sealab 2 Divers Go Exploring

LA JOLLA, Calif., Aug. 30 (AP) — Exploration parties moved in and out of Sealab 2 today as 10 aquanauts settled down to work in their dark and dangerous world 205 feet below the surface of the Pacific.

"Reconnaissance sorties" was the phrase a Navy spokesman used for the trips the rubber-suited divers made from the 12x58-foot steel cylinder which will be an underwater barracks for three 10-man teams in rotation for 45 days.

Sealab 2 was lowered to the bottom 1000 yards off this southern California resort last Thursday and the first team took up residence late Saturday.

So far the divers have reported seeing only one shark, a small one with which they played tag for a while before chasing it away.

Divers keep their rubber suits and air tanks in the shower room. They wear a minimum of clothing, usually just trunks, when they enter the laboratory, which is next to the shower room.

Beyond the laboratory is a small galley and beyond that a sleeping room with 10 bunks on the walls and a table in the center.

From FREE PRESS Detroit, Mich.



M. Scott Carpenter

Sea Floor Explored by Aquanauts

LA JOLLA, Calif. (AP)—Exploration parties moved in and out of Sealab 2 Monday as 10 aquanauts settled down to work in their dark and dangerous world 205 feet below the surface of the Pacific.

"Reconnaissance sorties" was the way a Navy spokesman described the trips the rubber-suited divers made from the 12-by-58 foot steel cylinder which will be an underwater barracks for three 10-man teams in rotation for 45 days.

* * *

THE TEAM leader, astronaut M. Scott Carpenter, a Navy commander and expert diver, reported the men were in good condition but made a request for more fresh lettuce and bread. He was assured it would be dispatched in a waterproof box that makes several trips daily via a small cable trolley.

Sealab 2 was lowered to the ocean bottom 1,000 yards off this Southern California resort last Thursday and the first team took up residence late Saturday.

They took it easy Sunday but were up for reveille at 7 a.m. Monday. After breakfast—Western omelettes — they donned diving gear and went outside to hook up the bright lights needed to illuminate the depths.

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From AUG 31 1965
INQUIRER
Philadelphia, Pa.

10 Aquanauts Start Working In Sealab 205 Ft. Down Under

Erect Lights For Study of Marine Life

LA JOLLA, Calif., Aug. 30 (AP). — Exploration parties moved in and out of Sealab 2 on Monday as 10 aquanauts settled down to work in their dark and dangerous world 205 feet below the surface of the Pacific.

"Reconnaissance sorties" was the phrase a Navy spokesman used for the trips the rubber-suited divers made from the 12-by-58-foot steel cylinder which will be an underwater barracks for three 10-man teams in rotation for 45 days.

DON DIVING GEAR

Sealab 2 was lowered to the bottom 1000 yards off this southern California resort last Thursday and the first team took up residence late Saturday.

They took it easy Sunday but were up for reveille at 7 A. M. Monday. After breakfast—western omelettes—they donned diving gear and went outside to hook up the bright lights needed to illuminate the depths.

Other chores planned Monday:

Connection of cables from Sealab 2 to a 7-ton, beehive-shaped benthic (deep) laboratory, a multi-channeled television and telephone station which will provide the primary communications between the undewater base and a twin-hulled crane barge serving as the mother ship on the surface. This will take over the function of a network of direct cables used until the pod could be lowered.

Mapping of the ocean floor near Sealab 2 and study of fish and other marine life.

This is a Navy project, so some of the divers drew "clean-up duty," the duration depending on how much debris there is on the sea floor which interfere with work.

The team leder, astronaut M. Scott Carpenter, a Navy commander and expert diver, reported the men were in good condition but made one request: more fresh lettuce and bread. He was assured it would be dispatched in a waterproof box that makes several trips daily via a small cable trolley.

THREE HATCHES

Navy officials said entering and leaving Sealab 2 is "as easy as falling off a log."

The vessel, about the size and shape of an oil-tank car, has three access hatches. One is at the top of a conning tower-like structure extending upward from the middle of the tank which rests horizontally in a cradle on the bottom. The others are on the floor, one at each end.

The hatch used ordinarily is a lidded 4-foot hole in the floor of a room equipped with hot showers where divers can wash off salt wate rand warm up after trips out into the 5-degree ocean. gree ocean.

Because amospherjc pressure inside Sealab 2 is slightly greater than ocean pressure at that depth — more than six times that at the surface—the hatches can be opened at any time. The air pressure—about 100 pounds per square inch — keeps the water out.

Below the main hatch is a wire-mesh cage with a door. This protects the divers against possible attack by sharks when they would be most vulnerable—entering and leaving.

So far the divers have reported seeing only one shark, a small one with which they played tag for a while before chasing it away.

First Day Is 'Light' For SeaLab Team

SAN DIEGO UN
AUG 30 196
PUBLIC INFORMATION OF
Eleventh Naval Distric
San Diego, Californi

By BRYANT EVANS
The San Diego Union's Science Writer

Clearing water and large numbers of fish were reported by SeaLab II aquanauts yesterday, their first day of residence under 205 feet of water off Scripps Pier.

Capt. George Bond, topside commander of the operation, said that the aquanauts purposely were given a light program on this first day. They spent it getting accustomed to their new habitat, checking out life support systems and checking gear both inside and outside the 58-foot long cylinder.

The 10 aquanauts were all up and about at 6 a.m. Bond said that all of them had stayed up for the conversation between the group captain, Cmdr. M. Scott Carpenter, and L. Gordon Cooper Jr. in Gemini 5 at 11:28 Saturday night. But, except for two who had the watch, all were in bed by midnight.

Some of them during the day began cautious explorations outside the 12-by-58 foot steel cylinder which will be their home for the next 15 days.

They left the chamber through a shark - proof cage from which they will harvest fish and other marine life for study. They reported clearer water, and better visibility, than expected.

Although the project will last 45 days, each of the aquanauts, except Carpenter, will stay below for only 15 days. Carpenter will make the chamber his "home" for 30 days.

During the day a trolley supply system was rigged between SeaLab and the mother ship, the Berkone. An airtight canister is raised and lowered along a taut guideline that connects the cage around the entry of the SeaLab with the fantail of the Berkone.

One of the first shipments to be sent down contained equipment to record the brain waves of four of the aquanauts — Wilbur H. Eaton, Berry L. Cannon, Billie Coffman and Earl A. Murray. All four had had electrode leads attached to their scalp before leaving the surface.

The electro-encephalograph tracing to be recorded will be studied by Dr. C. W. Sem-Jacobsen, Oslo, Norway, who is here to make the study.

Sunday was observed with the reciting of the SeaLab prayer by Bond over the communication link to the SeaLab. Bond wrote the prayer for SeaLab I last year. It is as follows: "Almighty God, who declared through Holy Scripture that mankind would one day acquire dominion over the seas, and the creatures therein, grant that this day fulfillment of Thy word is at hand. To the brave and dedicated men who have committed themselves to this project, grant Thine unending watch and safeguarding care in all of the many hours of their life under the sea. Give unusual wisdom to each of us topside who might somehow control their work and safety as they perform their duties below. And when their work and Thy will together be done, grant us all a safe, worthy respite from our labors for a time to come. We ask all of this in the name of Jesus Christ our Lord."

On the lighter side the day was marked by the project's first undersea haircut. Eaton performed on the locks of Cyril Tuckfield. Persons who watched the result over closed circuit television said it is just as well that Tuckfield has two weeks to grow new hair before coming up.

Bond reported that the temperature was 75 degrees and comfortable.

The entire SeaLab project passed under the local command of Capt. Ray Sencer of the Office of Naval Research. He will act in place of Capt. Lewis Melson, who returned to Washington yesterday. Melson remains project director.

Davenport (Ia) Times-Democrat
TUESDAY, AUGUST 31, 1965

205 FEET DOWN IN PACIFIC

Aquanauts Busy In Sealab

LA JOLLA, Calif. (AP) — Exploration parties moved in and out of Sealab 2 Monday as 10 aquanauts settled down to work in their dark and dangerous world 205 feet below the surface of the Pacific.

The 12x58-foot steel cylinder will be an underwater barracks for three 10-man teams in rotation for 45 days in the Navy project.

Sealab 2 was lowered to the bottom 1,000 yards off this Southern California resort Thursday and the first team took up residence late Saturday.

They took it easy Sunday but were up at 7 a.m. Monday. After a breakfast of Western omelet they donned diving gear and went outside to hook up lights to illuminate the depths.

Other chores Monday included:

1. Connection of cables from Sealab 2 to a 7-ton, beehive-shaped, television and telephone station which will provide the primary communications between the underwater base and a twin-hulled barge serving as the mother ship on the surface.

2. Mapping of the ocean floor near Sealab 2 and study of fish and other marine life.

3. Clean-up duty, the duration depending on how much debris there is on the sea floor that might interfere with work.

EXCHANGITE - 91
National Exchange Club
3050 Central Avenue
Toledo 6, Ohio M

AUG '65

Items of Defense

News About Advances In The Military

SECOND UNDERWATER "HOME"

A second experimental study by the Navy, SEALAB II, to learn of man's ability to live and work under water will begin in late summer. Two teams of ten men each will work 250 feet below the ocean surface off the coast of La Jolla, Calif., for 15-30 days. The first project, in 1964, involved a depth of 193 feet for 11 days, near Bermuda.

A cylindrical house, 50 by 12 feet, will provide easy access to the sea. Air pressure inside will be 100 pounds psi, equal to that of surrounding water. Because of breathing a mixture including helium, a helium speech converter will be used to clarify speaking. Environment will be 80-90 degrees at 60% humidity for comfort. Outside temperature will be 50 degrees with visibility between 20 and 100 feet.

A surface craft will provide safety and emergency power. Teams will be monitored in and around the lab by shore television. SEALAB II will have supplies for six weeks. Two-thirds of the personnel will be Navy divers. Others will be military or civilian scientists concerned with the study of the ocean floor.

EAT, SLEEP WELL

Aquanauts Work Outside SeaLab

By JUDITH MORGAN

SeaLab II aquanauts yesterday spent 7½ hours on missions outside their undersea home performing scientific tasks and general area clean-up.

The first sorties were scheduled from 8 a.m. to 11:30 a.m. and the second from 2 to 6 p.m.

Two divers spent four hours outside the lab breathing through "hookah" gear rather than carrying their own supply of helium-nitrogen-oxygen in back tanks. Hookah is similar to the umbilical cord used by astronaut Edward White on his famous walk in space. The hookah is like a hose which allows the diver to breathe from the SeaLab itself.

Capt. George F. Bond, USN, head of the Navy's man-in-the-sea project, said that all the divers were sleeping and eating well. From his station at the control center aboard the mother ship, Berkone, Bond reported that the temperature in SeaLab was correct at 85 degrees Fahrenheit.

Bond said the aquanauts all were happy and in good health.

He reported a delay in installation of the Benthic laboratory which was scheduled to begin service yesterday as an undersea communications center.

The Benthic lab is expected to be installed this afternoon and will improve the closed circuit pictures being received by Navy and Scripps Institution of Oceanography scientists topside. The job of the lab — which weighs seven tons — is to take the many electronic signals coming out of SeaLab and multiplex them so they can be transmitted from the lab to shore on one wire.

Bond said it is too early for any reports of the physiological tests being taken by the aquanauts. Yesterday's tasks outside the lab included connecting SeaLab communications lines to the Benthic control lab, connecting the diving lights and conducting a general area clean-up.

The aquanauts were awake at 7 a.m. yesterday with Dr. Robert Eric Sonnenburg the last to arise. The highlight of breakfast was a western omelet — one of the prepackaged foods used in SeaLab.

Lunch was at noon with a siesta from 1 to 2 p.m. Dinner was served at 6:30 p.m.

A SeaLab spokesman said the aquanauts had been caught raiding the icebox by topside observers of closed circuit television.

The fact that extra sandwiches had been made was confirmed yesterday when the aquanauts requested more lettuce and bread from the surface.



BILLIE L. COFFMAN
. . . re-enlisting 'under pressure'

SAN DIEGO UN
AUG 31 196
PUBLIC INFORMATION OF
Eleventh Naval Distric
San Diego, Californ

These items were delivered by air-tight "trolley" which acts as a surface to SeaLab dumb waiter.

Meanwhile, it was disclosed that Billie L. Coffman, 36, will re-enlist in the Navy today under great pressure.

The torpedoman's mate, 1st class, USN, will sign his papers at 11 a.m. in a special ceremony in SeaLab II where Coffman is a member of the first team of aquanauts. It will be the first such ceremony at a depth of 205 feet.

Capt. Bond and Capt. Walter F. Mazzone, USN, will swim down from the mother ship Berkone for the event. Mazzone is physiological control officer.

Coffman entered the Navy in January, 1948, at Tucson, Ariz. During his service, he has received many citations including the Bronze Star medal with combat V. Coffman, who has served with various experimental diving units, lives in Willimantic, Conn.

Wife Sees Her Hubby, The Aquanaut, for Cash

Family finances and plans for an underwater birthday brought an aquanaut's wife to the mothership Berkone yesterday.

It was the first such visit since the Sealab II project got under way.

Mrs. Patricia Sonnenburg, wife of Lt. Robert E. Sonnenburg, a Navy doctor, had a problem only her husband could solve, but her husband was in Sealab 205 feet under the sea.

She needed money to take care of the family finances, but Sonnenburg had neglected to sign checks before leaving for his 15-day tour of duty on the sea bottom.

So Mrs. Sonnenburg went to Scripps Institution of Oceanography yesterday afternoon, and with Navy permission, took a package of checks to the Berkone.

Officials on the Berkone let her put the checks into a dumb waiter so they could be sent to Sonnenburg for his signature, and promised to return them to Mrs. Sonnenburg today.

While she was aboard, Mrs. Sonnenburg visited the control center on the Berkone, and Capt. George Bond, principal investigator for the experiment, called down to Sealab and asked Sonnenburg to stand close to the television camera so that his wife could see him.

Sonnenburg appeared on the screen wearing shorts and with a stethoscope around his neck. Mrs. Sonnenburg got a reassuring look at her husband but was not able to talk with him.

Then she and Bond planned a birthday party for Sonnenburg who will be 28 next Monday.

SAN DIEGO
EVENING TRIBUNE
AUG 31 1965
BLIC INFORMATION OFFICE
Eleventh Naval District
Diego, California

Smoking Impossible In Sealab's Air

If the aquanauts have put up a "no smoking" sign in their undersea tank, it's there as a joke.

It's impossible to light a cigarette inside Sealab, because the special atmosphere the aquanauts have to breathe won't support flames. You can't even strike a match.

"It's a great place if you want to quit smoking," Tom Clarke, 25, a Scripps Institution of Oceanography graduate student, told reporters before splashing into the sea for the 205-foot swim to the undersea home.

"Actually, all the aquanauts gave up smoking three months ago," Clarke said, lighting a cigarette, "but none of them, including Commander Carpenter, made the grade.

"They will quit in a hurry, though, when we go down."

The special atmosphere in Sealab is mostly helium. It contains some nitrogen, and only a tiny amount of oxygen by surface standards. The great pressure under which the aquanauts live forces the oxygen into their tissues so it has the same effect as the larger amounts needed on the surface.

SAN DIEGO
EVENING TRIBUNE
AUG 30 1965
BLIC INFORMATION OFFICE
Eleventh Naval District
Diego, California

Aquanauts Quit Lab For a 'Look-Sea'

Ten Sealab 2 aquanauts, including astronaut M. Scott Carpenter, spent an unconventional eight-hour work day yesterday in a Jules Verne underwater setting in the Pacific off San Diego, Calif. Purpose of the 45-day project is to determine man's ability to adapt to an underwater environment. Sealab 2 is a 4.5 ton cylinder-like laboratory resting on a shelf 205 feet below the ocean surface. Astronaut Carpenter, who descended with the crew Saturday, will spend 30 consecutive days below, a Navy spokesman said. The aquanaut squad conducted "area cleanup" and "general reconnaissance" duties yesterday outside their underwater barracks. They asked that lettuce and bread be sent them, their sole request since the "man-in-the-sea project" began.

Sealabbers Explore Dark World

LA JOLLA — (AP) — Rubber-suited exploration parties moved in and out of Sealab 2 yesterday as 10 aquanauts settled down to work in their dark and dangerous world 205 feet below the surface of the Pacific.

Sealab 2, a 12x58 foot steel cylinder, was lowered to the bottom 1,000 yards off this southern California resort last Thursday and the first team took up residence Saturday. Three 10-man teams will live inside in rotation for 45 days.

They were up for reveille at 7 a. m. yesterday, donned [illegible] outside to h[illegible] needed to illuminate the depths.

Other chores:

- Connecting cables from Sealab 2 to a seven ton, beehive shaped benthic (deep) laboratory, a multi-channeled television and telephone station which will provide the primary communications between the underwater base and a twin-hulled crane barge serving as the mother ship on the surface.
- Mapping the ocean floor near Sealab 2 and studying marine life.
- Removing debris which might interfere with work.

The team leader, astronaut Scott Carpenter, a Navy commander and expert diver, reported the men were in good condition but asked for more fresh lettuce and bread.

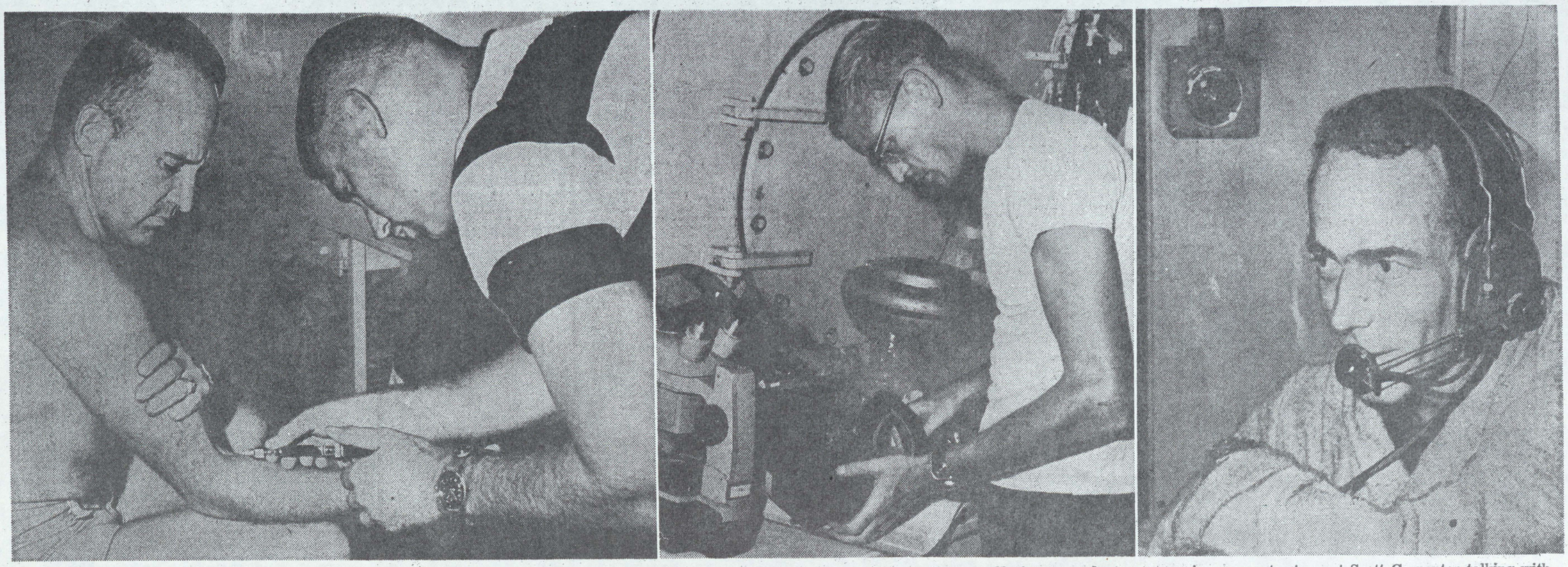
New York 38, N. Y.
AUG 22 1965
FREE PRESS
Detroit, Mich.

San Francisco, Calif.
Examiner
(Cir. D. 292,539 - S. 435,887)
AUG 31 1965

From
HERALD TRIBUNE
New York, N. Y.
AUG 31 1965

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Life, Studies Go Forward in Neptune's Realm



HISTORY IN THE MAKING —Life in Sealab is shown in these Navy photos, the first released. At left, Frederick J. Johler has blood sample taken by Lt. Robert Sonnenburg, a Navy doctor from San Diego. In center, Thomas Clarke, a graduate student, prepares marine biological studies. At right is aquanaut-astronaut Scott Carpenter talking with astronaut Gordon Cooper in Gemini 5.

* New York Herald Tribune, Paris, Tuesday, Aug. 31, 1965—3

12 ★ Tuesday, August 31, 1965 THE CHRISTIAN SCIENCE MONITOR

On the team...a dolphin

Aquanauts test Sealab

By Curtis J. Sitomer
Staff correspondent of The Christian Science Monitor

La Jolla, Calif.

Sealab 2—the Navy's answer to Gemini—now rests on the bottom of the sea off San Diego.

This set the stage for a highly-trained team of aquanauts to take up residence for two weeks in the capsule which is resting on an ocean shelf some 210 feet below the surface.

Three teams formed

Three teams of divers and scientists will live in the Sealab—over a 45-day period—and participate in various oceanographic and physiological experiments. Additionally, new salvage techniques will be tried out.

This project, which is part of the Navy's continuing man-in-the-sea program, is designed to test man's capabilities and competence in a hostile environment.

"Sealab 1, tested last year off the coast of Bermuda, taught us that people can live underwater safely and comfortably," explains Capt. Lewis B. Melson.

Captain Melson is project director for the sealab Venture, representing the Office of Naval Research, sponsors of the underwater expedition.

"This year, we want to see what man can accomplish under these conditions," he said.

The teams of aquanauts — there will be three teams of 10 men each — are led by M. Scott Carpenter — one of the nation's astronauts.

Commander Carpenter, the second man in space, will spend 30 and perhaps the entire 45 days in the under-the-sea capsule, directing operations.

Gemini contacts?

It was originally planned that there would be communication between astronaut Gordon Cooper in Gemini 5 and the auqanauts on the floor of the ocean. Tight scheduling may make this impossible.

Sealab 2 is a 57-foot, oblong-shaped seagoing craft. It has water Ballast tanks which are used to control positive and negative buoyancy.

Its living compartment is divided into a laboratory, galley, and bunkroom.

"It was built to make the men as comfortable as possible," reports Russel Greenbaum, deputy technical information director for the Office of Naval Research.

"There is even wall-to-wall carpeting," Mr. Greenbaum discloses.

A radiant heating cable, imbedded in the surface of the solid concrete deck, will maintain an interior temperature of 80-90 degrees. Air conditioning equipment is designed to keep the humidity at 60 percent.

A mixture of helium, oxygen, and nitrogen makes up the atmosphere the astronauts will breathe.

Picture windows

The capsule itself contains large picture windows, hot showers, bunks, workshop, tables, and a stocked galley.

Frozen dried foods, not yet on the commercial market, will be used extensively.

"These are quick frozen to retain flavor," Mr. Greenbaum explains.

Canned foods will also be much in evidence.

No broiling or frying will be done. These processes are thought to pollute the air.

'No smoking' ruled

For a similar reason, a "no smoking" rule will also be in effect at all times in the capsule.

During the second week of the experiment, the Navy plans to add a different type of aquanaut to the team.

Tuffy, an educated dolphin, will be employed as a sort of under-the-sea St. Bernard.

The sonar-equipped mammal will be used in experiments to rescue swimmers and to carry equipment and supplies between the surface and Sealab.

Tuffy, with her ultrasentitive listening devices, will pick up signals flashed by the aquanauts.

"Our only problem with the dolphin," reports one of the Sealab team, "is that she will also pick up other signals sent between the men—and not meant for her."

U.S. News In Brief

AquanautsReport 'Tremendous' Fish Life

LA JOLLA, Calif., Aug. 30 (UPI).—Ten "aquanauts" submerged 250 feet below the Pacific Ocean in the 57-foot Sealab reported yesterday "tremendous" fish life around the steel cylinder and said visibility was much better than they had expected.

The men, including astronaut M. Scott Carpenter, are in the craft for 45 days of tests to determine how well man can live and work under pressure 6 1/2 times greater than on land.

The aquanauts conducted preliminary checkouts today on a personnel transfer capsule and on the cylinder's power package. The capsule is located about 30 feet from Sealab, but the men reported that visibility was so good they could see it clearly from the craft.

The men spent a "relatively light day" checking internal systems within the laboratory and setting up trolley lines outside the vehicle which will transfer supplies from the staging vessel above.

They also conducted "psychomotor" physical-dexterity experiments and four of them underwent "brain wave" tests that were monitored on the staging vessel.

Mpls. (Minn.) Morning Tribune
TUESDAY, AUGUST 31, 1965

10 Aquanauts Work Away on Sea Bottom

SAN DIEGO, Calif. —(UPI) —Ten Sealab 2 aquanauts, including astronaut M. Scott Carpenter, spent an unconventional eight-hour workday in a Jules Verne underwater setting Monday.

It was the second full day of experimentation planned for Sealab 2 over a 45-day span. Purpose of the project, which also will involve a porpoise named Tuffy, is to determine man's ability to adapt to an underwater enviroment.

The 10 descended Saturday but Navy spokesman said this will not count as one day as far as the project is concerned.

SEALAB 2, a cylinder-like laboratory resting on a shelf 205 feet below the surface, is to be Carpenter's home for 30 consecutive days. No other man will spend more than 15 days at one time.

Yesterday's schedule called for the team to spend 7½ hours outside of the chamber. For 3½ hours yesterday morning, the divers — outfitted in scuba gear — conducted what the Navy termed "sorties" outside the Sealab.

They also conducted "area cleanup" and "general reconnaissance."

The astronauts worked on a conventional luncheon schedule, though, getting a chance to dine from noon to 1 p.m. A one-hour nap followed with more sorties scheduled from 2 to 6 p.m.

A 10 P.M. retirement hour is part of the Navy schedule to keep the men on a routine pattern for experiments that Verne never conceived in his imaginative concept of sea adventure.

A spokesman for the project said all 10 aquanauts were doing well, and the only items requested since they descended was lettuce and bread.

The 4.5 ton Sealab looks like the top of a mushroom and contains an underwater telemetry system for relaying to the surface all auxiliary communications between the aquanauts and scientists above.

Wash Post 8/30/65

Aquanauts Delighted by Life in Sea

Los Angeles Times

LA JOLLA, Calif., Aug. 29 Ten aquanauts completed their first day aboard Sealab 2, 205 feet below the surface of the Pacific, here today, delighted with the start of their undersea adventure.

"Our views of marine life are tremendously exciting," said former astronaut Scott Carpenter, leader of the project, in a message to the surface.

"Visibility down here is much greater than we had hoped for. We should be extremely successful with our marine biology experiments."

The project, said Capt. George Bond, medical director, was proceeding according to schedule, with only one significant change—the temperature aboard the 12-by-58-foot cylinder was reduced from 90 degrees Fahrenheit to 75 degrees at the request of the aquanauts.

The ten aquanauts entered the capsule Saturday for the 45-day test in underwater endurance.

All except Carpenter will surface after 15 days to be replaced by another team. Carpenter is expected to remain in the Sealab for 30 days.

Just before midnight Saturday, Carpenter, one of the original seven astronauts, spoke by radiophone hookup to spacemen L. Gordon Cooper Jr. and Charles Conrad Jr. as they orbited the earth in Gemini 5.

Sealab 2 Divers Go Exploring

LA JOLLA, Calif., Aug. 30 (AP) — Exploration parties moved in and out of Sealab 2 today as 10 aquanauts settled down to work in their dark and dangerous world 205 feet below the surface of the Pacific.

"Reconnaissance sorties" was the phrase a Navy spokesman used for the trips the rubber-suited divers made from the 12x58-foot steel cylinder which will be an underwater barracks for three 10-man teams in rotation for 45 days.

Sealab 2 was lowered to the bottom 1000 yards off this southern California resort last Thursday and the first team took up residence late Saturday.

So far the divers have reported seeing only one shark, a small one with which they played tag for a while before chasing it away.

Divers keep their rubber suits and air tanks in the shower room. They wear a minimum of clothing, usually just trunks, when they enter the laboratory, which is next to the shower room.

Beyond the laboratory is a small galley and beyond that a sleeping room with 10 bunks on the walls and a table in the center.

Aquanauts Prepare for Experiment

LA JOLLA, Calif. — (AP) — Ten aquanauts finished setting up housekeeping today for their 45-day endurance test in Sealab-2, 205 feet below the Pacific Ocean surface.

Then they'll swim out to help hook up a communications and data-gathering unit on the side of their undersea trailer.

"Our views of marine life are tremendously exciting," team leader M. Scott Carpenter radioed to the surface Sunday.

"Visibility down here is much greater than we had hoped for," he said. "We should be extremely successful with our marine biology experiments."

A mass of unusually clear water now surrounds the undersea craft, giving the aquanauts 60 to 70 feet visibility, a Navy spokesman said.

"During preliminary dives, the water was so murky, they could see only about 20 feet," he said.

Minneapolis (Minn.) Star
MONDAY, AUGUST 30, 1965

UNDERSEA TECHNOLOGY - 52
1111 N. 19th Street M
Arlington, Va. Circ. 24,354

AUG '65

Submarine Flotilla One has established the Navy's first Deep Submergence School at San Diego. Simultaneous training of 200 men will prepare them for duty in submarine rescue operations when the new generation of deep submersibles is available. Lt. Cdr. Brad Mooney, Officer-in-Charge of the submersible Trieste II, is also in charge of the school whose first class of two officers and 20 enlisted men reported July 15.

New Trouble Delays Sealab Experiments

Exclusive to The Times from a Staff Writer

LA JOLLA — Problems with a separate communications laboratory caused a new delay Monday in experiments being conducted by Sealab 2 beneath the sea.

The concrete shell of the dome-shaped communications laboratory cracked at the 205-feet depth and was hoisted to the surface, a project spokesman said.

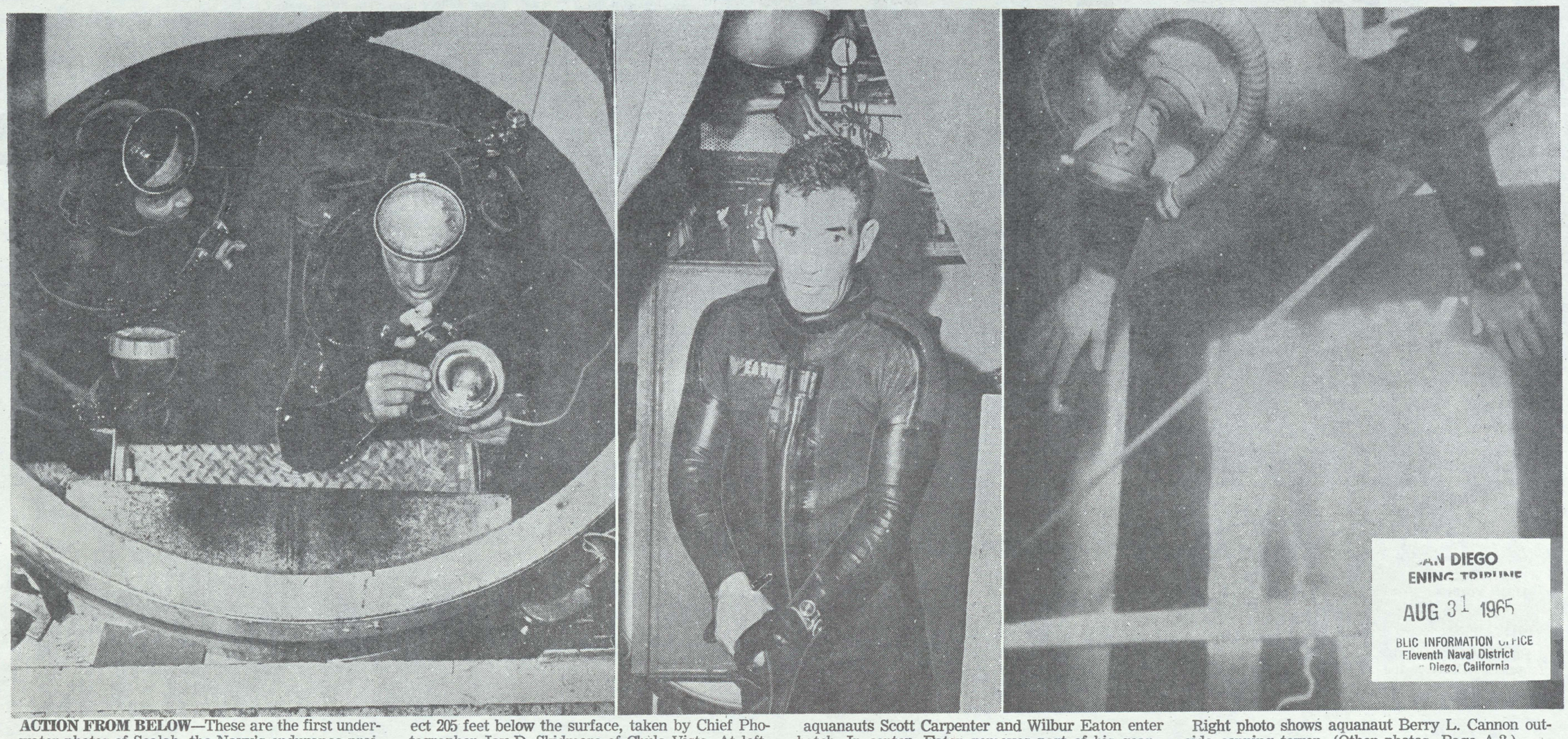
A steel casing will replace the concrete cover and the laboratory, 9 feet in diameter, will be lowered again today, the spokesman said.

Ten Navy men and scientists, including astronaut M. Scott Carpenter, are in Sealab 2 to test the capability of humans to live, work and perform normal functions at great depths for extended periods.

L.A. Times
8-31-65

70

First Underwater Photos of Sealab!



SAN DIEGO
EVENING TRIBUNE
AUG 31 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

ACTION FROM BELOW—These are the first underwater photos of Sealab, the Navy's endurance project 205 feet below the surface, taken by Chief Photographer Jay D. Skidmore of Chula Vista. At left, aquanauts Scott Carpenter and Wilbur Eaton enter hatch. In center, Eaton removes part of his gear. Right photo shows aquanaut Berry L. Cannon outside conning tower. (Other photos, Page A-2.)

From AUG 31 1965
POST-GAZETTE
Pittsburgh, Pa.

Ocean Floor Barracks for 45 Days

Sealab 2 Crew Begins Work—205 Ft. Under Sea

By RALPH DIGHTON
Associated Press Staff Writer

LA JOLLA, Calif., Aug. 30—Exploration parties moved in and out of Sealab 2 today as 10 aquanauts settled down to work in their dark and dangerous world 205 feet below the surface of the Pacific.

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Ate Western Omelettes

They took it easy Sunday but were up for reveille at 7 a. m. today. After breakfast — western omelettes — they donned diving gear and went outside to hook up the bright lights needed to illuminate the depths.

Other chores planned today:

►Connection of cables from Sealab 2 to a 7-ton, beehive-shaped benthic (deep) laboratory, a multi-channeled television and telephone station which will provide the primary communications between the underwater base and a twin-hulled crane barge serving as the mother ship on the surface. This will take over the function of a network of direct cables used until the pod could be lowered.

►Mapping of the ocean floor near Sealab 2 and study of fish and other Marine life.

►This is a Navy project, so some of the divers drew "clean-up duty," the duration depending on how much debris there is on the sea floor which might interfere with work.

The team leader, Astronaut M. Scott Carpenter, a Navy commander and expert diver, reported the men were in good condition but made one request: more fresh lettuce and bread. He was assured it would be dispatched in a waterproof box that makes several trips daily via a small cable trolley.

Entering, Leaving Easy

Navy officials said entering and leaving Sealab 2 is "as easy as falling off a log."

The vessel, about the size and shape of an oil tank car, has three access hatches. One is at the top of a conning tower-like structure extending upward from the middle of the tank, which rests horizontally in a cradle on the bottom. The others are on the floor, one at each end.

The hatch used ordinarily is a lidded four-foot hole in the floor of a room equipped with hot showers where divers can wash off salt water and warm up after trips out into the 50-degree ocean.

Because atmospheric pressure inside Sealab 2 is slightly greater than ocean pressure at that depth — more than six times that at the surface — the hatches can be opened at any time. The air pressure — about 100 pounds per square inch — keeps the water out.

Below the main hatch is a wire-mesh cage with a door. This protects the divers against possible attack by sharks when they would be most vulnerable — entering and leaving.

So far the divers have reported seeing only one shark, a small one with which they played tag for while before chasing it away.

Divers keep their rubber suits and air tanks in the shower room. They wear a minimum of clothing, usually just trunks, when they enter the laboratory, which is next to the shower room.

Beyond the laboratory is a small galley and beyond that a sleeping room with 10 bunks on the walls and a table in the center.

They report they are most comfortable with heaters regulated at 75 degrees.

SEALAB TEAM PROBES OCEAN

LA JOLLA, CALIF. (AP)—Exploration parties moved in and out of Sealab 2 Monday as 10 aquanauts settled down to work in their dark and dangerous world 205 feet below the surface of the Pacific.

"Reconnaissance sorties" was the phrase a Navy spokesman used for the trips the rubber-suited divers made from the 12 by 58-foot steel cylinder which will be an underwater barracks for three 10-man teams in rotation for 45 days.

Sealab 2 was lowered to the bottom 1,000 yards off this southern California resort last Thursday. The first aquanauts took up residence late Saturday.

After breakfast Monday, they donned diving gear and went outside to hook up the bright lights needed to illuminate the depths.

Other chores included:

Connection of cables from Sealab 2 to a 7-ton, beehive-shaped multi-channeled television and telephone station which will provide the primary communications between the underwater base and a twin-hulled crane barge serving as the mother ship on the surface.

Mapping of the ocean floor near Sealab 2 and study of fish and other marine life.

The team leader, astronaut M. Scott Carpenter, a Navy commander and expert diver, reported the men were in good condition but made one request: More fresh lettuce and bread.

Des Moines (Ia.) Register
TUESDAY, AUGUST 31, 1965

Torpedoman To Re-Enlist 205 Ft. Down

By LEO BOWLER
EVENING TRIBUNE Science Writer

Aquanauts in Sealab II prepared today to welcome the only two visitors who will be permitted to enter their underwater residence 205 feet below the surface.

Occasion for the visit is the re-enlistment of aquanaut Billie L. Coffman, 36, a torpedoman's mate first class.

Unique Ceremony

Coffman will ship over in a first-of-its-kind ceremony to be conducted by Cdr. Scott Carpenter. The two visitors will be Navy Capts. George Bond, 49, and Walt Mazzone, 47.

Bond and Mazonne are the aquanauts' main link with the outside world. They take turns sitting in a control center on the mothership Berkone monitoring the physical condition of the men below and directing them in their work.

The two will put on diving gear and be lowered part way to Sealab, then swim the rest of the way. They will enter through the hatch in the floor of Sealab, witness the re-enlistment ceremony, then return to the surface the same way they came down. They will be in Sealab for only a few moments.

Doctor Fills In

LCdr. Robert Thompson, a Navy doctor who was one of the four men who stayed in Sealab I for 11 days at a depth of 192 feet off Bermuda last year, will fill in for Bond and Mazzone in the Berkone's control center while they are making the dive.

Through most of the rest of the day today the aquanauts were engaged in preparing the area around Sealab for further explorations later on.

They were installing diving lights and other gear and working on the ends of tethers to avoid becoming lost on the sea floor. This precaution is despite the fact that the water around Sealab has been clearer than previously expected.

Appetites Are Healthy

Bond said that all the divers are in good shape and their spirits are high.

"They are eating, eating, eating," he said. "I don't know why they are so hungry, except that the water outside is cold and they have been burning up a lot of energy.

"They are able to stay outside Sealab for almost an hour, but they are pretty cold when they come back in.

"The temperature inside the lab is 86 degrees."

Lettuce Sent Down

The food the aquanauts eat is prepackaged submarine fare. They have asked for and received bread and lettuce through a dumb waiter system.

They have also received mail by way of the dumb waiter, but none have been able to make calls home. The calls are being held up pending the installation of an underwater communications center which will open up more electronic channels to the shore.

The center, called a Benthic Lab, broke before it could be lowered to the ocean floor. It has been repaired and should be in operation soon, Sealab officials say.

Bond said that a school of baby octopuses have surrounded Sealab and are clinging to its windows. One of the creatures was sent to the surface by the aquanauts and kept for a time in a bottle of sea water aboard the Berkone.

The aquanauts have been also seeing snapper, mackerel, sardines, flatfish, groupers and sea bass in large numbers.

"There is enough fish life there that the aquanauts could live away from the land as far as food is concerned," Bond said, "but they won't kill any fish. They want to study them instead."

The aquanauts have already sent back more data about the sea and about their own reactions to their situation than was recovered in the whole Sealab I experiment, Bond said.

He attributed the success to better planning, placing more emphasis on scientific studies, and to the leadership given the men in Sealab by Carpenter.

Bond said the men are becoming used to the helium in the atmosphere which they are breathing and are learning to speak more intelligibly while breathing it.

The helium changes their voices to high-pitched squeaks. The control center has an electronic unscrambler which restores the sound nearly to normal.

"They are learning to talk so that most people, with a little experience, would be able to understand them without the unscrambler," Bond said.

SAN DIEGO
EVENING TRIBUNE
AUG 31 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

Marine Digest
Seattle, Washington
SEP 4 1965

Sealab Goes Down For Underwater Stay

SAN DIEGO – The U. S. Navy's Sealab II has gone down in 210 feet of water off the California coast for a 45-day underwater living experiment. A picked crew of men will live in their watery domain completely isolated from the outside world. The strange appearing craft looks like a monster from the depths.

SAN DIEGO
EVENING TRIBUNE
SEP 4 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

LETTERS TO THE EDITOR (Cont.)

NAVY TIMES Aug 65



NAVY DIVERS use descending line during underwater training for *Sealab II*. Men will live in cylindrical tank off La Jolla, Calif., in 215 feet of water.

SWIMMIE-TALKIE TRIED

Aquanauts to Work On Labor Day Holiday

Labor Day will be just that for the men in Sealab II.

A full day's schedule is planned for the aquanauts in the underwater capsule and their support group on top, said Capt. George Bond, who is directing the experiment.

The aquanauts had their longest trip away from their lab home today. They made an excursion of 233 feet along the bottom, plotted the terrain near the lab, and traced rock ridges nearby.

They also tried a new underwater radio communication system, a sort of swimmie-talkie, which allows a free swimming aquanaut to communicate with the lab. Four men participated in the radio test.

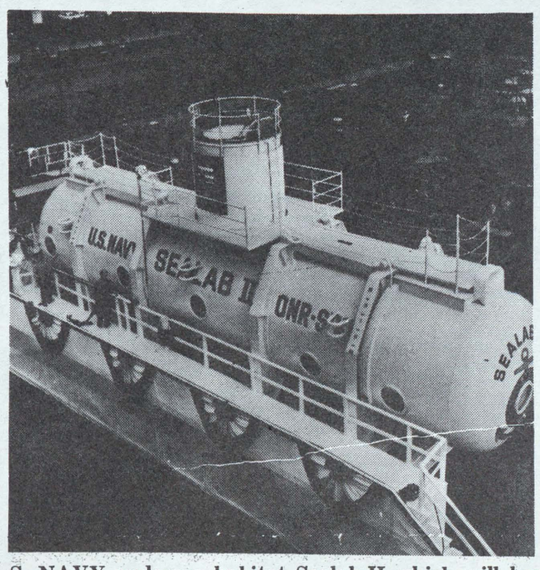
This afternoon they are scheduled to undergo extensive physiological tests in which radioactive iron will be injected in the blood stream and samples withdrawn at 30-minute intervals.

Last night the men spent a quiet evening in their undersea home with several of them making phone calls to their families through the Benthic communications system.

The laboratory is in 204 feet of water off the Scripps Institution of Oceanography pier. The 10 aquanauts plan to live under water for different periods up to 30 days.

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Sealab Aquanauts Set For Long Stay On Ocean Floor



U. S. NAVY undersea habitat Sealab-II which will house the Navy's aquanauts at a depth of 210 feet for extended periods off the California coast at La Jolla beginning mid-August 1965.

Sealab II, second phase of the Navy's "man-in-the-sea" program, is resting on the ocean bottom off La Jolla, Calif., ready to test man's ability to work and live in the sea.

Astronaut Scott Carpenter will lead one diving team scheduled to occupy the lab for 30 days.

Two teams will use the 57-foot-long undersea habitat, alternating during the month-long project. They will carry out experiments in salvage techniques, and oceanographic and marine biological research, and undergo a series of physiological and human performance tests.

This Sealab follows the success last year of Sealab I, which was an undersea home for Navy divers for 11 days in 193 feet of water off Bermuda.

Deep Water

Sealab II is in 300 feet of water.

One project slated for the lab and its sub-sea dwellers is the recovery of a Navy fighter aircraft which will be sunk in the vicinity especially for this test. The aquanauts will use a new plastic foaming technique to float the plane to the surface.

Other salvage work which may be undertaken includes an attempt to use standard stud guns to attach lifting padeyes to a piece of steel hull simulating a submarine and also to patch holes in the hull. Divers will attach experimental rubberized floatation bags to serve as pontoons to raise the hull. Other tasks which will be attempted, time permitting, are ore mining and the construction of the underwater portion of an offshore oil drilling rig.

Fish Cage

Marine biologists will work with marine life in a 10-foot square fish cage that will be placed on the ocean floor to provide an at-depth undersea "aquarium." A census of marine life in the area will be made and large fish will be given physiological tests, including the taking of internal gas samples. Bioluminescence and biofluorescence of marine life will be studied, the plankton sampled.

Geologists will study the composition of the ocean bottom, especially the sediment.

Two new systems for taking electrocardiograms of men swimming and working under water will be tested. Using acoustic biotelemetry, the data will be transmitted to physiologists in the surface control station. Brief experimental dives are planned to a depth of 350 feet.

Telemetry

A special feature of the Sealab II operation will be a newly designed undersea telemetry station contained in a concrete beehive structure about six feet in diameter and located about 100 feet from the habitat.

Known as a Benthic Laboratory, it will serve as the central switchboard for communications and data sampling channels. It will also provide four television channels which will make possible constant monitoring on shore of the aquanauts activities both inside and outside their undersea home. It will provide 20 channels for audio communications and 120 data channels.

Manipulators

Designed and built by the Scripps Institution of Oceanography, the Benthic Laboratory will contain special manipulator arms for making its own repairs. If a component should become defective, the arms, operated by remote control, will remove the component and replace it with a spare part.

Aquanauts will also operate an undersea weather station to collect such data as the velocity of currents at the bottom, near the bottom, and 30 feet from the bottom; temperature fluctuations in a 30-foot vertical line from the bottom, and variations in pressure caused by undersea waves and swells.

PACIFIC COAST INDUSTRY & ELECTRONIC NEWS - 72
537 Land Title Bldg. M
San Diego, Calif. 92101
AUG '65

SAN DIEGO EVENING TRIBUNE
AUG 31 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California



SUNKEN TREASURE—Mrs. Patricia Sonnenburg, wife of Lt. Robert E. Sonnenburg, gets a reassuring look at her husband as he receives package of checks he has to co-sign so she can keep family in groceries while he is in Sealab capsule. She is hoping someone down there has a pen.

SEALAB CREW GETS A MEAL OF FRESH FISH

Treat Sent Down by Mother Ship

La Jolla, Cal., Sept. 3 (AP)—Ten divers living in a metal hut on the ocean floor had an extra special treat today—fresh fish.

They like it raw, Japanese style, with sauce.

The fileted bonito is the first fresh fish the men have had since they entered Sealab 2 for a 15-day stay last Saturday.

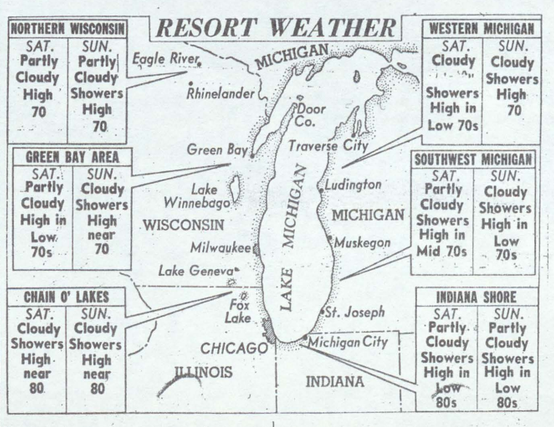
At their depth of 205 feet they are surrounded by fish and other marine life but they do no foraging. Their job is to study the underwater environment 1,000 yards offshore, not disturb it.

Sent from Mother Ship

The fish and other requested items were sent down from the mother ship in a sealed can that trolleys along a cable anchored outside the 12-by-58-foot sea hut.

The marine "dumb waiter" also took down chewing gum, candy, bread, cinnamon and "some other stuff they ought to have thought of before they went down," said Capt. George Bond, medical director of the project.

The men take turns preparing meals on an apartment-size electric stove — gas wouldn't burn well in the Sealab's atmospheric mix of 80 per cent helium, 16 per cent nitrogen, and 4 per cent oxygen.



Freeze-Dried Food

To save space their larder is comprised mostly of freeze-dried foods which are soaked in water for 10 minutes, then heated. The stove has an oven but they haven't used it yet.

"I'm going to encourage them to do so," Bond said. "I'm going to send down some frozen dough instead of fresh baked bread one of these days."

Bond said the men put in nine-hour work days in the laboratory, plus two hours outside per man and two hours rotating on watch. They sleep normal hours. What time they have for relaxation is spent reading, playing cards, writing letters or just talking.

No Psychological Conflicts

So far no psychological conflicts have shown up among the men or between them and those on the surface.

And Bond doesn't expect any.

"They're a fine bunch of well disciplined men," Bond said.

On the schedule today was further work installing an underwater "weather" station which will record ocean currents and temperatures, and tests of new, electrically-warmed diving suits.

The conventional rubber "wet suits" the divers are using now retain body heat only for short periods and few of the men like to stay out in the 49 degree water for the two hours.

The new suits may enable them to stay longer without becoming numbed.

Guinea pigs for the suit test are Astronaut M. Scott Carpenter, a navy commander, and Lt. Robert E. Sonnenburg, a medical officer.

Carpenter, leader of the first of three teams who will spend 15-day tours in rotation in Sealab 2, plans to stay down 30 days. Others of his team will be relieved a week from Sunday by nine more men. Sonnenburg plans to go back down with the third team.

From SEP 4 - 1965
TRIBUNE
Chicago, Ill.

Sealab Crew Starts Ocean Floor Tasks

La Jolla, Cal., Aug. 30 (AP)—Exploration parties moved in and out of Sealab 2 today as 10 aquanauts settled down to work in their dark and dangerous world 205 feet below the surface of the Pacific.

"Reconnaissance sorties" was the phrase a navy spokesman used for the trips the rubber-suited divers made from the 12 by 58-foot steel cylinder which will be an underwater barracks for three 10-man teams in rotation for 45 days.

Sealab 2 was lowered to the bottom 1,000 yards off this southern California resort last Thursday and the first team took up residence late Saturday.

Hook Up Bright Lights

They took it easy yesterday but were up for reveille at 7 a. m. today. After breakfast—western omelets — they donned diving gear and went outside to hook up the bright lights needed to illuminate the depths.

Other chores planned today:

1. Connection of cables from Sealab 2 to a 7-ton, beehive-shaped benthic [deep] laboratory, a multi-channeled television and telephone station which will provide the primary communications between the underwater base and a twin-hulled crane barge serving as the mother ship on the surface. This will take over the function of a network of direct cables used until the pod could be lowered.

Will Map Ocean Floor

2. Mapping of the ocean floor near Sealab 2 and study of fish and other marine life.

3. Clearing away of debris. This is a navy project, so some of the divers drew "clean-up duty," the duration depending on how much debris there is on the sea floor which might interfere with work.

The team leader, Astronaut M. Scott Carpenter, a navy commander and expert diver, reported the men were in good condition but made one request: more fresh lettuce and bread. He was assured it would be dispatched in a waterproof box that makes several trips daily via a small cable trolley.

Navy officials said entering and leaving Sealab 2 is "as easy as falling off a log."

The vessel, about the size and shape of an oil tank car, has three access hatches. One is at the top of a conning tower-like structure extending upward from the middle of the tank, which rests horizontally in a cradle on the bottom. The others are on the floor, one at each end.

The hatch used ordinarily is a lidded four-foot hole in the floor of a room equipped with hot showers where divers can wash off salt water and warm up after trips into the 50-degree ocean.

Because atmosphere pressure inside Sealab 2 is slightly greater than ocean pressure at that depth—more than six times that at the surface—the hatches can be opened at any time. The air pressure—about 100 pounds per sqaure inch—keeps the water out.

Play Tag with Shark

Below the main hatch is a wire-mesh cage with a door. This protects the divers against possible attack by sharks when they would be most vulnerable—entering and leaving.

So far the divers have reported seeing only one shark, a small one with which they played tag for a while before chasing it away.

Divers keep their rubber suits and air tanks in the shower room. They wear a minimum of clothing, usually just trunks, when they enter the laboratory, which is next to the shower room.

Beyond the laboratory is a small galley and beyond that a sleeping room with 10 bunks on the walls and a table in the center.

They report they are most comfortable with heaters regulated at 75 degrees.

Minneapolis (Minn.) Star
TUESDAY, AUGUST 31, 1965

UNDERWATER—Navy aquanaut Billy Coffman will reenlist today 205 feet below the surface of the Pacific Ocean, in the underwater laboratory Sealab-2, in what is believed will be the first such enlistment ceremony in naval history.

Aquanaut to Re-enlist in Navy Deep Under Sea

★ ★ ★ ★ ★ ★ ★ ★

BOSS WILL DIVE TO HIM

LA JOLLA, Calif. — (AP)— If the Navy wants aquanaut Billy Coffman to reenlist, it's going to have to come to him today — 205 feet below the surface of the Pacific.

And that's just what Coffman's commander, Capt. George F. Bond, planned to do — swim down to Sealab-2, the Navy's underwater laboratory, to sign him up.

Coffman, 36, a torpedoman's mate first class, is one of 10 undersea specialists who descended Saturday to the steel cylinder 1,000 feet off the Southern California coast.

Bond, stationed aboard the mother ship Berkone, planned to don a diving suit and an aqualung today to descend to Sealab for the ceremony. Swimming down with his will be Capt. Walter F. Mazzone, physiological control officer for the project.

Coffman, Willimantic, Conn., enlisted in the Navy in January 1948. He won a Bronze star for combat duty in Korea.

Bond said he believed it would be the first such enlistment ceremony in naval history.

The aquanauts made repeated forays Monday into the sea around the cylinder to conduct scientific readings and clean up debris on the sea floor which might interfere with their work

Fish Dinners Sent Sealab 2 Crew

Pasadena Star-News
9-4-65

LA JOLLA (AP) — Ten divers living in a metal hut on the ocean floor had an extra special treat Friday—fresh fish.

They like it raw, Japanese style, with sauce.

The fileted bonito is the first fresh fish the men have had since they entered Sealab 2 last Saturday for a 15-day stay.

At their depth of 205 feet they are surrounded by fish and other marine life but they do no foraging—their job is to study the underwater environment 1,000 yards offshore, not disturb it.

The fish and other requested items were sent down from the mother ship in a sealed can that trolleys along a cable anchored outside the 12X58-foot sea hut.

The marine "dumb waiter" also took down chewing gum, candy, bread, cinnamon and "some other stuff they ought to have thought of before they went down," said Capt. George Bond, medical director of the project.

The men take turns preparing meals on an apartment size electric stove—gas wouldn't burn well in the sealab's atmospheric mix of 80 per cent helium, 16 per cent nitrogen and 4 per cent oxygen.

To save space their larder is comprised mostly of freeze-dried foods which are soaked in water for 10 minutes, then heated.

The stove has an oven but they haven't used it yet.

"I'm going to encourage them to do so," Bond said. "I'm going to send down some frozen dough instead of fresh baked bread one of these days."

Bond said the men put in nine-hour work days in the laboratory, plus two hours outside per man and two hours rotating on watch. They sleep normal hours. What time they have for relaxation is spent reading, playing cards, writing letters or just talking.

So far no psychological conflicts have shown up among the men or between them and those on the surface.

On the schedule Friday was further work installing an underwater "weather" station which will record ocean currents and temperatures, and tests of new, electrically warmed diving suits.

The conventional rubber "wet suits" the divers are using now retain body heat only for short periods and few of the men like to stay out in the 49-degree water for the two hours.

Guinea pigs for the suit test are astronaut M. Scott Carpenter, a Navy commander, and Lt. Robert E. Sonnenburg, a medical officer.

Carpenter, leader of the first of three teams who will spend 15-day tours in rotation in Sealab 2, plans to stay down 30 days. Others of his team will be relieved a week from Sunday by nine more men. Sonnenburg plans to go back down with the third team.

Mpls. (Minn.) Morning Tribune
SATURDAY, SEPTEMBER 4, 1965

Sealab Divers Eat First Meal of Fresh Fish

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To save space, their larder is comprised mostly of freeze - dried foods that are soaked in water for 10 minutes, then heated.

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Whenever our Navy is faced with an especially difficult diving job, it is likely to call on Chief Torpedoman Robert C. Sheats to supervise the actual diving. A wiry man just turned 49, Sheats has a leathery complexion that crinkles into an irrestistibly infectious grin at the slightest provocation. Yet, nobody takes his diving more seriously. In his 30 years as a Navy diver, Chief Sheats has chalked up as many hours and hair-raising experiences underwater as any man alive. I had the pleasure of working with this illustrious diver while covering the Navy SEALAB project in Bermuda for which he served as Master Diver in charge. Being a chronic brain picker, I took the opportunity to interview him the first chance I got. Here is the story of . . .

MASTER Of the MASTER DIVERS

SKIN DIVER MAGAZINE

SKIN DIVER/SEPTEMBER 1965



Chief Sheats, how did you first get started in diving?

I shipped in the Navy in 1935 and had the opportunity to enter diving about a year later while serving aboard a submarine tender vessel. However, in those days, there was no extra pay for diving. It just gave us a sense of accomplishment and adventure.

You had no particular interest in diving previous to that?

Only the kind of romantic interest that I believe every boy gets after reading underwater adventure stories.

Did you have to go to a special diving school in those days?

Yes, they had the same training facilities then that they have now. In fact, essentially, they still give the same training as far as hard hat diving goes. I got my basic training aboard a submarine tender. They took us out and put us through a 90 foot open-water dive in order to qualify us. After that, they sent us back to Washington D.C. to qualify us as first class divers. They trained only two classes a year in those days. My class in 1939 had about 15 men in it and out of that only about ten graduated. The rest of it was on-the-job training such as that given after the ocean liner Normandie caught fire and sank in New York harbor. I did not work on this job—just used as an example.

Would you describe some of your most interesting diving experiences for us?

Probably still my most interesting diving experience was the recovery of silver from the Philippine treasury that was dumped into a part of Manila Bay during the early part of World War II.

Yes. What's the true story on that episode? You read so many conflicting versions of it that you don't know what to believe.

Unfortunately, that's true. The fact is that when the Japanese first invaded the Philippines, all the money in the Philippine treasury was moved into the fortress of Corregidor for safekeeping. But the war got worse and when we saw that Corregidor was eventually going to fall, we knew we had to get rid of it. All the paper money was ordered burned but the silver presented disposal problems. Finally, it was decided to dump it in an area of Manila Bay known as Caballo, where the water was so deep and treacherous that it wouldn't likely be found. The money was in silver pesos and 50 centavo pieces. It was loaded into canvas bags and the bags were put into wooden boxes, six at a time. All total, the silver weighed hundreds of tons, and I imagine it was a backbreaking job to load it onto barges and dump it at night without the Japs catching on. As it was, word about the silver must have leaked out, because it wasn't six weeks after the fall of Corregidor before the Japs recruited a crew of Filipino divers and began diving it up.

But Manila Bay is a big place. How did the Japs know where to look for the silver?

Well, I have personal knowledge of this, because I talked to one of the officers who revealed it. He told me that when the Japs questioned him about it, they said that the other two officers involved had revealed the exact location and that if his location did not correspond to that given by the others, he would be punished and probably killed. So he told them. No need to mention the officer's name now. He died on a ship during the war.

How did you personally get involved in the silver project?

Well, the Filipino divers didn't know anything about the bends or decompression tables. A couple of them died from it, and after that, the others refused to dive. Since they had no divers of their own, they rounded up all the ex-divers like myself who were then prisoners of war. We knew that we could not come up empty handed after every dive and expect to live long, so it became a matter of giving the Japs token cooperation while at the same time trying our best to sabotage the project as much as possible. As I said, the silver was loaded into wooden boxes, so it was a fairly easy job to break the boxes open while underwater so that the boxes would break and spill the silver out when the Japs tried to lift them.

Didn't the Japs ever catch on to what you were doing?

Yes. Eventually, I think they caught on. Silver was turning up all over the place—especially inside the prisoner of war camps—and there was only one place it could have come from. But although there were some close shaves, I don't think they could ever prove it. They finally canceled the diving operations and sent us back to prison.

After the war, the Navy sent you back to recover what silver was left on the bottom, did they not?

No. They didn't send *us* back. Of course they knew where the silver was planted, so after the war, they commenced diving operations under the direction of a Commander Marshal. He wrote an article on this for the "Naval Institute Proceedings" magazine. The issue was March 1955, I think, give or take a year, and that article is the only one that was ever based entirely on documentary evidence and was completely factual. Most of the other articles that were written about it exaggerated and even distorted the facts.

Were there any other perhaps less dramatic incidents in your diving career?

Yes. I suppose every man has his moments, but I am most proud of the fact that since the war I have dedicated my life to safety in diving—both within and outside the Navy. For example, I organized scuba diving courses and worked out diving curriculums for both Navy and civilian personnel. I was an instructor in Pearl Harbor for some three and a half years, and we put out some of the Navy diving curriculums at that time. Since then, I have served aboard salvage ships and submarine rescue vessels. I've worked in the helium/oxygen field in submarine rescue work and spent four and a half years in Keyport, Washington, on the recovery of missiles. Incidentally, some of this missile recovery work was very challenging. We often had to work in mud up to 30 feet deep and some of the missiles were worth as much as a million and a half apiece! We did some plane recovery work in the San Juan Islands and also routine jobs, like changing propellers of ships and submarines underwater and torpedo recovery work. In fact, we did most of the Navy diving for the entire Pacific northwest area. We worked in depths up to 260 feet, and on some occasions, we used underwater television units to depths of 1200 feet or more.

How did you first locate the lost missiles and torpedoes when they landed in deep water?

We used a pinging device called a Mark II Ordnance Locator. This is a device on the unit itself that sends out high frequency signals. The sound is picked up by directional hydrophones and amplified. The closer we got the louder the sound gets. When we're within several hundred feet of it, we put down underwater TV units that are also equipped with directional sound pickups. By switching the various hydrophones on and off, we can tell in which direction it lies. Then we plant a guide line between two kedge anchors and pull the camera along it until the missile comes into view. After that, we lower a wire loop that is held open by aluminum angles. The loop is worked over the head or tail of the missile and tripped so that the loop closes around it. It's almost like lassoing a calf. Then we bring it up to within range so that divers can hook on the lifting gear. We've recovered some 200 units in this manner in the past three to four years, and I think it's one of the real underwater feats of the century.

Chief Sheats, I think every diver has his hairy moments underwater. What were some of yours?

It was while recovering a new kind of atomic bomb casing called a "Sandia" that fell some 5000 feet and buried itself under 20 feet of mud in the Agate Passage off Washington state. We had to try to wash the mud and sand away with high pressure water jets. If the water pressure cut off or dropped, the sand would fall back in on you and it was like being buried alive. On this particular occasion, I was about twenty feet down in the hole with scuba and had just succeeded in hooking onto the bomb. It looked like the job was just about finished. But when I tried to surface, I discovered that a line had tangled around my body and fouled on my air tank. I knew my buddy couldn't see me due to zero visibility and I was running out of air. Yet, I couldn't let loose of the jet hose or I would have been buried under the sand and mud. So I held the jet between my knees and had to trip (ditch) my rig and cut the line away with my knife. That's the reason why I always emphasize the need to carry a good sharp knife and use quick-release equipment. That day, they saved my life!

Are there other highlights you would care to mention?

Yes, I would like to mention something about the use of scuba in deep water. You know the Navy places a working depth limit of 130 on scuba, but because of the special circumstances, we weren't using it on this plane recovery job. (In June of 1964, two Air Force planes collided in mid air and fell into 205 feet of water off the coast of Bermuda. Navy SEALAB divers attempted to recover some of the bodies from that depth using compressed air scuba. On one of the dives, I was working particularly hard trying to free a body from the wreckage on the bottom and became so narcotized by nitrogen that I could barely keep my senses. As you know, the effort required to simply breathe from scuba at that depth is enough to cause a CO_2 build-up. Well, in this case the resultant narcotic effect was much worse than anything I had ever experienced since using deep sea (hardhat) gear in almost twice that depth. So nitrogen narcosis is something that every scuba diver should be wary of when working in deep water. They should make it a point to never over exert themselves.

How did you feel when you had nitrogen narcossis?

Well, at first you could describe it as a feeling of euphoria. But that only lasts a while. Then, you become aware of what's happening to you and it becomes a psychological problem. It confuses you; takes your mind off of what you are doing and how long you've been there. And if it's bad enough, it will ride right back toward the surface with you and you might miss a decompression stop. It's a very dangerous and unpredicable thing. Therefore, even though the Navy did dive beyond the normal limit of 130 feet in this case, it was a necessary part of the job at hand, and I certainly would not advise anyone to attempt any work beyond 130 feet in scuba unless he absolutely had to.

How has diving changed since you began your career in 1935?

Oddly enough, there have been no drastic changes in deep sea (hardhat) diving within the Navy outside of a revision of the standard decompression tables. However, helium/oxygen or mixed gas diving has advanced considerably and will continue to do so. The self-contained rigs—both the open, closed and semi-closed circuit units—are completely new since I began. Of course this accounts for the most drastic change. Now, anyone who wants to can dive without any lines or restrictions. This has brought about a severe need to disseminate as much information about diving physics and hazards as possible so that the general populace can participate with complete safety. Your book is a real accomplishment in this respect and in my own way I have done whatever I could to promote safe diving practices.

What's that, Chief?

Well, I have already mentioned the civilian scuba classes and curriculums I started. I also lecture before groups such as NAUI and the YMCA throughout the Northwest. In general, I try to give the diving public the benefit of my experience as a Master Diver wherever and whenever I can.

Do you think that there should be some kind of law enacted that would require a qualifying or licensing program before people are allowed to dive beyond certain depths?

Certainly not. Every man has the inherent right to use his own judgment in doing whatever he wishes to do. We should not restrict anybody in any way so long as he does no harm to others. However, we should try to see that everyone who is interested gets all the information he needs in order to judge wisely.

What changes in diving techniques and practices do you envision for the future?

In the scuba field, which is our primary concern here, I think we will have a much smaller air tank that can be charged to much higher pressures, thus providing divers with a longer down time than is now possible. Of course this change alone would bring about other changes. For example we would need a new kind of compressor to charge these tanks safely to pressures of, say, 10,000 p.s.i. The purity of the air would be of prime importance, for the slightest amount of carbon monoxide at those pressures would be extremely toxic. There would also be a need for new advancements and facilities regarding decompression.

What about mixed-gas rigs for deep diving? Do you think they will ever be available to the public?

Mixed gas breathing has a very definite application to the military field, but for the average civilian diver the problems involved are far too complex for it to be of any practical value. There are a few civilian outfits such as Jon Lindberg's and Ed Link's (now consolidated under Union Carbide Co.) who use it for industrial purposes and I am sure they will continue to use it to good effect. But I am just as sure that eventually a few people will die as a result of trying to use mixed-gas techniques without the proper knowledge. You almost need a degree in physiology to even understand the problems involved in mixed-gas breathing let alone solve them. The divers who use it do at great risk to their lives in order to get big money. I would not recommend it to anyone who values his life more than money.

But you know the assimilation of knowledge is not limited to Navy personnel. Wouldn't mixed-gas rigs be safe if interested divers acquired schooling in such techniques?

But how would you go about this? The problems in mixed-gas diving are so complex that you need a highly specialized team behind every man who dives. You are faced with anoxia, with oxygen poisoning or starvation, with carbon dioxide buildup and many other problems that don't even exist with open circuit scuba. You also have unique decompression problems, because gases of different densities come out of solution in various tissues at different rates. All of these factors are still in the experimental stage, and an error in any one of these would almost surely be fatal. How could we recommend mixed-gas rigs for civilians?

Chief, you were the Master Diver in charge of diving operations on project SEALAB under Capt. George Bond. How did you come to land this assignment?

Well, Dr. Bond and I first met in 1954 in Pearl Harbor and began diving together. We became good diving buddies and his particular dedication to diving became infectious with me. We've kept in contact with each other ever since and we still like to work together whenever we can.

What about your personal life? How many children?

I have two boys. One is sixteen, the other eleven.

Are your sons interested in diving?

Yes. Both of them are. I'm letting my oldest son take up diving, but only after a year of snorkeling and basic scuba.

What does your wife think of your sons' diving?

My wife is a Sheats-trained woman. She's a diver herself and loves it almost as much as I do. Besides, diving is my life's work, so she has a vested interest in it.

Do you suppose your sons will follow in the old man's footsteps by becoming professional divers or by going into oceanography or the Navy?

I have no idea. They are free to make their own choice regarding professions; I do know they are very interested.

What kind of future would you say the Navy holds for a young fellow who is interested in a diving career?

Quite a few young men ask me this question—most of them imbued with the romantic idea of diving—and they are always disillusioned when I tell them that diving cannot be a primary rate in the Navy. It can only be a secondary rate. For example, I am rated as a Chief Torpedoman—not as a diver. In the Navy as in civilian life, diving can only be a mode of transportation to the work site. He has to be able to accomplish something once he gets there. If a man wants to dive, he should go to school and get his education in some field that will require him to dive. You don't have to join the Navy to become a diver and to do so would reveal an entirely false concept of both diving and the Navy as a profession.

How many master divers are there in the Navy today?

I think there are about 55 of us, although the exact number varies from month to month. This is because most divers have reached retirement age by the time they qualify for master. You must serve time on both submarine rescue vessels and the ARS salvage type ships before you can qualify as master and many divers just don't get this opportunity, because their primary rate keeps them in other fields. Therefore, many of the Navy's best divers never make master.

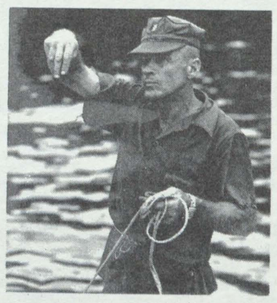
Supposing a fellow is already in the Navy and wants to get into diving. What are the requirements?

First, you have to be under thirty and be in good physical condition to qualify, meet specific requirements in mechanical and mathematical fields and pass an O_2 tolerance test. Then, once you reach forty, you must pass before a board of three medical officers and undergo frequent checkups—especially on your heart and circulatory system—in order to continue diving. I am 49 at present, and this is rather unusual, so I have to keep myself in pretty good shape.

Well, we've talked about the future of diving; now what about your personal future?

I'll be retiring in December of this year. But I plan to stay in diving nevertheless. I'll probably go to work for the Fish and Wildlife Service or in oceanography of some sort or I may possibly become a civilian consultant on special Navy projects such as SEALAB. The one requirement I hold is that it must be challenging. Money is of very little consequence to me at this point. Anything of a pioneering nature in the underwater field is my meat, so I plan to stay in it. I dearly love this kind of work and if you love what you do, that's pretty good pay in itself.





Master Diver Robert Sheats stands beside an exact duplicate of the Morse shallow water hat which he and other divers used when working for Japanese in Manila Bay. At right above he stands on top of SEALAB as he directs the ballasting operations of the undersea laboratory prior to its being towed to the operational site 30 miles southwest of Bermuda.

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

SEP 1 1965

Chow Time In SeaLab



—Navy Photo

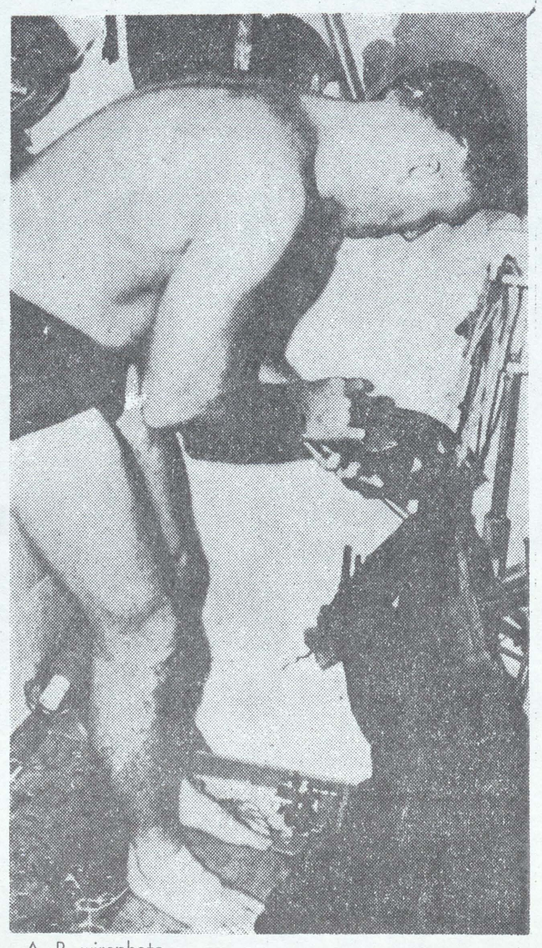
Getting up in time for breakfast is no problem for the aquanauts in SeaLab II. A flip of the table leaves converts the dormitory into a neat, if a bit crowded, dining nook. These casually attired crewmen are in midst of soup course. (Story on a-1)

Seattle Times
Seattle, Wash.
(Cir. D. 223,264 - S. 252,265)

SEP 1 1965

AQUA EVENT:

Sailor Re-enlists —Under Pressure



—A. P. wirephoto.
BILLIE COFFMAN CHECKED DIVING GEAR

LA JOLLA, Calif., Sept. 1. — (AP) — One of the ten divers in the Navy's 205-foot-deep Sealab 2 re-enlisted today under pressure — 100 pounds per square inch.

Navy officers made a big thing of what they called the first ceremony of its kind, held on the bottom 1,000 yards off shore in a 12-by-58-foot steel cylinder presurized to six times normal to resist the weight of the ocean.

Capt. George F. Bond, medical director of the 45-day project to test underwater endurance, swam down from the surface with Capt. Walter F. Mazzone to sign up Billie L. Coffman, 36, Willimantic, Conn., who first enlisted in 1948.

COFFMAN, a torpedoman's mate 1st class, didn't have much choice. His hitch was up at midnight and regulations gave him 24 hours to re-inlist.

And he is stuck in Sealab 2 until a second team of divers relieves his team September 12.

The schedule calls for three teams, to spend 15 days each in rotation demonstrating human ability to live and work inside and outside the underwater base long enough to salvage a wrecked ship or to install detection devices and weapons.

The ceremony came at 11:28 a. m. as the first team, which descended to the horizonatally cradled cylinder Saturday, was well along in the third day submerged.

THE OATH was administered by Astronaut M. Scott Carpenter, who although he is team leader and a Navy commander, started the historic day by doing the dishes.

On the same closed-circuit television monitor that has betrayed the divers as rampant refrigerator raiders, scientists on the mother ship above the Sealab 2 saw Bond and Mazzone pop up through an open hatch in the floor of the house trailer-sized base for the brief ceremony.

THE AQUANAUTS planned to complete a sophisticated communications system, known as a benthic laboratory, today. The apparatus is a concrete structure serving as a switchboard.

When hooked up, it will have four channels for television communications, 20 audio channels and 20 data channels.

A Navy spokesman said the aquanauts have developed hearty appetites on the bottom.

"Every time I look at the television screen," he said, "someone is raiding the ice-box in Sealab 2. They're sandwich hounds, like most men who aren't on a fixed meal schedule. We had to send more bread down to them."

Keyport Diver Heads Team For Sealab II.

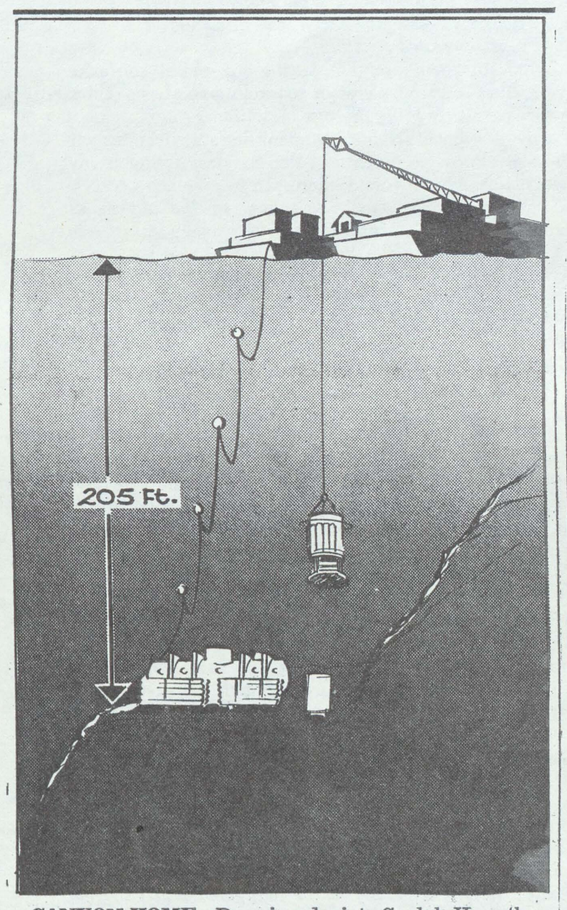


ROBERT SHEATS

Robert C. Sheats, a master chief torpedoman at the Keyport Naval Torpedo Station, is team leader of the Team 3, scheduled to complete the final 15 days of the 45-day underwater experiment by Sealab II. at La Jolla, Calif.

Sheats, whoserved also in the Sealab I. experiment last year off Florida, will be technical adviser on diving matters.

In the Second World War, Sheats was one of eight Navy divers captured by the Japanese and forced to dive for gold dumped in Manila Bay by the United States before Japanese occupation of the Philippines.



CANYON HOME—Drawing depicts Sealab II on the edge of Scripps Canyon off La Jolla. The canyon position was selected so dives to greater depths could be made by aquanauts during their stay in Sealab. The canyon is about 700 feet deep. Suspended at end of line is the personnel transfer capsule in which the aquanauts will travel to the surface. The capsule rests on the bottom until it is needed. The mothership Berkone floats above Sealab and is connected to it with cables for communications and supply hoses to carry water and breathing gas.

TEAM KEEPS WATCH

UDT Diving Crew Taught Aquanauts

By BOB RODRIGUEZ
EVENING TRIBUNE Staff Writer

The early success of Sealab II is due largely to a group of Underwater Demolition Team divers who trained the aquanauts, tested their equipment and located the present site off La Jolla.

They are now over the site on standby duty on a landing craft converted into a complete diving support platform.

CWO Kenneth Specht of 351 Bradley St., El Cajon, is in command of the 10 standby divers, the auxiliary support craft and its crew.

Specht and his men tested the long term exposure suit the aquanauts wear. The suit was tested nearly two years. It worked so well that Sealab officials decided to use it at the last moment after the equipment they had planned to use proved inadequate.

The divers, attached to the Research, Development, Test and Evaluation Division of the Naval Operations Support Group Pacific, based at the Coronado Amphibious Base, trained the aquanauts nearly two months ago in the use of the Mark I Swimmer-Delivery Vehicle (SDV).

The torpedo shaped SDV, equipped with a homing device, will enable aquanauts to return to a specific location underwater. They carry a device which sends out a pinging signal enabling a diver with a vehicle to home in on them.

The vehicle has a top speed of more than one knot, and is equipped with a compass and direction gauge. It may be used for towing, and the support divers will also use it to photograph Sealab operations.

The aquanauts were trained here in two five-man groups one

(Continued on A-28, Col. 1)

SAN DIEGO
EVENING TRIBUNE
SEP 1 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

SAN DIEGO
EVENING TRIBUNE
SEP 1 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

From SEP 1 - 1965
INQUIRER
Philadelphia, Pa.

Diver Re-Enlists Under Pressure In Sealab Tank

LA JOLLA, Calif., Aug. 31 (AP).—One of the 10 divers in the Navy's 205-foot-deep Sealab 2 re-enlisted Tuesday under pressure—100 pounds per square inch.

Navy officers made a big thing of what they called the first ceremony of its kind, held on the bottom 1000 yards off shore in a 12 by 58-foot steel cylinder pressurized to six times normal to resist the weight of the ocean.

Capt. George F. Bond, medical director of the 45-day project to test underwater endurance, swam down from the surface with Capt. Walter F. Mazzone to sign up Billie L. Coffman, 36, Willimantic, Conn., who first enlisted in 1948.

NOT MUCH CHOICE

Coffman, a torpedoman's mate first class, didn't have much choice. His hitch was up at midnight and regulations gave him 24 hours to re-enlist. And he is stuck in Sealab 2 until a second team of divers relieves his team Sept. 12.

The schedule calls for three teams to spend 15 days each, in rotation, demonstrating human ability to live and work inside and outside the underwater base long enough to salvage a wrecked ship or to install detection devices and weapons.

LEADER DOES DISHES

The ceremony came at 11:28 A. M. as the first team, which descended to the horizontally cradled cylinder Saturday, was well along in the third day submerged.

The oath was administered by astronaut M. Scott Carpenter who, although he is team leader and a Navy commander, started the historic day by doing the dishes.

AQUANAUT REENLISTS UNDERWATER

Diver In Sealab Takes Navy Oath 205 Feet Down

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Navy officers made a big thing of what they called the first ceremony of its kind, held on the bottom 1,000 yards off shore in a 12-by-58-foot steel cylinder pressurized to six times normal to resist the weight of the ocean.

Two Officers Descend

Capt. George F. Bond, medical director of the 45-day project to test underwater endurance, swam down from the surface with Capt. Walter F. Mazzone to sign up Billie L. Coffman, 36, of Willimantic, Conn., who first enlisted in 1948.

Coffman, a torpedoman's mate first class, didn't have much choice. His hitch was up at midnight and regulations gave him 24 hours to reenlist.

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10 KEEP UP TO DATE WHILE 205 FEET DOWN

The 10 aquanauts in Sealab II 205 feet beneath the ocean off La Jolla haven't been lacking news of the outside world since they entered their underwater home.

Copies of the Evening Tribune were sent to them yesterday along with other supplies in a dumb waiter from the mothership Berkone.

The aquanauts also are able to watch their favorite television entertainment. They have a television set inside Sealab.

They get other news from their topside control center and the officers who man it.

Capt. George Bond, in charge of the center, says that during most of the daylight hours, the phone communications between his station and Sealab are limited to business.

"We try to leave them alone as much as possible during the day," Bond said. "But at night the men on watch often want to talk. We often get in four or five hours of conversation then."

New York 38, N. Y.
From SEP 1 1965
JOURNAL, Atlanta, Ga.

Aquanauts' Appetites Prodigious

LA JOLLA, Calif., Sept. 1 (AP). Aquanauts in Sealab II planned to wind up installation Wednesday of a sophisticated electronic communications center.

Meanwhile, the 10 divers are eating like . . . well, eating heartily.

The apparatus, known as a Benthic laboratory, is a concrete structure that will serve as a switchboard to handle communications for the Navy's underwater living experiment.

When it is hooked up, the aquanauts will have four television channels, 20 channels for audio communications and 20 data channels.

Up to now, communication has been limited to telephone conversations with the support ship 205 feet above on the surface, and by messages sent down by dumbwaiter.

Officials said one of the biggest surprises thus far is the aquanauts' enormous appetites. A closed-circuit television camera is focused on the sealab's kitchen.

14

SAN DIEGO UN
SEP 1 196

Divers Work To Improve Shore Contact

By LEO BOWLER
EVENING TRIBUNE Science Writer

Sealab II aquanauts were helping complete the installation today of a complicated electronic communications center that will bring them into closer touch with their families ashore.

Their communications ashore have been limited by the failure more than a week ago of a Benthic Lab which was to be installed before the 10 aquanauts entered their underwater residence.

Giant Steel Can

The lab was repaired, and yesterday it was lowered to the bottom. It is a giant steel can filled with electronic gear and a special underwater hand which is capable of replacing parts which go bad.

It will take six men at least four hours to finish connecting the Benthic lab to Sealab.

The lab will furnish many more channels of communications between Sealab and the shore. Sealab officials said that when it is in full operation, aquanauts will be able to talk by phone with relatives ashore.

Conversations Limited

Their communications so far, except for Cdr. Scott Carpenter's talk with astronaut Gordon Cooper in space, have been limited to conversations with the men in the control center on the mothership Berkone above them and letters received in a dumb waiter system from the Berkone.

The dumb waiter was used yesterday to lower re-enlistment papers to Sealab so that Carpenter could swear in Billie L. Coffman, 36, a torpedoman's mate first class, for another hitch in the Navy.

Captains' Plans Change

Capt. George F. Bond and Capt. Walter Mazzone were to carry the papers down as they dived to Sealab to witness the ceremony, but Bond decided at the last minute that the papers might get wet, so the dumb waiter was used.

Bond, 49, and Mazzone, 47, spent 8 minutes getting to Sealab, 8 minutes inside, then 70 minutes coming back up. The long time in coming up was needed for decompression.

Bond said after his return that the dive he and Mazzone made is a good illustration of the reasons for Sealab.

Big Advantage Cited

The aquanauts are able to stay down full time and can work in the open sea for up to two hours a day, but a diver based above can operate on the bottom for only a few moments without pushing his decompression time beyond reasonable limits.

The aquanauts will decompress for 36 hours after remaining on the bottom 360 hours.

The amount of decompression needed by surface-based divers for 360 hours of bottom time would be astronomical, Bond said.

Yesterday the aquanauts set up a strength-testing platform outside Sealab.

Yesterday, aquanauts swam 175 feet from Sealab in search of a site where they will place an underwater weather station. They found a suitable site and marked it with a buoy.

The weather station will consist of an anchor, 60 feet of cable and a submarine buoy which will hold the cable erect. Current meters, temperature gauges, devices to measure water salinity and pressure, and other instruments will be strung on the cable at varying depths from the bottom.

The data collected by the weather station will be sent ashore through the Benthic lab after it's installed.

This morning the aquanauts awoke at 7, had a breakfast of figs, cereal, mushroom omelettes, milk, coffee, toast, oranges and a fruit drink, then began their day's task.

They spent a total of nearly eight hours outside Sealab yesterday and expected to increase that time today.

SAN DIEGO
EVENING TRIBUNE
SEP 1 1965

Pressured, A Sealab Diver Re-enlists On Ocean Floor

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Coffman, a torpedoman's mate first class, didn't have much choice. His hitch was up at midnight and regulations gave him 24 hours to re-enlist.

And he is stuck in Sealab II until a second team of divers relieves his team Sept. 12.

The schedule calls for three teams to spend 15 days each in rotation demonstrating human ability to live and work inside and outside the underwater base long enough to salvage a wrecked ship or to install detection devices and weapons.

The ceremony came at 11:28 a.m. as the first team, which descended Saturday to the horizontally cradled cylinder, was well along in the third day submerged.

Astronaut Dishwasher

The oath was administered by astronaut M. Scott Carpenter who, although he is team leader and a Navy commander, started the historic day by doing the dishes.

On the same closed-circuit television monitor that has betrayed the divers as rampant refrigerator raiders, scientists on the mother ship above Sealab II saw Bond and Mazzone pop up through an open hatch in the floor of the house trailer-sized base for the brief ceremony.

After it was over, the officers shook hands with Coffman, who was dressed in swim trunks and a jacket bearing Sealab II insignia.

Undergo Decompression

They spent 14 minutes on the bottom and more than an hour decompressing slowly in a diving bell as they ascended to the surface.

The teams will spend 36 hours in a decompression chamber after they return to the surface because of the long time spent on the bottom. Tissues become completely saturated with atmospheric gasses under extreme pressure after 28 hours. Bond and Mazzone figured they had only slight saturation in their brief visit

SIGNED TO STAY ON TEAM

L.A. TIMES
1 Sept 1965

Aquanaut Re-enlists at Bottom of Ocean

Torpedoman Billie L. Coffman, 36, re-enlisted in the Navy Tuesday in his swim trunks on the bottom of the sea.

Coffman, a 17-year Navy veteran, signed over with the help of astro-aquanaut M. Scott Carpenter in the Navy's Sealab capsule 205 feet deep in the ocean off La Jolla.

The Willimantic (Conn.) torpedoman didn't have much of a choice.

His hitch was up at midnight. If he didn't re-enlist he would have been scratched as one of the initial 10 aquanauts on Carpenter's team to test man's ability to live at great depths in the ocean for a long period of time.

Capt. George F. Bond, medical director of the 45-day project, and Capt. Walter F. Mazzone, physiological control officer, swam down from the Sealab surface vessel to Sealab, a three-room underseas apartment, to witness Coffman's re-enlistment.

While submerged Bond also did a favor for Mrs. Patricia Sonnenburg, wife of Navy Dr. Robert Sonnenburg, another aquanaut.

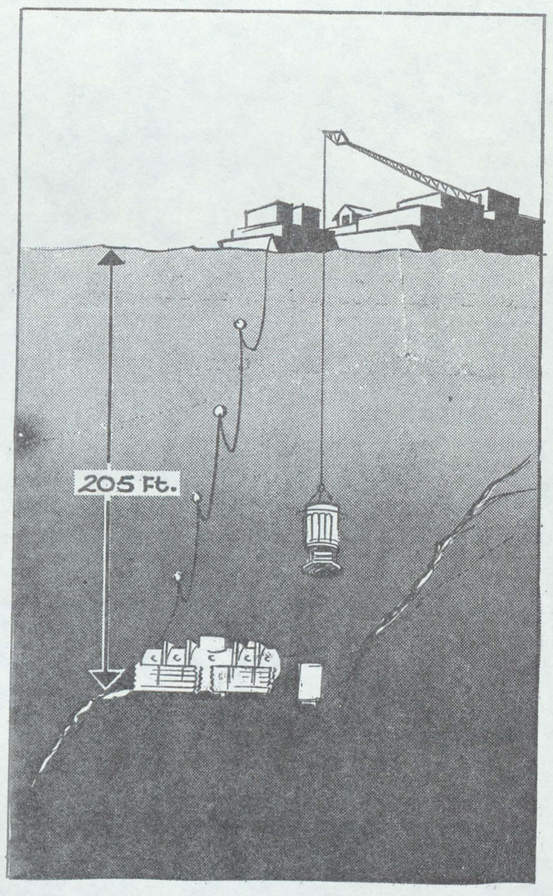
He brought a number of personal checks for Dr. Sonnenburg to sign. The doctor had forgotten to endorse the checks so that his wife could buy groceries and pay bills while he lived on the ocean floor.

One of the biggest surprises since the aquanauts descended Saturday has been the ravishing appetites of the aquanauts, a spokesman said. One closed circuit TV camera is focused on the underseas kitchen. The divers, it shows, are rampant refrigerator raiders.

Dr. Sonnenburg, tallest and heaviest of the divers, has been eating three servings a meal.

The Bethnic Laboratory which failed to function properly and was resurfaced Monday was repaired and returned to its station next to the Sealab capsule.

SAN DIEGO
EVENING TRIBUNE
SEP 1 1965



CANYON HOME—Drawing depicts Sealab II on the edge of Scripps Canyon off La Jolla. The canyon position was selected so dives to greater depths could be made by aquanauts during their stay in Sealab. The canyon is about 700 feet deep. Suspended at end of line is the personnel transfer capsule in which the aquanauts will travel to the surface. The capsule rests on the bottom until it is needed. The mothership Berkone floats above Sealab and is connected to it with cables for communications and supply hoses to carry water and breathing gas.

SAN DIEGO UI
SEP 1 196

SEALAB MAIL

13 Checks Bounce Up From Deep

By JUDITH MORGAN

Thirteen checks surfaced over SeaLab II yesterday and Mrs. Patricia Ann Sonnenburg was delighted they were high and dry.

The pretty brunette discovered Monday that her husband, Lt. Robert Eric Sonnenburg, a Navy doctor and aquanaut, had taken up housekeeping at 205 feet under the sea without leaving her any signed checks for household business on shore.

SENT VIA TROLLEY

The checks made the round trip from the mothership Berkone to Sonnenburg in SeaLab in an airtight device called a trolley.

Mrs. Sonnenburg said yesterday that she hopes to use the trolley Monday to lower a cake to her husband for his 28th birthday.

"It will have to be a tall layer cake instead of a flat sheet cake," she said. "The trolley is only about 14 inches across."

PLANS BIG CAKE

She plans to bake a chocolate cake—her husband's favorite—big enough for all 10 aquanauts to have some.

The Sonnenburgs and their children, Sandra, 4, Eric, 2, and Suzanne, 8 months, live in Panama City, Fla., where Lt. Sonnenburg works with the Navy's Mine Defense Laboratory.

Mrs. Sonnenburg had a peek at her husband over SeaLab's closed-circuit television aboard the Berkone Monday.

"He looked very skinny," she said yesterday, "but it may have been the picture transmission."

Mrs. Sonnenburg received her checks in a white envelope with the artistic, oversized "post mark" of SeaLab—a drawing of King Neptune and a mermaid draped around a circle saying, "U.S. Navy Man in the Sea, Sealab II mail, 1965."

And the address below? Pacific Ocean. No zip code.

Mrs. Sonnenburg explained that she and her husband have separate accounts at their hometown bank in Florida and she did not bring any of her checks with her.

"Bob usually does all the business, but this month I have to pay the rent and other bills by mail," she said.

While in San Diego, the family is staying with Lt. Sonnenburg's mother, Mrs. Harold Hickman of 4367 Adams Ave. They will be here the full 45 days of SeaLab's planned mission because Sonnenburg is scheduled as medical officer with the first and third teams of aquanauts.

Sonnenburg and Cmdr. Scott Carpenter, chief aquanaut, are the only two men scheduled to stay below 30 days.


SAN DIEGO UI
SEP 1 196

—San Diego Union Staff Photo

Even if Lt. Robert Sonnenburg is at bottom of Pacific, bills must be paid. He floated up checks to wife, Patricia, who receives help opening envelopes from Eric, 2, Sandra, 4, and Suzanne, 8 months.



Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)
SEP 1 - 1965

AQUANAUT-ASTRONAUT, M. Scott Carpenter, at a depth of 205 feet in Sealab 2, in the Pacific Ocean, chats with astronaut Gordon Cooper in Gemini 5. The photo shows the first talk between a man at the ocean bottom and a man in space, which took place Saturday. Carpenter heads a team of 10 aquanauts living in Sealab 2 in the first phase of the United States' most ambitious test of man in the sea. (AP)

HUNGRY CREW RAIDS ICEBOX ON SEALAB 2

Aquanauts Also Add to Daily Routine

La Jolla, Cal., Aug. 31 (UPI)—An extremely hungry team of aquanauts, observed raiding the icebox aboard Sealab 2 via closed circuit television, stepped up their daily routine today and also took time for an underwater reenlistment ceremony.

One of Aquanaut Scott Carpenter's chores included washing the breakfast dishes.

"They're eating, eating, eating," observed Capt. George Bond, principal investigator for Sealab 2, who descended 205 feet with other navy personnel today for the five-minute reenlistment ceremony of Billie L. Coffman, navy torpedoman 1/c.

Wonders About Hunger

"I don't know why they're so hungry," Bond said after emerging from a decompression chamber, "except that the water is cold and they're burning a lot of energy. They're able to stay outside the Sealab almost an hour but they're pretty cold when they come back inside."

The temperature inside the 57-foot long Sealab 2 is 86 degrees.

The principal purpose of the 45-day project, officially is in its third day, is to test man's ability to survive in an underwater environment. Exact medical readings are taken on all aquanauts as they perform a variety of chores outside the cylinder and for the leisure time inside the tube.

"They spend a quiet, comfortable night," the doctor assigned to the team said.

Will Stay 30 Days

Carpenter will remain below for 30 days, and others w ill stay no longer than 15 days.

Yesterday's schedule called for a total of 7½ hours in the water. Officials said today that the aquanauts would do more outside work, increasing on a daily ratio.

In the brief ceremony to reenlist Coffman, Carpenter officiated with Capt. Walter Mazzone, physiological control officer, also present.

Scientsts said it was too early to evaluate any physiological data from the test, one of the most ambitious of its kind ever attempted. Sealab 2 rests on a 205-foot shelf approximately a half mile off the southern California coast.

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NAVY NEWS - 52
3738-40 El Cojon Blvd. M
San Diego 5, Calif.
SEP '65 Circ. 10,000

SEALAB II EXPERIMENT

LIFE BENEATH THE SEA

By GERALD R. BOLING

A member of the Pacific Fleet Mobile Photographic Unit in San Diego, California participated in Sealab II project at La Jolla, Calif. He is John F. Reaves, Photographers Mate first class. Reaves, his wife Hilda, and their two children make their home in Oxnard, Calif.

He and eight other aquanauts of the second team began their 15 day stay in Sealab II Sept. 12 when they dove off the diving platform of the mother ship Berkone to join their team captain Cmdr. M. Scott Carpenter.

Carpenter had already spent 15 days submerged with team one and has now finished operations with team two. However, he returned Sept. 27 to the surface with Team Two members.

Reaves and the other Team Two divers along with Scott Carpenter were brought back aboard the Berkone Sept. 27. There they all underwent 30 hours of decompression in the support craft's decompression chamber. After this they got a complete medical check up to determine if their watery surroundings had effected them in any way.

The first handicap Reaves and his shipmates had to overcome was learning to talk and be understood in the Sealab II helium atmosphere. They had a little trouble understanding each other at first because the helium atmosphere distorted their voices.

They had a lot of fun laughing at each other's speech for the first few days. However, after a while submerged in Sealab they learned to talk so they could understand each other.

The aquanuats have discovered many kinds of fish and other undersea life they said they didn't know existed. "There is more to see down here than the eye can grasp," Reaves said.

Reaves primary duty in Sealab II, with the second team, was to give photographic coverage underwater. However, he had other duties not involving photography.

Reaves was, one of four of the present team, wired for sound before entering Sealab II for his 15 day tour. All four had had electrode leads attached to their scalps before leaving the surface. By this method medical personnel are able to record their brain waves while they are participating in the Sealab II experiment.

Working in the area around their undersea quarters, the aquanauts are carrying out an extensive program of oceanography, marine biological research and other assigned duties.

In addition, Reaves and fellow aquanaut Kenneth Conda have participated in a special experiment involving "Tuffy" the Point Mugu porpoise. The purpose of the experiment involving Tuffy was to see if such animals could be trained to help divers at the bottom of the sea.

Reaves and his fellow aquanauts are finding a completely new world under the sea. They live in a beautiful blue-green light which filters down from the surface of the sea above them.

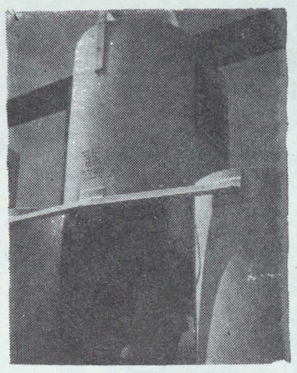
One of Tuffy's exercises consisted of carrying a line from Reaves to Conda in the Sealab area. This ability, was considered handy if a diver should be lost in the dark waters around Sealab.

Another test was to carry messages, mail and small tools 205 feet down to Sealab.

Reaves was the first man to receive a letter by "fish express." Tuffy carried a letter to the habitat from Reaves wife and delivered it in person. The two Navymen had special training in handling Tuffy before the Sealab experiment began. During the experiment Reaves used a special signal to call Tuffy from the surface down to Sealab. Upon reaching Reaves Tuffy waited while Reaves attached a line to his special harness. Conda then used another signal and in this method the animal carried a line between the two divers.

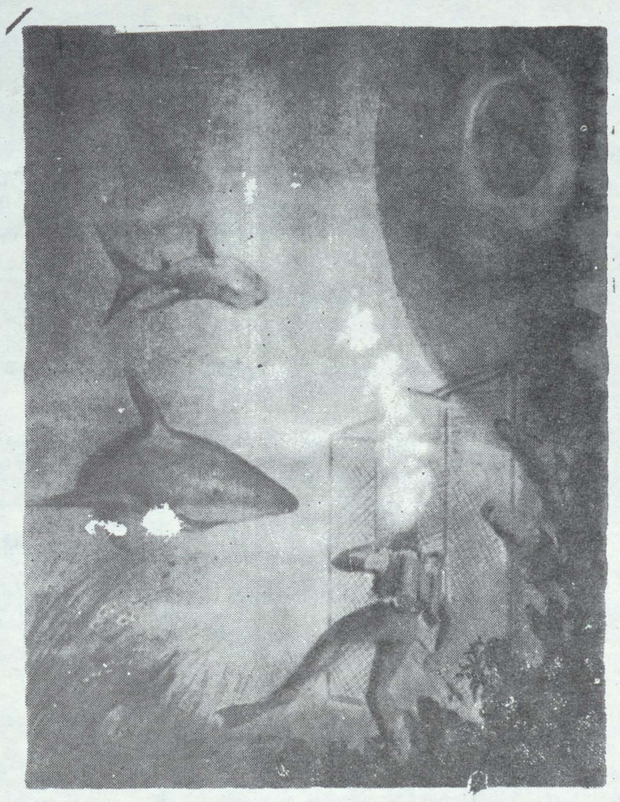
Reaves and fellow aquanauts are undergoing extensive medical test during their period in Sealab II. Divers use various equipment to test their strength. In addition, they are tested in various ways before and after each swim into the ocean around them.

The aquanauts are being studied by TV cameras on the surface by medical personnel. Television cameras supply direct broadcast of activities both in and outside the lab.

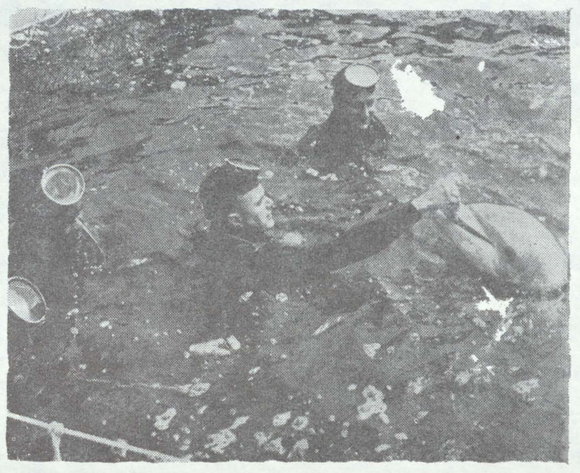


John F. Reaves stands inside a way station aboard the Berkone. The way stations are used in the Sealab area 205 feet beneath the surface. They contain emergency breathing mixtures in case an aquanaut's tanks run low or in the event he becomes lost.

The personnel transfer chamber is mated to the Berkone's deck decompression chamber. When Reeves and fellow aquanauts completed their 15 days in Sealab II they were transported topside inside the personnel transfer chamber. After the mating, aquanauts enter decompression through a hatch and spend 30 hours. Both systems have the same pressure when the divers enter as that to which the aquanauts have been subjected in Sealab.



Artist concept drawing of aquanaut swimming into the Sealab II shark cage 205 feet beneath the surface.



John F. Reaves, Photographers Mate first class feeds fish to Tuffy while Kenneth Conda, Torpedoman first class looks on. In background are two point Mugu, Calif., Navy divers.

San Francisco, Calif.
Examiner
(Cir. D. 292,539 - S. 435,887)
SEP 1 1965

He Re-enlists ---Under 'Pressure'

LA JOLLA — (AP) — One of the 10 divers in the Navy's 205-foot-deep Sealab 2 re-enlisted yesterday under pressure—100 pounds per square inch.

It was the first ceremony of its kind, held on the bottom 1,000 yards off shore in a 12x58-foot steel cylinder pressurized to to six times normal to resist the ocean's weight.

GO UNDER WATER

Capt. George F. Bond, medical director of the 45-day project to test underwater endurance, swam down from the surface with Capt. Walter F. Mazzone to sign up Billie L. Coffman, 36, Willimantic, Conn., who first enlisted in 1948.

The schedule calls for three teams to spend 15 days each in rotation demonstrating human ability to live and work inside and outside the underwater base long enough to salvage a wrecked ship or to install detection devices and weapons.

MEN COME UP

On the same closed-circuit television monitor that has betrayed the divers as rampant refrigerator raiders, scientists on the mother ship above eSalab 2 saw Bond and Mazzone pop up through an open hatch in the floor of the house trailer-sized base for the brief ceremony.

SCIENCE JOURNAL - 78
Dorset House, Stamford Street
London S.E. 1, England M

SEP 65

EXTENDING MAN'S UNDERWATER WORKING DEPTH

THE ADOPTION of the nuclear submarine with its deep operating capacity has given a new impetus to the Royal Navy's frogman programme and other deep water performances. Two types of individual deep water operations have been successfully tackled recently. One has been to stretch the limit of frogman working depth from 200 ft to 600 ft; the other, to rescue minimally equipped men from similar depths in simulated emergencies. The basic problem in both cases is that of ascending without causing incapacity or death from the 'bends'. (Men could work in the water at these or even greater depths for quite long periods if they were expendable!)

The difficulty for frogman dives below 200 ft was what gas mixture to use to avoid nitrogen bubbles forming in the blood—the cause of the bends. The internal body gases expand with the drop in pressure from depth to surface. At 800 ft, for instance, the normal two litre gas flow through the lungs rises to 60 litres. Oxygen becomes toxic beyond 200 ft.

During trials on divers in pressure chambers ashore last winter at the Navy's Physiological Laboratory, Alverstoke, it was established that oxygen mixed with the inert gas helium could take a man to 800 ft and back—down to a pressure of 25 times atmospheric. The mixture ratio used was 95 per cent helium to 5 per cent oxygen. But before real tests could be carried out, new decompression tables had to be worked out: it has proved misleading to extrapolate the length of decompression time from experience at shallower depths.

Several months ago the Navy felt sufficiently confident of the techniques worked out during the 'dry runs' to take the experiment to sea. From the diving ship *HMS Reclaim* off Toulon, 18 dives to 600 ft were successfully completed. A team of eight divers took it in turns to go down in pairs to the target depth and work there for one hour. The system is to go down rapidly in a modern version of a diving bell, a 30 ft long pressure chamber, breathing the oxy-helium mixture. At the scheduled depth, when the pressure inside and outside is equalized, the frogmen leave the chamber for their outside tasks; on the Toulon trials these included sawing metal, taking water temperatures and filming the operation. A 30 ft tether kept the frogmen in contact with their underwater base. Provision was made for their pressurized breathing gas to be supplied either from back-cylinders or from cylinders attached round the outside of the bell. For return the men re-entered the bell, closed it and depressurized there. When they are up to 300 ft nominal pressure, the chamber can be hauled aboard the mother vessel and connected with the onboard pressure chamber to complete decompression in greater comfort.

The oil companies have expressed great interest in the Navy's feat. They would like to know how men can perform tasks at continental shelf depths both for routine maintenance of the underwater parts of off-shore oil rigs and to extend the search for undersea gas and oil reserves. Some uncertainty still surrounds the pressure tables used by the Navy for the ascent—that is, the total length of decompression and the number and length of the stops. This is explained by a naval spokesman as due to the still experimental stage of the procedures: Navy diving experts do not wish to publish their new tables until they are quite sure they are safe under almost all circumstances. It is, however, known that for the dry run at Alverstoke where two men spent two hours at 800 ft pressure, they spent 50 hours decompressing afterwards! Discussions between the Navy and industry are taking place in late summer when it is expected that enough key data will be released to enable the oil men to go ahead with their own experiments.

The Navy's own ultimate objective is to perfect tables and techniques so that even men without special experience of diving can work for up to four hours at a depth of 800 ft. It is expected that helium may become toxic at pressures much beyond 25 times atmospheric.

The other deep water success that the Navy has recently claimed is concerned with escape from deep operating submarines. As a result of the proving tests all Royal Navy submarines are now to be fitted with new equipment. Ten Navy men made escape ascents from the submarine *Orpheus* submerged at 500 ft off Malta last July. A rate of release of one man every 3·5 minutes was achieved. A one-man escape lock fitted to the submarine is filled with water from outside; the man then rises through the hatch and travels direct to the surface breathing air presupplied from the submarine and trapped in a cotton fabric hood over his head (*see illustration*). The longest part of the operation is the passage through the escape cylinder; on release, the surface is reached in a few seconds. The key is the quick pressurization procedure between submarine and local environment and then the 'hurry' to the surface. The subscape method the Navy has employed previously, limited to ascents from no more than 260 ft, was to persuade escapers to rely simply on the gas in their lungs and to breathe *out* continuously so as to match gas expansion with falling pressure during the few seconds of ascent.

Other countries are tackling the new human environment of deep underwater working on a broader front. Both the French and the American navies plan to have their 'aquanauts' living beneath the seas for quite substantial periods.

This month the United States' *Sealab II* is to be inhabited sequentially by two ten-men teams for periods of a fortnight to a month at a depth of 250 ft off the Californian coast. Astronaut M. Scott Carpenter is on loan from NASA to head one of the teams. In last year's experiment in *Sealab I*, four men spent 11 days at 193 ft off Bermuda.

In this year's upgraded experiment a "rigidly controlled" breathing mixture of helium, oxygen and nitrogen is the choice. The pressure within the cylindrical 'habitat' will be the same as the surrounding water, 100 lb/in². The 57 ft long and 12 ft diameter vessel is divided into a laboratory, galley and bunkroom. Eleven portholes are provided. The teams have two means of getting to and from the vessel: one is a specially designed personnel transport capsule; the other a standard diving bell. Once on the bottom the men will swim about ten yards to *Sealab* and enter through an anti-shark cage and hatch. Sufficient food and atmosphere is contained on board for at least six weeks. Power and water will be provided from shore.

Inside temperature is maintained at 80°-90°F (60 per cent humidity) to offset the mild internal chill from breathing a high helium atmosphere. Several of the world's navies, including the Soviet Union's, must be getting used to their divers talking falsetto:



SEP 1 19
FREE PRESS
Detroit, Mich.

AQUANAUT Scott Carpenter, 205 feet beneath the pacific in Sealab 2, chats with astronaut Gordon Cooper in Gemini 5. This photo was released Tuesday by the Navy. It was the first talk between a man in space and a man at the bottom of the ocean.

SAN DIEGO U.
SEP 1 19

New Deep-Diving Vessel Shown

ANNAPOLIS, Md. (AP) — A new deep - diving research craft which will take scientists 4,000 feet below the surface of the ocean was shown yesterday by Westinghouse Electric Corp.

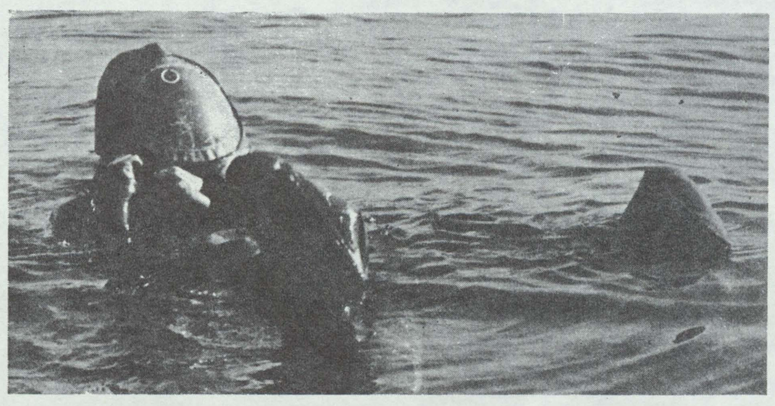
The vessel, which looks something like a huge yellow bug, is the first of a series of underwater research vehicles to come from a $1 million Westinghouse research and development program.

Westinghouse plans to lease the vessel for military and scientific research.





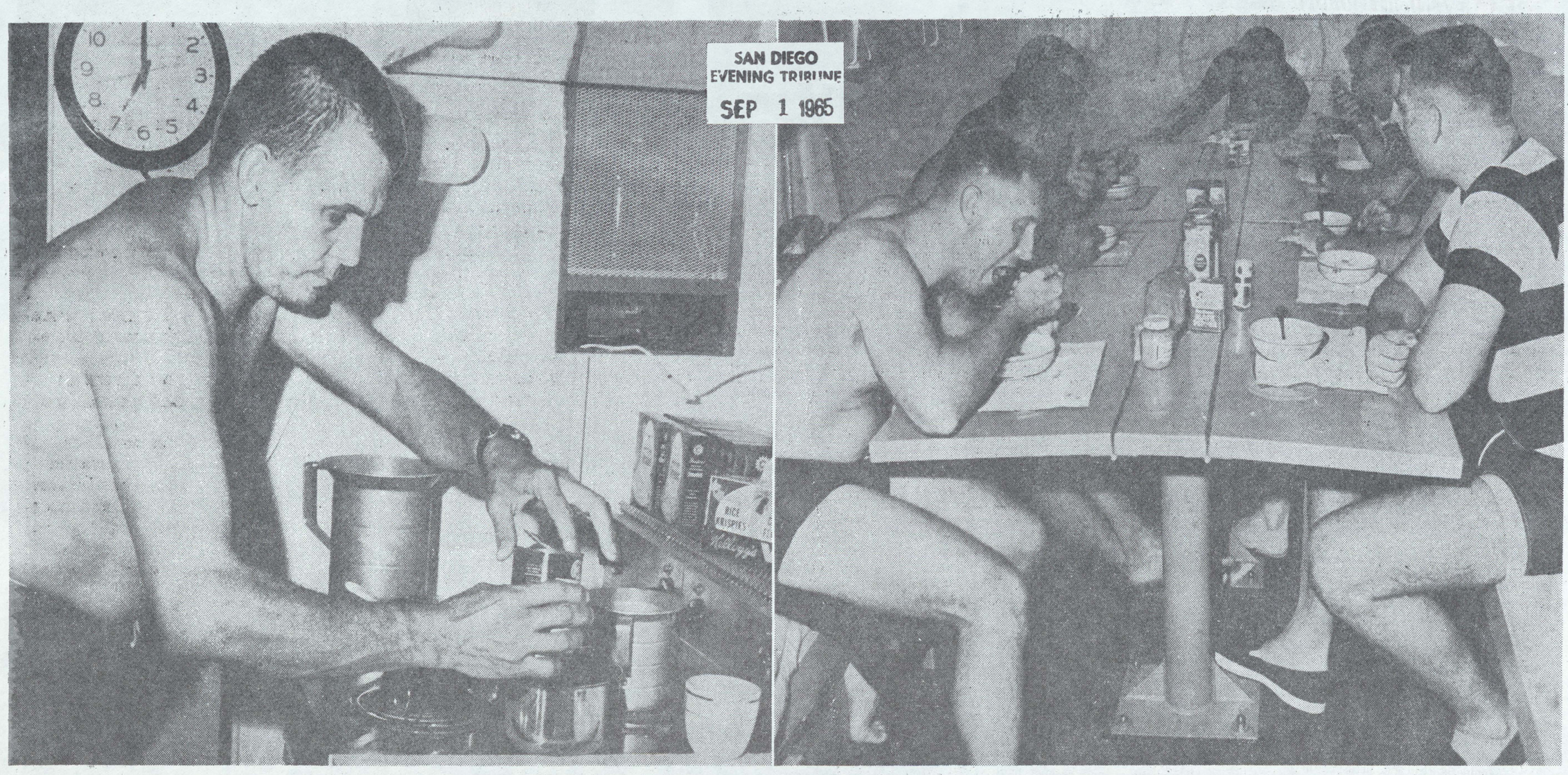
SUBMARINE ESCAPE TRIALS using a new technique were tested in the Mediterranean last July. Escapers, dressed in suits incorporating a cotton fabric hood with a plastics facepiece, breathed trapped air during their ascent to the surface (top and bottom left). In other deep water exercises, the United States' Sealab II (below) is to be inhabited sequentially by two ten-men teams for periods of a fortnight to a month at a depth of 250 ft off California. Astronaut Scott Carpenter is on loan from NASA to head one of the teams



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Breakfast Is Breakfast — Even 205 Feet Down

SAN DIEGO
EVENING TRIBUNE
SEP 1 1965



DOMESTICITY—Chief Engineman Cyril Tuckfield opens a can of fruit for breakfast 205 feet under ocean in Sealab II in left photo. At right, a hearty breakfast is enjoyed in mess compartment. At end of table, left, is Torpedoman's Mate Billie L. Coffman and at right, Lt. Robert E. Sonnenburg. The crew captain, Cdr. Scott Carpenter, sits at the head of the table. A heavy day's work followed shortly.

TEAM FLOATS OVER SEALAB

Divers Coached Aquanauts, Tested Gear, Located Site

By BOB RODRIGUEZ
EVENING TRIBUNE Staff Writer

The early success of Sealab II is due largely to a group of Underwater Demolition Team divers who trained the aquanauts, tested their equipment and located the present site off La Jolla.

They are now over the site on standby duty on a landing craft converted into a complete diving support platform.

CWO Kenneth Specht of 351 Bradley St., El Cajon, is in command of the 10 standby divers, the auxiliary support craft and its crew.

Specht and his men tested the long term exposure suit the aquanauts wear. The suit was tested nearly two years. It worked so well that Sealab officials decided to use it at the last moment after the equipment they had planned to use proved inadequate.

The divers, attached to the Research, Development, Test and Evaluation Division of the Naval Operations Support Group Pacific, based at the Coronado Amphibious Base, trained the aquanauts nearly two months ago in the use of the Mark I Swimmer-Delivery Vehicle (SDV).

The torpedo shaped SDV, equipped with a homing device, will enable aquanauts to return to a specific location underwater. They carry a device which sends out a pinging signal enabling a diver with a vehicle to home in on them.

The vehicle has a top speed of more than one knot, and is equipped with a compass and direction gauge. It may be used for towing, and the support divers will also use it to photograph Sealab operations.

The aquanauts were trained here in two five-man groups one week. They previously had undergone two weeks of training at Panama City, Fla., with Specht.

Yesterday the support divers used the Mark I to deliver equipment to the aquanauts. The aquanauts may use the vehicles in some of their tasks.

Eight of the Swimmer-Delivery Vehicle divers — Carl Schulze, Donald Patrick, Frank Flynn, Donald Blackwell, Earl Bolen, Arno Swagemakers, Donald Phillips and John Stepp — are from UDT-11.

The two other divers, Bill Ledford and James Parks, are from UDT-12 and SEAL Team 1, respectively. Specht is on the staff of the Naval Operations Support Group.

The UDT men dived about two weeks off La Jolla searching for the present Sealab site. The original site couldn't be used due to large amounts of soft sediment. Specht and his men dived to depths of 200 feet, using a mixture of oxygen and helium, to bring back bottom samples and probe the ocean floor.

The suit the UDT divers tested and developed was an outgrowth of their work, which took them to depths never reached before by Navy divers other than in experiments. Divers previously became incapable of operating after more than 1½ hours under water, due to cold which caused numbness and fatigue.

Their long hours in the water, testing the suit under all conditions, has resulted in extended bottom time, enabling divers to perform more work more efficiently.

The development of the long term exposure suit by the UDT divers has broken a large barrier to underwater exploration.



SEA VEHICLE—Navy divers view towing device they used to train aquanauts and to deliver equipment to Sealab operations. Left to right are Arno Swagewakers, Donald Patrick, Donald Blackwell and William Ledford. They are Underwater Demolition Team members on standby duty over Sealab.

Making Progress SeaLab Aquanauts

Picture — Page a-3

By BRYANT EVANS
The San Diego Union's Science Writer

Despite continued difficulties of minor but time-consuming nature, the 10 SeaLab II aquanauts were making progress on their scientific mission, Capt. George Bond, USN, topside commander, said last night.

The aquanauts were starting on their oceanographic observations, on their physiological tests and on their physical performance tests, inside and outside the lab. There were no results available.

A first for the Navy was scored when one of the team, Billie L. Coffman, torpedoman's mate first class, decided to reenlist under the pressure of seven atmospheres. Men have reenlisted before under water in submarines but not under this pressure or in a helium atmosphere.

Capt. Walter Mazzone and Bond swam down to the lab to witness the ceremony administered by Cmdr. M. Scott Carpenter, team captain, and to congratulate Coffman.

The two captains left the surface at 11:20 a.m., reached SeaLab at 11:28 and started back up at 11:36.

Bond said he found everything on the bottom in good shape. The morale of the men was high. They are sleeping and eating well and "between times doing their scientific chores."

"But they are not up to schedule," he said. "One thing that has held us up today is getting the benthic (sea-bottom) lab in place."

By last night the benthic lab was secure on the seabottom.

This is a device developed by the Marine Physical Laboratory of the Scripps Institution of Oceanography to collect and send data from under the ocean surface to the land. Dr. V. C. Anderson of Scripps is its developer.

(Continued on a-4, Col. 1)

It is designed to operate six video channels, make underwater readings of temperature and pressure and transmit 20 channels of telemetry.

It also can control a robot for sampling, mining and drilling the ocean bottom although it will not do these things in connection with SeaLab.

The most remarkable thing about the benthic lab is that its parts and circuits can be replaced by remote control by a man sitting on the shore and looking into it by closed-circuit television.

The shore station of SeaLab is depending on the benthic lab to supply it with much of the data on which the scientific purpose of SeaLab depends.

The benthic lab was delivered to the SeaLab mother ship, the Berkone, yesterday by the Scripps research vessel Horizon. The big crane from the Berkone lowered the lab into the sea but encountered difficulty in getting it placed. A diver was sent down to help out.

Last night, after the lab was put on the bottom, the shore station of the Marine Physicial Laboratory reported that the television cameras inside the underwater installation were sending a good signal and all seemed in order. The lab was expected to be in service today.

A new device for obtaining an electrocardiogram from a swimming man was tried out for the first time yesterday. The device, built by Allan Slater, chief engineer for the Cariology department at Philadelphia General Hospital, was strapped on aquanaut Fred Johler. It reported on Johler's heartbeat by sound transmission through the water.

10 KEEP UP TO DATE WHILE 205 FEET DOWN

The 10 aquanauts in Sealab II 205 feet beneath the ocean off La Jolla haven't been lacking news of the outside world since they entered their underwater home.

Copies of the Evening Tribune were sent to them yesterday along with other supplies in a dumb waiter from the mothership Berkone.

The aquanauts also are able to watch their favorite television entertainment. They have a television set inside Sealab.

They get other news from their topside control center and the officers who man it.

Capt. George Bond, in charge of the center, says that during most of the daylight hours, the phone communications between his station and Sealab are limited to business.

"We try to leave them alone as much as possible during the day," Bond said. "But at night the men on watch often want to talk. We often get in four or five hours of conversation then."

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A HEYDAY FOR SAVING

Aquanauts' Payday— But What Good Is It?

By LEO BOWLER
EVENING TRIBUNE Science Writer

Today was payday in Sealab II.

Sealab officials put pay checks for the Aquanauts who are Navy men into a dumb-waiter and lowered it to Sealab.

Chief Yeoman Billy B. Snell, who handles pay records for the Navy men in the lab, made a special trip to 11th Naval District Headquarters to get the checks.

Time For Waiting

No one is quite sure what the men in Sealab will do with the checks. Six of them won't be on the surface where the checks can be cashed until Sept. 12. Cdr. Scott Carpenter, leader of the team of aqunauts, will be in Sealab until Sept. 26.

Aquanauts today were making reconnaissance surveys of the bottom near Sealab and were installing outside television cameras.

Bond said they spent a quiet night, got plenty of sleep and were in good spirits today.

The men began work today on an undersea weather station near the lab. The station will give data on currents, water temperatures and pressure in the area. Sealab officials say placement of the station is one of the most important projects the aquanauts will undertake.

Emily Stirs Concern

While the men on the bottom were preparing to take a look at underwater weather, Sealab officials were showing concern over tropical storm Emily off the coast of Baja California.

Capt. George F. Bond, principal investigator for the Sealab project, and Cdr. Tom Blockwick, deputy on-scene commander, were getting frequent weather reports and checking on the five mooring lines which hold the mothership Berkone above the Sealab.

Poor Light Hurts

Work outside has been hampered by lack of light. Daylight hours at the 205-foot depth where Sealab is located are from 10 a.m. until 4 p.m. Bond said that artificial lights must be used at other times, and they haven't been working out too well.

"We think that the lights may not be in the right places, or they may not be pointed in the right direction," Bond said. "The water looks clear until you examine it closely.

Full of Jellyfish

"Then you find that it is full of tiny marine organisms, plankton, and tiny jellyfish which run from the size of a pin head to four times that size. These reflect the light and scatter it."

"Sealab is still covered with tiny octopuses, but they aren't giving us much trouble. They act like they have found a mama."

Three of the men in Sealab are civilians and receive pay from the civilian organizations. They are Tom Clarke, 25, of Scripps Institution of Oceanography; Earl Murray, 37, also of Scripps, and Berry Cannon, 30, of Panama City, Fla., an electronics engineer.

Signatures Needed

Navy officials explained that the families of the aquanauts cannot cash the government checks until they have been signed by the men themselves. It will be necessary for them to sign the checks, then mail them to their families if they wish to use the money.

First Mission Shortened

A heavy storm would not move Sealab itself, but could disrupt the operation if it pushed the Berkone away from its position.

Sealab I, which was conducted at 192 feet under the sea last year 30 miles from Bermuda, had to be cut short because of a hurricane.

Despite the storm, Bond said that the tempo of work on the bottom could be expected to increase.

"As the aquanauts get their housekeeping chores inside Sealab squared away, they will be able to devote more time to operations outside on the sea floor," he said.

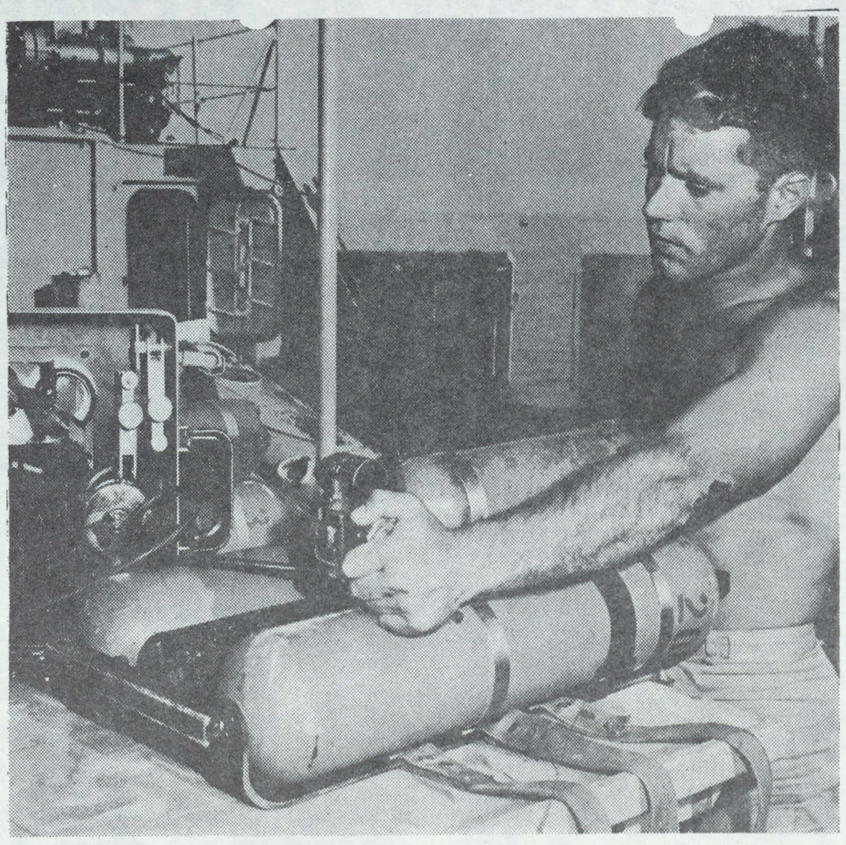
More Remain Inside

Bond said that two men must remain inside Sealab at all times, but for the first few days on the bottom, two could not keep up with the work that needed to be done.

The first few days on the bottom have been devoted largely to medical testing. This, Bond said, has required the close supervision of Lt. Robert E. Sonnenburg, the only doctor on the aquanaut team. Sonnenburg, 27, is the only native San Diegan in Sealab.

The medical work conducted includes electrocardiograms taken on men swimming outside Sealab.

SAN DIEGO EVENING TRIBUNE
SEP 2 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California



TESTING — Arno Swagemakers gets ready for a dive by testing amount of oxygen in his Mark VI breathing apparatus. He is member of UDT-11. Aquanauts use same rig but require a different gas mixture in their job.

Sobering Experiment Whips Deep-Sea Divers' Giddiness

By BOB RODRIGUEZ
EVENING TRIBUNE Staff Writer

The era of the "drunken" deep-sea diver nearly has come to a close.

Eleven Underwater Demolition Team divers on the Sealab II auxiliary support craft have proved this by diving for the last two months to 200 feet breathing an exotic gas mixture.

They have not suffered from nitrogen narcosis, a drunk-like effect which afflicts divers using compressed air below 100 feet.

They breathed a combination of 68 per cent helium and 32 per cent oxygen while searching for the present Sealab site and while they trained the aquanauts.

A small tank of pure oxygen on the UDT divers breathing apparatus is used to purge their systems of the oxygen-helium mixture when they surface.

The mixture increases the time a diver may stay on the bottom and negates nitrogen narcosis. The aquanauts breathe 80 per cent helium, 16 per cent nitrogen and 4 per cent oxygen.

The nitrogen is used to make speech at the Sealab depth intelligible. The decreased oxygen is used since the aquanauts are not as concerned with the decompression time that will be required when they ascend.

UDT divers use more oxygen because, although it cuts down bottom time, it reduces decompression time. Decompression is necessary to rid the blood stream and lungs of nitrogen which builds up as a diver surfaces.

Failure to decompress causes what is commonly known as the bends and results in severe crippling or death.

"This is the first time the helium-oxygen mixture has been used in an actual operation," said CWO Kenneth Specht, project director for Sealab support.

"It has been used in controlled tests, but we have used it to do a job."

Specht and the other divers are on standby duty. They have taken equipment to the aquanauts and will aid in rescue operations if necessary.

(Continued on A-35, Col. 1)

(CONTINUED FROM A-33)

They also will photograph the operation using the Mark I, an underwater vehicle they tested.

The aquanauts are using the Mark VI semiclosed breathing apparatus designed for deep diving. Specht and his men tested and developed this equipment as well as the wet suits the aquanauts use.

Specht is also in charge of the support craft and its crew. The landing craft was modified in the past 18 months to serve men who carry tanks instead of tanks that carry men.

Chief Boatswain's Mate William Wetenkamp, 10083 Diversion St., La Mesa, heads the crew. The crew consists of Don Patterson, Phillip Nowels, Lee Farber, William Endicott, Walter Voldase, William Britton and Robert Thomas.

Wetenkamp said he and his men installed everything except the recompression chamber room, radar and compasses. A high and low pressure compressor system, three cranes and an AC generator are among the things they installed.

Working from the craft, testing the breathing apparatus and underwater vehicle, Specht and his men have greatly aided Sealab.

SAN DIEGO EVENING TRIBUNE
SEP 2 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California



NEIL MORGAN

REAL BOND: Identification badges for press and staff at Sealab II are in three digits, and it was only natural that 007 should be assigned to the project's principal investigator, Navy Capt. George Bond.

SeaLab Keeps Eye on Storm

LA JOLLA, CALIF. (AP)—Officials of SeaLab 2 are keeping a close watch on a hurricane moving up the coast of Baja California.

The storm was about 450 miles southeast of La Jolla Wednesday, but officials believe it won't cause trouble for the underwater-living experiment.

The Weather Bureau said Hurricane Emily, packing winds of up to 78 miles per hour, probably will veer off before reaching southern California although it is closer than any other potentially hazardous storm in many years.

Communications, power and other facilities for the SeaLab would be disrupted if a storm pushed the support ship Berkone away from the project site, and the 10 aquanauts who are spending 15 days on the ocean bottom in the SeaLab capsule would have to be brought to the surface.

Des Moines (Ia.) Tribune
THURSDAY, SEPTEMBER 2, 1965

Men In SeaLab Talk To Shore By Phone

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

SEP [illegible]

Continue Installation Of Weather Station

Pictures—Page a-3

By JUDITH MORGAN

A telephone rang at noon yesterday in SeaLab headquarters on the Scripps Institution of Oceanography campus and it was aquanaut Berry Cannon calling from 205 feet beneath the sea.

Lt. Cmdr. Hugh Golightly, the Navy officer who answered the call, spent half an hour talking to Cannon, chief engineman Cyril J. Tuckfield and chief photographer Jay Dee Skidmore.

In a later transmission, Golightly talked to Cmdr. Scott Carpenter, who inaugurated the lab to shore telephone calls late Wednesday night when he phoned his wife, Rene, in their Timber Cove, Tex., home.

Such telephone calls became possible after a benthic laboratory was connected Wednesday, improving and boosting the complicated electronic communication circuits.

The aquanauts continued installation of an underwater weather station yesterday as the water temperature remained below 50 degrees.

When completed, the station will be as tall as a six-story or seven-story building rising from a cement slab on the ocean floor. A 500-pound cement anchor was lowered yesterday to a site 175 feet north of SeaLab.

MORALE 'UP'

Cannon, an electronic engineer with the Navy's Mine Defense Laboratory in Panama City, Fla., told Golightly the aquanauts' morale was "way up." He said the men had more to look at than the eye could see and the Scripps oceanographers were excited over the marine life.

The aquanauts barely had finished a lunch of vegetable soup, chicken and dumplings, English peas and pineapple when Cannon placed the call, he said.

Tuckfield, a veteran of SeaLab I, then came on the line and said the aquanauts probably would set an eating record.

SeaLab personnel topside have watched the aquanauts raid the icebox and have answered many requests to send down more food.

GETTING FAT?

"We're eating so much, the hatch may be too small when we try to swim out at the end of the project," Tuckfield said.

Skidmore, a Chula Vista photographer-diver, said the water is relatively dark but clear. Especially in the early evening, he said, the water is a beautiful green from the bottom to the surface.

Skidmore reported that the SeaLab portholes are crowded with fish looking in. "We're watching them and they're watching us," he said.

VOICES PROCESSED

Skidmore asked to have newspapers lowered to him in the dumb waiter used for SeaLab to surface messages and packages.

The radio-telephone voices went through a helium unscrambler before being heard on shore. A spokesman explained that the unscrambler lowers the voice from its chipmunk high quality but does not bring the voice back to normal pitch.

Golightly said he could understand the aquanauts on the telephone but it was hard to tell one person from another.

Capt. George Bond, principal investigator for SeaLab, said outside television cameras were being set up so that activities outside SeaLab could be monitored as well as those inside the habitat.

As the aquanauts telephoned topside, soap operas and afternoon movies played on the pressurized television set bringing commercial TV to the underwater home.

The television set was installed to give aquanauts a means of recreation "in their spare time." Their schedule has been so busy that the TV is left on mainly to be sure they still are picking up commercial stations.

The closed-circuit television showing life inside SeaLab still is not operating in the Scripps Aquarium for the public to view. It is expected to be ready next week as soon as the video picture is improved with the installation of the benthic lab.

SAN DIEGO U[illegible]
SEP [illegible] 196[illegible]
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San [illegible]go, Californ[illegible]

78

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

SEP 2 1965



Aquanaut Richard Grigg's wife, Sandra, and daughter, Raina, 2, walk on the shore near La Jollla. Grigg will enter SeaLab II Sept. 28.

SDS COURSE HELPS

This Aquanaut Has Understanding Wife

By JUDITH MORGAN

Sandra Grigg, 27, deserves credit for trying to understand her aquanaut husband, and she got it last month at San Diego State.

Sandra, wife of Richard Grigg, who will descend in SeaLab II Sept. 28 with the third team of aquanauts, received one college credit this summer for a course called "Science and Man."

"I learned a lot about my husband in that class," said the pretty Oriental girl. "Scientists are complicated to understand because they are so devoted to their work. I couldn't understand why my husband was leaving so many evenings, and then I saw that all the other husbands up here (at University of California at San Diego's married students' housing) were, too."

Sandra thinks every wife of a student at Scripps Institution of Oceanography should sign up for the course.

MET IN HONOLULU

Rick Grigg, a Stanford University graduate from Los Angeles, met Sandra Song, a psychology student at the University of Hawaii, when Rick was in Honolulu working on a master's degree.

They were married in Hawaii in 1961 and moved to La Jolla in 1963 so Rick could work on his Ph.D. at Scripps Institution.

Sandra's mother is Chinese and her father is Korean. The Griggs' two-year-old daughter is named Raina Lailin, which means Queen of the Water lilies, Sandra explained.

"I spent two and a half hours at the library in Hawaii trying to find a name we would both like for the baby," she said. "Raina is Celtic and means queen."

Sandra said her aunt and grandmother put their heads together and came up with "Lailin," Hawaiian for "water lilies."

"Rick and I liked the name because of his work in oceanography," Sandra explained.

Raina loves the sea, and has been surfing out as far as the end of the Scripps pier.

Her father, the aquanaut, paddles out with Raina sprawled on her tummy in front of him. Then Rick stands, holds the two-year old in his arms, and rides the waves in to shore.

"Rick first took Raina surfing when we moved to La Jolla and she was four months old," Sandra said. "Rick goes surfing every day on his lunch hour or right after work. He's been surfing since he was nine years old."

STANDS WATCH

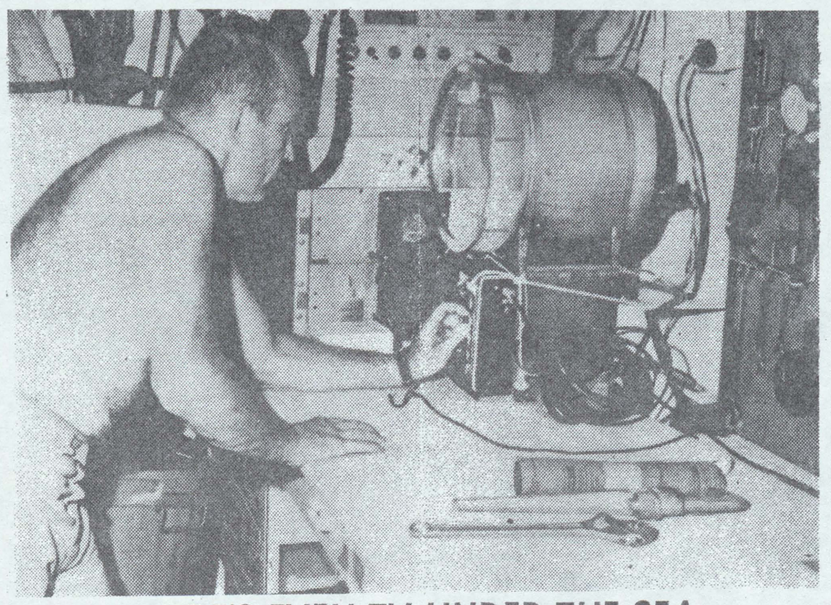
But Rick has missed surfing for three weeks because of his duties with SeaLab.

He now stands 24-hour watch on the mother ship Berkone every three days.

"Rick talked to Tom Clarke (Scripps' bachelor aquanaut who is a member of SeaLab's first team) yesterday from the Berkone," Sandra said. "Tom is so enthused about the marine animals around Sealab and how many there are."

Clarke is doing his master's thesis on the orange Garibaldi fish.

12
From SUN-TIMES Chicago, Ill.
SEP 2 - 1965



THERE'S EVEN TV UNDER THE SEA

Aquanaut Fredrick J. Johler, 39, adjusts pressurized television set aboard the Sealab 2. The Sealab is in 205 feet of water off LaJolla, Calif., for a 15-day stay. Spokesman says Johler is the best at tuning the set and the others aboard won't let him go to bed before it's tuned. (AP)

From SEP 2 - 1965
POST-GAZETTE
Pittsburgh, Pa.

Sealab 2 Finds Plenty

Who Says There's No Weather Beneath Sea?

By RALPH DIGHTON
Associated Press Science Writer

LA JOLLA, Calif., Sept. 1—You might not think Sealab 2 aquanauts have "weather" on the floor of the ocean, but they do: wet and gloomy.

There are other factors in the "climate," too—changes in temperature of the water and in direction and speed of currents—all of which have a bearing on how well the Navy divers and scientists can function at their depth of 205 feet, 1,000 yards off the southern California coast.

Pressure 6 Times Greater

The 10 aquanauts who began living in the house trailer-sized underwater laboratory Saturday started setting up a "weather station" today 175 feet away from Sealab 2.

With the weight of the ocean on their bodies creating a pressure six times that at the surface, they expect it will take four or five men two days to complete the fairly simple task.

Others will continue hooking up their 12x58-foot steel cylinder abode with an underwater communications center which will expand the number of telephone and television channels to the mother ship on the surface.

This task is expected to require 24 man hours, maybe more.

A Navy spokesman said each man averaged more than 47 minutes of outside work yesterday and this is expected to increase daily to two or more hours.

Working in 50-degree water means they need a lot of food to keep them warm.

Little Time to Loaf

A typical day's menu:

Breakfast — Figs, cereal, omelette, milk, coffee, toast, jam.

Lunch—Soup, beans and beef, potato salad, peaches, coffee, milk, crackers.

Dinner — Beef stew, carrots and peas, pears, coffee, milk.

Plus unlimited between-meal snacks.

Although the men average less than an hour a day outside the base, they have little time to loaf.

Inside they are busy with research projects, such as cataloging marine life in the area, and measuring their own heart beat and brain wave patterns to see if there are any changes due to the stress of living in an underwater world.

Three teams of 10 men will rotate in 15-day tours on the bottom in the Navy's largest project yet to test the endurance of men in the sea.

HURRICANE CAUSES CONCERN OVER SEALAB EXPERIMENT

LA JOLLA, Calif., Sept. 2 (AP)—Officials of Sealab 2 are keeping a close watch today on a hurricane moving up the coast of Lower California. The storm was several hundred miles southeast of La Jolla. Officials believe it will not cause trouble for the underwater living experiment.

Of primary concern was the influence the storm, hurricane Emily, might have on the Berkone, the support ship moored over the Sealab capsule 1000 feet from shore. Communications, power and other support facilities for the Sealab would be disrupted if a storm pushed the Berkone away from the project site, and the divers would have to be brought to the surface.

Ten aquanauts are spending 15 days on the bottom at a depth of 205 feet in the test of underwater endurance. Their home is the 12 x 58-foot Sealab capsule. Today was payday for the aquanauts and they continued their various tasks and tests while their paychecks were lowered to them in the dumbwaiter connected to the Berkone.

New York 38, N. Y.
From SEP 2 - 1965
POST-DISPATCH
St. Louis, Mo.

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

SEP 2 1965

SeaLab Crew Set To Install Weather Unit

Aquanaut's wife tries to understand—Page B-10

By JUDITH MORGAN

SeaLab II aquanauts today will begin installing an underwater weather station called by the Navy "the most important piece of scientific gear in the experiment."

A support ship near the mother ship Berkone will drop a 500-pound cement anchor this afternoon at a site marked yesterday by four aquanauts 175 feet north of SeaLab II.

NEXT STEP

Once the cement slab is in place, aquanauts will begin assembling the station, which will rise 60 feet above the ocean floor. The station is expected to be operational by tomorrow afternoon.

Four other aquanauts yesterday completed connecting the complex benthic communication lab to the SeaLab. The seven-ton communication center has improved audio and video reception between SeaLab and shore. The Navy expects to start scheduling telephone calls for aquanauts and their families late this afternoon.

STATION'S PURPOSE

The benthic lab took seven hours to connect instead of the predicted four hours. Capt. George F. Bond, project director, said the aquanauts had completed all the work assigned to them by dark.

The underwater weather station will measure and record weather details at two depths: 145 feet and 205 feet below the surface. Concealed instruments will give definitive information on the speed and direction of water currents, water pressure and temperature.

Twin banks of instruments are located on top of the concrete anchor on the ocean floor and on the bottom of a buoyancy tank.

The buoyancy tank is at the top of the station, separated from the anchor by 35 feet of taut wire.

DAILY CHECKS

The self-contained weather station will be checked daily by aquanauts. If any of the gauges or meters is not recording properly as indicated by a small moving needle, the aquanaut will take the instrument off the station and return to the SeaLab for a replacement.

All the parts of the weather station are now in SeaLab and will be assembled after the cement base in place.

The Navy reported that yesterday the temperature around SeaLab dropped to a low of 45 degrees. The average area temperature had been 50 to 51 degrees.

VIEW CHANGES

At first the Navy thought the change of depth and pressure between the bottom and top of the weather station was too critical for an aquanaut to check. However, Bond said yesterday the 60-foot change is at the ceiling of allowable travel and the aquanauts will be able to read instruments at the 145-foot depth as well as on the ocean floor.

The aquanauts can wander as far as 300 feet away from SeaLab in a horizontal direction and have a rope fence of sorts strung around the area to prevent getting lost in the dark water.

Meanwhile, the aquanauts are setting up visual tests by planting well-spaced rows of markers in the water away from SeaLab. The Navy said photo flood lights will be turned on for one visibility check and recordings will be made to show how far an aquanaut can see.

From SEP 2 - 1965
PRESS
PITTSBURGH, PA.

Aquanauts Defy Hurricane Emily

LA JOLLA, Calif., Sept. 2 (UPI) — Ten aquanauts went ahead with the Sealab 2 Man-in-the-Sea Project experiments today despite Hurricane Emily about 500 miles south of here.

The aquanauts, including Astronaut M. Scott Carpenter, were making fine-tuning adjustments on a laboratory they helped set up yesterday.

The laboratory provides auxiliary communications with scientists on shore to monitor the aquanauts inside and outside of the 200-ton, 57-foot-long Sealab-2 via closed circuit television.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

SEP 2 - 1965

Aquanauts Install Lab

LA JOLLA, Calif. (AP) — Aquanauts in Sealab II planned to wind up installation Wednesday of a sophisticated electronic communications center.

Meanwhile, the 10 divers are eating like . . . well, eating heartily.

The apparatus, known as a Benthic laboratory, is a concrete structure that will serve as a switchboard to handle communications for the Navy's underwater living experiment.

When it is hooked up, the aquanauts will have four television channels, 20 channels for audio communications and 20 data channels.

Up to now, communication has been limited to telephone conversations with the support ship 205 feet above on the surface, and by messages sent down by dumbwaiter.

Officials said one of the biggest surprises thus far is the aquanauts' enormous appetites. A closed-circuit television camera is focused on the Sealab's kitchen, and the divers are raiding the refrigerator often.

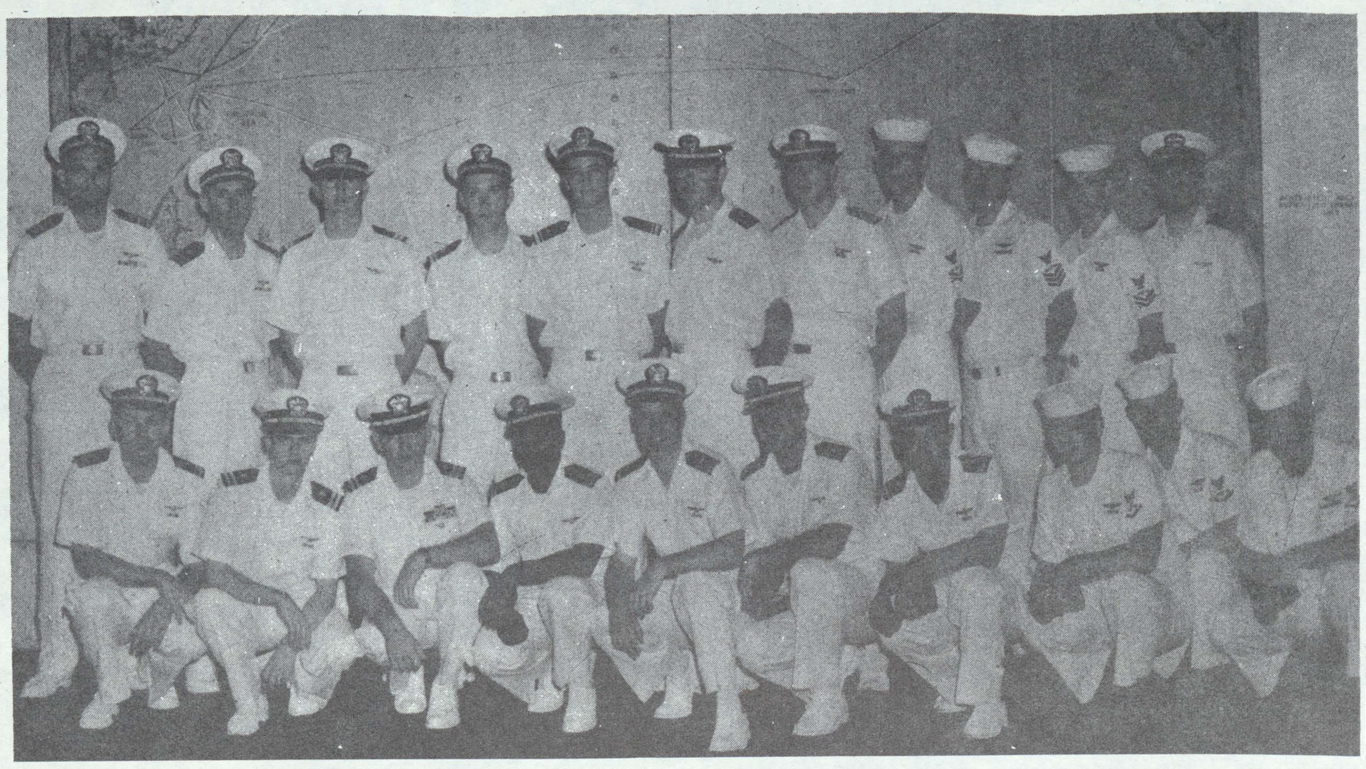
From
DAILY NEWS
New York, N. Y.
SEP 2 - 1965

Aquanauts Ignore Threat of Hurricane

La Jolla, Calif., Sept. 1 (UPI) —Hurricane Emily posed a potential threat to the Sealab 2 project today, but aquanauts went ahead with installation of the first underwater weather station to gauge conditions man must endure in exploring the world's oceans.

The hurricane was placed 600 miles south of San Diego, moving eastward at six knots. Scientists believe it may increase swells and could hit the Sealab site off the Southern California coast in diminished force by the weekend.

If this happened, the 10 aquanauts, including M. Scott Carpenter, the second U.S. astronaut to orbit the earth, would have to stay inside the Sealab proper, 205 feet below the surface and interrupt experiments.



NAVY AIR MEDALS AND ARMED FORCES EXPEDITIONARY MEDALS..were recently presented to officers and enlisted men of Carrier Airborne Early Warning Squadron Eleven (VAW-11) Detachment Delta serving in Southeast Asia aboard the USS Coral Sea. The awards included a citation and were presented by Rear Admiral R. W. Cousins, Commander of Carrier Division Nine. Thirteen of the men also received Commendation Medals with Combat "V". LCdr. C. L. McGathy (standing far left) is the officer-in-charge of Detachment Delta.

SAN DIEGO
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DISPATCH

Devoted To The Navy, Marine & Coast Guard Community Of San Diego

CIVIL SERVICE NEWS
Pages 12, 13

AQUANAUTS DOING WHALE OF A JOB ON OCEAN FLOOR

Ten man team moving along on undersea experimental work

While the rest of the nation tries to escapt the sweltering heat of Labor Day by vacationing at seasides and resorts, ten Navy Aquanauts will be on their ninth day in the cool waters 45 to 50 degrees beneath the sea off La Jolla.

The ten man team of officers, enlisted men and civilian oceanographic experts under the command of Commander Scott Carpenter, are 200 feet on the ocean floor in SeaLab II, their home for 45 days as the U.S. Navy undertakes their most ambitious project in the "Man in the Sea Program".

Thursday, the SeaLab II Aquanauts put in over 8 hours of work outside their capsule as they continued to carry out assignments which include:

.Installation of an underwater weather station and other instruments to study the ocean floor, water and plant life.

.Installation of fish cages which they will stock and study. A census of the fish population in their temporary residence is also planned.

.The study of human performance working for long periods beneath the sea.

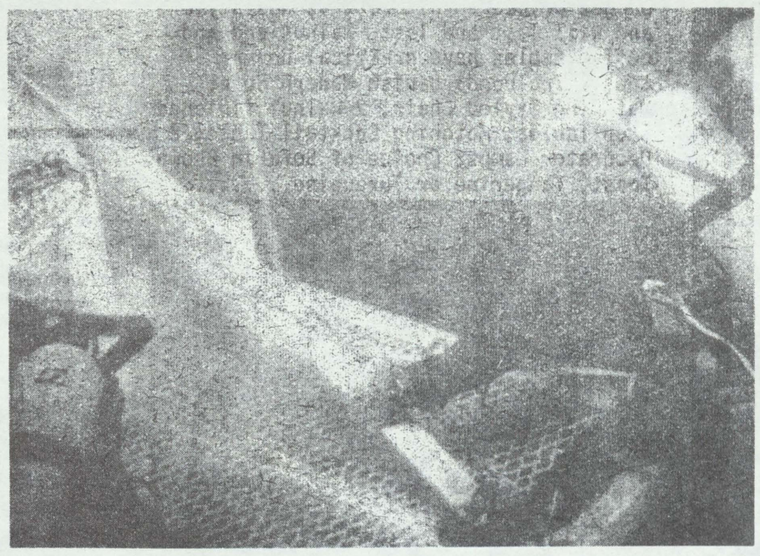
Wednesday, a unique reenlistment ceremony was held aboard the SeaLab as Billie L. Coffman, Torpedoman's Mate, First Class, USN was reenlisted for four years by CDr. Scott Carpenter. The ceremony was qptnessed by two visitors from SEALAB Topside Control, Capt. George F. Bond and Capt. Walter F. Mazzone. The two Navy Captains took 8 minutes for their swim to the ceremony and 70 minutes for their return due to the decompression cycle.

The ten aquanauts are reportedly eating well and working at a far superior rate than had been expected. The Underwater Weather Station should be completed this weekend by four to five of the men working at least two full days outside the capsule.

A typical dinner included Beef Stew, Carrots and Peas, Coffee, milk and crackers. According to Aquanaut Chief Photographer Jay Dee Skidmore, the residents of the ocean bottom haven't found their strange domicle restricting appetites. He added "snacks in-between" in the his electrowriter menu message to topside control.

So far the aquanauts seem quite self-sufficient. The only items they have asked for from the surface have been lettuce and bread.

Delivery was made.



ENTERING THE ANTI-SHARK CAGE.....Cdr. Scott Carpenter enters SEALAB II 200 feet beneath the surface off La Jolla. The aquanaut enters his "home" after a day's work by swimming into the cage and ascending into a four foot diameter access hatch. He then removes his diving gear, climbs a ladder and emerges into the living compartment where he may have almost all the comforts of home including a hot shower or a soak in a tub or warm water.

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Scientific Tasks Keep SeaLab Staff Busy



Berry L. Cannon, left, one of the SeaLab II aquanauts, takes a saliva test while in SeaLab. He is an electronic engineer from the Navy Mine Defense Laboratory, Panama City, Fla. This is one of many medical tests being administered to the group during their sojourn at the bottom of the sea off La Jolla. Engineman 1.C. John Lyons of Middletown, N.Y., center, takes samples from the waterproof capsule which conveys objects from SeaLab II to the mother ship Berkone on the surface. Billie Coffman, right, removes canister from a breathing device on SeaLab II. He is a torpedoman first class.

U.S. Navy Photos

EVENING TRIBUNE SAN DIEGO, CALIFORNIA Friday, Sept. 3, 1965 A-7

TUFFY SIGNS ON

Sealab Aquanauts Seek Assistance From an Expert

By LEO BOWLER
EVENING TRIBUNE Science Writer

Tuffy the propose will join the Sealab II project in La Jolla Sept. 13 — barring rough water.

Forrest G. Wood, director of the Marine Sciences Division of the Point Mugu Naval Missile Center and Tuffy's boss, said the date could slip a little if high seas develop and make the move here hazardous for Tuffy and his handlers.

Flight Planned

Plans call for Tuffy to be flown to Mission Bay in a helicopter, then be put aboard a Navy crash boat for the 45-minute run to the Sealab site off Scripps Pier.

Before he arrives, a home for Tuffy will be put together on the beach at La Jolla and towed to sea where it will be moored about 250 feet from the Sealab mothership Berkone. The home will be a floating pen made of wood and heavy nylon fishnet. It will be about 20 by 20 feet and will extend about seven feet down into the water.

Practice Planned

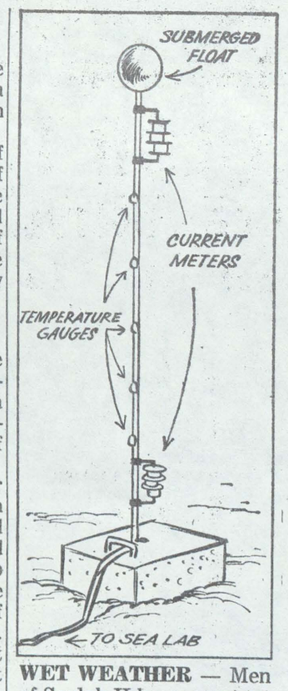
A three-man staff from Point Mugu, including Tuffy's trainer, Wally Ross, will accompany the porpoise. Ross will give Tuffy a few days of practice dives in La Jolla before sending him down to Sealab.

By the time Tuffy arrives, there will be a new team of aquanauts in Sealab. Nine of the 10 men who went down last Saturday will come up Sept. 12, leaving Cdr. Scott Carpenter below for another 15-day stretch.

Two Get Training

Two men on the second team have been given special training in handling Tuffy. They are John Reeves, a Navy photographer first class, and Kenneth J. Conda, torpedoman's mate first class.

When Tuffy is ready, Ross will let him out of his pen and one of the two aquanauts will use an underwater sound device to call Tuffy down to Sealab.



WET WEATHER — Men of Sealab II keep constant tabs on the "weather" outdoors through this weather station, which measures water temperature and current flow at varying depths.

One of Tuffy's exercises will consist of carrying a line from one of the divers to the other. This ability would be handy if a man were lost in the dark waters around Sealab.

Message Role Sought

Another test will be to carry messages from the surface to Sealab 205 feet below.

The purpose of the experiments is to see if porpoises can be trained to help divers at the bottom of the sea.

Yesterday, the aquanauts in Sealab got a different kind of help in their work.

Workmen on the decks of the Berkone lowered a cluster of underwater television, still, and movie cameras to the bottom.

SAN DIEGO
ENING TRIBUNE
SEP 3 1965
BLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

Viewing Planned

The cameras are mounted on a framework and can be turned in almost any direction. The purpose of the unit is to allow the men on the Berkone to watch the operations of divers within range of the unit and record their actions.

The underwater television camera and the mechanism which turns the cameras by remote control from the surface vessel are of the same type as those used by the Navy in the hunt for the submarine Thresher which was lost in the Atlantic.

The camera and mount are made by Oceanographic Engineering Corp. of Del Mar.

Three of the aquanauts described the beauty of their undersea world yesterday in their first telephone interview since they entered the lab.

The three are Chief Photographer Jay D. Skidmore, 36, of Chula Vista; Berry Cannon, 30, an electronics engineer from Panama City, Fla., and Cyril J. Tuckfield, 43 chief engineman.

Light Beautiful

Skidmore said the aquanauts live in a beautiful blue-green light which filters down from the surface of the sea above them.

"I think the first dive I made outside of Sealab was my biggest thrill," he said. "All of us are particularly interested in the sea, and the oceanographers are finding things here they did not know existed."

Skidmore said it is particularly interesting at night when the fish come up and peer through the windows at the men inside.

'We Look Back'

"We peer right back at them," Skidmore said. "Every time someone sees something new, we all rush to the windows to look. It's wonderful."

Skidmore and Cannon said the experiment is going well. They said they are having fun and getting plenty of work done.

Tuckfield, who has been doing much of the cooking for the aquanauts, said they appear to be hungry all the time.

"If we don't do anything else, we will certainly set an eating record while we're here," he said. "You know that hatch we come in and out of is 40 inches across. If we're not careful, we won't be able to get out when this is all over."

2★ Los Angeles Times 15
FRI., SEPT. 3, 1965—Part III

BY AQUANAUTS

'Weather' at Bottom of Sea Studied

If you get on the telephone and ask the Navy's 10 aquanauts, "How's the weather down there?" they won't think you're kidding.

Chances are astro-aquanaut M. Scott Carpenter or one of the nine Navy men and scientists in his crew would reply:

"Well, temperature's 45 degrees now, down from 50 to 51 Wednesday. We'll be able to tell you about wind—I mean current — velocity and direction by Friday."

Thursday the 10 spent their fifth day of camping on the ocean floor installing instruments in a "weather station" at a depth of 205 feet.

It is considered one of the most important of the complex of experiments in the Sealab II program, and may ultimately shed light on whether and how sub-sea climate affects atmospheric weather conditions.

The base of the undersea weather station off the coast at La Jolla is a concrete block anchored 175 feet north of Sealab II, well within the 300 feet range from the laboratory within which the aquanauts have been operating.

A second set of instruments will be installed on a buoyancy tank at the 145-foot level, a project spokesman said.

The difference in depth—60 feet—is the highest the aquanauts can ascend toward the surface without undergoing decompression procedures.

Continue Installation Of Weather Station

Pictures—Page a-3

By JUDITH MORGAN

A telephone rang at noon yesterday in SeaLab headquarters on the Scripps Institution of Oceanography campus and it was aquanaut Berry Cannon calling from 205 feet beneath the sea.

Lt. Cmdr. Hugh Golightly, the Navy officer who answered the call, spent half an hour talking to Cannon, chief engineman Cyril J. Tuckfield and chief photographer Jay Dee Skidmore.

In a later transmission, Golightly talked to Cmdr. Scott Carpenter, who inaugurated the lab to shore telephone calls late Wednesday night when he phoned his wife, Rene, in their Timber Cove, Tex., home.

Such telephone calls became possible after a benthic laboratory was connected Wednesday, improving and boosting the complicated electronic communication circuits.

The aquanauts continued installation of an underwater weather station yesterday as the water temperature remained below 50 degrees.

When completed, the station will be as tall as a six-story or seven-story building rising from a cement slab on the ocean floor. A 500-pound cement anchor was lowered yesterday to a site 175 feet north of SeaLab.

MORALE 'UP'

Cannon, an electronic engineer with the Navy's Mine Defense Laboratory in Panama City, Fla., told Golightly the aquanauts' morale was "way up." He said the men had more to look at than the eye could see and the Scripps oceanographers were excited over the marine life.

The aquanauts barely had finished a lunch of vegetable soup, chicken and dumplings, English peas and pineapple when Cannon placed the call, he said.

Tuckfield, a veteran of SeaLab I, then came on the line and said the aquanauts probably would set an eating record.

SeaLab personnel topside have watched the aquanauts raid the icebox and have answered many requests to send down more food.

GETTING FAT?

"We're eating so much, the hatch may be too small when we try to swim out at the end of the project," Tuckfield said.

Skidmore, a Chula Vista photographer-diver, said the water is relatively dark but clear. Especially in the early evening, he said, the water is a beautiful green from the bottom to the surface.

Skidmore reported that the SeaLab portholes are crowded with fish looking in. "We're watching them and they're watching us," he said.

VOICES PROCESSED

Skidmore asked to have newspapers lowered to him in the dumb waiter used for SeaLab to surface messages and packages.

The radio-telephone voices went through a helium unscrambler before being heard

(Continued on a-22, Col. 3)

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SEP 3 196
PUBLIC INFORMATION O
Eleventh Naval Distric
San Diego, Californ

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IT'S ALL FOR SCIENCE

2 Plan To Litter Sea With Papers

By JUDITH MORGAN

Two Florida scientists plan to litter the ocean floor with papers during their stay as SeaLab II aquanauts.

Government forms stamped "top secret" and "confidential" will be set adrift 205 feet under the sea by William H. Tolbert Jr. and George B. Dowling, oceanographers at the Navy's Mine Defense Laboratory in Panama City, Fla., who will descend to SeaLab Sept. 12 with the second team of aquanauts.

MOVE'S GOAL

The men want to learn how far paper — and other nearly buoyant objects — will drift in a specified length of time. This study of current diffusion is one of many questions triggered by the loss of the nuclear submarine Thresher.

From their research, Dowling and Tolbert hope to learn how large an area around a disaster will be filled with trash and how far from the center of impact in an underwater accident you could expect to find certain objects.

Dowling said he thought a nylon shoe was the first evidence found in the Thresher search.

DATA LACKING

"But no one knew how far something of that weight would travel in the time that had passed since the Thresher went down and no one had any idea which direction to go from the shoe to look for the bulk of the ship itself," he said.

The aquanauts added that the cards and forms they will release and track are only "top secret" when filled in.

Another Tolbert-Dowling experiment will involve a bioluminescence meter which will measure the total light-producing capability of plankton and other phosphorescent underwater creatures.

"Plankton light up like fireflies when they are agitated," Tolbert said. "At night it is the most beautiful sight I've ever seen.

"You are completely enclosed in a layer of sparks. You can wave your hand through the water and the movement makes it bright enough to see for 10 feet."

Dowling compared the bright underwater phenomenon to wearing a suit of lights.

This experiment would allow the Navy to compare phosphorescent conditions of marine life in various parts of the oceans. Knowing the amount of light along the coasts would be important in defense against undersea attack, the men said.

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

SEP 4 1965



—San Diego Union Staff Photo

SeaLab II scientists William H. Tolbert Jr., left, and George B. Dowling check papers they will release 205 feet under sea to study currents.

From SUN-TIMES Chicago, Ill.

Sealab Crewmen Eat Fresh Fish Sent Down To Them By Cable

SEP 4 - 1965

LA JOLLA, Calif. (AP) — Ten divers living in a metal hut on the ocean floor had an extra special treat Friday — fresh fish.

They like it raw, Japanese style, with sauce.

The fileted bonito is the first fresh fish the men have had since they entered Sealab 2 for a 15-day stay last Saturday.

At their depth of 205 feet they are surrounded by fish and other marine life but they do no foraging — their job is to study the underwater environment 1,000 yards offshore, not disturb it.

The fish and other requested items were sent down from the mother ship in a sealed can that trolleys along a cable anchored outside the 12-by-58-foot sea hut.

The marine "dumb waiter" also took down chewing gum, candy, bread, cinnamon and "some other stuff they ought to have thought of before they went down," said Capt. George Bond, medical director of the project.

The men take turns preparing meals on an apartment-size electric stove — gas wouldn't burn well in the Sealab's atmospheric mix of 80 per cent helium, 16 per cent nitrogen and 4 per cent oxygen.

To save space their larder is comprised mostly of freeze-dried foods which are soaked in water for 10 minutes, then heated.

Oven Is Unused

The stove has an oven but they haven't used it yet.

"I'm going to encourage them to do so," Bond said. "I'm going to send down some frozen dough instead of fresh baked bread one of these days."

Bond said the men put in nine-hour work days in the laboratory, plus two hours outside per man and two hours rotating on watch. They sleep normal hours. What time they have for relaxation is spent reading, playing cards, writing letters or just talking.

No Psychological Rifts

So far no psychological conflicts have shown up among the men or between them and those on the surface.

And Bond doesn't expect any.

"They're a fine bunch of well disciplined men," Bond said.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

SEP 3 - 1965

Storm Heads For Sealab 2

LA JOLLA, Calif. (AP) — Officials of Sealab 2 are keeping a close watch Thursday on a hurricane moving up the coast of Baja California.

The storm was about 450 miles southeast of La Jolla, but officials believe it won't cause trouble for the underwater living experiment.

The weather bureau said the storm, packing winds of up to 78 miles per hour, probably will not reach Southern California.

But at the same time they said the hurricane, Emily, was closer than any other potentially hazardous storm in many years.

Of primary concern was the influence a heavy storm might have on the Berkone, the support ship moored over the Sealab capsule 1,000 feet from shore.

Communications, power and other support facilities for the Sealab would be disrupted if a storm pushed the Berkone away from the project site, and the divers would have to be brought to the surface.

Test Under Way

Ten aquanauts are spending 15 days on the bottom at a depth of 205 feet in the test of underwater endurance. Their home is the 12x58-foot Sealab capsule.

The weather bureau said Hurricane Emily would take more than two days to reach this area at its present speed, but the Navy said the present course would carry the disturbance far to the west. Most storms of this nature turn either east or west before reaching California, the weather bureau said.

N Y TIMES

TUESDAY, AUGUST 31, 1965.

SEALAB 2 DIVERS BEGIN EXPLORING

Sortie 205 Feet Down—Find Access to 'Home' Easy

LA JOLLA, Calif., Aug. 30 (AP) — Exploration parties moved in and out of Sealab 2 today as 10 aquanauts settled down to work 205 feet below the surface of the Pacific.

"Reconnaissance sorties" was the phrase a Navy spokesman used for the trips the rubber-suited divers made from the 12-by-58-foot steel cylinder that will be an underwater barracks for three 10-man teams in rotation for 45 days.

Sealab 2 was lowered to the bottom 1,000 yards off this southern California resort last Thursday and the first team took up residence late Saturday.

They took it easy yesterday but were up at 7 A.M. today. After breakfast — western omelettes — they donned diving gear and went outside to hook up the bright lights needed to illuminate the depths.

Will Map Ocean Floor

Among the tasks planned for the divers is the connection of cables from Sealab 2 to a seven-ton beehive-shaped laboratory, a multi-channeled television and telephone station that will provide the primary communications between the underwater base and a twin-hulled crane barge serving as the mother ship on the surface.

The aquanauts will map the ocean floor near Sealab 2 and study fish and other marine life.

And, since this is a Navy project, some of the divers drew "clean-up duty," the duration depending on how much debris there is on the sea floor that might interfere with work.

The team leader, Lieut. Comdr. M. Scott Carpenter, reported that the men were in good condition. But he requested more fresh lettuce and bread. He was assured they would be dispatched in a waterproof box that makes several trips daily on a small cable trolley.

Navy officials said entering and leaving Sealab 2 was "as easy as falling off a log."

The vessel, about the size and shape of an oiltank car, has three access hatches. One is at the top of a structure like a conning tower extending upward from the middle of the tank, which rests horizontally in a cradle on the bottom. The others are on the floor, one at each end.

Equipped With Showers

The hatch used ordinarily is a lidded four-foot hole in the floor of a room equipped with hot showers where divers can wash off salt water and warm up after trips out into the 50-degree ocean.

Because atmospheric pressure inside Sealab 2 is slightly greater than ocean pressure at that depth — more than six times that at the surface — the hatches can be opened at any time. The air pressure — about 100 pounds a square inch — keeps the water out.

Below the main hatch is a wire-mesh cage with a door. This protects the divers against possible attack by sharks when they would be most vulnerable —entering and leaving.

So far the divers have reported seeing only one shark, a small one with which they played tag for a while before chasing it away.

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

SEP 4 1965

Shrimp Sauce Is Hot Stuff For SeaLab

By BRYANT EVANS
The San Diego Union's Science Writer

When aquanaut Billie Coffman in the SeaLab II galley unpacked a new bottle of shrimp cocktail sauce that had just come down from the surface last night, the bottle imploded.

Imploding is just the opposite of exploding. The glass broke inwardly because of too much pressure outside, but in one way this implosion was like most explosions — it created a big mess in the galley of SeaLab II, 205 feet below the ocean surface.

sonnel transport capsule. The capsule is the chamber that will serve as the aquanauts' elevator to the surface.

Because it might be needed in an emergency, it is always lighted. The light attracted anchovies by the thousands. The little fish crowded into the capsule through its bottom opening, and many of them died.

Consequently, the aquanauts had to clean out the dead fish and put a screen over the opening to prevent further incursions.

Otherwise, everything in the lab seemed to be going well yesterday. The 10 aquanauts were eating regularly and well. They were also busy on experiments, taking a fish census and trying out a new type of electrically heated diving suit.

In other respects the SeaLab II operation still was having its mechanical difficulties, troubles usually associated with doing hard things for the first time.

An attempt to plant an underwater weather station built by the Scripps Institution of Oceanography for automatically reporting sea teamperatures, current velocity and direction, pressure and light intensity ran into trouble.

When the skeleton of the lab attached to an underwater float and a concrete anchor was lowered, the anchor landed on a 45-degree slope instead of on a flat part of the ocean floor as had been planned. As a result it slid or tumbled part way into the Scripps submarine canyon.

Capt. George Bond said that the float had been located with an underwater television camera and that it would be hoisted back to another spot today. He said this would be done by asking two of the aquanauts to go out and hook on a line from the mother ship, the Berkone, to the anchor.

NY Times Sunday 9/5/65

Now the Aquanauts

Life originated in the sea; from there uncounted millions of years ago man's evolutionary ancestors emerged to begin life on land. In the saltiness of his blood every human being has a constant reminder of those dim origins, though the ocean depths are now as foreign and dangerous to mankind as outer space. Until recently the idea of men returning to the seas to live and work seemed fantasy. But increasing population and the strain it has put on the resources of the land are forcing close attention to the enormous food reserves in the oceans and the incalculable mineral wealth under them.

It is these practical considerations that inspire the Sealab 2 project now begun 205 feet below sea level off the California shore. Here American aquanauts have begun experiments to see how well men can live and work for extended periods under water. Their home is a steel cylinder with an artificial atmosphere consisting mainly of helium. They will work outside the Sealab in a sharkproof chamber, while later in the experiment the aquanauts will cooperate with Tuffy, a trained dolphin, whose breed may play a role for man under water similar to that of dogs and horses on land.

The work of the aquanauts may not be as spectacular as the exploits of astronauts in outer space. But the chances are good that the experience they gain in what many now call inner space will help bring humanity rich material returns in the decades immediately ahead.

From
NEW YORK TIMES
New York, N. Y.

SEP 5 - 1965

AQUANAUTS INSTALL WEATHER STATION

LA JOLLA, Calif., Sept. 4 (UPI)—Two of the 10 aquanauts of Sealab 2 ventured 233 feet from the 57-foot steel cylinder today and explored a rock ridge.

Earlier in the day a team of aquanauts completed installation of a platform that will contain the world's first underwater weather station.

Sealab 2 was lowered into the ocean Aug. 28 and the following day the aquanauts entered the pressurized tube with skin diving equipment.

The Navy said the two aquanauts climbed down a rock formation today and then returned after making notes of the types of rocks and sea life they had found.

Sealab 2 will remain submerged 45 days at a depth of 205 feet, resting on a shelf of the Pacific Ocean. The 10 aquanauts will be relieved at the end of 15 days with the exception of Lieut. Comdr. M. Scott Carpenter, who is scheduled to remain below for 30 consecutive days.

The purpose of the experiment is to determine man's ability to live and work on the ocean floor at pressures many times that on the surface.

WASH POST 9/9/65

Ear Infections

LA JOLLA, Calif.—Nine of the ten aquanauts in Sealab 2 have developed ear infections, but the ailments will not curtail the aquanauts' activities, officials said. Physicians blamed the infections on micro-organisms in the sea. They said all the aquanauts except Billie L. Coffman had contracted the infection.

WASH STAR 9/6/65

Test of Alarm On Sealab 2 Is Successful

LA JOLLA, Calif. (AP)—They've had their first alarm on Sealab 2. It was a test—and, says the Navy, it was a clanging success.

If the aquanauts are needed inside the 205-foot-deep Sealab, a ship's bell set up outside the entry port will be sounded. A shark cage surrounds the entry port as a safety precaution.

The bell alarm was tested over the weekend, and aquanauts working outside scurried through the cage and into the lab.

"There were four men outside and everybody was back at the lab in less than a minute," said Capt. George Bond, chief investigator of the 45-day project.

There's little danger of a fire aboard. For one thing, there's no smoking aboard.

The 10 aquanauts haven't had a smoke since they descended Sept. 4. They were advised to quit the habit before going down.

The mainly helium atmosphere in Sealab—and pressure that is nearly even times greater than that on the surface —won't support flames, not even a match.

The aquanauts enjoyed their first day off yesterday, under a schedule that allows holiday routine every seventh day.

But they were to be back on their busy schedule of work and scientific tests today, despite the Labor Day holiday.

POST 9/8/65

Sealab Team

LA JOLLA, Calif.—The ten aquanauts living in Sealab 2, 205 feet below the surface of the Pacific Ocean, underwent a series of physical tests as nine of them approached the end of their 15-day stay in the underwater station. Astronaut-aquanaut Scott M. Carpenter wil remain in the Sealab for another 15 days after his nine companions return to the surface Sunday. He will be joined by another nine-man team.

Sealab Divers Squeak Happily in Ocean Home

LA JOLLA, Calif., Sept. 3 (AP). —Two hundred feet below the surface of the Pacific, Sealab 2 is already beginning to look as if it belongs there.

The 12-by-58-foot steel cylinder, white when lowered to the bottom a week ago, now is gray with silt and literally crawling with small octopi.

Inside, the divers and scientists who still have more than a week to go before they return to the surface have adapted to the weird world so well they can hardly understand visitors from above.

Their voices and ears have adjusted to the high pressure helium atmosphere in their underwater habitat and they can understand each other's squeaky words with ease. But they have trouble comprehending the speech of topsiders whose larynxes and sinuses are accustomed to oxygen-rich air.

This picture of the dark and silent domain of the depths came in an interview with Capt. George Bond, Sealab 2 medical director, who swam down to sign up a diver whose enlistment had run out.

"It was midday and there was sunlight down to 150 feet," Bond said.

"Below that was a perpetual twilight. I stopped about 20 feet away from the habitat and looked it over for changes. It had already acquired the color of the ocean floor and was caked with marine growth and sediment. Baby octopi were crawling all over it.

"All around were fish, from six inches to two feet long, many of them curious about the light coming from the portholes.

"It was cold — 49 degrees Fahrenheit. I felt chilled, despite my rubber diving suit.

FANS OF CORAL

"This was the view: Sealab 2 was on a slight incline, resting horizontally in its cradle on a ledge, with one end of the cylinder toward a submarine canyon that drops off rather sharply at that point.

"It hadn't shifted position—that's the way we placed it.

"All around, the sea floor was rolling and lumpy, like a blanket with rocks underneath. Sticking up here and there were fans of coral, with fish swimming in and out.

"I moved to the rear of Sealab and entered the anti-shark cage, took off my slippers and climbed up a ladder into the after compartment.

CLIMB THROUGH MIRROR

"That's quite a thing, climbing up from the water through the diving hatch. There are lights above the open hatch and the surface of the water above you is silvery like a mirror.

"You climb up and it's like Alice stepping through the looking glass when you emerge inside Sealab.

"The men were all glad to see me — they'd been down there since Saturday — but they could hardly understand me. My voice, of course, was not adapted to the helium they have to use because of the high toxicity of oxygen under pressure.

"It was good for a laugh. Then we went on with the reenlistment and I got out of there."

From SEP 4 - 1965
INQUIRER
Philadelphia, Pa.

82

Inquisitive Fish See What's Up Below





San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)
SEP 5 1965



—U.S. Navy Photos

Piscatorial peeping-toms watch Berry Cannon repair communications gear in SeaLab II, 205 feet below the surface off Scripps Pier. Center photo, Earl Murray and Thomas Clarke examine bottom charts of the area. Right photo, Billie L. Coffman prepares to leave open sea-hatch for an underwater sortie. Thousands of fish are watching aquanauts in daily routines. (Story, Page a-1)

LONDON

THE SUNDAY TIMES SEPTEMBER 5 1965

They're 'having a ball' 205 ft down

By Evelyn Irons, New York, Saturday

THEY cannot smoke because there isn't enough oxygen to light a match; they cannot fry ham and eggs because the helium they breathe would be nauseating if they did; they cannot take a snifter because the US Navy allows only soft drinks, they cannot play cards or read because they're too busy.

But astronaut Scott Carpenter and the nine other aquanauts living 205 feet under the sea 344 yards off-shore from La Jolla, California, in Sealab Two are "having a ball," one of them said on the telephone today.

In their 57 feet by 12 feet steel cylinder, they have a streamlined American kitchen with electric cooker, refrigerator and deep freezer. This is a good thing because, unlike Gemini V men, those in Sealab have enormous appetites, owing to the amount of coldwater swimming they do around the capsule. They often raid the refrigerator between meals.

A typical lunch was: vegetable soup, chicken and dumplings with English peas (that means petits pois) and pineapple as dessert. The crew is up at about six or seven a.m. for breakfast of fruit, cereal, scrambled eggs, milk, coffee, toast and jam. Dinner may be beef stew, carrots and peas, pears, coffee and milk.

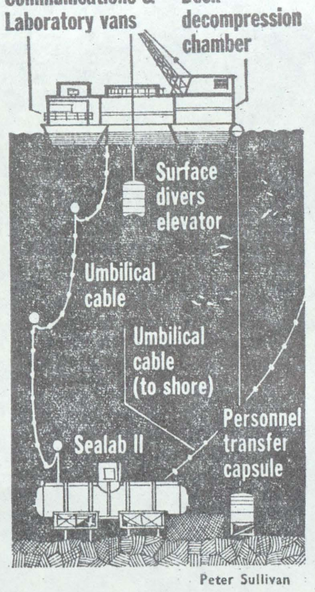
Commander washes up

Evidently, they thought they weren't getting enough greenstuff so they asked for lettuce. Down in the dumbwaiter from mothership above came a huge green salad, freshly dressed, ready for eating. Normally the aquanauts take turns to cook and prepare meals—whoever cooks can boil, bake or stew as required—and even Lieutenant Commander Scott Carpenter has been doing the washing up.

One of the outside jobs was to link up Sealab to the nearby concrete electronic communications centre. Now they have four television channels, 20 telephone channels and 20 data channels to connect them with the mother ship and navy observers ashore.

They have also begun installing the first underwater weather station 58 yards from their "house," which is painted white so that they can see it in the dark depths.

Unlike the four aquanauts of Sealab One off Bermuda last year, this crew, although it takes a nap after lunch, does not seem lethargic under the deep sea pressure of 100 lb. to the square inch, which is six times the pressure at sea level. Captain George Bond, chief of the Navy's Medical Research Laboratory, who is medical director of the project, finds they are reacting well to the artificial atmosphere of about 5 per cent. oxygen, under 20 per cent. nitrogen and 75 to 80 per cent. helium.



Peter Sullivan

The crew is quacking like Donald Duck or squawking like Alvin the Chipmunk because of the effect of helium on their speech but they have quickly become accustomed to one another's voice and the unscrambling device on the telephones is working well. It is hoped to carry on until the scheduled finish on October 12 with Carpenter staying down 30 days and the nine others being replaced after 15 days.

Divers out on sorties come up though the open hatch on Sealab's bottom, taking off their rubber suits in a shower room (hot and cold fresh water is plentiful) and entering the next room, which is the laboratory, in their swim trunks. The temperature is kept at 75 degrees.

Jay Skidmore, Sealab's official cameraman, said the marine life is utterly fascinating and the crew watches fabulously coloured fish through the eleven windows in eerie light while the fish are watching them in evident curiosity.

Oceanographers are constantly discovering new finds and much time is spent making careful written records. Besides oceanography, marine biology, geology and undersea weather, the aquanauts are experimenting with salvage methods, using buoyant foam to raise a sunken navy jet plane. They will also test man's physical and psychological endurance of isolated life under-seas.

Aquanauts Mark A Week Under Sea

Pictures — Page B

By JUDITH MORGAN

The first team of SeaLab II aquanauts yesterday marked one week in their undersea home but did not stop working to celebrate.

Nine of the 10 aquanauts are scheduled to stay below 15 days. Navy Cmdr. Scott Carpenter, chief aquanaut, is scheduled to remain in SeaLab 30 days.

Capt. George Bond, principal investigator for the project, yesterday said he would not know exactly when the first team would be brought to the surface "until an hour before they come."

"We just can't say," Bond said from his command post aboard the mother ship Berkone. "If we have bad weather topside that day we'll have to leave them down there a little while longer."

SHIFT NEXT SUNDAY

The second team of aquanauts is scheduled to replace the first team next Sunday.

Bond said there will be 13 men in SeaLab while the team exchange is made. Aquanaut Carpenter will not be alone in SeaLab at any time during the exchange, Bond said.

"We plan to send three men down — a corpsman and two divers — to get minute by minute physiological results in continuous tests that will take about six hours," he said.

These three aquanauts from the second team will be in SeaLab with the departing first team for about an hour, Bond estimated.

ANOTHER TRIP SET

Bond and Capt. Walter F. Mazzone, physiological control officer, who last week swam down to SeaLab briefly for a re-enlistment ceremony for torpedoman's Mate 1st Class Billie L. Coffman, are planning another quick trip during the second team's stay.

Bond said they probably would make the trip after the second team had a week on the bottom.

Emergency way stations resembling oversized, doorless telephone booths were readied on the Berkone yesterday for placement on the ocean floor. These stations will contain emergency breathing gear in case a diver's supply of helium-oxygen becomes dangerously low.

"The main purpose is that a diver can duck into a way station and get auxiliary breathing gear so he can survive long enough to swim back to SeaLab," Bond said.

An air bubble will form at the top of each station but air can have a drunken effect on a diver accustomed to the helium mixture.

"I would prefer the diver not breathe the air at all when changing to the emergency gear," Bond said. "The man should never take more than a few breaths of air when switching mouthpieces and tanks."

Bond said the way stations would be placed near major work areas — one of which is the weather station.

Parts of the important station were lowered yesterday but Bond does not think the unit will be functioning completely for two to three days.

The aquanauts spent a total of more than 600 minutes outside SeaLab yesterday with Cyril Tuckfield and Berry Cannon holding the single trip record of 95 minutes.

Two aquanauts awakened yesterday to injections of radioactive iron as part of a University of California experiment. Dr. Harry S. Winchell of the UC campus at Berkeley said blood samples were taken before the injections and at intervals for two hours afterwards as the aquanauts remained in bed. Winchell said the study in red cell production will be repeated at the end of 14 days. He said the amount of radiation in the injection was about the equivalent of that received in a chest X-ray.

The aquanauts had an underwater style fire drill yesterday when a big, bronze ship's bell was rung from its place outside the SeaLab shark cage.

"There were four men outside and everybody was back at the lab in less than a minute," Bond said. "The bell was so loud the surfers up by Scripps probably could hear it."

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)
SEP 5 1965

From NEW YORK TIMES
New York, N. Y.
SEP 5 - 1965

Now the Aquanauts

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From SUN-TIMES Chicago, Ill.
SEP 5 1965

2 Aquanauts Study Area Near Sealab

LA JOLLA, Calif. (UPI)—Two of 10 aquanauts of Sealab 2 Saturday ventured 233 feet from the steel cylinder and explored a rock ridge before returning to their underwater home.

Earlier in the day a team of aquanauts completed installation of a platform which will contain the world's first underwater weather station.

Sealab 2 was lowered into the ocean Aug. 28 and the next day the aquanauts entered the pressurized tube with skindiving equipment.

Regarding the tour from Sealab, the Navy said the two aquanauts climbed down a rock formation and made notes of the types of rocks and sea life they found.

New York 38, N. Y.
From SEP 5 1965
PRESS
PITTSBURGH, PA.

Aquanauts Probe Undersea Ridges

Weather Station Installed In Depths

LA JOLLA, Calif., Sept. 4 (UPI)—The aquanauts of Sealab-2 today ventured more than 200 feet from their 57-foot steel cylinder to explore rock ridges and formations near their underwater home.

Earlier a team of the aquanauts completed installation of the world's first underwater weather station.

Sealab-2 will remain submerged 45 days at a depth of 205 feet, resting on a shelf of the Pacific Ocean. The 10 aquanauts will be relieved at the end of 15 days with the exception of Astronaut Scott Carpenter who is scheduled to remain below for 30 consecutive days.

The experiment is to determine man's ability to live and work on the ocean floor at pressures many times that on the surface. The aquanauts come and go from the pressure chamber with Scuba gear and breathe a mixture of mostly helium.

The installed weather station consists of two raised instruments, one placed on the ocean floor near Sealab-2 and the second 65 feet toward the surface. A bank of numerous instruments are attached to the bottom. They will record water speed and direction as well as temperatures and pressure.

Minneapolis (Minn) Sunday Tribune
SUNDAY, SEPTEMBER 5, 1965

Aquanauts Study Formations Near Sealab 2 Home

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Earlier, a team of the aquanauts completed installation of the world's first underwater weather station.

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Purpose of the experiment is to determine man's ability to live and work on the ocean floor under pressures many times that on the surface. The aquanauts come and go from the pressure chamber with scuba gear and breathe a mixture of helium, nitrogen and oxygen.

From ROCKY MOUNTAIN NEWS
Denver, Colo.
SEP 5 1965

Aquanauts Go 200 Feet From Sealab

LA JOLLA, Calif., Sept. 4 — (UPI)—The aquanauts of Sealab 2 Saturday ventured more than 200 feet away from their 57-foot steel cylinder to explore rock ridges and formations near their underwater home.

Earlier, a team of the aquanauts completed installation of the World's first underwater weather station.

Sealab 2 will remain submerged 45 days at a depth of 205 feet, resting on a shelf of the Pacific Ocean. The 10 aquanauts will be relieved at the end of 15 days except for astronaut Scott Carpenter, who is scheduled to remain below for 30 consecutive days.

The purpose of the experiment is to determine man's ability to live and work on the ocean floor at pressures many times that on the surface. The aquanauts come and go from the pressure chamber with scuba gear and breath a mixture of mostly helium.

Four of the aquanauts underwent a physical examination Saturday in which radioactive iron was injected into their blood system and samples withdrawn every half hour.

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THE SAN DIEGO UNION
Sun., Sept. 5, 1965
SAN DIEGO, CALIF

MAN AND THE UNIVERSE

SeaLab Projects Seek Short Cuts Around Evolution

By BRYANT EVANS
The San Diego Union's Science Writer

Most, in fact all, of the techniques that we use to get things done and to live in our world are the result of evolution. Nobody invented a way to build a house. The very act of swinging a hammer is an improved copy of what some pre-human did hundreds of thousands of years ago. In the meantime the technique has evolved.



Evans

Today the U.S. Navy is seeking a short cut around evolution by developing a technique by logical, analytical methods. In the SeaLab II project, engineers and psychologists are using design and experiment to find out how man can work under the sea with safety and efficiency. They think this will be faster and much cheaper in the expenditure of human life than waiting for the slow pace of evolution to develop an undersea living technology.

Dr. John Craven, head scientist of the Navy's Special Projects Office, compared the SeaLab approach to that of the automotive industry.

Hazards To Be Found And Solved

"We have become accustomed to living with projectiles traveling 40 or more miles an hour coming within inches of our bodies," Craven said. "It is remarkable that people can become adapted to a hazard of this kind. But it has been enormously costly in life.

"In the SeaLab experiment we are conducting a series of tests to find out the hazards and get around them without depending on evolution to solve them for us. This is something that the automotive industry never did."

So far the news stories that have been written about the SeaLab operation have had little to say about the psychological studies that are being made. The reason for this oversight has been that the engineering and mechanical problems of getting the operation under way have been too critical, and therefore more interesting. Probably the first real information on the psychological side of the operation will be forthcoming soon.

These so-called psychological tests are concerned with two elements — hazard and difficulty.

The physical hazards can be defined by engineers and can be controlled to a large extent by engineers. The problem of building a tank that will not collapse under a known pressure of sea water is elementary. Most of the physical facts are pretty well known.

But just as the greatest hazard in operating an automobile is in the failure to find a way of predicting what drivers will do next, so a great hazard in living and working beneath the sea lies in the behavior of men under the kind of stress that faces them in this strange environment.

Under Six Atmospheres Of Pressure

The SeaLab aquanauts are living separated from the rest of humanity under more than six atmospheres of pressure and breathing a gas much unlike air; looking through an atmosphere outside where good visibility is less than 50 feet and moving through the same atmosphere in which the slightest movement requires an effort. What will these conditions do to behavior? Will they breed anger, frustration, recklessness or any other reaction to endanger their own lives or their colleague's lives?

The Navy research intends to find out such tendencies—not from mortality statistics, but from careful observations of behavior under stressful conditions.

"We are expecting men to work under the sea who are not as carefully selected or as highly motivated as the aquanauts," Craven said, and indicated that these late-comers would create hazards the Navy plans to anticipate and control.

The element of difficulty also comes from the environment. Think for a moment how you go about tightening a nut or prying two things apart in your back yard. Usually you use your weight against a wrench or a lever. But the man under water is neutrally buoyant, which is to say that he has no effective weight. How is he to do the job?

The aquanauts will be building structures and doing simple physical tasks under the water just to find out what is hard to do and what is easy. Then it is up to others to invent tools and methods that will make undersea work easier and more effective.

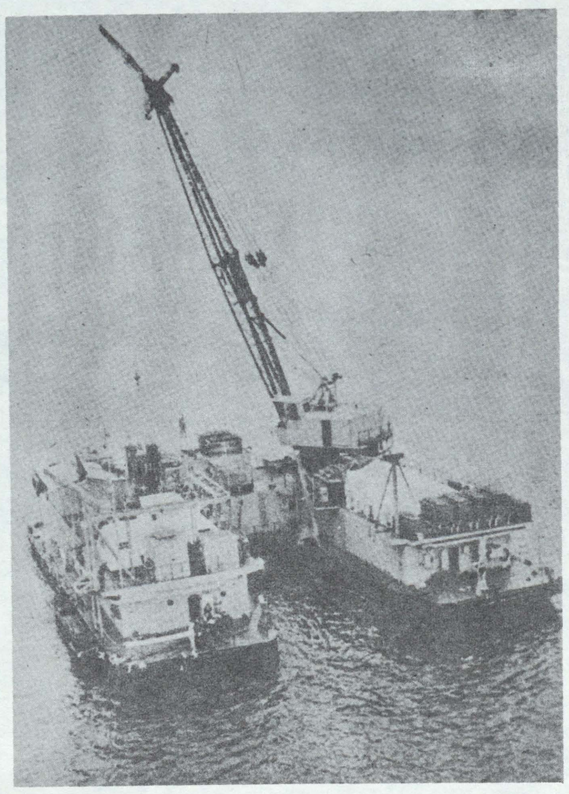
If men were to live under the sea for a number of generations as they have lived under the air on land, they would evolve techniques of survival.

The Navy plans to find a quicker way than evolution. The proof that evolution can be shortcut might prove more valuable than finding out how to work in the ocean.

From SEP 5 - 1965
POST-DISPATCH
St. Louis, Mo.

Experiment in Underwater Living

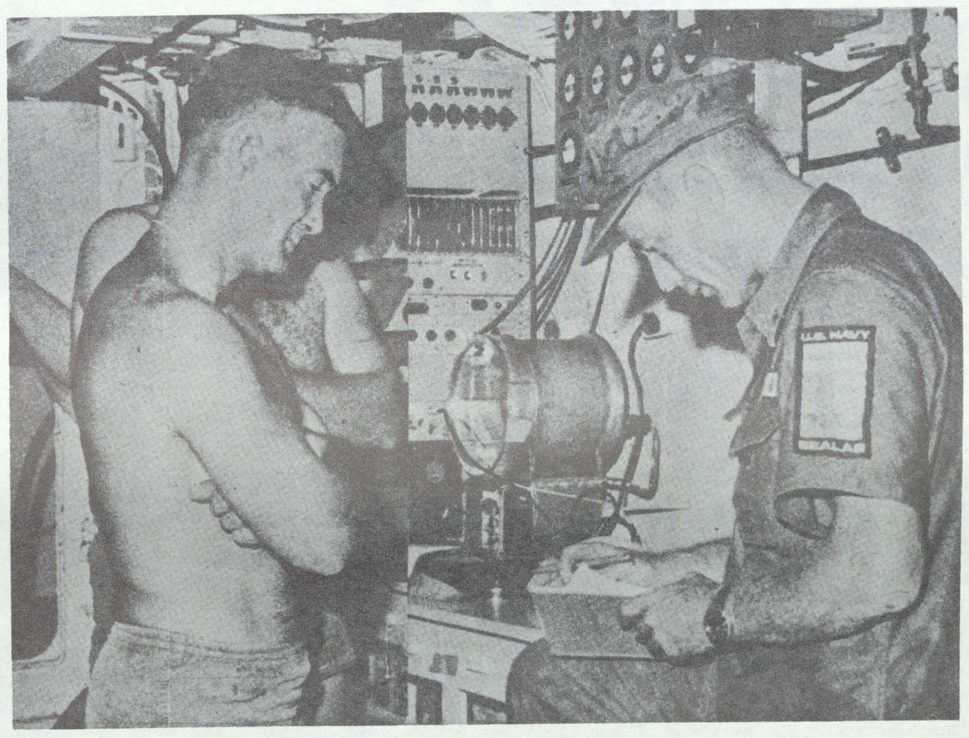




Specially built mother-ship for Sealab II is the Berkoni; large crane holds the sea-bottom laboratory before it was lowered. The experiment is a key step in U.S. exploration of more than a million square miles of submerged land and will point the way toward exploitation of the mineral, geological and agricultural potential of the sea. The test also will produce the most complete store of medical and physiological data about man's ability to function under the sea. With the first team of aquanauts is a Navy doctor, who daily checks each man's respiration, blood pressure, heart, blood.

AP Photos

At about the time that two American astronauts were completing their historic eight-day flight through space last weekend, 10 aquanauts were beginning another endurance test in the interest of science, this one 205 feet below the surface of the Pacific Ocean. Purpose of the 45-day test—some 3000 feet off the California resort town of La Jolla—is to determine how man can live and function during prolonged periods below the sea. One of the aquanauts is also an astronaut — M. Scott Carpenter, who is sitting on the rail (above) of Sealab II, a 12-by-58-foot steel cylinder that serves as the sea-bottom laboratory.



Carpenter (right) checks experiment schedule with fellow diver W. H. Eaton. Three teams of aquanauts will remain in Sealab II for 15 days each; Carpenter will stay underwater 30 days. Men can come from and go to the surface mother-ship in a capsule that serves as a portable decompression chamber. During their undersea stay, they are to spend as much time as possible outside the Sealab, catching fish, demolishing wrecked autos on sea floor. Part of project is to determine how much a man can accomplish at great depths.

From SEP 5 1965
TRIBUNE
Chicago, Ill.

Sealab Pair Explore 233 Feet Off Tube

La Jolla, Cal., Sept. 4 (UPI) — Two of 10 aquanauts of Sealab 2 today ventured 233 feet from the 57-foot steel cylinder and explored a rock ridge and then returned to their underwater home.

Another team of aquanauts completed installation of a platform which will contain the world's first underwater weather station.

Sealab 2 was lowered into the ocean Aug. 28 and the next day the aquanauts entered the pressurized tube with skin diving equipment.

Regarding the tour from Sealab, the navy said the two aquanauts climbed down a rock formation and then returned after making notes of the types of rocks and sea life they found.

Under Heavy Pressure

Sealab 2 will remain submerged 45 days at a depth of 205 feet, resting on a shelf in the Pacific ocean. The 10 aquanauts will be relieved at the end of 15 days with the exception of astronaut Scott Carpenter who is to remain below for 30 days.

The experiment is to determine man's ability to live and work on the ocean floor at pressures many times that on the surface. The aquanauts come and go from the pressure chambed with scuba gear and breathe a mixture of mostly helium.

Four of the aquanauts today underwent a physical examination in which radioactive iron was injected into their blood systems and samples withdrawn every half hour.

Storm No Menace

The installed weather station consists of two raised instruments, one placed on the ocean floor near Sealab 2 and the second 65 feet toward the surface. A bank of numerous instruments are attached to the bottom. They will record water speed and direction, temperatures and pressure.

On topside the weather was overcast and muggy, probably caused by hurricane Emily now centered several hundred miles to the southwest off Mexico. The storm was not expected to come close enough to affect the Sealab operation.

San Francisco, Calif.
Examiner
(Cir. D. 292,539 - S. 435,887)

SEP 3 1965

Swarms of Jellyfish Shut Off Sealab Light

LA JOLLA — (UPI)—Tiny jellyfish gave America's 10 aquanauts more trouble yesterday than sharks or octupuses outside Sealab 2.

As the long-range threat of Hurricane Emily diminished, the aquanauts went ahead with work on the first underwater weather station and other projects, 205 feet under the surface.

The men complained of a lack of light and had to use artificial light outside Sealab 2.

The problem: Jellyfish are so numerous they diffuse the light and make visibility poor. At best visibility has been 60 feet, with 35 feet or less at times.

The small octupuses which have found a home on the walls of the 57-foot long Sealab 2 don't bother the aquanauts. Nor do the sea scientists and divers cause the creatures any noticeable concern.

Sharks skirt the area 3,000 feet off-shore, but disperse quickly when marksmen armed with bows and arrow start firing.

Television cameras were being installed yesterday. Geometric experiments to determine the exact position of Sealab with relation to the ocean floor also are under way.

Yesterday was pay day for the Sealab crew and the checks were lowered by tube to the men. "They can't cash them or spend any of the money, though," one Navy man observed.

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Newspaper "A" wire

1/C

LA JOLLA, CALIF., SEPT. 6 (AP)-THEY'VE HAD THEIR FIRST ALARM ON SEALAB 2. IT WAS A TEST -- AND, SAYS THE NAVY, IT WAS A CLANGING SUCCESS.

IF THE AQUANAUTS ARE NEEDED INSIDE THE 205-FOOT-DEEP SEALAB, A SHIP'S BELL SET UP OUTSIDE THE ENTRY PORT WILL BE SOUNDED. A SHARK CAGE SURROUNDS THE ENTRY PORT AS A SAFETY PRECAUTION.

THE BELL ALARM WAS TESTED OVER THE WEEKEND, AND AQUANAUTS WORKING OUTSIDE SCURRIED THROUGH THE CAGE AND INTO THE LAB.

"THERE WERE FOUR MEN OUTSIDE AND EVERYBODY WAS BACK AT THE LAB IN LESS THAN A MINUTE," SAID CAPT. GEORGE BOND, CHIEF INVESTIGATOR OF THE 45-DAY PROJECT.

THERE'S LITTLE DANGER OF A FIRE ABOARD. FOR ONE THING, THERE'S NO SMOKING ABOARD.

THE 10 AQUANAUTS HAVEN'T HAD A SMOKE SINCE THEY DESCENDED SEPT. 4. THEY WERE ADVISED TO QUIT THE HABIT BEFORE GOING DOWN.

THE MAINLY HELIUM ATMOSPHERE IN SEALAB -- AND PRESSURE THAT IS NEARLY SEVEN TIMES GREATER THAN THAT ON THE SURFACE -- WON'T SUPPORT FLAMES, NOT EVEN A MATCH.

THE AQUANAUTS ENJOYED THEIR FIRST DAY OFF YESTERDAY, UNDER A SCHEDULE THAT ALLOWS HOLIDAY ROUTINE EVERY SEVENTH DAY.

BUT THEY WERE TO BE BACK ON THEIR BUSY SCHEDULE OF WORK AND SCIENTIFIC TESTS TODAY, DESPITE THE LABOR DAY HOLIDAY.

Porpoise Seen As Adversary To Diver Foes

Sealab to Study Tuffy's Reactions During Project

By LEO BOWLER
EVENING TRIBUNE Science Writer

One of the experiments in the Sealab II project seeks to determine if a propoise can become man's best friend during his entures into the sea.

But some Navy officers are speculating that porpoises could be trained to become a deadly enemy to divers.

Tuffy, the Point Mugu porpoise which will be brought here to work with aquanauts outside Sealab, was well known for his unpleasant disposition and frequent attacks on his trainer when he was first captured three years ago.

Tamed by Woman Student

But a student from Stanford University, Deborah Duffield, was able to tame him, and he was later trained to work in the open sea and return to his master on call.

Navy officers are wondering if the process couldn't be reversed and if porpoises like Tuffy couldn't be trained to attack enemy divers if the time ever comes when U.S. aquanauts clash with their counterparts from an enemy power.

Capt. George Bond, principal investigator for the Sealab II project, said a porpoise can be a formidable adversary to a diver. Tuffy is 7 feet long, weighs 270 pounds, and can flash like lightening through the water.

Has Been Attacked

Bond has been attacked in the water by wild porpoises. Porpoise experts say the animals are playful and like to "bump" a man in the water as an undersea prank.

Bond said that if the porpoise attacks he has experienced are just happy playfulness, then a porpoise on a serious mission could be a real menace.

He described dives in warm but inky black waters off the coast of Florida which he made wearing the helmet generally associated with deep sea diving. He wore no diver's suit, but carried the lead weights necessary to keep him on the bottom in the hip pockets of a pair of dungaree trousers.

Bumped From Behind

Porpoises would streak up from behind, bump him, and send him sprawling. Often he would loose the helmet in the porpoise play, and this would leave him on the bottom with no air supply and his pants full of lead.

The only way to keep from drowning was to strip off the pants and head for the surface at top speed.

"I came up stark naked many times," he said.

Bond said friendly divers could be equipped with identification devices which would put out a coded sound signal and the porpoises could be taught to attack and possibly kill any diver not wearing such a device.

SAN DIEGO
EVENING TRIBUNE

SEP 6 1965

STAR-NEWS
SOUTHERN CALIFORNIA'S FINEST EVENING NEWSPAPER
PASADENA, CALIFORNIA, MONDAY, SEPTEMBER 6, 1965 10 Cents

Aquanauts Have Quiet Day

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

SEP 6 1965

By BRYANT EVANS
The San Diego Union's Science Writer

Sunday was a day of rest and worship for 10 aquanauts in SeaLab II, 205 feet under the ocean's surface off La Jolla.

It was the eighth day of submergence. The rest came after a week of normal problems and the indication that there will be more to solve in the week ahead.

Among today's problems will be the moving of a taut tether for the underwater weather station built by the Scripps Institution of Oceanography and the setting-up of way stations to provide breathing gas for wandering aquanauts.

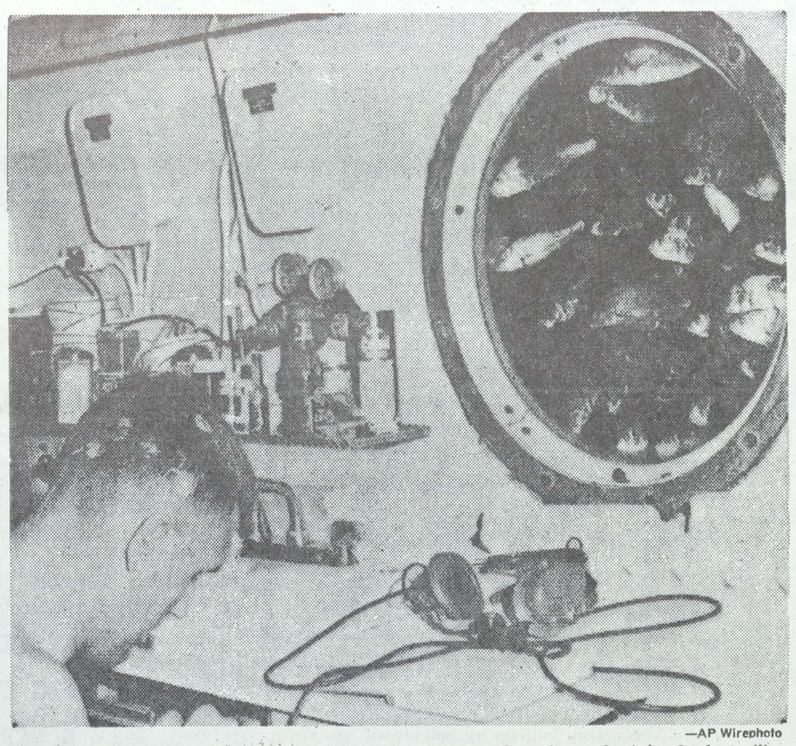
The weather station tether was lowered last week, but unfortunately its concrete anchor landed on a 45-degree slope and slid part way down. It will be relocated by a line dropped from a crane above the mother ship Berkone. Aquanauts from the SeaLab will connect the hook from the crane line to the misplaced anchor.

The only practical task performed by the aquanauts yesterday was an inspection of the breathing gas supply in the personnel transport capsule. This is a large diving bell that stands 30 feet outside SeaLab to be used to bring the aquanauts to the surface under pressure.

On a closed-circuit television, the aquanauts were observed spending their time much as anyone else does on a quiet Sunday when it is wet outside. They talked, ate and watched television. Cmdr. M. Scott Carpenter, team captain, and Jay Dee Skidmore spent an hour taking pictures.

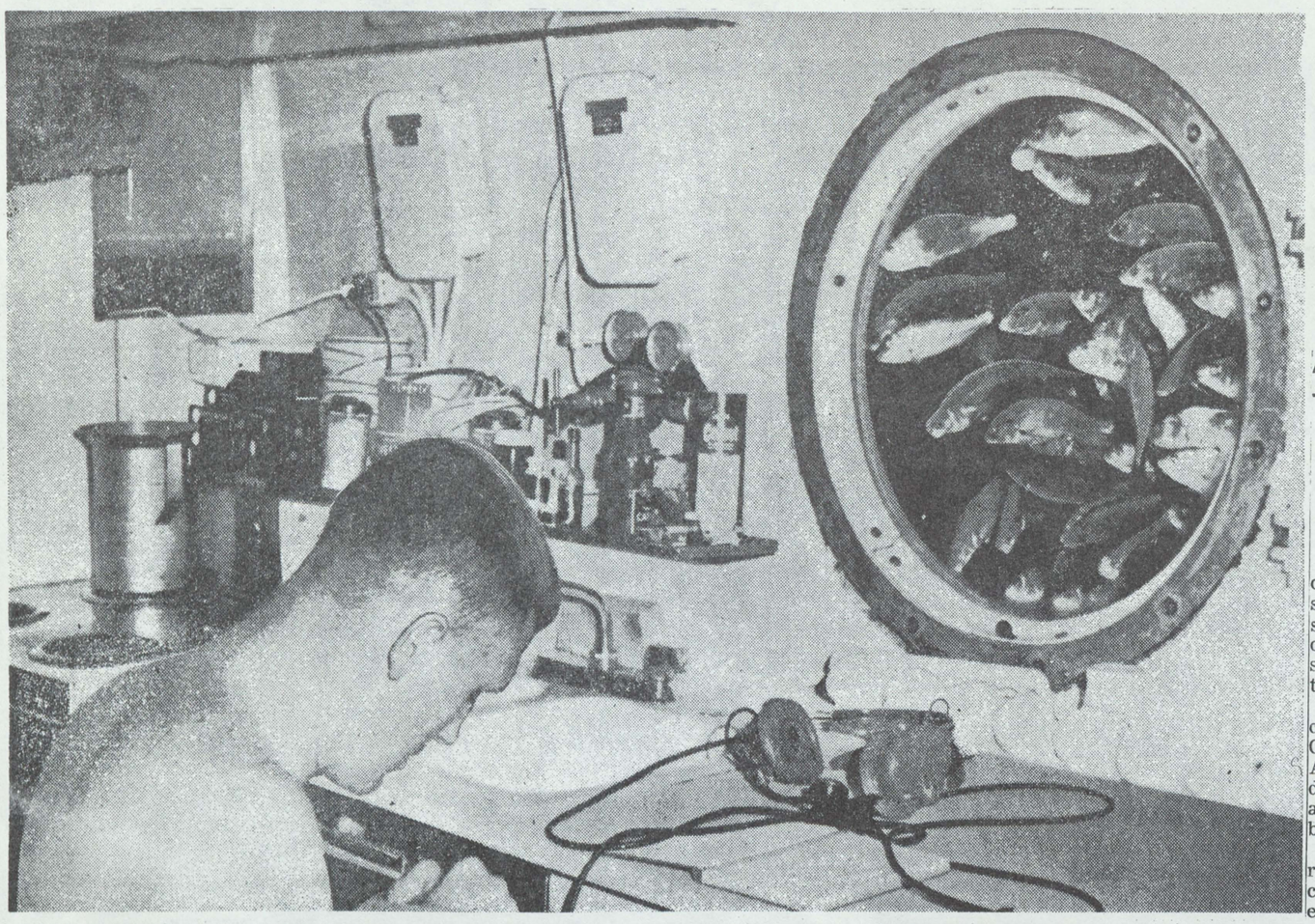
Skidmore was observed cutting a cake sent by his wife in a pressure pot from topside. Lt. Robert Sonnenburg will have a cake to celebrate his 28th birthday tonight. His wife, Patricia, said she baked a 10-inch devil's food cake to be sent down to him. Although bottles may explode in the high pressure aboard the SeaLab, it was explained that cakes, like people, can equalize pressures and avoid damage.

Capt. George Bond, topside commander of the operation, led the aquanauts in a religious service through a large speaker system from the Berkone.



—AP Wirephoto

HUMAN AQUARIUM—The nation's aquanauts in 205-foot-deep Sealab 2 feel like they're in an aquarium on display for curious fish outside porthole. Aquanaut Berry Cannon, Panama City, Fla., is oblivious to visitors while repairing headset for the helium unscrambler. See story on Page 2.



FISH-EYE VIEW OF AN AQUANAUT — Some curious neighbors gather at the porthole to watch engineer Berry Cannon as he repairs headset aboard Sealab 2 at 205-foot depth in ocean off La Jolla. Cannon is one of 10 men aboard for a 45-day experiment.
(AP) Wirephoto

Los Angeles Times 6 Sept. 1965

'HOLIDAY ROUTINE'

10 Aquanauts Spend 'Day Off' in Depths

LA JOLLA (UPI)—America's 10 aquanauts Sunday spent their first "day off" since descending 205 feet underwater into the 57-foot steel Sealab 2 cylinder for the "man in the sea" tests.

The experimenters, including astronaut M. Scott Carpenter, entered Sealab Aug. 28 at the start of a 45-day series of projects in and around the underwater laboratory.

A spokesman said the morale of the aquanauts "is exceptionally high. They are elated to be involved in the project."

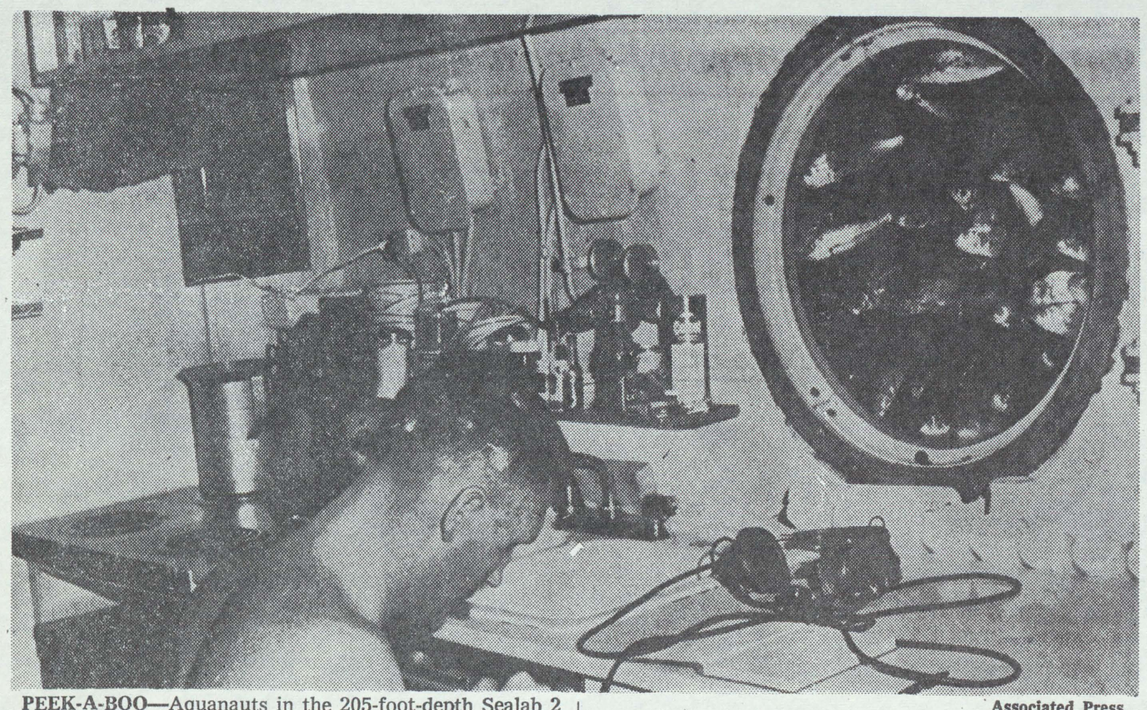
No trips outside Sealab were planned Sunday. The spokesman said the men were to go through a "holiday routine, tending to personal chores."

Navy Capt. George Bond, chief investigator for the Sealab 2 project, conducted religious services from the staging vessel Berkone, which rides the Pacific Ocean above the stationary cylinder.

Two of the aquanauts ventured 233 feet outside the cylinder Saturday to explore a rock ridge. Another team completed installation of a platform to contain the world's first underwater weather station.

Work will continue today.

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PEEK-A-BOO—Aquanauts in the 205-foot-depth Sealab 2 sometimes feel like they're in an aquarium on display for the curious fish seen outside the porthole. Aquanaut Barry Cannon was too busy repairing a headset to notice the visitors.

Associated Press

Minneapolis (Minn.) Star
MONDAY, SEPTEMBER 6, 1965

Birthday Cake Goes To Doctor in Sealab

A birthday cake is to challenge the ocean depths off La Jolla today.

The devil's food layer cake — with white icing — is to be lowered 205 feet in a pressure pot to Sealab II.

The cake is for the 28th birthday today of Lt. Robert E. Sonnenburg, a Navy doctor and one of 10 aquanauts in Sealab. The baker is his wife, Patricia, of 4367 Adams Ave.

Whether the cake can withstand the pressure of the ocean depths is in question.

Lt. Gene Marum, assistant public information officer for Sealab II, said the cake will be lowered in a pressure capsule.

"The capsule looks like a pressure cooker without handles," he said. "I don't know what will happen once it gets inside Sealab because the pressure is seven times greater there and the cake could collapse.

"If they eat it up fast enough there won't be any problem," Marum said.

The aquanauts have a busy schedule today.

Yesterday the aquanauts had their first day of rest since they descended to Sealab on Aug. 28

Nine of the aquanauts are scheduled to end a 15-day stay in Sealab Sunday. Only Cdr. Scott Carpenter, who is also an astronaut, is to stay for another 15 days. Another team will join him.

SAN DIEGO
EVENING TRIBUNE
SEP 6 1965

(LA JOLLA /LAH-HOY-YAH/, CALIFORNIA)---LABOR DAY IS JUST ANOTHER WORKING DAY FOR AMERICA'S TEAM OF 10 AQUANAUTS LIVING 205 FEET BENEATH PACIFIC WATERS OFF ~~THE COAST OF SOUTHERN CALIFORNIA~~ LA JOLLA. THEIR HOME IS THE 200-TON SEALAB-TWO. THE AQUANAUTS WERE GIVEN THEIR FIRST DAY OFF YESTERDAY SINCE DESCENDING INTO THE OCEAN AUGUST 28TH TO GET THE 45-DAY "MAN IN THE SEA" PROJECT UNDER WAY. DESPITE THE CLOSE QUARTERS AND LONG SERIES OF EXPERIMENTS...A NAVY SPOKESMAN DESCRIBED THE MORALE OF THE AQUANAUTS AS "EXCEPTIONALLY HIGH."

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UPI RADIO WIRE 6 Sept

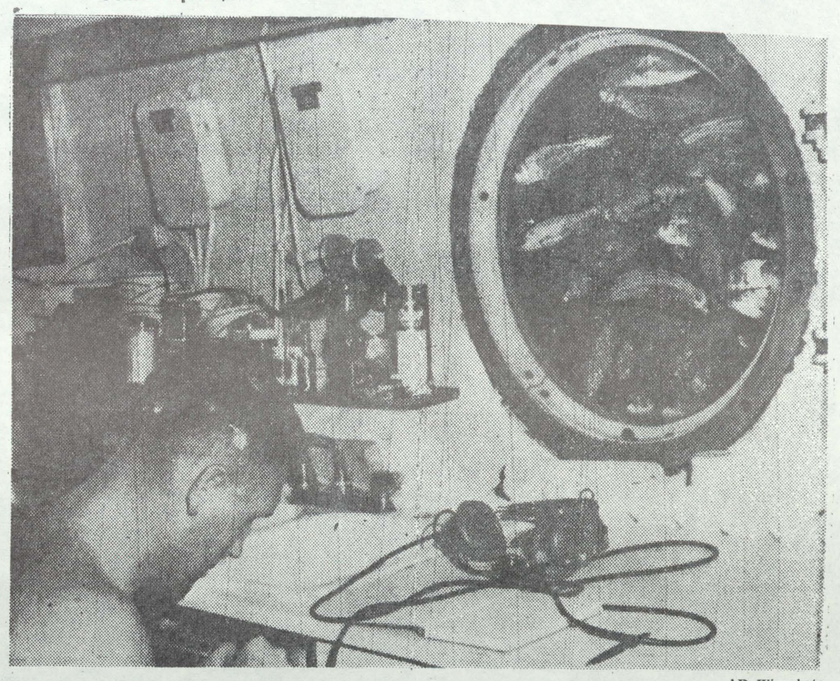
(SEALAB)

(LA JOLLA)---LABOR DAY IS JUST ANOTHER WORK DAY FOR AMERICA'S TEAM OF 10 AQUANAUTS LIVING 205 FEET UNDERWATER IN THE SEALAB TWO OFF LA JOLLA.

THE EXACT EXPERIMENTS FOR TODAY WILL BE ANNOUNCED LATER THIS MORNING. DURING THE WEEKEND THE AQUANAUTS COMPLETED THE INSTALLATION OF THE WORLD'S FIRST UNDERWATER WEATHER STATION.

6838APD 9/6

From SEP 6 - 1965
INQUIRER
Philadelphia, Pa.



AP Wirephoto

Crowd of curious fish watch through porthole as aquanaut Berry Cannon, of Panama City, Fla., repairs headset for helium unscrambler aboard Sealab 2, which is on floor of Pacific Ocean off La Jolla, Calif.

Labor Day Like Any Other For Aquanauts

LA JOLLA, Calif. AP) —day, when the second team Labor Day will be no holiday will go down. Astronaut Carfor the nation's aquanauts in penter will remain below durSealab 2. ing the second 15-day phase of

The 10 divers enter their second week of a busy work and the 45-day experiment. scientific testing schedule at a depth of 205 feet.

The divers had their first day off Sunday, though, and the men spent it "doing whatever they want to do — sleeping, writing letters," a spokesman said. Religious services also were held.

Cmdr. M. Scott Carpenter had asked that every seventh day be designated "holiday routine" in Sealab 2.

Meantime, men aboard the mother ship Berkone have been readying emergency way stations to be lowered to the bottom.

The stations resemble oversized, doorless telephone booths that will contain emergency breathing gear. They will be placed near major work areas such as the underwater weather station in case divers run low on air.

The first team of divers — all except Carpenter — is scheduled to ascent next Sunday.

The daily status report since the aquanauts went down has always included: "The aquanauts spent a restful night."

And why not? It's quiet down there. The only noisemaker is a loud bell, used over the weekend in an undersea drill.

The bell sounded outside the Sealab.

"There were four men outside and everybody was back at the lab in less than a minute," said Capt. George Bond, chief investigator of the project.

The bell has emergency functions such as shark alarm.

The aquanauts have found their new environment a good place to quit smoking.

The helium atmosphere and pressure of the depth inside the 12x58-foot, cigar-shaped laboratory make it impossible to light a match.

Cooking is done on an electric stove which must reach 327 degrees fahrenheit to boil water.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

SEP 6 - 1965

(SEALAB)

TEN DAYS OF LIVING UNDERWATER AROUND-THE-CLOCK ~~HAS~~ HAVE NOT DAMPENED THE ENTHUSIASM OF AMERICA'S TEN AQUANAUTS. PROJECT PSYCHOLOGIST ROBERT HELMREICH SAYS THEY ARE CHEERFUL...THEY FEEL VERY ACTIVE. THEY ARE BUOYANT AND NOT AT ALL BLUE OR DISTRESSED.

YESTERDAY THE AQUANAUTS PUT IN A BUSY DAY OUTLINING WITH STAKES AND BUZZERS A SEA AREA EXTENDING AS FAR AS TWO-HUNDRED AND TWENTY-FIVE FEET FROM SEALAB TWO IN WHICH A NAVY FIGHTER PLANE WILL BE DROPPED FOR AN EXPERIMENT TO SEE WHETHER THEY CAN SALVAGE IT. THE DAY ALSO WAS MARKED BY THE CELEBRATION OF ONE OF THE AQUANAUT'S TWENTY-EIGHTH BIRTHDAY. THE EVENT WAS NOT WITHOUT SOME OF THE AMENITIES OF HOME. LT. ROBERT SONNENBURG OF SAN DIEGO RECEIVED A DEVIL'S FOOD CAKE BAKED BY HIS WIFE.

UPI SEPT 7 1965

EVENING NEWS
Newark, N. J.
SEP 7 1965

Aquanauts Enjoy Life

Enthusiasm Remains After 10 Days on Sea Floor

LA JOLLA, Calif. (UPI) — Ten days of living underwater around-the-clock has not dampened the enthusiasm of America's 10 aquanauts, according to project psychologist Robert Helmreich.

"Their mood is great," Helmreich reported. "They are cheerful, they feel very active. They are buoyant and not at all blue or distressed.

"I have particularly noticed the consistence of their reactions," Helmreich added. "Not one departs very far from the general good mood."

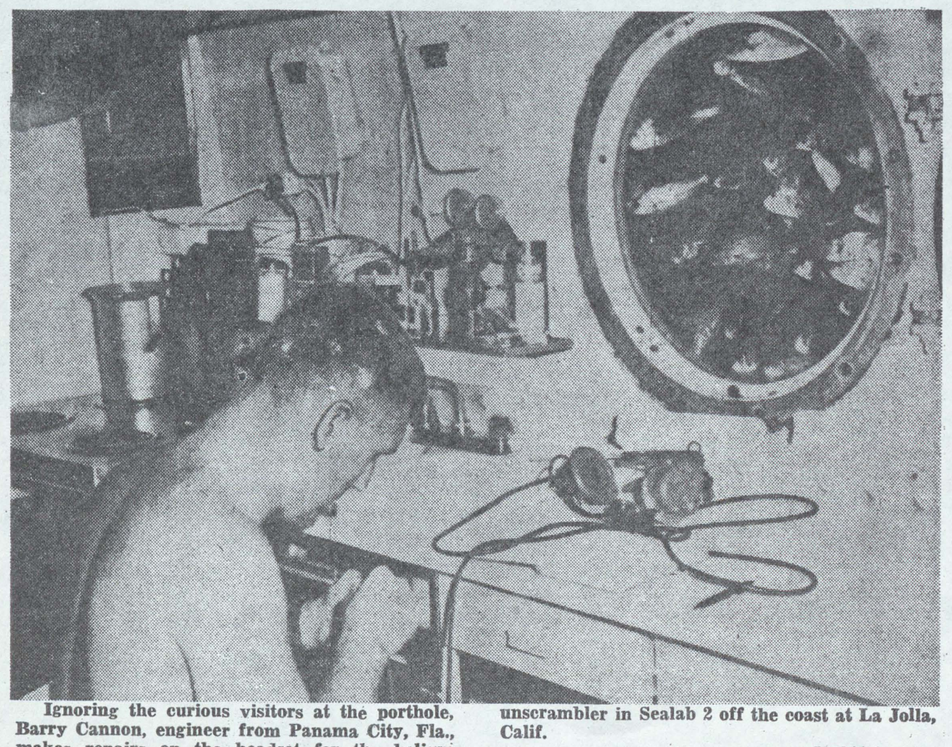
Food Problem

Helmreich said that if anything, the mood of the aquanauts is even better now than it was before they went 205 feet underwater in Sealab 2 — a 200 ton, 57-foot-long steel cylinder.

The aquanauts, including astronaut M. Scott Carpenter, disagree, however, on the food they have been receiving. Carpenter, the team leader, was quoted as saying he was becoming tired of omelettes.

Since they descended to the depths Aug. 28, the aquanauts in the man-in-the-sea project have been sleeping 7-9 hours nightly.

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Ignoring the curious visitors at the porthole, Barry Cannon, engineer from Panama City, Fla., makes repairs on the headset for the helium unscrambler in Sealab 2 off the coast at La Jolla, Calif.

—*UPI Telephoto.*

Sealab Tests Alarm With Great Success

LA JOLLA, Calif., Sept. 6—(AP) — They've had their first alarm on Sealab 2. It was a test—and, says the Navy, it was a clanging success.

If the aquanauts are needed inside the 205-foot-deep sealab, a ship's bell set up outside the entry port will be sounded. A shark cage surrounds the entry port as a safety precaution.

The bell alarm was tested over the weekend, and aquanauts working outside scurried through the cage and into the lab.

"There were four men outside and everybody was back at the lab in less than a minute," said Capt. George Bond, chief investigator of the 45-day project.

There's little danger of a fire aboard. For one thing, there's no smoking aboard.

The 10 aquanauts haven't had a smoke since they descended Sept. 4. They were advised to quit the habit before going down.

The mainly helium atmosphere in Sealab—and pressure that is nearly seven times greater than that on the surface—won't support flames, not even a match.

The aquanauts enjoyed their first day off Sunday, under a schedule that allows holiday routine every seventh day.

But they were to be back on their busy schedule of work and scientific tests Monday, despite the Labor Day holiday.

ROCKY MOUNTAIN NEWS
Denver, Colo.
SEP 7 1965

SEALAB II: Navy Chief Ron Sweig, one of the year-round crew at 11th Naval District headquarters here, has been a key figure in the news office of Sealab II. His reward, the other day, was inappropriate. Hungry and rummaging about for a snack, he reached in a doughnut box on a high shelf at the Sealab press room and pulled out a tarantula. Live, and, to Sweig, horrifying. One of the newsmen covering Sealab had put it there for safe keeping after picking it up from a highway for his son, Nick Bowler, 9.

AMPHIBIAN: Ed Rosenberg, one of the developers of NEL's underwater sled for scuba divers, spends all his spare time on land vehicles. He's currently acquiring his second Stanley Steamer.

NO CHOICE: So much useless paperwork these days. Like the sign over the rest room inside Sealab II on the ocean floor off La Jolla, reading MEN.

SAN DIEGO
EVENING TRIBUNE
SEP 7 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

ONE COUNTY RESIDENT CHOSEN

Second Team Named For Stay in Sealab

By LEO BOWLER
EVENING TRIBUNE Science Writer

The Navy today announced the names of the nine aquanauts who will man Sealab for 15 days after nine of the present team members come to the surface.

One of the new aquanauts is a San Diego county resident. Four are civilians.

The team will be led by Navy Cdr. Scott Carpenter, present team leader in Sealab. Carpenter will stay down for a total of 30 days as leader of the two teams.

The current team marked its 10th day below today.

One From Encinitas

The local man is Arthur C. Flechsig, 40, of 619 Orpheus St., Encinitas. Flechsig is an oceanographer for Scripps Institution of Oceanography in La Jolla.

The new team members are Robert A. Barth, 35, a Navy chief quartermaster from Panama City, Fla.; Howard L. Buckner, 36, a Navy chief steelworker of Forestville, Md.; Kenneth J. Conda, 32, a torpedoman's mate first class, of Ledyard, Conn.; George B. Dowling, 39, a research physicist of Panama City; Glen L. Iley, 36, a chief hospital corpsman of Groton, Conn.; Wallace T. Jenkins, 30, an equipment specialist of Panama City; John F. Reaves, 36, a Navy photographer first class of Oxnard, and William H. Tolbert Jr., 39, an oceanographer of Panama City.

Captain Relieved

Barth is the only member of either team who participated as an aquanaut in Sealab I. He stayed in Sealab I for 11 days at 192 feet, 30 miles from Bermuda last year.

The aquanauts were announced by Capt. Ray A. Spenser, project director, who relieved Capt. Lewis B. Melson in the position.

Capt. George F. Bond, principal investigator for Sealab II, said the second team will not have a physician as the first team has had. Lt. Robert E. Sonnenburg, 28, a Navy doctor in the first team, will go down with the third team, but Iley will handle medical chores for the second group.

3 to Go Ahead

Barth, Buckner and Iley will enter Sealab six hours before the present team comes to the surface. They will participate during this time in intensive physiological studies and then will help get the new team settled when the others descend to Sealab.

Today the aquanauts were completing the final hookup of their underwater weather station, helping to install more underwater television cameras and conducting studies on the bottom to determine the topography of the ocean floor around Sealab.

Yesterday was the 28th birthday for Sonnenburg. His wife, Patricia, baked a three-layer devil's food cake. While she was driving to the mother ship Berkone, however, it fell apart into quarters inside the hat box in which she placed it.

Gets Greedy Welcome

But the cake was lowered inside a pressure pot dumbwaiter. Even if it had been in one piece, it wouldn't have stayed that way for long.

It was a welcome relief for the aquanauts, some of whom have had less than complimentary remarks about their diet while inside Sealab.

Carpenter, for instance, allowed as how he is getting a little weary of omelets.

Morale Called High

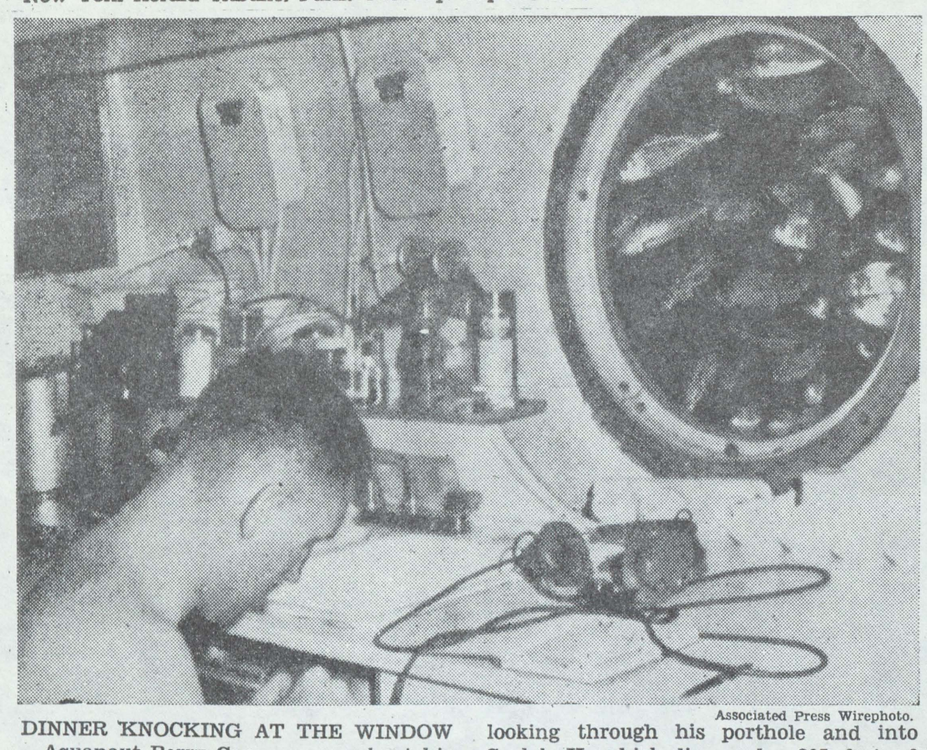
But a psychologist on the project said that questionnaires show the morale of the men is high.

"They are cheerful, they feel very active, they are buoyant and not at all blue or depressed," said Robert Helmreich, one of the psychologists on the project.



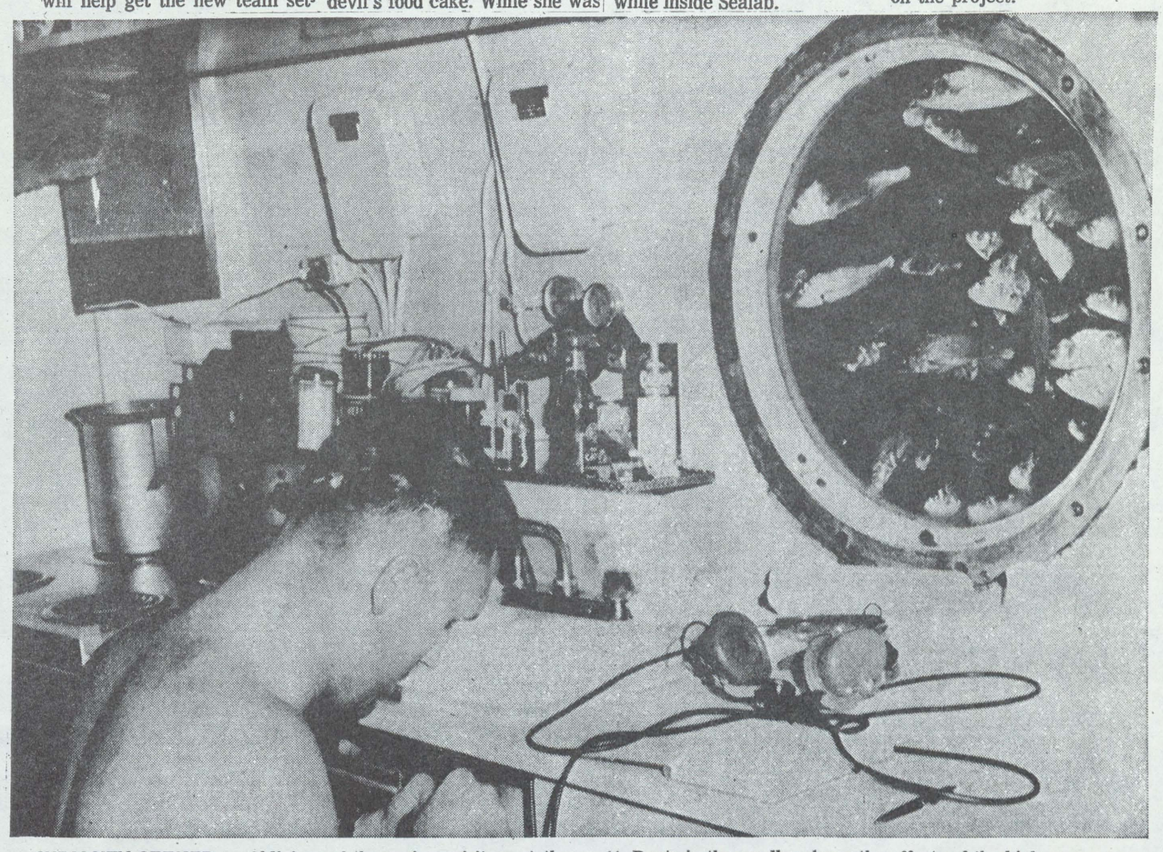
COMING RIGHT DOWN—Mrs. Robert E. Sonnenburg puts finishing touches on birthday cake for her husband, one of the Sealab aquanauts. Watching are her children, Sandra Lee, 4, and Robert Eric Jr., 2. Mrs. Sonnenburg delivered the cake yesterday to be lowered to Sealab.

—New York Herald Tribune, Paris, Tuesday, Sept. 7, 1965



Associated Press Wirephoto.

DINNER KNOCKING AT THE WINDOW —Aquanaut Berry Cannon goes about his duties, oblivious to the school of fish looking through his porthole and into Sealab II, which lies under 205 feet of Pacific Ocean, off the California coast.

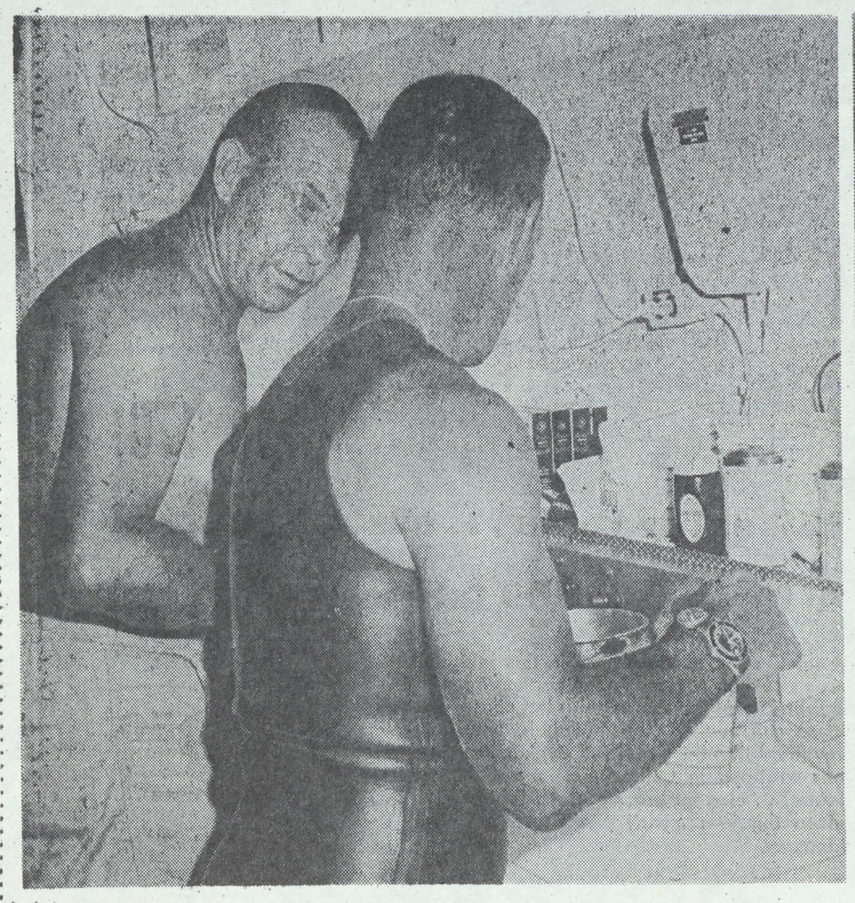


CURIOSITY SEEKER — Oblivious of the curious visitors at the porthole, engineer Berry Cannon, from Panama City, Fla., makes repairs on the headset for the helium unscrambler in SEALAB 11. Dents in the noodles shows the effects of the high pressure on the underwater-lab under the Pacific Ocean off the coast of La Jolla. (UPI Telephoto)

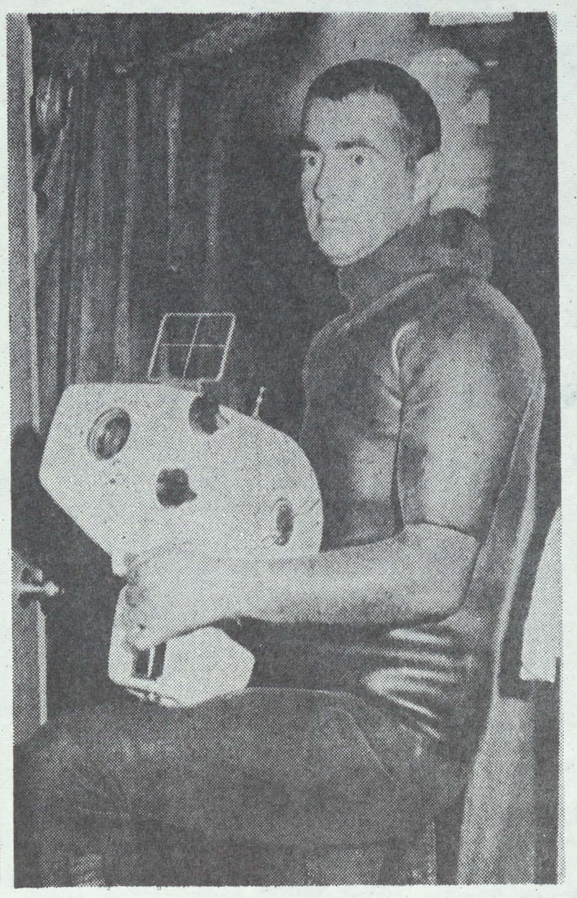
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SD Union 8 Sept

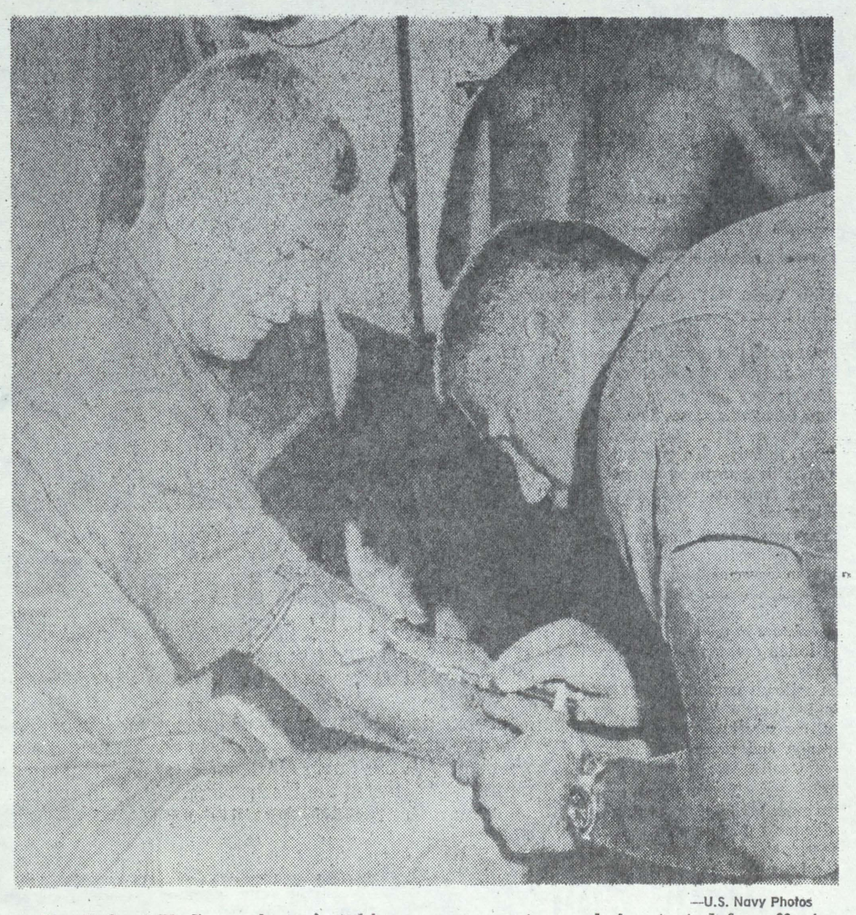
Dishes, Other Duties Keep Aquanauts Busy



SeaLab II is under 205 feet of ocean water off La Jolla and aquanaut Wilbur Eaton, right, wears the appropriate gear for washing dishes — a wet suit. Aquanaut Cyril Tuckfield wears shorts as he cooks a meal.



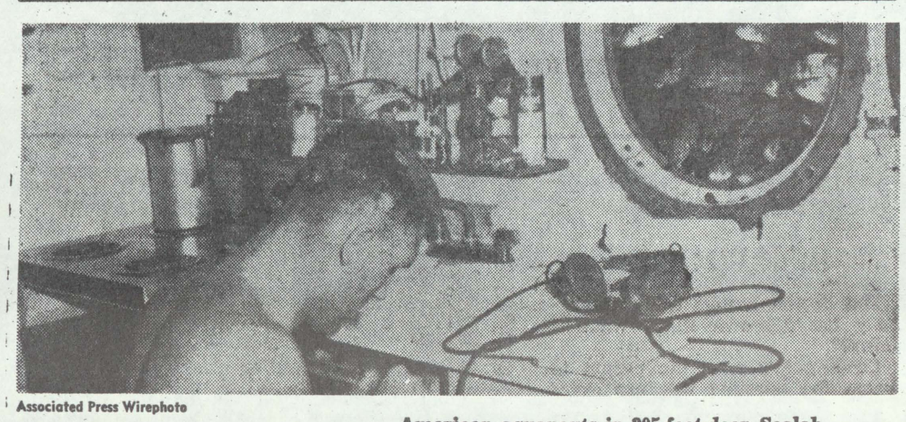
J. D. Skidmore, chief photographer, holds the underwater motion picture camera he uses as he prepares to leave SeaLab II after assignment there.



Dr. Robert E. Sonnenburg is taking a blood sample from the arm of aquanaut Earl A. Murray. Four SeaLab II aquanauts are being tested for effect of helium in the admosphere and the high pressure in SeaLab. (Story, a-1)

—U.S. Navy Photos

From
CHRISTIAN SCIENCE MONITOR
Boston, Mass.



Associated Press Wirephoto

Aquarium for humans

American aquanauts in 205-foot-deep Sealab 2 feel as though they're in an aquarium on display for curious fish outside the porthole. Aquanaut Berry Cannon, Panama City, Fla., seems oblivious to visitors while he repairs a headset for the helium unscrabler.

Aquanauts Carry On Despite Ear Ailment

Tribune 8 Sept

By LEO BOWLER
EVENING TRIBUNE Science Writer

Nine of the 10 Sealab II aquanauts have ear infections.

Physicians think the infections were brought on by swimming excursions around the undersea residence.

The infections are characterized by pain and swelling. Lt. Robert E. Sonnenburg, the Navy physician who is looking after the health of the aquanauts and doubling as an aquanaut himself, is administering an antibiotic and swabbing the aquanauts' ears with another medicine.

Billie L. Coffman, 36, a Torpedoman's mate first class from Willimantic, Conn., is the only one of the 10 without the infection.

Dr. George Bond, a Navy doctor who is principal investigator for the project, said the aquanauts' activities have not been curtailed by the infections.

"They probably feel less pain when they are outside swimming than when they are in Sealab," Bond said.

Bond and Sonnenburg believe the infections came from microorganisms in the water around Sealab. The trouble is in the outer ear canal and has nothing to do with the eardrum, Bond said.

"It's not a common occurrence among divers," he said. "I've been diving for 13 years in all kinds of waters and I've never had it.

"We expect it to clear up when the aquanauts are brought to the surface."

The divers, with the exception of Cdr. Scott Carpenter, the team leader, are expected to be brought to the surface Sunday.

After three members of the next team are sent to Sealab, the present team members will enter a transport capsule which is already on the bottom.

The capsule will be closed so that the atmosphere inside it remains at the pressure of sea bottom and it will be lifted to the mothership Berkone where it will be attached to a decompression chamber.

The aquanauts will then move from the capsule to the chamber. The pressure in the chamber will be reduced gradually until the aquanauts adjust to normal air pressure and to breathing normal air.

36-Hour Changeover

This should take 36 hours. After the aquanauts are allowed to leave the decompression chamber, they will be kept aboard the Berkone for another 12 hours, just in case they have to go back into the chamber.

When they leave the Berkone, they will go to Naval Hospital in Balboa Park for further checks.

If an aquanaut were to swim to the surface instead of coming up in the pressure capsule, he would die before he could be put into the decompression chamber aboard the Berkone, Bond said.

This is because his body has become adjusted to the pressure on the bottom and to the helium-based atmosphere which the aquanauts breathe.

Yesterday the aquanauts spent 12 hours and 12 minutes outside Sealab. This was the first day in which they had averaged more than an hour each in the water. The earlier record had been 9 hours for the 10 men.

Seattle Times
Seattle, Wash.
(Cir. D. 223,264 - S. 252,265)

SEP 1 1965

Installation On Sealab Set For Completion

LA JOLLA, Calif., Sept. 1. —(AP)— Aquanauts in Sealab II. planned to complete installation today of a sophisticated electronic communications center.

Meanwhile, the ten divers are eating heartily.

The apparatus, known as a benthic laboratory, is a concrete structure that will serve as a switchboard to handle communications for the Navy's underwater-living experiment.

When it is hooked up, the aquanauts will have four channels, 20 channels for audio communications and 20 data channels.

Up to now, communication has been limited to telephone conversations with the support ship 205 feet above on the surface, and by messages sent down by dumbwaiter.

Officials said one of the biggest surprises thus far is the aquanauts' enormous appetites. A closed-circuit television camera is focused on the Sealab kitchen, and the divers are raiding the refrigerator often.

AP RADIO WIRE 7 Sept

AP8FX

CALIFORNIA HEADLINES

PRELIMINARY REPORTS INDICATE THAT THE CALIFORNIA LABOR DAY HOLIDAY TRAFFIC DEATH TOLL REACHED 41. THIS WAS EXCEEDED BY TEXAS, WHICH HAD 45 TRAFFIC DEATHS.

THE CREW OF TEN NAVY MEN ABOARD THE UNDERWATER SEALAB TWO WORKED ON THE HOLIDAY YESTERDAY. THE SEALAB PROJECT OFF LA JOLLA IS THE NATION'S LARGEST UNDERWATER EXPERIMENT.

RANGERS AT ZION NATIONAL PARK IN UTAH WILL BEGIN A SEARCH TODAY FOR FIVE CALIFORNIANS MISSING IN NARROW ZION GORGE. THE FIVE WERE AMONG SEVERAL OTHERS STRANDED AFTER RECENT RAINS.

A 24-YEAR-OLD CALIFORNIAN WHO SAILED THE SOUTH PACIFIC LOST, SICK AND ALONE FOR 130 DAYS ARRIVED IN SAN FRANCISCO LAST NIGHT. HE IS DAVID MEIGS OF ATHERTON, WHO WENT OFF COURSE IN HIS SAILBOAT BETWEEN PAGO PAGO AND HONOLULU.

MA528APD7

7 Sept

WHAT IS IT LIKE 205 FEET BELOW THE PACIFIC OCEAN SURFACE? THE PSYCHOLOGIST TENDING THE MINDS OF TEN AQUANAUTS IN SEALAB TWO WHO HAVE SPENT TEN DAYS UNDER WATER OFF LA JOLLA SAYS: "THEIR MOOD IS GREAT. THEY ARE CHEERFUL. THEY ARE ACTIVE. THEY ARE BUOYANT -- NOT AT ALL BLUE OR DEPRESSED."

MAYBE THAT'S THE PLACE TO BE.

KS/EJ1111AED 7

AP radio wire, used as "kicker" at end of 5-min. news summary

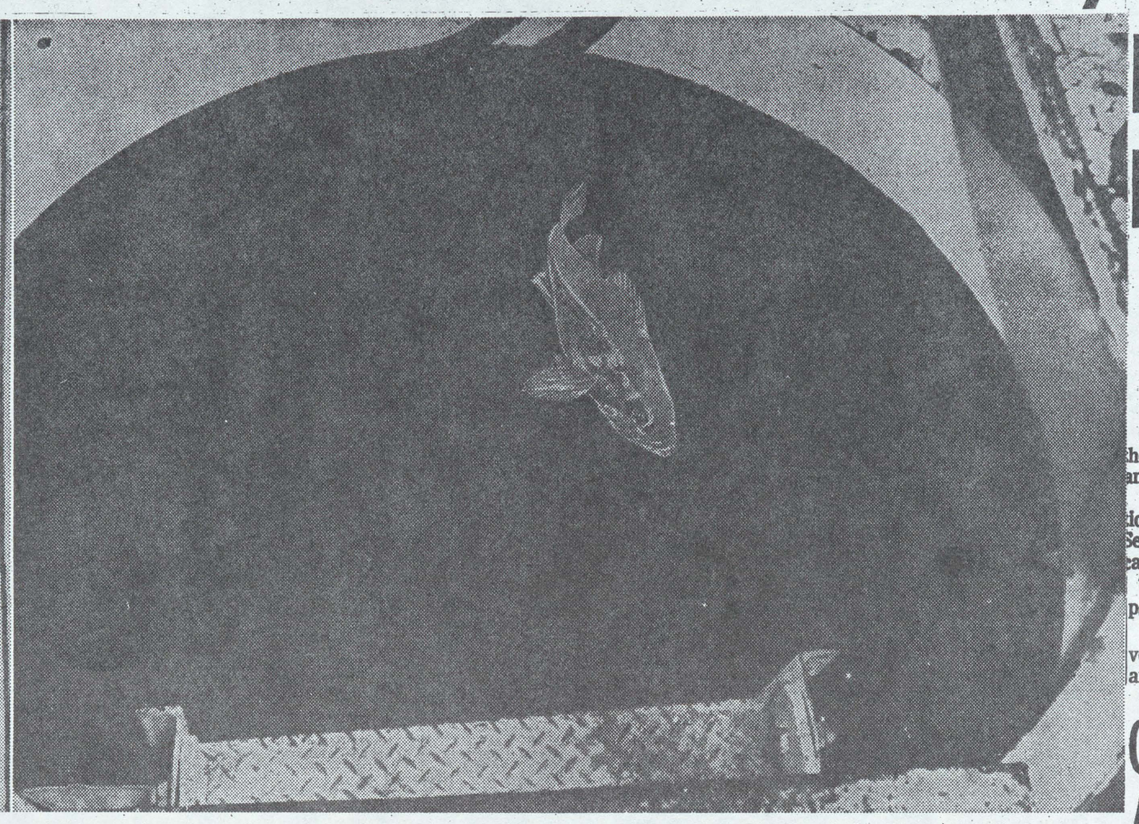
AP radio wire
9-8-65

(LA JOLLA, CALIFORNIA)--A "SEALAB TWO" PSYCHOLOGIST--IN CHARGE OF TENDING THE MINDS OF AQUANAUTS WHO HAVE BEEN UNDER 205 FEET OF WATER FOR THE LAST TEN DAYS NEAR LA JOLLA (LAH HOY'-YAH), CALIFORNIA--SAYS THE MEN ARE REMARKABLY CHEERFUL. JUST ABOUT THE ONLY GRIPE COMES FROM ASTRONAUT-TURNED-AQUANAUT SCOTT CARPENTER. HE SAYS HE'S GETTING A LITTLE TIRED OF OMELETS -- CHEESE, WESTERN AND MUSHROOM--FOR BREAKFAST EVERY DAY. WHICH JUST GOES TO SHOW--THE WATER'S ALWAYS BLUER ON THE OTHER SIDE.

88

SeaLab Labors Continue On Labor Day

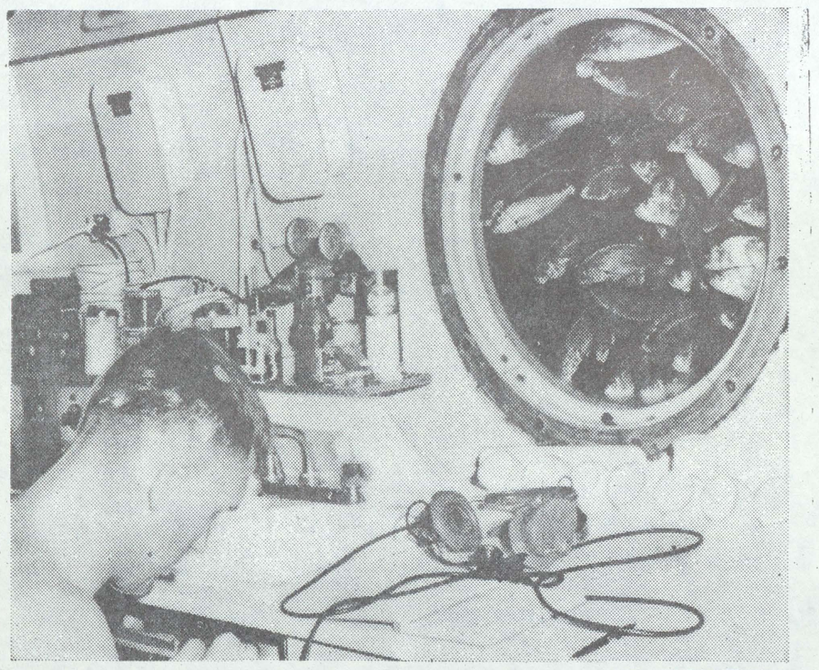




Labor Day was no holiday for 10 aquanauts in SeaLab II. At left, Lt. Robert Sonnenburg catches up on some physiological records despite the fact yesterday was his 28th birthday and his wife baked him a cake. In center, a sea bass is caught by camera in entry hatch to SeaLab. At right, Billie Coffman and Earl Murray prepare for a sortie outside their underwater home. Murray holds nylon lines used by the aquanauts to determine distance they travel from the SeaLab. The men spent the day staking out the perimeter of their working area on the ocean floor. (Story on Page a-21)

—U.S. Navy Photos





Associated Press Wirephoto

Something Human Here

Aquanaut Berry Cannon, repairing a headset for Sealab 2's helium unscrambler, pays no attention to crowds of curious fish gazing through the porthole of the craft at a depth of 205 feet off La Jolla, Calif.

LA JOLLA, Calif., Sept. 7 (UPI)—Ten days of living underwater have not dampened the enthusiasm of America's 10 aquanauts, project psychologist Robert Helmreich says.

"Their mood is great," Helmreich reported. "They are cheerful, they feel very active. They are buoyant and not at all blue or distressed."

Hlemreich said that if anything, the mood of the aquanauts is better now than before they went 205 feet underwater on Aug. 28 in Sealab 2—a 200-ton, 57-foot-long steel cylinder.

The aquanauts, including astronaut M. Scott Carpenter, have been sleeping seven to nine hours nightly.

Scientists monitoring the aquanauts' activities by closed-circuit television said the 10 men were full of wisecracks and jokes. They reported that underwater electrocardiograms proved satisfactory.

SEP 7 - 1965
POST-DISPATCH
St. Louis, Mo.

Aquanauts Keeping Up Enthusiasm

Psychological Checks Reveal High Spirits After Nine Days

Pictures—Page a-3

By BRYANT EVANS
The San Diego Union's Science Writer

Nine days of being separated from the rest of the world on the bottom of the Pacific Ocean has not dimmed the enthusiasm and ebullience of the 10 SeaLab II aquanauts.

This was found yesterday when results of psychological questionnaires taken daily during the operations were compared at SeaLab headquarters on the Scripps Institution of Oceanography campus.

"Their mood is great," said Robert Helmreich, one of the psychologists on the project. "They are cheerful, they feel very active, they are buoyant and not at all blue or depressed. I have particularly noticed the consistency of their reactions. Not one departs very far from the general good mood."

* * *

Helmreich said that, if anything, the mood of the aquanauts is even better than it was before they went down to the 205-foot-deep habitat off La Jolla on Aug. 28.

CHOW DISAGREEMENT

One point on which the aquanauts disagreed was that of food. Some stated frankly that the "chow" was not all that it might be.

Cmdr. M. Scott Carpenter, team leader, said that he is getting a little tired of omelets.

People who have been monitoring SeaLab activity by closed-circuit television say that the aquanauts are full of wisecracks and jokes. They are spending less time looking out portholes at the abundant fish life. They have been sleeping well from seven to nine hours per night.

Work of the aquanauts yesterday included the laying out of an area for future projects and experiments.

One point of the irregular outline is 225-feet from the SeaLab. It is marked by stakes and buzzers. It is somewhere in this outline that an old airplane will be dropped to test the aquanauts' ability to salvage it. This exercise will be held after the third team goes down, about Sept. 26 or 27.

SeaLab officers reported that the remotely registering electrocardiagraph developed by the Philadelphia General Hospital scientists has proved to be satisfactory. Heart tracings of free-swimming aquanauts 205 feet under the surface were recorded on the mother ship, the Berkone.

PLANKTON STUDIED

Two members of the Scripps staff, aquanauts Tom Clarke and Earl Murray, were scheduled to make plankton observations last night. The purpose of these observations is to determine whether the tiny organisms have a regular movement, up and down the slopes of the underwater area, according to the time of day.

Instruments were put in place in the Scripps' underwater weather station near SeaLab yesterday by the aquanauts.

Two sets of instruments, 60 feet apart, are suspended by an underwater float anchored to the sea bottom. They will report pressure, temperature, light intensity, current speed and direction.

Sample cores from the sea bottom were sent up to the Berkone yesterday.

Cake Falls—Aquanaut's Wife Crumbles

Mrs. Patricia Sonnenburg baked a three-layer devil's food cake yesterday — and had the devil's own time with it.

She was taking it in her car to her husband, Dr. Robert E. Sonnenburg, an aquanaut aboard SeaLab II, when it fell apart on a freeway curve.

Mrs. Sonnenburg, who is expecting her fourth child in January, almost collapsed, too.

"I've never been so upset in my whole life," she said. "It was so pretty. I'd rather go through having a baby than take what's left of the cake out to the ship. I'm so embarrassed I feel like throwing it in the bay."

BOARDS SHIP

But it was her husband's 28th birthday. So, with her mother-in-law, Mrs. Harold Hickman, a stack of cards from her children, and chunks of chocolate cake in a pink polka dot hat box, Mrs. Sonnenburg boarded SeaLab's mothership Berkone.

She wore green slacks and a green-and-red maternity blouse.

"I wore a dress and high heels last time and learned my lesson," she said.

Mrs. Sonnenburg described the cake as it had looked just out of the oven for reporters who stared with bewilderment into the hat box.

"It had a red SeaLab symbol on the white icing on top," she said.

FIGURES DESCRIBED

Ten pipe-cleaner figures with wooden faces were the aquanauts. They had jelly beans on their backs for "breathing gear." The sides of the cake were decorated with icing portholes, with rolling plastic panda bear eyes peeking out.

The cake broke into quarters, revealing rich, dark chocolate and layers of icing filling.

The cake was lowered in the "pressure pot" dumb waiter, and the aquanauts reported no further damage — betwen mouthfuls of desert.

Mrs. Sonnenburg spoke to her husband from the Berkone, but did not sing "Happy Birthday."

"I'd like to, but I just can't sing," she said.

NEWS Detroit, Mich.
SEP 8 1965

Name State Man to Sealab Team

LA JOLLA, Calif., Sept. 8.—(AP) — The Navy announced today the names of the second 10-man team of aquanauts scheduled to establish residence Sunday for 15 days in Sealab 2.

Among them is Navy torpedoman 1c. Kenneth J. Conda, of Phoenix, Mich.

The first team has been living in Sealab 2 at a 205-foot depth on the ocean floor since Aug. 28.

"The aquanauts remain in excellent health and their morale is high," a spokesman said.

"Sorties were conducted today to the first part of the rim of Scripps Canyon, where they plan to set up a marine biological watch station—a permanent observation post."

SAN DIEGO U.
SEP 7 196

NEIL MORGAN 9/7/65
SAN DIEGO EVENING TRIBUNE
SEP 7 1965

SEALAB II: Navy Chief Ron Sweig, one of the year-round crew at 11th Naval District headquarters here, has been a key figure in the news office of Sealab II. His reward, the other day, was inappropriate. Hungry and rummaging about for a snack, he reached in a doughnut box on a high shelf at the Sealab press room and pulled out a tarantula. Live, and, to Sweig, horrifying. One of the newsmen covering Sealab had put it there for safe keeping after picking it up from a highway for his son, Nick Bowler, 9.

The Colton Courier ★ Tuesday, September 7, 1965

Mood of Aquanauts 'Great' After 10 Days

LA JOLLA, Calif. (UPI) — Ten days of living underwater around-the-clock has not dampened the enthusiasm of America's 10 aquanauts, according to project psychologist Robert Helmreich.

"Their mood is great," Helmreich reported. "They are cheerful, they feel very active. They are buoyant and not at all blue or distressed.

"I have particularly noticed the consistence of their reactions," Helmreich added. "Not one departs very far from the general good mood."

Helmreich said that if anything, the mood of the aquanauts is even better now than it was before they went 205 feet underwater in Sealab 2 — a 200 ton, 57-foot-long steel cylinder.

The aquanauts, including astronaut M. Scott Carpenter, disagree, however, on the food they have been receiving. Carpenter, the team leader, was quoted as saying he was becoming tired of omelettes.

Since they descended to the depths Aug. 28, the aquanauts in the man-in-the-sea project have been sleeping 7-9 hours nightly.

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Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

SEP 9 - 1965

Navy Names 10 Aquanauts

LA JOLLA, Calif. (AP) — The Navy announced Tuesday the names of the second 10-man team of aquanauts scheduled to establish residence Sunday for 15 days in Sealab 2.

The first team has been living in Sealab 2 at a 205 foot depth on the ocean floor since Aug. 28. The third and last team to participate in the 45-day underwater research project will be announced later.

Navy Cmdr. M. Scott Carpenter, 40, will continue his role as team leader with the second squad in his bid to remain at the ocean bottom for 30 straight days.

His new teammates will be:

Robert A. Barth, 35, Navy chief quartermaster, Panama City, Fla.

Howard L. Buchner, 36, Navy chief steelworker, East Alton, Ill.

Kenneth J. Conda, 32, Navy torpedoman first class, Phoenix, Mich.

George B. Dowling, 39, research physicist from the Navy Mine Defense Laboratory, Panama City, of Valdosta, Ga.

Arthur O. Flechsig, 40, oceanographer of Scripps Institution of Oceanography, La Jolla, of Chicago, Ill.

Glen L. Iley, 36, Navy chief hospital corpsman, La Crosse, Wis.

Wallace T. Jenkins, 30, equipment specialist, Navy Mine Defense Laboratory, Tampa, Fla.

John F. Reaves, 36, Navy photographer's mate first class, Robertsdale, Ala.

William H. Tolbert Jr., 39, oceanographer, Navy Mine Defense Laboratory, Biloxi, Miss.

Barth is the only member of either team to participate in both sealab experiments. He lived in Sealab 1 for 11 days at a depth of 192 feet last year off Bermuda.

Meanwhile, the first team of underwater pioneers was in its 10th full day in Sealab 2.

Second Team of Aquanauts Now in Sea Lab

By Gen Fortis

The second team of aquanauts this week prepared to descend 205 feet into the ocean off Scripps pier to take up their duties in the experiments of Sea Lab II as the staging vessel "Berkone" readied for the arrival of fish-aquanaut, "Tuffy," a porpoise.

"All is well," was the sound from Capt. George F. Bond aboard the Berkone as the 10 aquanauts this week worked at experiments, set up a weather station and were attempting to get the underwater television going. They were assisting in installing coaxial cables which carry the signal back to shore and it was expected that television would be available for public viewing in Sumner auditorium next week.

"Tuffy" will arrive by helicopter, wrapped in wet blankets, probably Monday. It is the intention of Sea Lab II that the porpoise, to be kept in a tank by the Berkone, be worked with the second team of aquanauts who will begin their descent Sunday.

Bond said that three men will descend to Sea Lab six hours before the first team is scheduled to return to the surface. They will participate during the six-hour period in continuous intensive physiological studies which include lung function studies and measurements to determine the rapidity of helium absorption into the blood

Aquanauts who will join astronaut-aquanaut Scott Carpenter on the ocean floor are Robert A. Barth, Howard L. Buckner, Kenneth J. Conda, George B. Dowling, Arthur Fleming, Glen L. Iley, Wallace T. Jenkins, John F. Reaves and William H. Tolbert. Carpenter is the only man who will remain from the first team and he will stay with Sea Lab II for 30 days.

SEP 9 - 1965
POST-DISPATCH
St. Louis, Mo.

Aquanaut Compares Sealab With Submarine

LA JOLLA, Calif., Sept. 9 (AP) — A swim at 205 feet below the surface of the sea was compared with a stroll in his own back yard by one of the aquanauts in Sealab 2 last night.

Lt. Robert E. Sonnenburg, the doctor on the aquanaut team, gave this impression of undersea living in a telephone interview with the Associated Press.

"I think we are all feeling well, but some of us are getting cabin fever after 11 days down here, and we are getting ready to go up," Sonnenburg said.

Nine of the 10 aquanauts in the, Navy's underwater living experiment are scheduled to surface Sunday and will be replaced by another team.

Comdr. M. Scott Carpenter, the astronaut turned aquanaut, plans to stay down another 15 days.

Sonnenburg said that life in the 12-by-58-foot steel capsule was not much different from submarine duty and that the civilian members of the team had adjusted easily to the routine.

"The biggest thing for me was the original occupancy," he said. "There's no feeling of insecurity here. We never think about that."

The pressure of seven atmospheres in the Sealab gave Sonnenburg's voice the high pitch quality of a speeded-up phonograph record.

He said the ear infection that hit nine of the aquanauts was responding to antibiotic treatment.

Physicians had said microorganisms in the ocean water were responsible for the infections that were the first physical trouble reported since the men went down Aug. 28.

Sonnenburg said he believed swimmers on the surface sometimes got the same type of infection.

The first team of aquanauts has spent much of its time getting the Sealab ready for occupancy and preparing the surrounding area for experiments.

"I think teams of two and three will accomplish more in the way of scientific discovery," Sonnenburg said. "My job has been to determine the physiological results of living down here."

He has been sending up blood, urine and saliva samples for analysis by scientists on the surface.

The aquanauts are on a rigid schedule that allows little time for relaxation, but they did get Sunday off.

"Most of the men spent the day sleeping, reading, writing and watching television.

"I went for a swim," Sonnenburg said.



Associated Press Wirephoto From U.S. Navy

Deep Sea Doctor

Dr. Robert E. Sonnenburg, a Navy lieutenant, taking a blood sample from Aquanaut Earl A. Murray in Sealab 2.

HERALD TRIBUNE
New York, N. Y.

SEP 9 1965

9 of 10 Aquanauts Have Ear Infections

Ear infections have stricken nine of the 10 aquanauts in Sealab 2, the Navy reported in La Jolla, Calif., yesterday.

The infections have caused pain and swelling but will not curtail the aquanauts' activities in and around their 205-foot deep home during their 15-day experiment, officials said.

Physicians agreed that micro-organisms in the ocean were to blame for the first report of an adverse physical condition in Eealab since the drivers rescended Aug. 28.

New Sealab 2 Crew Changing Places With Old

LA JOLLA, Calif. (AP)—Operation Crew-Switch got under way Sunday in the Navy's Sealab 2 — more than 200 feet below the ocean's surface.

Three members of a fresh crew of nine aquanauts swam down from a staging vessel and entered the 12-by-58 foot steel capsule.

A spokesman said, "We have no word of any problems."

Later in the day nine men who have been in the capsule 15 days were to enter a pressurized transfer tank and be hoisted in a five-minute ride to the deck of the vessel, the Berkone.

There the transfer tank would be mated to a decompression chamber in which the men will wait about 36 hours while the pressure is slowly reduced to that of sea level.

The other six members of team No. 2 were to enter Sealab 2 after team No. 1 reached the surface. The second team, too, will stay below 15 days, in company with Astronaut M. Scott Carpenter. He has been down 15 days and plans to stay 30.

A third team later will replace the second in the 45-day experiment, the Navy's most ambitious underwater living project.

Its primary purpose is to determine whether man can live and work in the hostile environment of ocean depths.

SUN-TIMES Chicago, Ill.

SEP 13 1965

From SEP 13 1965
FREE PRESS
Detroit, Mich.

New Crew Takes Over Sea Probe

LA JOLLA, Calif. —(AP) — Operation Crew-Switch got underway Sunday in the Navy's Sealab Two, 205 feet below the ocean's surface.

Three members of a fresh crew of nine aquanauts swam down from a staging vessel and entered the 12-by-58-foot steel capsule.

Nine men who have been in the capsule 15 days were to enter a pressurized transfer tank and be hoisted in a five-minute ride to the deck of the vessel, the Berkone.

There the transfer tank would be mated to a decompression chamber in which the men will wait about 36 hours while the pressure is slowly reduced to that of sea level.

The other six members of Team No. 2 were to enter Sealab 2 after Team No. 1 reached the surface. The second team, too, will stay below 15 days, in company with Astronaut Scott Carpenter. He has been down 15 days and plans to stay 30.

A third team later will replace the second in the 45-day experiment.

90

Alton Man Will Join Sealab Team

An Alton man, Navy Chief Steelworker Howard Buckner, has been named to take part in Project Sealab at La Jolla, Cal., as a member of the second team of aquanauts carrying out the underwater experiment, it was announced Wednesday. He is 36 and lives at 110 Belle st.

The 9-man team will descend 205 feet in the Pacific Ocean Sunday to spend 15 days in the 200-ton, 57-foot steel cylinder. Astronaut Scott Carpenter is the only one of the 10 aquanauts in in the first team who will remai nsubmerged past Sunday. He is scheduled to spend 30 consecutive days under water as captain of both the first and second teams.

The projects seeks to determine the ability of man to live and work under water under pressure 6½ times greater than on the surface, while breathing a mixture of 85 per cent helium, 11 per cent nitrogen and 4 per cent oxygen.

n SEP 9 - 1965
GLOBE DEMOCRAT
St. Louis, Mo.

Ready to Surface

Aquanauts Feeling Cabin Fever

LA JOLLA, Calif. (AP) — Taking a swim at 205 feet below the surface of the sea is much like strolling in his own back yard, says one of the aquanauts in Sealab 2.

Lt. Robert E. Sonnenburg, the doctor on the aquanaut team, gave this impression of undersea living last night in a telephone interview.

"I think we are all feeling well, but some of us are getting cabin fever after 11 days down here, and we are getting ready to go up," Sonnenburg said.

Nine of the 10 aquanauts in the Navy's underwater living experiment are scheduled to surface Sunday when they will be replaced by another team.

Carpenter Staying

Cmdr. Scott Carpenter, the astronaut turned aquanaut, plans to stay down another 15 days.

Sonnenburg said life in the 12x58-foot steel capsule was not much different from submarine duty and that the civilian members of the team had adjusted easily to the routine.

He said the ear infection that hit nine of the aquanauts was responding to antibiotic treatment.

Physicians had blamed microorganisms in the ocean water for the infections, the first physical trouble reported since the men went down Aug. 28.

EVENING NEWS
Newark, N. J.
SEP 9 1965

Thursday, September 9, 1965 The Atlanta Journal 5I

Sealab Swim Is Like 'A Walk in Backyard'

LA JOLLA, Calif. (AP) — Taking a swim at 205 feet below the surface of the sea is much like strolling in his own backyard, says one of the aquanauts in Sealab 2.

Lt. Robert E. Sonnenburg, the doctor on the aquanaut team, gave this impression of undersea living Wednesday night in a telephone interview with The Associated Press.

"I think we are all feeling well, but some of us are getting cabin fever after 11 days down here, and we are getting ready to go up," Sonnenburg said.

Nine of the 10 aquanauts in the Navy's underwater living experiment are scheduled to surface Sunday when they will be replaced by another team.

Cmdr. Scott Carpenter, the astronaut turned aquanaut, plans to stay down another 15 days.

Sonnenburg said life in the 12x58-foot steel capsule was not much different from submarine duty and that the civilian members of the team had adjusted easily to the routine.

"The biggest thing for me was the original occupancy," he said. "There's no feeling of insecurity here. We never think about that."

The pressure of seven atmospheres in the Sealab gave Sonnenburg's voice the high-pitch quality of a speeded-up phonograph record.

He said the ear infection that hit nine of the aquanauts was responding to antibiotic treatment.

Physicians had blamed microorganisms in the ocean water for the infections, the first physical trouble reported since the men went down Aug. 28.

Fish Stings Aquanaut Carpenter

LA JOLLA, Calif. (AP) — A scorpion fish stung astronaut-aquanaut M. Scott Carpenter yesterday as nine of his fellow crewmen were preparing to leave the Navy's Sealab 2 on the ocean bottom off La Jolla.

The departure of the nine was delayed while one of them — Lt. Robert Sonnenburg, a Navy doctor—treated Carpenter to see if he could stay as planned or would have to surface with the team. Plans call for carpenter to stay down 15 more days.

After an hour-and-15-minute delay Lt. Sonnenburg said that Carpenter was responding to treatment and would stay. The sting of the dorsal spines of the Red fish is painful but not lethal.

THE NAVY said the nine men who were brought to the surface were in good shape—and had proved that man can live and work efficiently in the ocean depths.

A fresh team of nine swam down to the 12-by-59-foot steel capsule 205 feet below the surface to stay for the second 15 days of the experiment.

SEP 13 1965
The Plain Dealer
Cleveland, O.
A.M.-circ. 339,112
Sun.-circ. 494,645

SEALAB EXPLORES AN 'INNER WORLD'

Aquanauts' Hardships Yield New Findings in Ocean

By PETER BART
Special to The New York Times

LA JOLLA, Calif., Sept. 8—Scientific findings that may aid in the exploration of the "inner world" beneath the ocean are starting to emerge from the Sealab, a steel capsule submerged 210 feet below the ocean's surface off La Jolla.

For the last 11 days a team of 10 men headed by Comdr. M. Scott Carpenter, the astronaut, has lived in the 57-foot-long capsule anchored on an ocean shelf 1,000 yards off shore.

Each day the men, attired in underwater gear, have left their capsule to probe the pitch blackness o the ocean's floor and perform varied experiments.

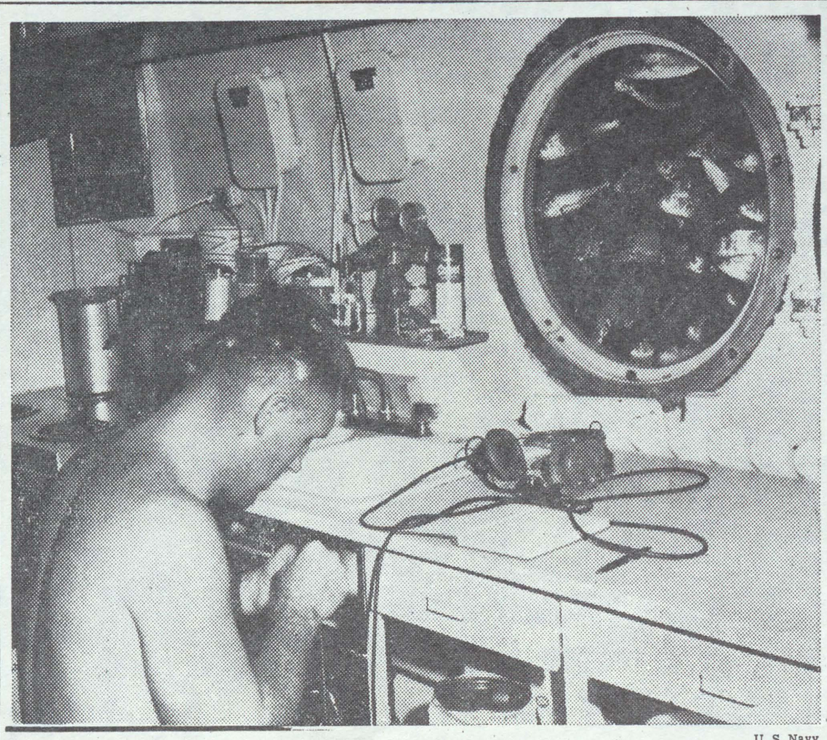
These have ranged from the setting up o fa large underwater weather station, the first of its kind ever installed, to the collection of exotic underwater marine life.

Hardships for Men

A monitoring of conversations between the aquanauts in the capsule and scientists on the mother ship anchored at the surface disclosed tat the men were suffering considerable hardships.

Nine of the 10 men are afflicted with painful ear infections. Inadequacy of some of the protective "wet suits" has resulted in paralyzing coldness that has often forced the men to abandon their assigned tasks outside the capsule.

The men have also been harassed by an unexpected invasion of stinging scorpion fish and the ever-present danger of sharks.



U. S. Navy

AQUANAUT AT WORK: Berry Cannon, one of 10 men living in Sealab II 210 feet below the ocean surface off La Jolla, Calif., repairs a headset. Wires are attached to the shaved spots on his head to measure various effects of living at great depths undersea.

Some of the aquanauts, who now jokingly call each other "aquanuts," were also worried about leaks in the capsule's steel port covers as well as the possibility that the capsule might slip off its shelf and break its "umbilical cord" with the mother ship.

The first team of aquanauts, with the exception of Commander Carpenter, was scheduled to be brought to the surface Sunday afternoon to be relieved by nine new men.

Commander Carpenter, who has been on loan to the project from the astronaut program, plans to remain in the capsule through 30 days of the 45-day experiment.

Despite all the difficulties, the experiment has been producing useful and optimistic scientific results, according to Capt. George F. Bond, the naval physician and scientist who is the project's chief investigator.

The workload performed by the men, despite their afflictions, has been vastly greater than had been anticipated, according to Captain Bond.

during a small pilot program a year ago, the work curve of four aquanauts submerged for nine and one-half days in a small capsule plunged sharply below their normal performance.

The superior performance of the present aquanauts, Captain Bond said, could be explained by their superior conditioning, higher morale stemming from the presence of a larger team, changes in the capsule's atmosphere or other factors.

Captain Bond and other medical advisers have been keeping a close watch on curious changes in the blood chemistry of several of the aquanauts as well as symptoms of incipient hypertension.

Captain Bond and his associates keep a constant watch on the aquanauts by means of closed-circuit television.

However, the high helium content (85 per cent) in the capsule's atmosphere has destroyed 10 TV cameras and inhibited continuous observation.

Th purpose of the program, headed by the Office of Naval Research, is to open the way for exploration of the ocean's sprawling continental shelves —until now "a vast unreachable frontier." Captain Bond explained.

It is widely believed by scientists, he said, that the eventual exploration of the ocean's bottom will reveal among other things a vast new store of edible foodstuffs, petroleum and minerals at least equal to those available on land, new families of antibiotics and considerable new sources of fresh water.

"Before all this can be done," he said, "we must know much more about the way in which men can work effectively under water and about the equipment they will need."

The aquanauts are being subjected to intensive medical scrutiny. Blood, saliva and urine samples are sent topside each day. Brain waves and blood pressure are carefully measured.

The men are experimenting with several types of underwater clothing, some of which has proved highly unsatisfactory. The type of gear that shows most promise, Captain Bond said, contains a double barrier of carbon dioxide and electrical heat.

There has been some concern that an aquanaut might become so cold in the water that, in panic, he would lose his way.

To guard against this, the men work in pairs, carry cords leading to the capsule. They are equipped to receive an acoustical beacon that would guide them back if their cords were severed.

Ear Infections Hit 9 Aquanauts In Sealab 2

LA JOLLA, Calif., Sept. 8 — (AP)— Ear infections have stricken nine of the 10 aquanauts in Sealab 2, the Navy said Wednesday.

Capt. George Bond, chief investigator of the 45-day experiment, said the infections have caused pain and swelling but will not curtail the aquanauts' activities in and around their 205-foot deep home.

Physicians agreed that microorganisms in the ocean are to blame for the first report of an adverse physical condition in Sealab since the divers descended Aug. 28.

Lt. Robert Sonnenburg, the Navy doctor who is doubling as an aquanaut, is treating the infections with an antibiotic and swabbing the ears with another medicine.

"It's not a common occurrence among divers," said Bond aboard the staging vessel Berkone. "I've been diving for 13 years in all kinds of waters and I've never had it.

"We expect it to clear up when the aquanauts are brought to the surface. They probably feel less pain when they are outside swimming than when they are in Sealab," he said.

The 12x58-foot steel cylindrical sealab is under nearly seven atmospheres of pressure.

Bond said the trouble is in the outer ear canal and does not affect the ear drum.

The Navy said Billie L. Coffman, 36, Williamantic, Conn., was the lone aquanaut without the infection.

Meantime, a spokesman said the divers will start preparing Thursday for their 36-hour decompression cycle when they ascend at 2 p.m. Sunday, with the exception of Cmdr. M. Scott Carpenter, who'll stay below to lead the second team for another 15 days.

After the divers complete the decompression, which is necessary to prevent a condition known as the bends, they'll be taken to Balboa Naval Hospital in nearby San Diego for further checks.

The divers' tasks Wednesday were mainly to finish installing the underwater weather station and survey the perimeter around Sealab, the spokesman said.

ROCKY MOUNTAIN NEWS
Denver, Colo.
SEP 9 1965

SOME 'CABIN FEVER'

Life in Sealab Turns Routine

LA JOLLA, Calif. — (AP) — Taking a swim at 205 feet below the surface of the sea is much like strolling in his own back yard, says one of the aquanauts in Sealab 2.

Lt. Robert E. Sonnenburg, the doctor on the aquanaut team, gave this impression of undersea living Wednesday night in a telephone interview with the Associated Press.

SET TO GO UP

"I think we are all feeling well, but some of us are getting cabin fever after 11 days down here, and we are getting ready to go up," Sonnenburg said.

Nine of the 10 aquanauts in the Navy's underwater living experiment are scheduled to surface Sunday and will be replaced by another team.

Cmdr. Scott Carpenter, the astronaut turned aquanaut, plans to stay down another 15 days.

Sonnenburg said life in the 12-by-58-foot steel capsule was not much different from submarine duty and that the civilian members of the team have adjusted easily to the routine.

The pressure of seven atmospheres in the sealab gave Sonnenburg's voice the high pitch quality of a speeded-up phonograph record.

He said the ear infection that hit nine of the aquanauts was responding to antibiotic treatment.

Physicians had blamed microorganisms in the ocean water for the infections that were the first physical trouble reported since the men went down Aug. 28.

POST, Denver
SEP 9 1965

SAN DIEGO UNION
SEP 9 196

Sealab's Eye, Maybe Ear Kept on French

By LEO BOWLER
EVENING TRIBUNE Science Writer

Sealab officials here are keeping a careful watch on a similar experiment half way around the world.

They hope that their efforts will result in a conversation between U.S. aquanauts 210 feet below the surface of the Pacific off La Jolla and a group of French aquanauts who plan to spend 14 days 33 feet under the Mediterranean Sea.

The conversation might have to be relayed from a communications satellite, especially if a television picture is to be included.

Not Just a Stunt

"We don't want the conversation to take place if it is just going to be a stunt," Capt. George Bond, principal investigator for Sealab said. "We do want it if it will result in a useful exchange of information between two groups of aquanauts."

The French aquanauts plan to enter their undersea residence this weekend.

They are under the command of oceanographer Jacques-Yves Cousteau. The experiment is sponsored by the Monaco Museum and other scientific groups.

Some Changes

Bond said the Cousteau effort, called Precontinent III, is similar to Sealab in many ways, but is radically different in others.

Instead of living in a steel tank, the Frenchmen will live in an 18-foot sphere. They will breathe a helium-nitrogen-oxygen mixture, but the method of purifying the atmosphere in the sphere will be different.

The Frenchmen will use a machine that freezes the unwanted gases to remove them.

Computer Use Seen

Bond said Cousteau hopes to use a computer for most of the topside command work. The computer will keep track of conditions inside the sphere and relay information to the aquanauts.

"We are looking into the possibility of having our aquanauts here talk with the French aquanauts, each group from its undersea habitat," Bond said, "so they can compare notes."

Record Surpassed

The aquanauts in Sealab II yesterday passed the record set by the four men in Sealab I who stayed at 192 feet in the Atlantic off Bermuda last year.

The aquanauts spent a total of seven hours, 44 minutes outside Sealab yesterday. This was almost five hours less time than they had spent in the water the day before.

Talking Takes Time

Sealab officials said there was quite a bit of communication between the lab and surface yesterday and that this took up time which could have been spent in diving.

Today's activities outside the lab centered around a project which calls for undersea roadways in the vicinity of Sealab. The aquanauts will drive stakes in the bottom and string lines to guide them to and from the lab while they are working in the vicinity. The pattern of the roadways will be similar to a huge wagonwheel with Sealab as its hub. The spokes will extend from 200 to 250 feet from the lab.

SAN DIEGO EVENING TRIBUNE
SEP 9 1965

From SEP 9 1965
FREE PRESS
Detroit, Mich.

9 of 10 Aquanauts Bothered by Ear Infections

LA JOLLA, Calif.—(UPI)—Nine of the 10 aquanauts living 205 feet underwater in Sealab 2 have developed ear infections, but the ailments will not curtail their activities, Navy Dr. George Bond said Wednesday.

Capt. Bond said the infections probably were caused by microorganisms in the water and that the aquanauts picked them up during their excursions outside the submerged cylinder.

He said the aquanauts were being given antibiotics for the infections, which are characterized by pain and swelling and involve the outer ear canal, not the eardrum.

The San Dieguito Citizen, Solana Beach California

Aquanaut Father Phones Daughter in Del Mar

"Daddy's voice was real high pitched and sounded sort of like Mickey Mouse" was the way 13 year old Linda Murray described her father's voice as he spoke to her from the depths of the SeaLab off La Jolla last Saturday. Eighteen year old Kathy Murray said he sounder "more like a porpoise beep."

The two young women are the daughters of Aquanaut Earl Murray who lives in Del Mar.

The girls said their father told them that he would begin ascending to the surface today (Sept. 9) and would call them when he reached topside. They explained he would be confined to a hospital for about four days while undergoing debriefing and physical examinations, before returning to his home in Del Mar. His daughters said they "can hardly wait" for him to come home.

Kathy and Linda said their father's favorite hobbies were skin-diving and motorcycle racing. Although the girls have not been skin-diving, Linda has ridden a motorcycle with him. They explained he used to have time to surf but has been too busy recently. Murray, they said, belongs to the Bottom Scratchers, a skin diving club in San Diego.

Last night they were looking forward to speaking to their dad over television for the first time.

Attends School

Murray's two daughters said their father had attended the Submarine School at Point Loma as part of his training for submarine service with the United States Navy. After eight years of naval service, he went to work for Scripps Institute of Oceanography about 1952, where he worked in their geology department.



AQUANAUT EARL MURRAY'S daughters, Kathy and Linda Murray were mighty proud of their Dad as they pointed him out in a photograph showing him with Aquanauts Scott Carpenter and Tom Clarke. The Del Mar girls are eagerly awaiting the return of their father. (Huntley photo)

Murray is a trained deep sea diver, according to the girls, and was at Scripps when the aqualung was introduced by Cousteau; he was one of the early users of the lung for deep sea diving.

Kathy said her father was chosen from the Scripps staff to be part of the SeaLab II experiments and she thought the first SeaLab experiments had been conducted off the coast of Florida. Murray spent the month of May in Pensacola, Fla., training for the tests.

Big Surprises

When Murray returns home next week he is in for a couple of surprises according to his daughters. Kathy said she had written her father that she had become engaged to Eric Meyer, son of Mr. and Mrs. Robert Meyer of Poway, during his trip to the ocean depths; she explained however that he knew she was considering it before he left. In addition the girls have managed to acquire a television set and are waiting for daddy to come home to install the antenna on the roof.

TOO FREE SPEECH: With improved communications, the conversation of aquanauts in Sealab II is about to go public — over closed circuit TV on shore. Yesterday a topside psychologist on the Berkone urged the men below to start tidying up their conversations.

SAN DIEGO UNION
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SEP 196

9 Aquanauts' Ears Infected, But Activities Not Curtailed

By LEO BOWLER
EVENING TRIBUNE Science Writer

Nine of the 10 Sealab II aquanauts have ear infections.

Physicians think the infections were brought on by swimming excursions around the undersea residence.

The infections are characterized by pain and swelling. Lt. Robert E. Sonnenburg, the Navy physician who is looking after the health of the aquanauts and doubling as an aquanaut himself, is administering an antibiotic and swabbing the aquanauts' ears with another medicine.

Billie L. Coffman, 36, a Torpedoman's mate first class from Willimantic, Conn., is the only one of the 10 without the infection.

Dr. George Bond, a Navy doctor who is principal investigator for the project, said the aquanauts' activities have not been curtailed by the infections.

"They probably feel less pain when they are outside swimming than when they are in Sealab," Bond said.

Bond and Sonnenburg believe the infections came from microorganisms in the water around Sealab. The trouble is in the outer ear canal and has nothing to do with the eardrum, Bond said.

"It's not a common occurrence among divers," he said. "I've been diving for 13 years in all kinds of waters and I've never had it.

"We expect it to clear up when the aquanauts are brought to the surface."

The divers, with the exception of Cdr. Scott Carpenter, the team leader, are expected to be brought to the surface Sunday.

After three members of the next team are sent to Sealab, the present team members will enter a transport capsule which is already on the bottom.

The capsule will be closed so that the atmosphere inside it remains at the pressure of sea bottom and it will be lifted to the mothership Berkone where it will be attached to a decompression chamber.

The aquanauts will then move from the capsule to the chamber. The pressure in the chamber will be reduced gradually until the aquanauts adjust to normal air pressure and to breathing normal air.

36-Hour Changeover

This should take 36 hours. After the aquanauts are allowed to leave the decompression chamber, they will be kept aboard the Berkone for another 12 hours, just in case they have to go back into the chamber.

When they leave the Berkone, they will go to Naval Hospital in Balboa Park for further checks.

If an aquanaut were to swim to the surface instead of coming up in the pressure capsule, he would die before he could be put into the decompression chamber aboard the Berkone, Bond said.

This is because his body has become adjusted to the pressure on the bottom and to the helium-based atmosphere which the aquanauts breathe.

Yesterday the aquanauts spent 12 hours and 12 minutes outside SeaLab. This was the first day in which they had averaged more than an hour each in the water. The earlier record had been 9 hours for the 10 men.

Lost in Canyon

Aquanauts today were still working on their underwater weather station. Aquanaut Earl Murray, a lab assistant from Scripps Institution of Oceanography, was directing the undersea end of the project.

Earlier, a concrete slab which was to be the base of the station was lowered to the bottom, but it was lost in Scripps Canyon when a mooring line from the Berkone struck it and pushed it over the edge.

Dr. Doug Innman, an oceanographer at Scripps, said a new base of steel was constructed and lowered to the bottom.

Aquanauts then attached underwater floats to it and inflated them. This gave the base enough buoyancy that it could be towed into position by aquanauts, but not enough buoyancy so that it would bob to the surface.

Innman said the aquanauts put the base into position, removed the floats and staked it to the bottom. He sent instruments down to Murray yesterday to complete the station.

A BURNING PROBLEM

Steak Taken Off Sealab's Broiler

They said it shouldn't be done, but 10 hungry aquanauts did it anyway.

They broiled steaks at the bottom of the sea.

Topside officials in the Sealab II project say it won't happen again, and to back up their stand, they have ordered that all steaks be brought up from Sealab and stowed safely aboard the mothership Berkone.

The concern displayed by Sealab officials is based on a phenomena well known to all brides who are trying to learn to cook.

When animal fat gets too hot, it gives off an eye-smarting, lung-choking odor. The burning fat, scientists say, produces a gas called acrolein.

The bride can turn on the kitchen fan and clear the air before much damage is done, but there is no way to clear the atmosphere in Sealab of so pungent a gas.

If the fat from a steak hit one of the red hot elements in the electric broiler and much acrolein was produced, all 10 aquanauts would have to be brought to the surface.

"A little acrolein in the atmosphere will bring a submarine charging to the surface in the middle of a battle with everyone aboard gasping for air," one Sealab officer said.

The confiscated steaks will go back to Sealab, but they will be well cooked first. The aquanauts, however, are licking their chops. They have had their day in the kitchen.

Diver's Wife Pops in For Look at Bubbles

Mrs. Jay D. Skidmore of Chula Vista tries to keep track of her husband by watching for his bubbles.

Her husband, a Navy chief photographer, is one of the 10 aquanauts in Sealab II 205 feet below the surface off La Jolla.

Mrs. Skidmore, with their two children, Sandra, 13, and John, 9, went to the Sealab mother ship Berkone yesterday. Sandra had baked some brownies for her father to send down the dumb waiter to Sealab.

The three were invited into the control center aboard the Berkone. They could see Skidmore on the closed circuit television linking the undersea residence with the mothership nd could talk to him over the phone lines.

It was the second such visit paid by an aquanaut's wife. Earlier, Mrs. Robert Sonnenburg, wife of a Navy doctor, had visited the control center for a look at her husband and to deliver a birthday cake.

At the close of the conversation, Skidmore began donning diving gear.

"I've got to go outside for a swim and to take some pictures," Skidmore told his family.

"Blow some bubbles, and we will watch from the rail of the ship," Mrs. Skidmore told him.

There were several divers in the water, however, and Mrs. Skidmore couldn't tell which bubbles were meant for her.

Los Angeles, Calif.
Times
(Cir. D. 812,147 Sun. 1,149,295)
SEP 8 1965

10 Aquanauts Given Tests in Sealab 2

LA JOLLA (UPI)—America's 10 aquanauts Tuesday underwent a series of physical tests as nine of them approached the end of their 15-day stay in Sealab 2, at rest 205 feet below the surface of the Pacific.

The 15 days end Sunday. The 10th aquanaut, Astronaut M. Scott Carpenter, will remain in the 200-ton, 57-foot steel cylinder another 15 days and be joined Sunday by nine new underwater explorers.

Tuesday's psychomotor tests included tests of strength, hand co-ordination and motor skills.

Several of the aquanauts went outside Sealab to work on completion of the world's first underwater weather station.

The aquanauts also made a short trip to the rim of the Scripps (underwater) Canyon. They used an instrument to chart the exact depth of the area. It was the first time this instrument had been used by persons on the ocean floor.

NAVY TIMES September 8, 1965

Carpenter-Led Aquanauts Begin 45-Day Underwater Sealab Test

LA JOLLA, Calif. — Ten aquanauts, headed by one of the original astronauts, Comdr. M. Scott Carpenter, began their Sealab II undersea scientific adventure 205 feet deep in the Pacific with a first when Carpenter spoke by radiophone hookup to Gemini V astronauts Lt. Comdr. Charles Conrad and Lt. Col. L. Gordon Cooper while they orbited on the seventh day of their record eight-day space trip.

The beginning of the 45-day test of man's ability to live and perform useful work underwater for long periods was prefaced by Carpenter's remarks to newsmen that the experiment "could be more damaging than spaceflight" because "the excessive pressure at which we will live is a little more rigorous than space flight."

Carpenter will try to stay 30 days in the 12-by-58-foot Sealab II cylinder where the aquanauts will live and operate from during the experiments. The other nine men are to be relieved after 15 days. In all, three teams will man the underwater base in rotation over the 45-day test.

The spirit of the first aquanaut team was reflected in Carpenter's message to the surface shortly after descending. He said that "Our views of marine life are tremendously exciting. Visibility is much greater than we had hoped for. We should be extremely successful with our marine biology experiments."

A 12-day delay in starting the test was occassioned by technical problems, which required a long series of safety checks, and on August 28, Carpenter, followed by the rest of the ten-man team, was given the "all systems Go" sign. A late starter to the team is a 270-pound porpoise named Tuffy, trained to carry tools and rescue lines, and perhaps protect the men from sharks.

Carpenter entered the water with Navy divers Cyril J. Tuckerfield, chief engineman; Wilbur H. Eaton, gunner's mate first, and Berry L. Cannon, a Mine Defense Laboratory electronics engineer. Nine minutes later they started entering through a hatch in the bottom of Sealab II. Others following were: medical officer Lt. Robert E. Sonnenburg; J. D. Skidmore, chief photographer; Billie L. Coffman, torpedoman's mate first; Frederick J. Johler, chief engineman; Earl A. Murray and Thomas A. Clarke, both from the Scripps Institute of Oceanography at La Jolla.

REPORTER TALKS TO SEALAB

Aquanaut Would Prefer To Remain Down Longer

Porpoise to join aquanauts—Page a-25.

By BRYANT EVANS
The San Diego Union's Science Writer

Aquanaut J. D. Skidmore, a Navy chief photographer, would prefer staying down in SeaLab II "a few more days" instead of coming to the surface Sunday, he told me in a telephone conversation last night.

All of the photographs taken inside SeaLab II that have appeared in The San Diego Union were taken by Skidmore.

"I've become completely acclimated to the environment down here," he said. "We have most of our work done now and we have a chance to do some things on our own. I would like to spend a few more days, but then I shall be glad to see the blue sky and sunshine again."

Does he like life in SeaLab well enough to volunteer for SeaLab III next year?

He said yes, but he is planning to retire from the Navy in the next few months after 20 years in the service.

"I think first that all of us, to a man, would like to take part in next year's operation," he said.

"Life down here is very much as normal. Of course, there is no daylight but we have regular hours and the feeling of the day progressing. At times I forget where I am but it all comes home to me when I step out of the back door into that icy cold water."

On the whole, Skidmore said, he did not find the environment very different from what he expected since he had done quite a bit of diving off La Jolla.

"The abundance of sea life down here is much greater than I thought possible," he said. "Right now the porthole is solid with fish. They are eating the small shrimp, crabs and crustaceans out there. You see them all times of the day and night."

As a photographer, one change Skidmore would like to make would be to get more light. He said he has been making two sorties a day into the water to take motion pictures. Most of these, he said, have to be taken with artificial light because of the darkness but he added that the water is surprisingly clear.

Along with some of the other aquanauts Skidmore has an ear infection, but he said it is not serious and does not bother him much even when he goes into the water.

He ended the interview, scheduled for five minutes to give all of the aquanauts a chance to be interviewed by reporters—by remarking on the excellent spirit that exists among members of the first team of SeaLab II.

"Everybody is getting along tremendously," Skidmore said. "We work well together. Although conditions are somewhat crowded, everybody goes out of his way to see to it that no problem results."

SAN DIEGO
EVENING TRIBUNE
SEP 8 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

Mpls. (Minn.) Morning Tribune
WEDNESDAY, SEPT. 8, 1965

Aquanauts Take Physical Tests on Ocean Floor

LA JOLLA, Calif. — (UPI) — America's 10 aquanauts Tuesday underwent a series of physical tests as nine of them approached the end of their 15-day stay in Sealab 2, at rest 205 feet below the surface of the Pacific.

The 15 days end Sunday. The 10th aquanaut, astronaut M. Scott Carpenter, will remain in the 200-ton, 57-foot steel cylinder another 15 days and be joined Sunday by nine new underwater explorers.

Yesterday's routine included tests of strength, hand co-ordination and motor skills.

Several of the aquanauts also left Sealab to work on completion of the world's first underwater weather station. Others attempted to locate one of the main station's way stations, lost last week when it tipped over on its side.

The way station is to be placed in position halfway between Sealab and the main station.

The aquanauts also made a short trip to the rim of the underwater Scripps Canyon. They used an instrument to chart the exact depth of the area. It was the first time this instrument had been used by persons on the ocean floor.

SD Union — 8 Sept

Aquanauts Leave SeaLab II Sunday

Pictures — Page a-3

By BRYANT EVANS
The San Diego Union's Science Writer

Nine of the 10 aquanauts in SeaLab II will end their stay on the ocean bottom early Sunday afternoon, Capt. George Bond, principal scientific investigator for the project, announced yesterday.

The names of the nine who will take their places were announced by Capt. Ray A. Spenser, project director. The 10th man on the first team and the team captain, Cmdr. M. Scott Carpenter, will remain on the bottom for an additional 15 days to serve as second-team captain.

The changeover procedure will start at 8 a.m. Sunday when three members of the second team will descend to SeaLab II. They will be Robert A. Barth, chief quartermaster, of Panama City, Fla.; Howard L. Buckner, chief steelworker, of East Alton, Ill., and Glen L. Iley, chief hospital corpsman, of LaCrosse, Wis.

For six hours the three will participate in an intensive series of physiological tests that have to do with lung function and the rapidity of helium absorption. These tests will require extensive blood sampling.

At 2 p.m. the nine aquanauts of the first team will board the personnel transport capsule stationed 30 feet from SeaLab. Then they will close the airtight hatch of the capsule to conserve their seven atmospheres of pressure.

The capsule will be lifted to the surface and placed on the mother ship, the Berkone. There it will be mated to a deck decompression chamber which the aquanauts will enter and remain in for a minimum of 36 hours while the atmospheric pressure within is brought back to sea level. The aquanauts will emerge from the chamber Tuesday forenoon.

After the aquanauts have entered the decompression chamber a hatch between it and the capsule will be closed and the capsule will be returned to the bottom. Then the other six men of Team 2 will descend to start their 15-day residence in the SeaLab.

They are Kenneth J. Conda, torpedoman first class, Phoenix, Mich.; George B. Dowling, research physicist, Naval Mine Defense Laboratory, Panama City, Fla.; Arthur Flechsig, oceanographer, Scripps Institution of Oceanography; Wallace T. Jacobs, equipment specialist, Naval Mine Defense Laboratory, Panama City, Fla.; John F. Reaves, photographer first class, Robertsdale, Ala., and William H. Tolbert Jr., oceanographer, Panama City, Fla. and Biloxi, Miss.

Yesterday the aquanauts started charting the contours of the nearby ocean floor with pneumofathometer — a device that works much like an altimeter except that it uses water pressure instead of air pressure to measure the distance from sea level. Work was also done in installing coaxial cables for underwater television cameras to furnish onshore pictures of the aquanauts at work. A marine biological station was being established on the brink of Scripps Submarine Canyon.

The aquanauts have passed an engineering test that was not part of their schedule but which became necessary. The plan for an underwater weather station had called for anchoring a wire supported by a float to a clump of concrete to be lowered to the bottom from a surface ship. The taut wire was to hold two groups of recording instruments.

When this was tried the concrete clump rolled off down a slope and its recovery appeared difficult. Then Dr. Douglas Inman of the Scripps Institution fashioned a new anchor. This was given the form of a heavy steel plate with sliding legs that could be driven through sleeves into the ocean bottom.

The new anchor was lowered. Attached to it were uninflated inner tubes and a bottle of compressed air.

Two aquanauts, Earl Murray and Tom Clarke, both of the Scripps Institution, reached the anchor, used the compressed air to inflate the inner tubes and, with the weight thus supported, moved the anchor to a site that was level and stable. Then they deflated the inner tubes and drove the anchor legs into the sea bottom.

Since then instruments have been attached to the cable and yesterday technicians were at work setting up a system that will provide sea weather information to the SeaLab and to recording stations on shore.

SeaLab Porpoise To Arrive Monday

Interview with submerged aquanaut—Page a-1

By BRYANT EVANS
The San Diego Union's Science Writer

Tuffy, the 270-pound, 7-foot-long porpoise scheduled to be tested as man-in-the-sea's seeing eye friend, will arrive by helicopter at Mission Bay at 9 a.m. Monday, SeaLab headquarters said yesterday.

From the police pier at Mission Bay the Porpoise will be rushed to the Berkone, mother ship of SeaLab II, and put in a pen alongside. It will take approximately a week to familiarize Tuffy with the area.

BUZZER SIGNAL

Then he is expected to dive 205 feet to the bottom on a buzzer signal from an old friend, aquanaut John F. Reaves of the second SeaLab team, which is to occupy the undersea habitat Sunday.

Many suggestions have been made as to how a porpoise might assist a diver, but the one to be tried out at SeaLab is to find whether he can help a lost diver find his way home.

To do this Tuffy will be called by a buzzer held at SeaLab. It is a faint sound but one that the keen-eared porpoises can hear for several hundred yards.

When Tuffy arrives at SeaLab, a light line will be attached to a harness he is wearing. Then an aqunaut out of sight will sound another buzzer to call Tuffy to him. Tuffy, of course, will carry one end of the line and the diver will have a lead to go home.

Reaves, who trained with Tuffy at the Missile Test Center at Point Mugu, explained that the porpoise had been trained to answer one certain buzzer first, no matter how many were going off. This assures that he will go first to the SeaLab.

Tuffy can stay submerged only for a few minutes. He cannot go to SeaLab for a breath of helium and oxygen as the aquanauts can do for the simple reason that he would not know about exhaling the high pressure gas on the way up. Or at least no one knows whether he would do it. If he failed, the pressure would do fatal damage to his lungs.

EAR INFECTIONS

Early yesterday it was learned that several of the aquanauts had developed infections of the outer ear caused by fungus. One figure given said that nine of the 10 aquanauts were affected.

Last night a SeaLab topside doctor said that there were "a few" of them affected but that the infection was yielding to antibotic treatment. He said that such infections are common afflictions of divers and that they are fostered by a humid atmosphere.

9-8-65 SUPERIOR (WIS) TELEGRAM

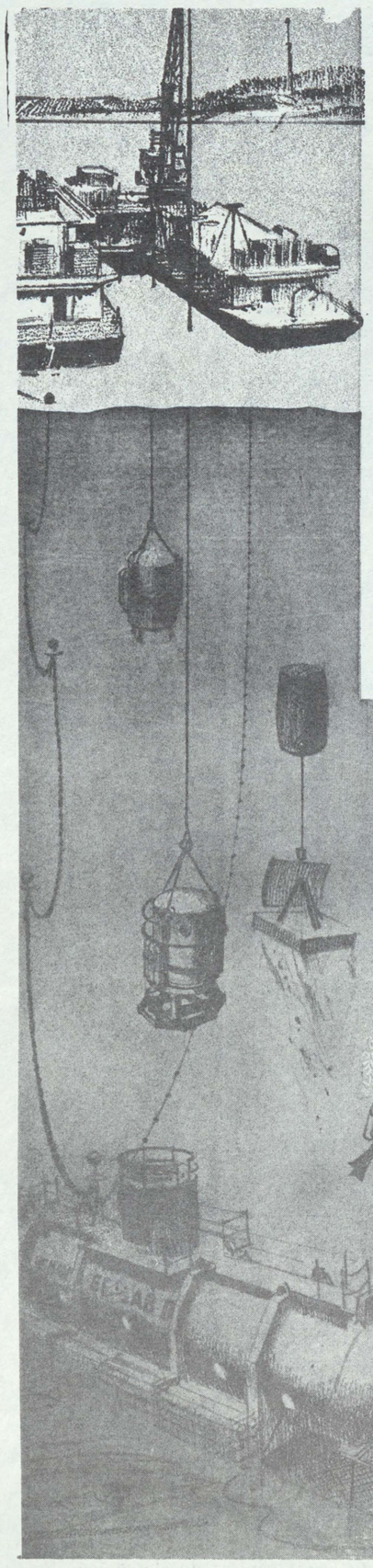
State Man On 2nd Team Of Sealab 2

LA JOLLA, Calif. (AP) — A Navy medical aide from Wisconsin was named Tuesday as a member of the second team to join Astronaut M. Scott Carpenter, 40, in Sealab 2 on the floor of the Pacific Ocean.

Glen L. Iley, 36, Navy chief hospital corpsman from La Crosse, Wis., was selected as a member of the second 10- man team of aquanauts to participate in the experiment. They will join Navy Cmdr. Carpenter Sunday.

The first team has been living in Sealab 2 at a 205 - foot depth since Aug. 28. The third and last team to participate in the 45-day project will be announced later. Carpenter will continue his role as team leader with the second squad in his attempt to remain at the ocean bottom for 30 straight days.

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RESEARCH

Man tests his limits in the ocean's depths

Navy's Sealab II, down for 45 days off California coast, is making the biggest attempt yet to measure human capability to live and work for long periods under the sea

Sometime this weekend, nine U. S. Navy aquanauts will wind up a 15-day stay under 205 ft. of water and rise to the surface of the ocean one mile off La Jolla, Calif. Behind them they will leave their underwater living quarters—Sealab II—and a 10th aquanaut, Commander M. Scott Carpenter, on loan from the National Aeronautics & Space Administration.

Carpenter will remain on the ocean bottom for another 15 days. He will be joined there by a second group of nine divers and scientists, both Navy and civilian. At the end of their tour they will give way to a third and final group, which will occupy the $850,000 Sealab II until October 12.

Major attempt. Altogether, the 45 days of experiments, both in and out of the underwater laboratory, will add up to the most massive research effort yet to measure man's capability to live and work for long periods under the ocean.

Last year, in the Sealab I experiments off Bermuda, four men stayed down 11 days at 193 ft. In 1963, Captain Jacques-Yves Cousteau of France and four other men operated for 30 days out of quarters submerged at a depth of 33 ft.

The Navy moved its Sealab experiments to La Jolla this year because researchers wanted to experiment in water that was colder, and where visibility was poorer. In both Sealab experiments, however, they have been able to leave and reenter their underwater home freely as they work and explore the ocean around them. They can make "bounce dives" to depths below the capsule. But in the current tests, they aren't permitted to return to the surface until the end of their 15 days of duty.

I. Five years to go

The Sealab experiments are administered jointly by the Navy's Special Projects Office and the Office of Naval Research. They are part of the Navy's "man-in-the-sea program," which will run to 1970. Representatives of the Scripps Institution of Oceanography trained for Sealab II and are on the teams.

The goal of the program, as explained by Captain George F. Bond, of the Navy Medical Corps, is "to give man the capability to freely explore the continental shelves of the world." Bond is principal investigator for the Sealab project.

Mobility. But although the men can move about, Sealab II cannot. It is tied to the ship that services it, and from there to shore by a cable that carries it electrical power and water. The Navy would like to cut this umbilical cord, and Bond thinks it will in another three years.

"At least one of the many sources of autonomous power that are being considered ought to come through for us," Bond says. Then a successor to Sealab II would have the mobility of a submarine.

At present, however, Sealab II is little more than a pressurized cylindrical tank—12 ft. in diameter and 57 ft. long—with three compartments and living quarters for 10 men. Its pressure is set for the depth at which it happens to be operating—in this case, 205 ft. This permits the divers to enter and exit without passing through an airlock (although they must go through a cage that protects the entrance from sharks).

The air bottles the men carry contain the same breathing gas mixture as Sealab II itself—from 76.5% to 80% helium, 16% to 19% nitrogen, and 4% to 4.5% oxygen.

Great expectations. Though tied to shore, Sealab II is expected to open new worlds for marine biologists and geologists. By staying down for 15 days at a time, they should be able to do research that, were they operating from the surface, would take years to complete.

A diver in a "hard helmet" pressurized diving suit can remain at a depth of 205 ft. for only 30 minutes. After that, he must undergo decompression for 4½ hours. This greatly reduces his daily underwater effectiveness. An underwater-based aquanaut can stay down 15 days or longer with only one decompression—but it must last 34 hours.

Bond estimates one diver working from Sealab II can do the work of 35 divers operating from the surface in the same amount of time.

II. The experiments

Just how much and what kind of work is possible, however, is one of the questions still unanswered. Many work experiments are planned for Sealab II. These include the erection of a sea-bottom oil drilling rig, the salvage of a Navy aircraft, the building of various research structures, and the setting up of an underwater automatic weather station.

Sealab II personnel will be testing thermally heated suits to see how this can improve their daily underwater work quotient. Other experiments will cover the psychological effects, if any, of confined living over extended periods. These tests, as well as the physiological studies, are the prime reason for keeping Carpenter down for 30 days continuously, and for keeping another aquanaut, Lieutenant Robert E. Sonnenburg, of the Navy Medical Corps, down for two 15-day periods. Sonnenburg, a member of the first team returning to the surface this weekend, will descend again with the third group.

The purposes. The Navy is anxious to know how long it can safely keep men underwater in order to enhance its abilities at salvage and construction. And it also has its eyes open for ways to strengthen its underwater warfare capabilities.

Commercial operators are anxious to move under the ocean on a more efficient basis, too. They—and representatives of foreign navies—are eagerly following the Sealab experiments. Bond says, "The commercial operators are all over us, particularly salvage operators and mining specialists."

This leads Bond to warn that although the Navy has fairly well satisfied itself that man can work underwater, and now is determining the degree, this doesn't mean that the Sealab II idea is ready for commercial exploitation. "It is still experimental, and commercial adaptation is perhaps three years away."

The superior machine. One question arises: What can free divers, working out of an underwater base, do that manned submersibles with manipulative devices cannot do?

Captain Ray A. Spencer, on-the-scene commander of the project for the ONR, answers: "A man with 10 fingers and a brain is superior to a machine. He can do more things, move faster, react faster." Thus, it is vital to find out how much he can do.

Surfacing. The first team made a free swimming descent to their ocean home on Aug. 28. They plan to return to the surface aboard a "personnel transfer capsule," a diving bell whose pressure and gas mixture are identical to Sealab II's.

But before they can resume normal living habits again, they must undergo the 34 hours of decompression. This is a gradual lowering of the pressures on their bodies from the extreme high pressure of 100 psi experienced at their 205-ft. depth to a normal surface pressure of 14.7 psi. In the process, the helium that saturates their bodies is vented safely through their lungs.

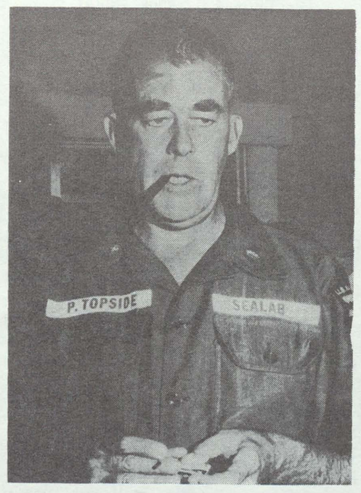
Communications. On the first night in Sealab II, the aquanauts listened to a brief radio conversation between Carpenter and two of his fellow astronauts, orbiting in Gemini-5.

The aquanauts are in daily touch with a surface staging vessel by means of a two-way intercom, an electronic writing machine (a Victor Electrowriter), and through closed-circuit television. Mail and small items are sent down in pressurized pots, called the "dumbwaiter."

Bond, who conceived the idea of the "saturation" dive, is called "Papa Topside" because he usually commands his divers from the surface staging vessel. But on Aug. 31, he swam down to reenlist one of his Navy divers, torpedoman's mate first class Billie Coffman.

Bond says the next steps in the Navy's deep submergence projects will be to try for greater depths, first to 400 ft. with Sealab II, then to 600 ft. and then perhaps to 1,000 ft.

"Most important to us is 600 ft. That will give us mastery of all the world's continental shelves." **End**



Captain Bond, called Papa Topside, is the Sealab II mission's director.

BUSINESS WEEK September 11, 1965

SCIENCE NEWS LETTER *for September 11, 1965*

GENERAL SCIENCE

Sealab, Gemini Similar

The astronauts and aquanauts of Gemini and Sealab are both connected to and supplied by their respective crafts by means of 'umbilical cords.'

➤ THE GEMINI SPACECRAFT and the underwater Sealab 2 provide similarly womb-like environments for their respective inhabitants, even as far as providing "umbilical cords" to crewmen who go outside.

Astronaut Edward White's cord was a two-way model, bringing air to him from his Gemini 4 vehicle as he floated in space last June 4, and carrying electronic data signals back to the spacecraft where they were transmitted to earth.

Sealab 2, however, 205 feet below the surface of the Pacific Ocean on the continental shelf of California, satisfies a different need—warmth.

While doing maintenance work that keeps them in the dark, frigid water for several hours at a time, Sealab's aquanauts need a source of continuous warmth that present portable battery packs are unable to provide. The solution, being tested in La Jolla, Calif., for the first time, may be a nylon and rubber suit impregnated throughout with tiny flexible wires like capillaries.

A flexible rubber-covered cable connects the suit with Sealab's main power supply. A current passes through the cable to the suit wires, which heat up like an electric blanket, cutting the ocean's chill.

For short-term jobs, up to half an hour, each aquanaut carries a silver zinc battery on a belt around his waist. Although its lifetime is limited, the battery leaves the swimmer unencumbered and free to move about at will, which could be an important advantage in the presence of sharks or other predators.

For this reason, the "umbilical missions" are performed from within a shark-proof cage.

The cable-equipped suits, consisting of a hooded parka, pants, gloves and boots, are worn under a high visibility lemon yellow tunic for safety. The suits are constructed sandwich style, with a layer of stretch nylon on the inside, then a layer of rubber, then the heating wires, and finally a sponge rubber outer coating.

Flushing the suit with an insulating gas before use provides "significant conservation of heat."

U.S. Rubber Company developed the suit and its umbilical cord.

In the future, however, such ties with the "womb" will probably be eliminated, both in space and under the sea. The next astronauts to venture outside their spacecraft may well have no connecting cable at all, and long-life space stations harboring a wide range of human activities will make free movement a must.

NEWS Detroit, Mich.
SEP 10 1965

Aquanauts Also Serve Mankind

While the outer space feats of our astronauts have captured the headlines and public imagination, the exploration of the ocean depths by the aquanauts also can be of vast importance to the future well-being of man.

Without the fanfare that accompanies a space shot, a team of 10 brave men headed by Commander Scott M. Carpenter, the astronaut, has been submerged 210 feet below the Pacific Ocean's surface in a 57-foot-long steel capsule about 1,000 ~~yards~~ off La Jolla, Calif. Wearing underwater gear, they have pushed out daily from the capsule to probe the pitch-black waters and make various experiments.

The aquanauts have suffered considerable hardships in this unique search for scientific knowledge. Nine are plagued with painful ear infections. They have had to endure "paralyzing cold" due to inadequate protective suits. There is the ever-present danger the capsule might slip off the ocean shelf and break the cord attached to the mother ship above.

As they brave the perils of sharks and scorpion fish, with the usual good humor of the intrepid, some of the depth pioneers are calling themselves "aquanuts."

★ ★ ★

The hardships will not be in vain, however. Scientists believe that eventually the ocean bottom will disclose abundant new supplies of edible foodstuffs for a world that suffers in many areas from over-population and under-nourishment.

There are also said to be located in the depths petroleum and mineral deposits at least equal to those on land, new families of antibiotics to fight disease and large additional sources of fresh water which man needs.

But before the world can benefit from all this, man must learn how he can work effectively underwater for long periods and must know the equipment required. That is the reason for the aquanaut test.

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HCR35

(SUB AQUANAUTS)

(LA JOLLA)--NINE OF THE 10 AQUANAUTS LIVING 205 FEET UNDERWATER IN SEALAB 2 OFF LA JOLLA HAVE DEVELOPED EAR INFECTIONS, IT WAS DISCLOSED TODAY, BUT THE AILMENTS WILL NOT CURTAIL THEIR ACTIVITIES, NAVY DR. GEORGE BOND SAID TODAY.

CAPTAIN BOND SAID HE THOUGHT THE INFECTIONS PROBABLY WERE CAUSED BY MICROORGANISMS IN THE WATER AROUND SEALAB. THE AQUANAUTS PROBABLY PICKED THEM UP DURING THEIR UNDERWATER EXCURSIONS OUTSIDE THE SUBMERGED CYLINDER.

HE SAID THE AQUANAUTS WERE BEING GIVEN ANTIBIOTICS FOR THE INFECTIONS WHICH WERE CHARACTERIZED BY PAIN AND SWELLING AND INVOLVED THE OUTER EARL CANAL, NOT THE EARDRUM.

P1155APD9/8

Aquanauts report on 11 days below

From CHRISTIAN SCIENCE MONITOR Boston, Mass.

SEP 11 1965

By the Associated Press

La Jolla, Calif.

Taking a swim at 205 feet below the surface of the sea is much like strolling in his own back yard, says one of the aquanauts in Sealab 2.

Lt. Robert E. Sonnenburg, the doctor on the aquanaut team, has given this impression of undersea living in a telephone interview with Associated Press.

"I think we are all feeling well," Lieutenant Sonnenburg said. He added that "some of us" were aware of living in close quarters and "are getting ready to go up."

Nine of the 10 aquanauts in the Navy's underwater living experiment are scheduled to surface Sunday.

Carpenter to stay

Comdr. M. Scott Carpenter, the astronaut turned aquanaut, plans to stay down another 15 days.

Lieutenant Sonnenburg said life in the 12x58-foot steel capsule was not much different from submarine duty and that the civilian members of the team have adjusted easily to the routine.

"The biggest thing for me was the original occupancy," he said. "There's no feeling of insecurity here. We never think about that."

The pressure of seven atmospheres in the Sealab gave Lieutenant Sonnenburg's voice the high pitch quality of a speeded-up phonograph record.

Experiments ahead

The first team of aquanauts has spent much of its time getting the Sealab ready for occupancy and preparing the surrounding area for experiments.

"I think teams of two and three will accomplish more in the way of scientific discovery," Lieutenant Sonnenburg said. "My job has been to determine the physiological results of living down here."

The astronauts are on a rigid schedule that allows little time for relaxation, but they did get Sunday off.

"Most of the men spent the day sleeping, reading, writing, and watching television.

"I went for a swim," Lieutenant Sonnenberg said.

Sealab Aquanauts Plan Long Trip to the Surface

LA JOLLA, Calif. (AP) — Nine aquanauts made final preparations today for what might qualify as one of history's longest trips over a short distance.

The nine men are participants in the Navy's Sealab 2 underwater living project. They are scheduled to surface Sunday after spending two weeks 205 feet beneath the surface of the Pacific Ocean.

But their rise to fresh air will make a snail's pace look like a rocket in comparison.

Doctors say a swift rise to the surface would probably be fatal. So the aquanauts will enter a special personnel transfer capsule that will take them to the surface where they will enter a decompression chamber on the mother ship's deck.

From the time they enter the capsule until they emerge into fresh air at sea level, doctors say 36 hours will have elapsed.

Watching the whole process — from his vantage point 205 feet below — will be astronaut-aquanaut M. Scott Carpenter. Carpenter, a Navy commander, will stay down another 15 days for a total of 30 days beneath the surface.

Carpenter will be joined Sunday by another group of nine divers, including a hospital corpsman who will make physiological studies of the divers, including blood tests to determine the amount of helium in their bloodstreams.

Friday the personnel transfer capsule was brought to the surface so divers could clean out a school of anchovies that had latched onto the steel chamber several days ago.

Navy officials said the anchovies apparently were attracted by the light of the nearby Sealab.

Scientists participating in the experiment have praised the project. A spokesman said Sealab 2 has so far furnished 100 times as much information as Sealab 1 produced last year in the Atlantic.

From SEP 11 1965

TRIBUNE
Chicago, Ill.

9 AQUANAUTS ENDING STAY IN SEALAB 2

La Jolla, Cal., Sept 10 (AP)— The first phase of the navy's Sealab 2 underwater living project is about to end. Nine of 10 aqunauts who have lived 205 feet undersea since Aug. 28 will surface on Sunday.

But they can't just pack a suitcase and leave. A quick swim up probably would be fatal after their 15 days below, officials said. That's why the navy was taking particular care today to see that the personnel transfer capsule that will lift them to the surface is in good condition.

The capsule, a steel chamber attached by cable to the support ship, will be used to maintain pressure on the aquanauts until they can be transferred to a decompression chamber on the ship's deck. It will take about 36 hours of slow decompression before they can be exposed to sea level atmosphere. A 45-day test of man's underwater endurance is being conducted with Sealab 2.

From SEP 8 - 1965

TRIBUNE
Chicago, Ill.

SECOND 10-MAN TEAM LISTED FOR SEALAB 2

La Jolla, Cal., Sept. 7 (AP)— The navy announced today the names of the second 10-man team of aquanauts scheduled to establish residence Sunday for 15 days in Sealab 2. The first team has been living in Sealab 2 at a 205-foot depth on the ocean floor since Aug. 28. The third and last team to participate in the 45-day underwater research project will be announced later.



Flechsig

Navy Comdr. M. Scott Carpenter, 40, will continue his role as team leader with the second squad in his bid to remain at the ocean bottom for 30 straight days.

His new teammates will include from Chicagoland:

Howard L. Buckner, 36, navy chief steelworker, East Alton, Ill.

Arthur O. Flechsig, 40, oceanographer of Scripps Institution of Oceanography, La Jolla, of Chicago.

Glen L. Iley, 36, navy chief hospital corpsman, La Crosse, Wis.

Meanwhile, the first team of underwater pioneers was in its 10th full day in Sealab 2.

"Sorties were conducted today to the first part of the rim of Scripps canyon, where they plan to set up a marine biological watch station, a permanent observation post," a spokesman said.

From SEP 11 1965

INQUIRER
Philadelphia, Pa.

Brave Men of the Space Age

Perhaps it was not to be expected that America's Gemini space pilots would come to make their first public report on their record-breaking expedition primed with data proving the superiority of machines and automated instruments over man for exploring space.

Astronauts Cooper and Conrad have a bias in favor of human space voyageurs which even they probably would not deny.

Yet we believe they have proved their point that men do have capabilities for which there is no mechanical substitute in space exploration.

We have no reason to doubt Pete Conrad's stout assertion that "I was ready to go again on the second day back." From the beginning of the man-in-space experiments men have fared better in the hostile environment beyond earth's atmosphere than had been anticipated. One reason for this, of course, has been the foresight of the engineers and scientists who devised the fantastically complicated equipment that safeguarded them from very real space perils. But, in addition, some of the expected obstacles have failed to materialize, even as the mythical sea monsters of another age failed to thwart Christopher Columbus.

The eagerness of both men to volunteer for the first moon flight should inspire the Nation. The United States needs the skill and courage of such men in many quarters in this time of troubles and awesome discovery.

Both in space and on earth our contemporary explorers must strive to excel for a dual purpose: to extend the horizons of human knowledge and because the defense of the Nation depends on it. This applies not only to the skies above but to mysteries beneath the vast oceans at our doorstep.

In this realm, as in space, science seems on the verge of an incredible breakthrough which the United States must exploit to the maximum for its own safety as well as the benefit of mankind. Let us salute all our brave men who serve the country on these modern frontiers of discovery. We have in mind especially former Astronaut N. Scott Carpenter and his company of heroes who are surveying hazards in Sealab II off the coast of California as strange and formidable as those encountered in Gemini 5.

The great venture to the moon has its counterpart here on earth in such efforts to unlock the secrets of the ocean depths. It is only half the moon's surface that is out of sight of man—the far side. But four-fifths of our own planet earth still remains out of sight beneath the sea. This space, too, is important—at least as important as the hidden face of the moon.

THE NEW YORK TIMES, TUESDAY, SEPTEMBER 14

AQUANAUT STUNG BY SCORPION FISH

But Carpenter Will Continue Test Aboard Sealab

LA JOLLA, Calif., Sept. 12 (AP)—A scorpion fish stung Comdr. M. Scott Carpenter Sunday as nine of his fellow aquanauts were preparing to leave the Navy's Sealab 2 on the ocean bottom off La Jolla.

The departure of the nine was delayed while one of them —Lieut. Robert Sonnenburg, a Navy physician—treated Commander Carpenter to see if he could stay as planned or would have to surface with the team. Plans call for the Navy officer to stay down 15 more days.

After a delay of an hour and 15 minutes, Lieutenant Sonnenburg said that the astronaut-aquanaut was responding to treatment and would stay. The sting of the dorsal spines of the inches-long red fish is painful but not lethal. Commander Carpenter was stung on the left index finger at Sealab's exit hatch.

Three members of a fresh crew of nine aquanauts swam down earlier and were with the commander, who fell asleep on his bunk, after the other nine crewmen ended a 15-day stay in the 12-by-59-foot steel capsule 205 feet below the surface.

Six other new crewmen descended later.

A Navy spokesman said the scorpion fish sting was not unexpected because hundreds of the bottom-dwelling fish lurk in the gloomy depths near Sealab 2. Commander Carpenter's sting was Sealab's first accident. He was treated with pain-killing drugs and cortisone.

The Navy said the nine men who were brought to the surface Sunday were in good shape and had proved that man can live and work efficiently in the ocean depths.

The ascent in a pressurized transfer tank took about seven minutes after a delay that was caused when an aquanaut had to shift a hoist line into proper position.

On the deck of the staging vessel Berkone, the transfer tank was mated to a decompression chamber. There the nine members of crew No. 1 will wait about 36 hours while the pressure is slowly reduced to that of sea level.

"They're all safe and sound; everything is going beautifully," a Navy spokesman said after the nine returned to the surface.

SAN DIEGO
EVENING TRIBUNE

SEP 11 1965

PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

AQUANAUTS' PROBLEM IS NOT ON THE LEVEL

A sign over the entrance to the sleeping quarters in Sealab II reads:

"Welcome to the Tiltin' Hilton."

The sign is a wry acknowledgement that everything is not on the level in the underwater residence.

When Sealab was placed on the bottom it wound up on uneven ground and had to be raised a few feet off the bottom and turned, but the maneuver did not completely solve the problem.

One end is still slightly higher than the other, and it still has a list toward one side. Sealab officials on the surface devised several ways of correcting the situation, but left the decision of whether to level or not to level up to the aquanauts.

One method discussed was to dig some of the ocean bottom out from under the high end. Another was to use hydraulic jacks and put shoring under the low end. But other work was more important and nothing was done.

When the aquanauts complained that dishes slid on the slick table top in Sealab, officials topside sent rubber mats for the table.

But the Hilton was left tiltin', at least for the time being.

MARINE DIGEST - 48
79 Columbia Street
Seattle 4, Wash. Circ. 3,091

Sea-ab Aquanauts In 45-Day Endurance Test

LA JOLLA, CALIF. — A 45-day endurance test in Sealab, 2,205 feet below the surface of the Pacific Ocean is underway.

The team leader is M. Scott Carpenter, famed as an astronaut. The divers descnded last week to their 12 by 58-foot steel cylinder on the ocean floor 1,000 yards from this Southern California resort wearing skin divers gear.

The ten aquanauts will set up housekeeping for 45 days in a Navy experiment program.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

SEP 11 1965

Aquanauts Plan Ascent

LA JOLLA, Calif. (AP) — The aquanauts in Sealab 2 neared the end of their two-week excursion 205 feet beneath the sea by blazing underwater trails.

The trails — lines fixed to stakes driven into the ocean floor — extend up to 200 feet from the Sealab capsule and are designed to help the aquanauts get around easier in their underwater habitat.

Nine of the 10 aquanauts in the Navy's underwater living experiment are scheduled to come to the surface Sunday and are making preparations for the ascent.

Cmdr. Scott Carpenter, the former astronaut now an aquanaut, will stay down another 15 days.

SAN DIEGO
EVENING TRIBUNE

SEP 11 1965

PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

Sealab Crew Switch Ready

Today was moving day for the aquanauts in Sealab II.

They were taking scientific gear and personal articles out of the undersea house and sending them to the mothership Berkone to prepare for their return to the surface tomorrow.

And they were stacking in Sealab other pieces of equipment and the personal articles of the aquanauts who will replace them as underwater residents for the next 15 days.

Excerciser Needed

The equipment going into Sealab included an exercising bicycle. It is to be used by the second team in medical tests. The bike was to have been placed in Sealab while it was still on the surface, but plans were changed and it has been aboard the Berkone since then.

Cdr. Scott Carpenter, the aquanauts' team leader, was the only man in Sealab not preparing to move. He will stay down for another 15 days as leader of the second team.

When the aquanauts yesterday checked the personnel transfer capsule in which they will ascend to the surface they found that the inside smelled heavily of anchovies.

Capt. Walter Mazzone, atmosphere control officer aboard the Berkone, explained that the anchovies had been attracted by a light hanging inside the capsule, and had tried to get in through the open hatch in the bottom.

Anchovies are Trapped

Many of them had become trapped inside the hatch and died there.

After the aquanauts complained, Mazzone and Capt. George F. Bond, principal investigator for Sealab II, decided to raise the capsule from the ocean floor and scrub it inside with a detergent.

"The aquanauts will be inside the capsule for up to a couple of hours, and the smell would get pretty bad," Bond explained.

Today also was moving day for the men who are bringing Tuffy the porpoise here from Point Mugu to participate in Sealab.

They began setting up a pen for the animal to live in while he is here.

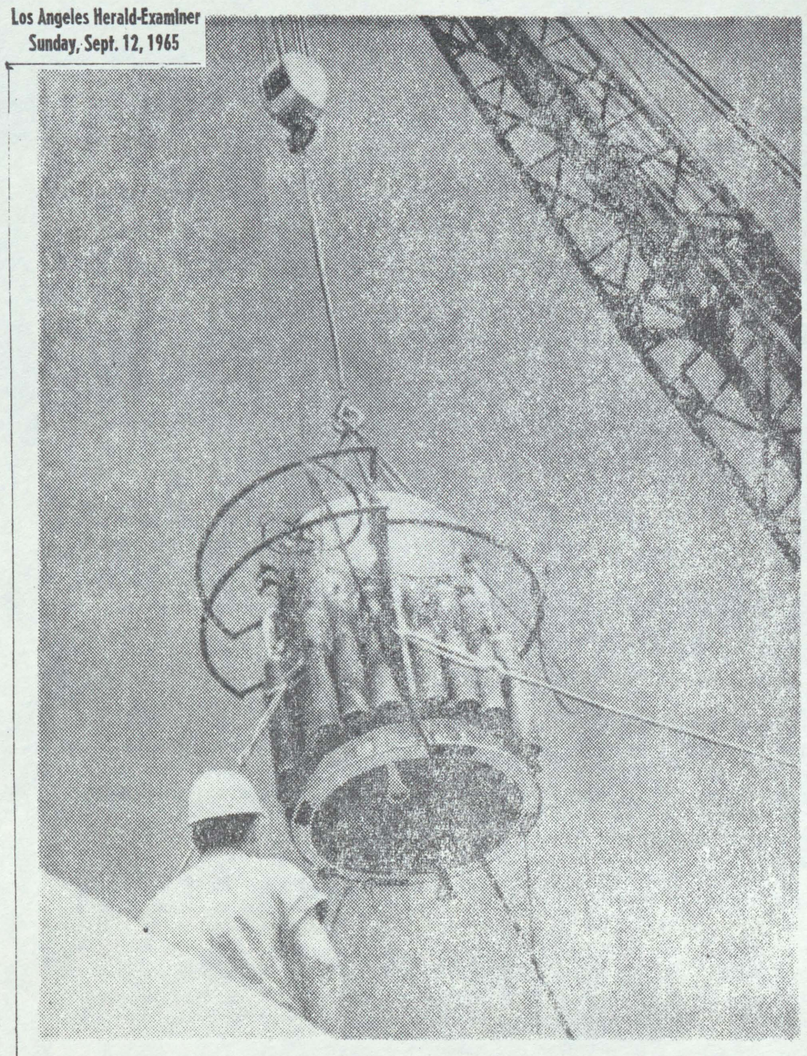
The pen will be completed this weekend and towed to a location near the Berkone.

Tuffy is scheduled to arrive by helicopter Monday about 9 a.m. The copter will land in a parking lot on Quivera Point near the Mission Bay Park headquarters building.

Tuffy will be transferred from the copter to a boat for the 45-minute ride to his pen.

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Los Angeles Herald-Examiner
Sunday, Sept. 12, 1965



—Associated Press Wirephoto

AQUATIC ELEVATOR FOR SEALAB AQUANAUTS
It will transfer personnel from undersea depot to mother ship on surface

Aquanauts To Come Up for Air

LA JOLLA, Sept. 11 (AP)—Nine aquanauts in Sealab 2 check out of their "Tiltin' Hilton" on the ocean floor tomorrow for a 205-foot, 36-hour trip back to sunshine and fresh air.

The men have lived and worked below the ocean's surface since Aug. 28. Their ascent marks the end of the first phase of the Navy's most ambitious underwater living project.

While the trip to the surface is expected to take only about 5 minutes, the aquanauts will go directly into a decompression chamber for a slow return to sea level pressure. This will take about 36 hours, officials said.

Tomorrow's schedule also calls for the descent of the second team of nine divers to the 12x58-foot steel capsule.

When the aquanauts leave their deepsea den, they will swim to a transfer capsule —a sort of underwater elevator.

Analysis

Baltimore Sun
9/11/65

Differing Ship Terms Hint Era Of Pacts Without Peace

By HELEN DELICH BENTLEY
[Maritime Editor of The Sun]

Washington, Sept. 11—A radiogram dispatched this week to all the American ships at sea manned by members of the American Radio Association (AFL-CIO) points up the smoldering within the American merchant marine.

The message cited six cost items gained by the union in its recent strike But the line at the end of those six items will add to the pending eruption far ahead of the 1969 termination date of the contracts.

That sentence read: "All of these first six items were outside the 3.2 economic package."

Exasperating To Others

Such a sentence is like waving a red flag in front of a bull as far as the other unions are concerned.

For although the three licensed officers' unions have signed contracts—all under the aegis of the Secretary of Labor—and are back at work after the longest shipping strike on the East and Gulf coasts since 1936, the underlying currents of inequities, "me too's," and other points of dispute that have kept the American flag in a state of turmoil are still strong.

The game of escalation will be played from now until 1969 as a result of some of the terms of the settlement reached in one contract, but not in another.

Pacts But Not Peace

The contracts all run until 1969, but the peace proclaimed by President Johnson when he announced the settlements August 29 will be much more short-lived This does not necessarily mean there will be any more widespread work stoppages: there could be sporadic ones.

But it does mean the shipowners are going to face difficult times over the next four years regardless of the fact that they have signed documents.

The shipowners involved here are the subsidized operators, since they were the ones strikebound for 78 days by the three licensed officers unions.

"The industry is in worse shape now than it was on June 14 before the strike began," one top Government official commented today.

"Nobody knows where this one will end."

The money items are not the only ones that fall within this boiling water. The key issue of manning—the one cited by the President on August 16 as the principal point of the strike—still is unsettled because the shipowners granted a minimum guarantee to one union and not to the other.

Advisers Guideline On Raise

The package of 3.2-per-cent increase a year —the amount established by the President's Council of Economic Advisers as being the non-inflationary ceiling management, for the most part, could pay each year over all labor costs —was pegged as the money package for all the seagoing labor unions this year.

With the arbitrary figure of 3.2 projected as the ceiling and the target, it was belived that at least there would be uniformity in this round of bargaining.

SAN DIEGO UNI
SEP 13 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

9 Aquanauts' Names Listed

The nine aquanauts who descended yesterday to become SeaLab's second team were:

Glen LeRoy Iley, 36, of Groton, Conn., chief hospital corpsman, USN; Arthur O. Flechsig, 40, of Encinitas, oceanographer, Scripps Institution of Oceanography; Wallace T. Jenkins, 30, equipment specialist, Navy Mine Defense Laboratory (MDL), Panama City, Fla.

John F. Reaves, 36, Oxnard, photographer 1st class, USN; William H. Tolbert Jr., 39, oceanographer, MDL; Robert A. Barth, 35, Panama City, chief quartermaster, USN; Howard L. Buckner, 36, Forrestville, Md., chief steelworker, USN; Kenneth J. Conda, 31, Ledyard, Conn., torpedoman's mate 1st class, USN; George B. Dowling, research physicist, 38, MDL.

They will stay down 15 days. After that, a third team will take their place for the final 15 days of the 45-day project.

SAN DIEGO UNI
SEP 13 1965

BATHROOM GARDEN

SeaLab Aquanauts Growing Marigolds

When two Florida scientists descended to SeaLab II yesterday with the second team of aquanauts, they were able to say, "Come into our garden."

The garden is in the bathroom.

Before SeaLab was lowered, William H. Tolbert Jr. and George B. Dowling, oceanographers at the Navy's Mine Defense Laboratory, Panama City, Fla., planted dwarf marigolds and barley in two boxes bracketed to the bathroom wall.

Each day, the plants will be photographed and measured to determine the effect of SeaLab's environment (about 85 per cent helium, and the rest oxygen and nitrogen) on their germination and growth.

A bank of eight 60-watt bulbs shines constantly on the marigold and barley seedlings. Since the incipient garden is in the bathroom, the lights don't bother anyone.

But the real reason the bathroom was chosen was that SeaLab space is at a premium and the bathroom wall wasn't being used.

EVENING TRIBUNE
SAN DIEGO, CALIFORNIA
Friday, Sept. 10, 1965

Navy Orders Stand-By To Recover Aquanauts

Plans Remain For Bringing 9 Up Sunday

Berkone's Crews Ready to Assist Sealab Tomorrow

By LEO BOWLER
EVENING TRIBUNE Science Writer

Crews on the mothership Berkone will be standing by to bring the Sealab II aquanauts to the surface any time after 8 a.m. tomorrow.

The order to get the crews ready was given today by Capt. George Bond, principal investigator for the Sealab project.

Bond said he still intends to bring the men up Sunday afternoon, but wants everything in readiness in case a change in the weather makes it advisable to return the aquanauts to the surface sooner.

Captain Gives Reason

Bond emphasized that the Berkone is ready at all times to bring the men up on an emergency basis. However, he said all hands on the vessel will stand by all day tomorrow to perform the removal operation on a routine rather than emergency basis.

Bond also announced today that the time spent outside the Sealab by the divers had decreased for the second straight day.

The 10 aquanauts yesterday spent a total of 6 hours and 44 minuts outside. The day before they spent 7 hours and 44 minutes outside. Tuesday had been their biggest day. They spent 12 hours and 12 minutes outside.

Figure Reached Once

The expectation before the men went down was that they would average an hour each outside daily. They reached this figure only on Tuesday.

The reason given for the cut in diving time yesterday was that the men had too much work to do inside Sealab and couldn't spend the time diving.

Today, the aquanauts were checking the personnel transfer capsule in which they will be brought to the surface. The Berkone was also sending divers from the surface to see that all was in readiness below for the delicate transfer operation.

Carpenter to Stay

Cdr. Scott Carpenter, the squanauts' team leader, will stay in Sealab another 15 days. The other nine men will enter the capsule, be hoisted to the surface, and spend 35 to 40 hours in decompression aboard the Berkone.

The aquanauts cannot just swim to the surface. If they did, the change in pressure would kill them, Bond said. The transfer capsule will maintain them at the pressue in Sealab until they reach the decompression chamber where the pressure will be reduced gradually.

Brain Tests Planned

Bond said today that a Norwegian scientist, Dr. Carl Wilhelm Sem-Jacobson, will enter the decompression chamber during the last 16 hours of decompression to take brain-wave measurements.

Despite the reduction in dives, Bond said the Sealab II program is accomplishing 100 times as much as its predecessor in the Atlantic a year ago.

Ran Previous Center

Bond, who is in charge of the control center aboard the Berkone and is responsible for the work of the men below, also ran the control center for Sealab I.

He said the increase in accomplishment is one of two major differences between the two projects.

(SEALAB) UPI Radio

AMERICA'S SECOND TEAM OF SEALAB TWO AQUANAUTS JOIN ASTRONAUT SCOTT CARPENTER TODAY IN THE WORKADAY EXPERIMENTS ABOARD THE SEALAB. THE SEALAB IS A 57-FOOT STEEL CYLINDER HOUSING THE AQUANAUTS 205 FEET BENEATH THE OCEAN OFF LA JOLLA. THREE MEMBERS OF THE NINE-MAN RELIEF TEAM ENTERED THE SEALAB YESTERDAY MORNING AND THE OTHER SIX FOLLOWED IN THE AFTERNOON. CARPENTER WILL REMAIN FOR 30 DAYS OF THE 45 DAY EXPERIMENT.

-0-

(MORE SEALAB)

IN OTHER DEVELOPMENTS ABOARD THE SEALAB, THE NAVY SAYS A SCORPION FISH STING CARPENTER RECEIVED HAS BEEN...QUOTE..."TREATED ADEQUATELY" HOWEVER, SOME SWELLING IN HIS LEFT HAND UP TO HIS ELBOW IS REPORTED. CARPENTER WAS MAKING A FINAL INSPECTION OF THE CONVEYING CAPSULE USED TO BRING DOWN THE NEW MEN YESTERDAY WHEN HE WAS STUNG.

12 Sep

Sealab Crew-Switch Operation Under Way

By Associated Press

LA JOLLA, CAL.—Operation crew-switch got under way Sunday in the Navy's Sealab 2—205 feet below the ocean's surface.

Three members of a fresh crew of nine astronauts swam down from a staging vessel and entered the 12-by-58 foot steel capsule.

A spokesman said, "We have no word of any problems."

TRANSFER TANK

Later, nine men who have been in the capsule 15 days were to enter a pressurized transfer tank and be hoisted in a five-minute ride to the deck of the vessel, the Berkone.

There, the transfer tank would be mated to a decompression chamber in which the men will wait about 36 hours while the pressure is slolfy reduced to that of sea level.

The other six members of Team No. 2 were to enter Sealab 2 after Team No. 1 reached the surface. The second team, too, will stay below 15 days, in company with Astronaut Scott Carpenter. He has been down 15 days and plans to stay 30.

A third team later will replace the second in the 45-day experiment, the Navy's most ambitious underwater living project.

Its primary purpose is to determine whether man can live and work in the hostile environment of ocean depths.

KEPT BUSY

Since Aug. 28, the first crew has kept busy in and about the deep-sea den a thousand yards off the shore of this scenic Southern California resort.

In wet suits, the astranauts have ventured forth to chart movements of ocean currents and sediment. They have set up an ocea-bottom weather station to see if there is a correlation between surface weather and recordings below.

Probably the most important benefit of the experiment, a Navy spokesman said, would be to show that deep-water salvage and rescue operations are possible after submarine, ship or plane disasters.

SEP 13 1965
GLOBE DEMOCRAT
St. Louis, Mo.

SAN DIEGO
VENING TRIBUNE
SEP 13 1965

CAPSULE SURROUNDED

Fish, Aquanauts Study Each Other

The scorpion fish which appear to be clustering around Sealab II will be the objects of intensive study during the next few weeks.

The study will be conducted by a Scripps Institution of Oceanography man, who is one of the nine new aquanauts now in Sealab.

Scott Carpenter, the Sealab team leader, was a victim of one of the fish yesterday.

The oceanographer, Arthur C. Flechsig, of Encinitas, hopes to capture and tag a number of the fish as part of the study.

Flechsig said the fish are easy to catch. They are one of the few fish in the area which do not scurry away when a diver approaches closely.

"The fish are pretty passive in this whole business," Flechsig said before leaving the Berkone yesterday. "When a diver gets his hand too close, they just raise the spines in their dorsal fin. If you hook your hand on the spines, tiny glands in the flesh around the spines are crushed and give off the poison. The fish aren't aggressive or anything like that."

Flechsig said the scorpion fish apparently are congregating around Sealab. This is one of the things he wants to study.

"I want to do a population count so we can tell if there are more around at some times than at others," he said. "And I want to tag them to see if the same fish are hanging around all the time, or if the population is transient."

Flechsig said he plans to grab the fish by the head to tag them so that he doesn't get stuck by the spines. The aquanauts swim with their hands bare, but Flechsig says that the spines would go through most gloves anyway.

The fish are common in the area and are good to eat, Flechsig says, but he urges caution in cleaning them because the spines can poison anyone they pierce even though the fish is dead.

Scorpion fish are a mottled gray-brown in color and are hard to see when they are resting on the bottom. They grow to be about 15 inches long.

SEP 13 1965

Sealab 2 Gets New Crew

Scott Carpenter Stays Down Despite Fish Sting

LA JOLLA, Calif. (AP) — M. Scott Carpenter — unscratched in three orbits of earth in 1962 as an astronaut—was stung by a scorpion fish yesterday during a tricky transfer of crewmen of the Navy's Sealab 2 aquanauts in 205 feet of water.

Plans calling for Carpenter to stay another 15 days in the laboratory on the ocean bottom were almost scuttled as the 40-year-old astro-aquanaut, his left hand and arm swelling painfully, was brought back through Sealab's escape hatch.

Nine aquanauts who had been scheduled to ascend after 15 days under water postponed their departure while one, a doctor, treated Carpenter with pain-killing drugs and cortisone. He said he wanted to stay.

Responds to Treatment

When Carpenter responded to treatment the nine aquanauts, 75 minutes late, continued the complicated maneuver designed to bring them back to man's normal environment: sea-level pressure and sea-level air.

They were raised to the surface yesterday afternoon in a capsule-like tank which maintained the pressure the crewmen had grown used to in Sealab: seven times that of the surface. The transfer unit was attached to a decompression chamber on the support vessel Berkone on the surface and the pressure slowly decreased.

When the 10-by-6 foot capsule rose dripping from the sea, newsmen saw the grinning faces of the aquanauts inside. They gave thumbs-up waves.

To Stay 36 Hours

The nine must spend 36 hours in the decompression unit before they can step out without suffering the diver's disease, bends, caused by bubbles in the bloodstream.

Nine new crewmen took the place of the men who ascended. The first three went down before Carpenter's accident. One of them, a Navy medical corpsman, attended Carpenter when the other aquanauts left.

After the first team leaves the decompression chamber they'll be taken to Balboa Naval Hospital in nearby San Diego for physical examinations.

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LA JOLLA LIGHT
and
La Jolla Journal

VOL. LIII, NO. 35 — LA JOLLA, CALIFORNIA, THURSDAY, SEPTEMBER 9, 1965 — 10 CENTS PER COPY

New York 38, N. Y.
From SEP 1 1965
JOURNAL, [illegible], Ca.

SA5OLA (SEALAB)

PMS BUDGET

SEALAB 2 (300)

BY ROBERT M. BURNETT

ASSOCIATED PRESS WRITER

LA JOLLA, CALIF., SEPT. 9 (AP)-TAKING A SWIM AT 205 FEET BELOW THE SURFACE OF THE SEA IS MUCH LIKE STROLLING IN HIS OWN BACK YARD, SAYS ONE OF THE AQUANAUTS IN SEALAB 2.

LT. ROBERT E. SONNENBURG, THE DOCTOR ON THE AQUANAUT TEAM, GAVE THIS IMPRESSION OF UNDERSEA LIVING LAST NIGHT IN A TELEPHONE INTERVIEW WITH THE ASSOCIATED PRESS.

"I THINK WE ARE ALL FEELING WELL, BUT SOME OF US ARE GETTING CABIN FEVER AFTER 11 DAYS DOWN HERE, AND WE ARE GETTING READY TO GO UP," SONNENBURG SAID.

NINE OF THE 10 AQUANAUTS IN THE NAVY'S UNDERWATER LIVING EXPERIMENT ARE SCHEDULED TO SURFACE SUNDAY AND WILL BE REPLACED BY ANOTHER TEAM.

CMDR. SCOTT CARPENTER, THE ASTRONAUT TURNED AQUANAUT, PLANS TO STAY DOWN ANOTHER 15 DAYS.

SONNENBURG SAID LIFE IN THE 12X58-FOOT STEEL CAPSULE WAS NOT MUCH DIFFERENT FROM SUBMARINE DUTY AND THAT THE CIVILIAN MEMBERS OF THE TEAM HAVE ADJUSTED EASILY TO THE ROUTINE.

"THE BIGGEST THING FOR ME WAS THE ORIGINAL OCCUPANCY," HE SAID. "THERE'S NO FEELING OF INSECURITY HERE. WE NEVER THINK ABOUT THAT."

THE PRESSURE OF SEVEN ATMOSPHERES IN THE SEALAB GAVE SONNENBURG'S VICE THE HIGH PITCH QUALITY OF A SPEEDED-UP PHONOGRAPH RECORD.

HE SAID THE EAR INFECTION THAT HIT NINE OF THE AQUANAUTS WAS RESPONDING TO ANTIBIOTIC TREATMENT.

PHYSICIANS HAD BLAMED MICRO-ORGANISMS IN THE OCEAN WATER FOR THE INFECTIONS THAT WERE THE FIRST PHYSICAL TROUBLE REPORTED SINCE THE MEN WENT DOWN AUG. 28.

SONNENBURG SAID HE BELIEVES SWIMMERS ON THE SURFACE SOMETIMES GET THE SAME TYPE OF INFECTION.

THE FIRST TEAM OF AQUANAUTS HAS SPENT MUCH OF ITS TIME GETTING THE SEALAB READY FOR OCCUPANCY AND PREPARING THE SURROUNDING AREA FOR EXPERIMENTS.

"I THINK TEAMS OF TWO AND THREE WILL ACCOMPLISH MORE IN THE WAY OF SCIENTIFIC DISCOVERY," SONNENBURG SAID. "MY JOB HAS BEEN TO DETERMINE THE PHYSIOLOGICAL RESULTS OF LIVING DOWN HERE."

HE HAS BEEN SENDING UP BLOOD, URINE AND SALIVA SAMPLES FOR ANALYSIS BY SCIENTISTS ON THE SURFACE.

THE AQUANAUTS ARE ON A RIGID SCHEDULE THAT ALLOWS LITTLE TIME FOR RELAXATION, BUT THEY DID GET SUNDAY OFF.

"MOST OF THE MEN SPENT THE DAY SLEEPING, READING, WRITING AND WATCHING TELEVISION.

"I WENT FOR A SWIM," SONNENBURG SAID.

WD114APD

Sealab II Capsule

Findings Begin to Emerge From 'World' Beneath Sea

By PETER BART

© 1965, New York Times News Service

LA JOLLA, Calif. — Scientific findings that may aid in the exploration of the "inner world" beneath the ocean are starting to emerge from a small steel capsule submerged 210 feet below the ocean's surface off La Jolla.

For the past 11 days a team of 10 men headed by Cmdr. M. Scott Carpenter, the astronaut, has lived in the 57-foot-long capsule anchored on an ocean shelf 1,000 yards off shore.

Each day the men, attired in underwater gear, have left the capsule, called Sealab II, to probe the pitch blackness of the ocean's floor and perform varied experiments. These have ranged from the setting up of a massive underwater weather station, the first of its kind ever installed, to the collection of exotic marine life.

A MONITORING of conversations between the "aquanauts" in the capsule and scientists on the "mother ship" anchored at the surface reveals that the men are suffering considerable hardships. Nine of the 10 men are afflicted with painful ear infections. Inadequacy of some of the protective "wet suits" has caused paralyzing coldness that has often forced the men to abandon their assigned tasks outside the capsule. The men also have been harassed by an unexpected invasion of stinging scorpion fish and the ever-present danger of sharks.

Some of the aquanauts, who now jokingly call each other "aquanuts," are also worried about leaks in the capsule's steel portcovers as well as the possibility that the capsule could slip off its shelf and break its "umbilical cord" with the mother ship.

THE FIRST team of aquanauts, with the exception of Carpenter, is scheduled to be brought to the surface Sunday afternoon to be relieved by nine new men. Carpenter, who is on loan to the project from the astronaut program, plans to stay in the capsule throughout the 30-day experiment.

With all the hazards and harassments, however, the experiment is producing useful and optimistic scientific results, according to Capt. George F. Bond, the naval physician and scientist who is the project's chief investigator.

According to Bond the workload performed by the men, despite their afflictions, is vastly superior than had been anticipated.

During a small pilot program a year ago the "work curve" of four aquanauts submerged for nine and one half days in a small capsule plunged sharply below their normal performance.

THE SUPERIOR performance of the present aquanauts, Bond said, could be explained by their superior conditioning, higher morale stemming from the presence of a larger team, changes in the capsule's atmosphere or other factors. However, Bond and other medical advisers are keeping a close watch on curious changes in the blood chemistry of several of the aquanauts as well as symptoms of incipient hypertension.

Bond and his associates keep a constant eye on the aquanauts via closed circuit television. However the high helium content (85 per cent) in the capsule's atmosphere has destroyed 10 TV cameras and hampered continuous observation.

SEP - 9 1965
NEWS
Dallas, Texas



The La Jolla Light/Journal joined the history-making epoch of Sea Lab II by being probably the first weekly newspaper to be read 205 feet under the sea off La Jolla where aquanauts are living in the 57-foot underwater house.

from SEP 9 - 1965
POST-DISPATCH
St. Louis, Mo.

FORMER ALTON MAN NAMED FOR DUTY IN SEALAB

Navy Chief Petty Officer Howard Buckner, formerly of Alton, has been selected as a member of the second 10-man team of aquanalts scheduled to live 15 days in Sealab 2 on the Pacific Ocean floor near La Jolla, Calif.

Sealab 2 is a 200-ton, 57-foot steel cylinder, 205 feet below the surface of the ocean. The first 10-man team has been in the cylinder since Aug. 28. A third team is to be announced for the final 15 days of the 45-day project, designed to determine man's ability to live and work beneath the ocean. Astronaut Scott Carpenter, a member of the first team, is scheduled to remain submerged 30 days.

Buckner is the son of Mrs. Grace Shirley of Alton. He is a steelworker with the Navy and now lives in Forestville, Md.

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From SEP 5 1965
INQUIRER
Philadelphia, Pa.

Aquanauts Explore Ocean Ridges, Set Up Own Weather Station

LA JOLLA, Calif., Sept. 4 (UPI).—Two of 10 aquanauts of Sealab 2 Saturday ventured 233 feet from the 57-foot steel cylinder and explored a rock ridge and then returned to their underwater home.

Earlier in the day, a team of aquanauts completed installation of a platform which will contain the world's first underwater weather station.

Sealab 2 was lowered into the ocean Aug. 28 and the following day the aquanauts entered the pressurized tube with skin diving equipment.

Sealab 2 will remain submerged 45 days at a depth of 205 feet, resting on a shelf of the Pacific Ocean. The 10 aquanauts will be relieved at the end of 15 days with the exception of astronaut Scott Carpenter who is scheduled to remain below for 30 consecutive days.

Purpose of the experiment is to determine man's ability to live and work on the ocean floor at the pressures many times that on the surface. The aquanauts come and go from the pressure chamber with scuba gear and breath a mixture of mostly helium.

Four of the aquanauts on Saturday underwent a physical examination in which radioactive iron was injected into their blood systems and samples withdrawn every half hour.

The installed weather station consists of two raised instruments, one placed on the ocean floor near Sealab 2 and the second some 65 feet toward the surface. Numerous instruments are attached to the bottom.

From
EVENING NEWS
Newark, N. J.
SEP 10 1965

Undersea Lab Blazing Trails

Lines Beneath the Ocean Aid to Aquanauts 205 Feet Down

LA JOLLA, Calif. (AP) — The aquanauts in Sealab 2 neared the end of their two-week excursion 205 feet beneath the sea by blazing underwater trails.

The trails — lines fixed to stakes driven into the ocean floor — extend up to 200 feet from the Sealab capsule and are designed to help the aquanauts get around easier in their underwater habitat.

Nine of the 10 aquanauts in the Navy's underwater living experiment are scheduled to come to the surface Sunday and are making prerations for the ascent.

Cmdr. Scott Carpenter, the former astronaut now an aquanaut, will stay down another 15 days.

Another team will then go down to the Sealab to continue the scientific investigations started by the first group.

HCR27 UPI

(SUB SEALAB)

(LA JOLLA) (~~L~~)-THE FIRST TELEPHONE CONVERSATION FROM UNDER THE PACIFIC TO BELOW THE MEDITERRANEAN HAS BEEN COMPLETED.

THE 8-THOUSAND-MILE CONVERSATION BETWEEN AQUANAUTS IN THE SEALAB-TWO PROJECT OFF LA JOLLA AND THEIR COUNTERPARTS NEAR MONTE CARLO LASTED 16 MINUTES.

IT WAS THE FIRST TELEPHONE CHAT IN HISTORY BETWEEN MEN IN TWO UNDERWATER ENVIRONMENTS.

AT THE OTHER END OF THE LINE WERE THE OCEANAUTS IN JACQUES COUSTEAU'S DIVING BATHSCAPH, WHO HAVE BEEN SUBMERGED SINCE SEPTEMBER 17TH.

P1043APD10/1

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LA JOLLA, CALIF., SEPT. 10 (AP)-THE AQUANAUTS IN SEALAB 2 NEARED THE END OF THEIR TWO-WEEK EXCURSION 205 FEET BENEATH THE SEA BY BLAZING UNDERWATER TRAILS.

THE TRAILS -- LINES FIXED TO STAKES DRIVEN INTO THE OCEAN FLOOR -- EXTEND UP TO 200 FEET FROM THE SEALAB CAPSULE AND ARE DESIGNED TO HELP THE AQUANAUTS GET AROUND EASIER IN THEIR UNDERWATER HABITAT.

NINE OF THE 10 AQUANAUTS IN THE NAVY'S UNDERWATER LIVING EXPERIMENT ARE SCHEDULED TO COME TO THE SURFACE SUNDAY AND ARE MAKING PREPARATIONS FOR THE ASCENT.

CMDR. SCOTT CARPENTER, THE FORMER ASTRONAUT NOW AN AQUANAUT, WILL STAY DOWN ANOTHER 15 DAYS.

ANOTHER TEAM WILL GO THEN GO DOWN TO THE SEALAB TO CONTINUE THE SCIENTIFIC INVESTIGATORS STARTED BY THE FIRST GROUP.

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PUBLIC INFORMATION OI
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San ro, Californ

Aquanauts Eat Hearty, Don't Gain

Two Lose Weight Under Sea Despite Big Meals, Snacks

By BRYANT EVANS
The San Diego Union's Science Writer

One way to eat all you want and not gain weight is to move to a home 205 feet under the water and do a lot of swimming.

This became evident yesterday when Capt. George Bond, chief scientific investigator of the SeaLab II project, remarks that although the 10 aquanauts in SeaLab have been eating enormous meals and frequent snacks none of them have gained any weight.

TWO LOSE WEIGHT

In fact, two of them, Lt. Robert E. Sonnenburg and Cmdr. M. Scott Carpenter, have lost weight. Sonnenburg, who weighs about 240 pounds, has dropped four pounds and Carpenter, a thin man, has lost two.

One unofficial report said in the 12 days they have been down, the 10 men have consumed 12 gallons of peanut butter.

Carpenter reported yesterday that the aquanauts have adopted a high energy drink for restoring themselves after swimming in cold water. It consists of fruit-flavored gelatin mixed in hot water. Mountain climbers have used similar beverages.

'ROADS' MARKED

Bond said that for most of yesterday the lab was silent because the men were working outside. One of their jobs was laying out roads from the lab to the perimeter of the area they have chosen for their experiments. "Roads" consist of lines of yellow plastic rope to mark favorable paths.

The Scripps Institution of Oceanography's underwater weather station was completed and declared functional yesterday. The aquanauts also installed current meters for the Navy Mine Defense Laboratory.

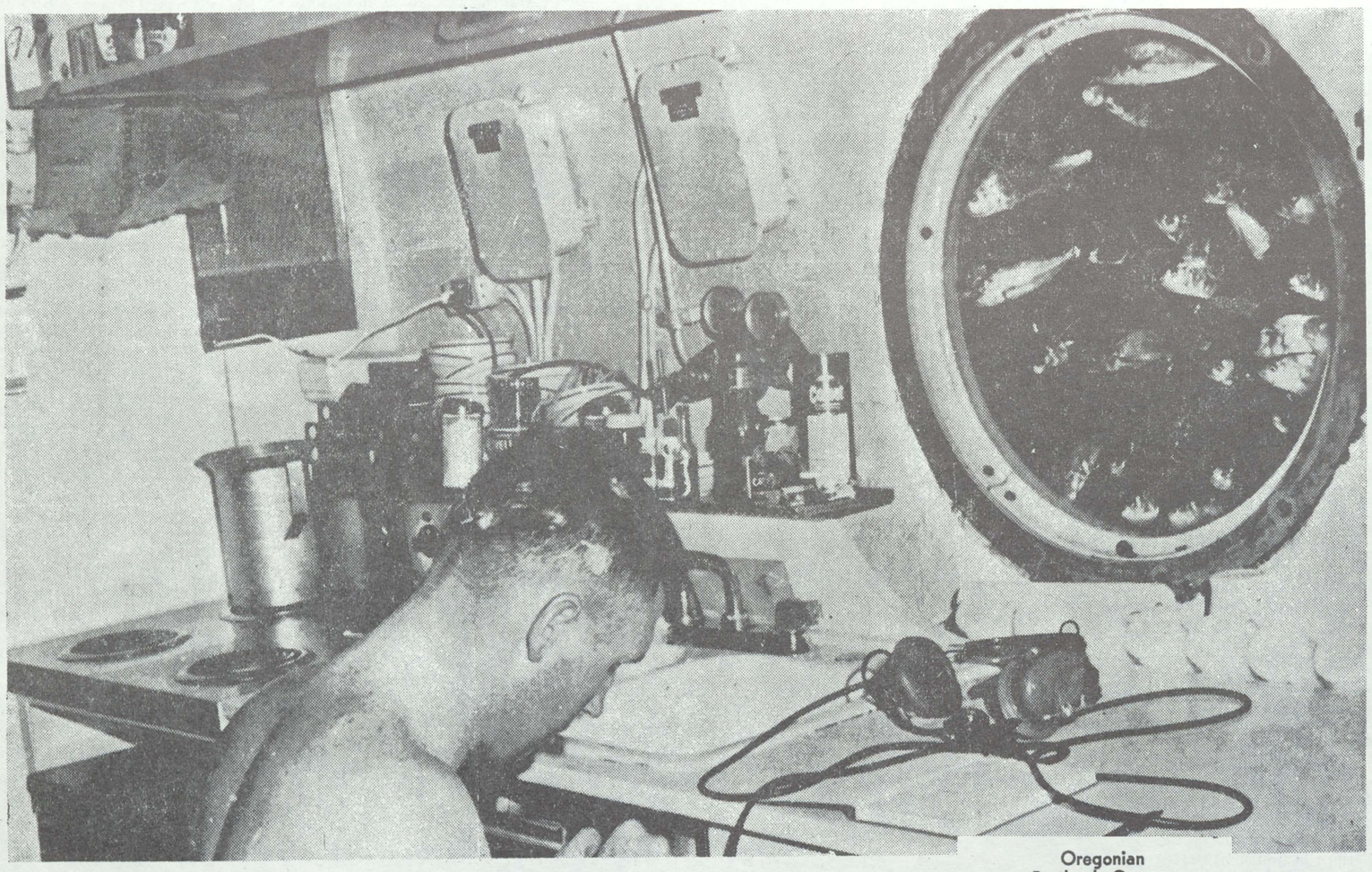
Bond announced that the team had rigged a restraining anchor 200 feet uphill. The anchor is connected with the lab by a 6½-inch nylon line. This was considered a first-rate engineering project for underwater workers. It is also a safety measure since the lab is on a gently sloping part of the bottom near the Scripps Canyon precipice.

HEARTS MONITORED

Bond also announced that electrocardiograms have been obtained by acoustical means from swimmers at least 100 feet from the habitat. The signals were obtained through listening instruments aboard the Berkone, the staging vessel for SeaLab II. Aquanauts Frederick J. Johler and Thomas A. Clarke were the swimmers whose heartbeats were monitored by a device developed by the Philadelphia General Hospital.

Nine members of the first team are scheduled to return to the surface about 2 p.m. Sunday. They will be replaced by the second team. Carpenter, captain of both teams, will remain in the SeaLab for a total of 30 days.

* * *



ENTERTAINING THE FISH appears to be the duty assigned to Aquanaut Berry Cannon, stationed in America's Sealab II, 205 feet below the surface of the ocean near La Jolla, Calif. Curious fish watch Cannon as he repairs a headset. (AP Photo)

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

SEP 10 1965

From SEP 10 1965
JOURNAL, Atlanta, Ga.

Aquanauts Near End Of Excursion

LA JOLLA, Calif. (AP) — The aquanauts in Sealab 2 neared the end of their two-week excursion 205 feet beneath the sea by blazing underwater trails.

The trails — lines fixed to stakes driven into the ocean floor — extend up to 200 feet from the Sealab capsule and are designed to help the aquanauts get around easier in their underwater habitat.

Nine of the 10 aquanauts in the Navy's underwater living experiment are scheduled to come to the surface Sunday and are making preparations for the ascent.

Cmdr. Scott Carpenter, the former astronaut now an aquanaut, will stay down another 15 days.

Another team will then go down to the Sealab to continue the scientific investigations started by the first group.

From SEP 10 1965
INQUIRER
Philadelphia, Pa.

But 'It's So Cold' Outside

Sealab Aquanauts Live in Tropics of 'Fish-Eat-Fish World'

By CHARLES HILLINGER
Special to The Inquirer And Los Angeles Times

LA JOLLA, Calif., Sept. 9.—What's it like living in a "house-trailer" parked 205 feet below the surface of the sea?

Thursday the Navy's 10 aquanauts, on their 12th day in the Sealab capsule off La Joppa, described day-to-day living in history's first ocean-floor to surface press conference.

"It's a fish-eat-fish world down here," said aquanaut Berry L. Cannon, 30, in his high-pitched "helium" voice on the special phone hookup.

"All the fish are being gobbled up or eating other fish. There's been some dandy fish fights."

Cannon, of Panama City, Fla., said inside the 57-foot cigar-shaped undersea house "it's like the tropics.

"Outside, after swimming for an hour, it's so cold it seems like we're swimming through snow drifts."

Water temperatures outside have been as low as 40 degrees.

Inside, four dehumidifiers keep the humidity "down" to 80 percent.

All aquanauts report seeing strange objects in the sea—marine life they have never seen before.

"Oddest looking thing I've seen," said Cannon, "was something with 12 arms and about 3 feet in diameter.

"At first I thought it was a crazy-looking octopus. Later I learned it was some kind of a giant star fish."

Breathing the exotic gaseous atmosphere of 85 percent helium, 11 percent nitrogen and 4 percent oxygen, the aquanauts' voices sound like they have been speeded on a record player.

Other aquanauts in the background were "chirping." It was like an Alvin and the Chipmunks recording.

From 2 P. M. until 10 the next morning it is black as coal outside the capsule, Cannon said. "Fish swarm around our 11 windows during the dark periods, attracted by our lights."

During light from 10 A. M. to 2 P. M., aquanauts can see as far as 60 feet. At other times they carry arc lamps in miner fashion when swimming from the capsule.

Cannon described his undersea home as being perched in "a hollow. There's a hill to the south. It's flat to the north. To the west, there's a cliff that drops off very deep.

"We're pretty limited to travel—300 feet out at the maximum, 33 feet up, 33 feet down. But we have no sense of being cooped."

He said the sea below is a noiseless world.

Lt. Robert E. Sonnenburg, 28, the Navy doctor on the aquanaut team, has been treating all the aquanauts for minor ear infections. Capt. George F. Bond, directing the Sealab experiment from the surface vessel Berkoni, said it was common for scrubs, hard-hat and salvage divers to have minor infections of the outer ear.

"Some of us are getting cabin fever and are getting ready to go up," Sonnenburg said. All the aquanauts, except Cmdr. N. Scott Carpenter, will return to the surface Sunday and be replaced by a second team of nine men.

Carpenter is the world's only astronaut-aquanaut.

"Being outside a space capsule like Ed White and swimming outside Sealab is much the same. In both instances you're in a weightless, buoyant state," Carpenter said.

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California Report Classified Ads
The San Diego Union
Sunday, September 12, 1956 Page B-1

MAN AND THE UNIVERSE

SeaLab II Crew Strikingly Normal Despite Tension

By BRYANT EVANS
The San Diego Union's Science Writer

One of the scientific objectives of the SeaLab II project appears doomed to failure and nobody seems to care.

This is the projected observation of isolated men under pressure. Psychologists were interested in seeing how putting men on the bottom of the sea would alter their behavior.



Evans

At the last report the finding was that the behavior of the men in SeaLab II was strikingly normal. Whatever it is that men under extreme tension are supposed to do, they didn't. Instead they went about their jobs in a workmanlike manner, ate well, slept well and did the best that they could under the crowded circumstances to keep out of each other's way.

And yet these men have been living with a present, known and constant hazard. Deep water is lethal in itself. For the SeaLab crew there is no quick and easy escape because a quick rise to the surface would also be lethal. If they were to drop the weights that give them "negative buoyancy" and hold them on the bottom, it would be just as bad as tying an anchor to a swimmer who had no breathing apparatus and sinking him to the bottom.

Everything Strange—Including Own Voices

The aquanauts' lives depend on the maintenance of an artificial atmopshere and an artificial environment for every breath they take. One mistake in a medium that is hostile to human life can mean death.

At the same time they are out of direct touch with all the reassuring sights and sounds of ordinary life. The sun and moon do not rise or set. The wind does not blow. There are no women or children. Everything is strange—even the sound of their own voices raised in pitch by the light helium atmosphere.

And yet they show no signs of stress. Why?

There are a couple likely answers. In the first place, they are picked men. There are 30 men in the squad chosen from 300. They were all experienced divers and hence men who had proved that the stress of diving is something that they could take.

Then they were subjected to months of training — in water, in decompression tanks, in the SeaLab before it was launched. As a result they were physically and psychologically prepared for their strange new home 205 feet under the ocean. By the time they got there it was not so strange anymore.

Every report of the attitude of the aquanauts has stressed their high motivation. This was one of the criteria which Capt. George Bond, the chief scientific investigator on the project, said that he looked for in choosing the men.

Time Not Heavy On Their Hands

They were given many jobs. Some people think they were given too many jobs. At any rate time has not had to hang heavy on their hands. Their attention has been turned to the tasks in hand and there has been no time for morbid thoughts. Perhaps if all they had to do was just to sit there and amuse each other, stress might have developed. As it is, they have been busy.

So this one small objective is not going to be reached. It is far too early to evaluate the rest of the project but it has become apparent that the aquanauts have succeeded in many of the heavy tasks they were given. Some of these were jobs not planned ahead of time because their need was not known. Methods of operation had to be worked out on the job.

Today the first team, except for its leader, Cmdr. M. Scott Carpenter, is to end its 15-day stay on the bottom. The project will go on for another 30 days as two more teams go down. The hazards will remain for the whole period. So will the challenges and the demonstrated human capability to face them.

SAN DIEGO UNION

SEP 1[illegible] 1965

PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

SeaLab II Team Switch Set On TV

Closed Circuit To Show Public Transfer Of Diving Units

Aquanaut behavior appears normal—Page b-1

By BRYANT EVANS
The San Diego Union's Science Writer

For three hours this forenoon — from 8 to 11 a.m. — members of the public can watch what is going on in SeaLab II by closed-circuit television. Monitoring sets will be available in Sumner Auditorium of the Scripps Institution of Oceanography during those hours.

The period will be one of intense activity because it will include the last preparations of members of the first team to return to the surface and the entry into the underwater habitat of the first members of the second team.

The period from 8:30 on also will be one of intense physiological testing. One phase will be the taking of blood samples from the first three of the Team 2 members to descend to determine the rapidity of helium absorption into their bloodstreams.

The first three to descend will be Aquanauts R. A. Barth, Howard L. Buckner and Glen Lilley. The rest of the team will descend after the ascent of the nine members of Team 1.

Cmdr. M. Scott Carpenter, captain of both teams, will not come to the surface for another 15 days.

TO ENTER CAPSULE

The departure of the first team members will commence shortly after noon. One by one they will dive into the well of SeaLab that opens into the ocean and swim 30 feet to the Personnel Transport Capsule that is to take them to the surface.

The capsule made a trip to the surface yesterday for a cleaning made necessary by the trespass of hundreds of anchovies, attracted by the light kept lit in the capsule. Some of the fish had entered through the open bottom and died. The capsule was put back on the bottom yesterday afternoon.

When the last of the nine aquanauts enters the capsule, from the bottom, he will seal the hatch through which he entered. This will conserve the seven atmospheres of pressure during the trip to the surface.

The capsule will be lifted to the surface with a counterweight winch to prevent surging caused by waves. On the suface it will be transfered to the big crane on the Berkone, the staging vessel. The crane will place the capsule on deck and it will be separated from its ballast platform. The capsule will then be mated with an air-tight connection to the deck decompression chamber.

The atmosphere in the chamber will be raised to about seven atmospheres—the pressure of the SeaLab and also of the capsule. Then the aquanauts will open the hatch in the capsule and descend into the decompression chamber. They will seal themselves in and the capsule will be sent back to the ocean bottom.

The aquanauts will remain in the decompression chamber for 30 to 36 hours. In the chamber, the pressure will be gradually lowered and at a decreasing rate. The purpose is to allow gas bubbles occasioned by living in an abnormally high pressure to escape from their systems without causing trouble.

When the pressure has been reduced to a little less than three atmospheres—equivalent to sea level atmosphere plus 66 feet of water.—Dr. Carl Wilhelm Sem-Jacobsen of Osslo, Norway, will enter the chamber to take electroencephalograms of all of the nine men. He will be allowed to stay for 70 minutes. He has perfected a quick system of attaching electrodes to get the job done in this interval.

It will be Tuesday morning before the nine emerge from the chamber and start a 12-hour debriefing session. Then they will be taken to the Naval Hospital for an extensive physical examination.

After a 36-hour period of rest and relaxation, they will report back to the Berkone to serve as support divers for the rest of the operation.

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

SEP 14 1965

TAKE A PEEK AT SEALAB II

Anyone who wants to see what it is like to live in SeaLab II can now do it by going to Sumer Auditorium on the campus of the Scripps Institution of Oceanography at the right times.

Closed circuit television monitors are set up in the auditorium. The auditorium will be open to the public from 11 a.m. until 3 p.m. on week days and from 10 a.m. until 4 p.m. on Saturdays and Sundays, the SeaLab headquarters announced.

Wash. STAR Sunday 9/12/65

9 Aquanauts Wrap Up Deep-Sea Stay Today

LA JOLLA, Calif., (AP) — Nine aquanauts in sealab 2 check out of their "Tiltin' Hilton" on the ocean floor today for a 205-foot, 36-hour trip back to sunshine and fresh air.

The men have lived and worked below the ocean's surface since Aug. 28. Their ascent marks the end of the first phase of the Navy's most ambitious underwater living project.

While the trip to the surface is expected to take only about five minutes, the aquanauts will go directly into a decompression chamber for a slow return to sea-level pressure. This will take about 36 hours, officials said.

Today's schedule also calls for the descent of the second team of nine divers to the 12 by 58-foot steel capsule.

When the aquanauts leave their deep-sea den, they will swim to a transfer capsule — a sort of underwater elevator.

The hatches on the transfer capsule will be closed and the pressure inside will remain at the levels of Sealab depth during its ascent.

The capsule will then be hoisted to the surface by cable and mated to a decompression chamber on the deck of the staging vessel, Berkone. The pressure inside the chamber will then be slowly released.

LONDON

THE SUNDAY TIMES SEPTEMBER 12 1965

The Washington Post

SUNDAY, SEPTEMBER 12, 1965 PAGE E6

Exploring the Undersea

Editorial

Although the Navy's team of aquanauts now in an experimental underwater project off California has yet to catch the public's fancy, the oceanographic research effort of which their Sealab 2 is a part could have an even greater impact than the space program on the lives and future well-being of Americans. The aquanauts, led by astronaut M. Scott Carpenter, a Navy commander, went underwater on August 29. Working in shifts, they are scheduled to spend 45 days in the Sealab capsule at a depth of 210 feet.

Their reactions to prolonged periods in Sealab's artificial environment and in the ocean depths will provide vital information on man's ability to explore and work on the world's continental shelves. Difficulties that have already occurred indicate that undersea exploration, heretofore granted only limited funds for research and development, is not likely to advance as spectacularly as the space program.

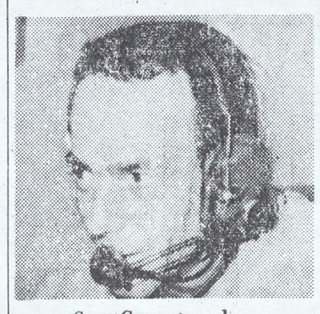
In any event comparison with the space program can be misleading. In view of the long established and diffuse programs already carried on by nine agencies of the Federal Government, creation of a nautical NASA would be impractical. Yet a central focus within the Government is needed. In Fiscal Year 1966 the Government will spend about $140 million on oceanography. The Navy has more than half the funds. The Departments of Commerce and Interior and the National Science Foundation also have large appropriations. There also is an opening for private initiative in oceanography.

Toward these ends the Senate has passed a bill sponsored by Sen. Warren G. Magnuson, chairman of the Commerce Committee, calling for a National Council on Marine Resources and Engineering Development to coordinate Federal programs. A separate commission, largely made up of persons outside Government, would conduct a survey to set guidelines for private and Government cooperation in oceanography. Though the House has yet to act, a subcommittee headed by Rep. Alton A. Lennon of North Carolina is drafting a bill that should emerge in a form similar to the Senate's. Congressman Lennon argues persuasively, however, that the Interagency Committee on Oceanography must be strengthened and that the Federal Council for Science and Technology, which operates under the President, can fill the role of Senator Magnuson's proposed Council.

There is bound to be a steady proliferation of oceanographic programs in the future. The vast resources that lie in the sea and under the ocean beds that cover seven tenths of the earth eventually must be tapped. It would be a pity to allow military considerations, important as they may be, to dominate the research effort in which there is still a hope of international cooperation. For this reason, particularly, a unified Government policy is much needed.

In Brief

Nine excited men come up for air



Scott Carpenter: down for another ten days

By Evelyn Irons

NEW YORK, Saturday

THE AQUANAUTS who have been living 205 feet under the Pacific in a 57-foot capsule called Sealab II for the past fortnight are suffering from a bad attack of "Channel Fever."

A naval officer at their shore base, at La Jolla, California, explained: "When sailors have been on a long tour of duty, maybe two years abroad, and are nearing port they sleep badly and get over-excited. Navy slang for this is Channel Fever."

The aquanauts have it because they are being hauled up from Sealab II tomorrow to be replaced by a fresh team—at least, nine of them are. The 10th, their leader, Commander Scott Carpenter, the astronaut, is staying down another 10 days.

After the team of crack navy divers and scientists from the Scripps Institution of Oceanography leave their undersea quarters 344 yards off the coast they will spend at least 36 hours in a decompression chamber otherwise they might die of "the bends."

At 2 p.m. (10 p.m. B S T) they will swim from Sealab II to a small decompression chamber about 40 feet away along the seafloor. They will be hauled in this to the mothership and transferred to a larger decompression unit.

US Navy officials deny stories that the aquanauts suffered severe pain and hardship underwater. A few were afflicted with ear infections from swimming but this was cleared up by antibiotic treatment.

Because the aquanauts complained of cold when swimming for long periods in diving equipment they were given other "wet suits" heated by batteries and the Sealab's temperature was raised to 85 degrees. They saw scorpion fish and sharks but were not molested.

ΣA105LA (PX)

FIRST LEAD SEALAB 2 BUDGET (170)

BY THE ASSOCIATED PRESS

LA JOLLA, CALIF., SEPT. 12 (AP)-NINE AQUANAUTS RETURNED TO THE OCEAN SURFACE "SAFE AND SOUND" TODAY AFTER 15 DAYS PROVING THAT MAN CAN LIVE AND WORK 205 FEET BELOW.

THREE MEMBERS OF A FRESH CREW OF NINE SWAM DOWN EARLIER FROM A STAGING VESSEL AND ENTERED THE NAVY'S 12-BY-59-FOOT STEEL CAPSULE SEALAB 2. SIX MORE WERE TO JOIN THEM LATER IN THE DAY.

STILL BELOW AFTER 15 DAYS WAS ASTRONAUT SCOTT CARPENTER, WHO PLANS TO STAY ANOTHER 15 WITH THE SECOND CREW.

THE ASCENT IN A PRESSURIZED TRANSFER TANK TOOK ABOUT SEVEN MINUTES AFTER A DELAY CAUSED WHEN AN AQUANAUT HAD TO SHIFT A HOIST LINE INTO PROPER POSITION.

ON THE DECK OF THE STAGING VESSEL BERKONE THE TRANSFER TANK WAS MATED TO A DECOMPRESSION CHAMBER. THERE THE NINE MEMBERS OF CREW NO. 1 WILL WAIT ABOUT 36 HOURS WHILE THE PRESSURE IS SLOWLY REDUCED TO THAT OF SEA LEVEL.

"THEY'RE ALL SAFE AND SOUND; EVERYTHING IS GOING BEAUTIFULLY," A NAVY SPOKESMAN SAID AFTER THE NINE RETURNED TO THE SURFACE.

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Part II—FRI., SEPT. 10, 1965 Los Angeles Times 2★

Aquanauts Under Sea Talk to Press Above

Living on 12th Day in Sealab Capsule Offers Fish Fights as Main Attraction

BY CHARLES HILLINGER
Times Staff Writer

What's it like living in a housetrailer parked 205 feet below the surface of the sea?

The Navy's 10 aquanauts, on their 12th day in the Sealab capsule off La Jolla, Thursday described day-to-day living in the first ocean-floor to surface press conference in history.

"It's a fish-eat-fish world down here," squeaked aquanaut Berry L. Cannon, 30, in a high-pitched helium voice in answer to a question via a special phone hookup.

"All the fish are being gobbled up or eating other fish. There's been some dandy fish fights."

Cannon, whose wife and three children live in Chula Vista, said that inside the 57-foot cigar-shaped underseas house "it's like the tropics."

Cold Outside

"Outside, after swimming for an hour, it's so cold it seems like we're swimming through snowdrifts."

Water temperatures outside have been as low as 40 degrees.

Inside, four dehumidifiers keep the humidity "down" to 80%.

All aquanauts report seeing strange objects in the sea, marine life they've never seen before.

"Oddest looking thing I've seen," said Cannon, "was something with 12 arms and about 3 feet in diameter.

"At first I thought it was a crazy-looking octopus. Later I learned it was some kind of a giant star fish."

From 2 in the afternoon until 10 in the morning it is black as coal outside the capsule, he said. "Fish swarm about our 11 windows during the dark periods, attracted by our lights."

See 60 Feet

During periods of ambient light from 10 a.m. to 2 p.m. aquanauts can see as much as 60 feet. At other times they carry arc lamps when swimming from the capsule.

Cannon said they seem to spend most of their time preparing for walks on the bottom of the ocean and cleaning up afterward.

"It takes almost an hour to get ready to leave the capsule. Then we stay out an hour. When we come back in it takes about an hour to remove our equipment. By the time we clean it up and check it out, it's time to get ready to go out again.

"To get 10 men in the water twice a day, there isn't much time for anything else, except our household chores."

Lt. Robert E. Sonnenburg, 28, the Navy doctor on the aquanaut team, said swimming on the bottom of the sea is "like strolling in my back yard. There's no feeling of insecurity here. We never think about that."

Dr. Sonnenburg has been treating all the aquanauts for minor ear infections. Capt. George F. Bond, directing the Sealab experiment from its surface-vessel Berkoni, said it's common for Scuba, hard hat and salvage divers to have minor infections of the outer ear.

"Some of us are getting cabin fever and are getting ready to go up," said Dr. Sonnenburg. All the aquanauts, except Cmdr. M. Scott Carpenter, will return to the surface Sunday and be replaced by a second team of nine men.

Minneapolis (Minn) Sunday Tribune
SUNDAY, SEPTEMBER 12, 1965

Nine Aquanauts to End Sojourn in Sealab 2

LA JOLLA, Calif. —(AP)— Nine aquanauts in Sealab 2 will check out of their "Tiltin' Hilton" on the ocean floor today for a 205-foot, 36-hour trip back to sunshine and fresh air.

The men have lived and worked below the ocean's surface since Aug. 28. Their ascent will mark the end of the first phase of the Navy's most ambitious underwater living project.

While the trip to the surface is expected to take only about five minutes, the aquanauts will go directly into a decompression chamber for a slow return to sea level pressure. This will take about 36 hours, officials said.

Today's schedule also calls for the descent of the second team of nine divers to the 12-by-58-foot steel capsule.

The aquanauts have nicknamed the capsule the "Tiltin' Hilton" as an indication that the ocean-bottom "hotel" was not exactly level. One end is slightly higher than the other, and there is a list to one side.

When the aquanauts leave their deep sea den, they will swim to a transfer capsule—a sort of underwater elevator.

The hatches on the transfer capsule will be closed and, the pressure inside will remain at the seven atmospheres of Sealab depth during its ascent.

The capsule then will be hoisted to the surface by cable and mated to a decompression chamber on the deck of the staging vessel, Berkone. The pressure inside the chamber then will be slowly released.

THE SAN DIEGO UNION
Fri., Sept. 10, 1965
SAN DIEGO, CALIFORNIA

SEALAB RESEARCH HELPS

Control Of Ocean Depths Called Vital For Defense

SeaLab II and similar oceanographic research projects in San Diego have "enormous" military and economic implications for the future of America, the San Diego Lions Club was told yesterday.

Finn Claudi-Magnussen, chairman of the oceanography development committee of the San Diego Chamber of Commerce, also said community support is vital if the city is to maintain and strengthen its position as the world capital of oceanographic research and development.

DECISIVE FACTOR

"The strategic military power on the seas of the free world vs. the Sino-Soviet bloc has reached a stage where neither side has a clear-cut definite advantage," Claudi-Magnussen said. "Under such circumstances, control of ocean resources and occupancy of ocean stations may well become a decisive factor."

The speaker related the sea frontier to a vast empty plain occupied by two unfriendly armies of equal strength.

"However," he said, "one of the two countries has developed an industry to build wagons and with that capability settlers from the country can travel into the prairie, select sites for homesteading, build their homes, grow corn and raise cattle. In effect, then, that country has control over the prairie."

In today's delicate balance of opposing powers, he said, the ability to exploit and occupy the depths of the ocean has become "critical to national defense" and important to the economic future of all nations.

Noting that the 1964 International Convention of the Continental Shelf recognized the sovereign right of nations to explore and exploit sea beds and subsoil sources to a "depth to which technology will permit," Claudi-Magnussen showed films of existing undersea vehicles and machines and artists' conceptions of those of the future.

HIDDEN FORCES

They included large-mouthed subarmines "swallowing" whole schools of fish and fish traps consisting of electrostatic fields and curtains of air bubbles.

Claudi-Magnussen, a former Dane now director of planning and marketing for the Whittaker Corp's. Narmco Division here, said it still "is easy to hide terrific military striking power" under the sea and "most difficult to find similar forces of the enemy."

This, he said, is why it is so vital to learn how to operate efficiently and effectively within the ocean environment, the primary purpose of the Navy's SeaLab program.

But, the speaker said, American industry and particularly that in San Diego County should not depend on federal programs.

"Companies which seek to take full advantage of the potential would do well to reorient their thinking toward the free enterprise type of business and the idea of venture capital," he said.

Presently in San Diego County, he said, there are 40 private firms engaged in oceanographic research and development projects.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

Aquanauts to Leave Ocean Floor 'Hotel'

LA JOLLA, Calif., Sept. 11 — (AP) — Nine aquanauts in Sealab 2 check out of their "Tiltin' Hilton" on the ocean floor Sunday for a 205-foot, 36-hour trip back to sunshine and fresh air.

The men have lived and worked below the ocean's surface since Aug. 28. Their ascent marks the end of the first phase of the Navy's most ambitious underwater living project.

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The hatches on the transfer capsule will be closed and, the pressure inside will remain at the seven atmospheres of Sealab depth during its ascent.

The capsule will then be hoisted to the surface by cable and mated to a decompression chamber on the deck of the staging vessel, Berkone. The pressure inside the chamber will then be slowly released.

The transfer capsule, which has been on the bottom near the Sealab since the project began, was brought up Saturday for a thorough scrubbing.

Officials said anchovies attracted by the light had entered an open hatch in the bottom and died. It was cleaned out.

Astronaut Scott Carpenter is the only man in the first team who will not come up Saturday. He stays down for another 15-day shift with the second crew.

From
ROCKY MOUNTAIN NEWS
Denver, Colo.
SEP 12 1965

SEP 12 1965

Deep-Diving Aquanauts Win Despite Handicaps

By PETER BART
Copyright 1965, New York Times Service

LA JOLLA, Calif., — Scientific findings that may aid in the exploration of the "inner world" beneath the ocean are starting to emerge from a small steel capsule submerged 210 feet below the ocean's surface off La Jolla.

For nearly two weeks a team of 10 men headed by Cmdr. M. Scott Carpenter, the astronaut, has lived in the 57-foot-long capsule anchored on an ocean shelf 1,000 yards off shore.

Each day the men, attired in underwater gear, have left the capsule, called Sealab II, to probe the pitch blackness of the ocean's floor and perform varied experiments. These have ranged from the setting up of a massive underwater weather station, the first of its kind ever installed, to the collection of exotic marine life.

A monitoring of conversations between the "aquanauts" in the capsule and scientists on the "mother ship" anchored at the surface reveals that the men are suffering considerable hardships. Nine of the 10 men are afflicted with painful ear infections. Inadequacy of some of the protective "wet suits" has caused paralyzing coldness that has often forced the men to abandoned their assigned tasks outside the capsule. The men also have been harassed by an expected invasion of stinging scorpion fish and the ever-present danger of sharks.

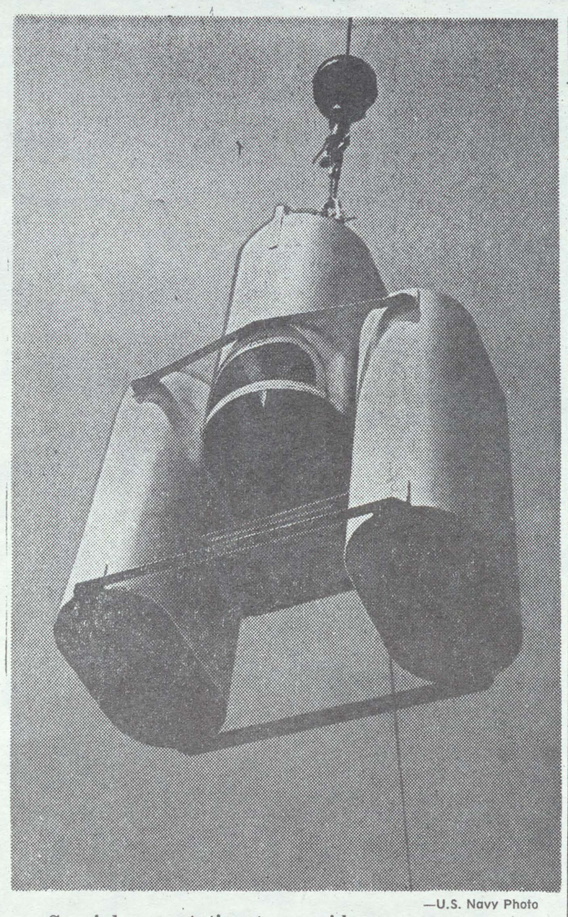
Some of the aquanauts, who now jokingly call each other "aquanuts," are also worried about leaks in the capsule's steel port covers as well as the possibility that the capsule could slip off its shelf and break its "umbilical cord" with the mother ship.

The first team of aquanauts, with the exception of Carpenter, is scheduled to be brought to the surface Sunday afternoon to be relieved by nine new men. Carpenter, who is on loan to the project from the astronaut program, plans to stay in the capsule throughout the 30-day experiment.

From SUN-TIMES Chicago, Ill.
SEP 10 1965

THE SAN DIEGO UNION
Sat., Sept. 11, 1965
SAN DIEGO, CALIFORNIA

1st, 2nd SeaLab Teams Prepare To Swap Places



—U.S. Navy Photo

Special way station to provide emergency space for breathing gases for SeaLab aquanauts is swung over water by seaboard crane for lowering. Two such stations have been established for project.

'Trolley' To Shift Gear

By BRYANT EVANS
The San Diego Union's Science Writer

Today is packing day for the nine aquanauts in the first SeaLab II team and also for the nine in the second team.

Capt. George Bond, chief scientific investigator on the program, said the main activity today would be in getting ready for the team shift to take place tomorrow.

All day long, he said, the "trolley" between the mother ship, the Berkone, and the SeaLab would be going up and down—bringing back clothes and personal items from Team I and taking down items for Team II.

Work outside SeaLab was hampered to some extent yesterday when visibility dropped to 10 feet. This was caused by northwest winds which gave rise to currents that churned up bottom sediments.

DEAD ANCHOVIES

An unexpected job for the topside crew off La Jolla developed yesterday when it was learned that a significant number of anchovies had committed suicide in the personnel transport capsule. This capsule is the vehicle that will bring the SeaLab II men back to the surface after two weeks of submergence.

The capsule has been standing ready 30 feet from SeaLab ever since the men went down. It is a very large diving bell, open at the bottom and it has a light inside. The light attracted the anchovies and some of them got stuck inside.

The aquanauts' attempt several days ago to clean out the capsule with an air hose apparently did not quite do the job. As a result there are dead fish inside.

Consequently the capsule will have to be brought up to the Berkone today and scrubbed. For a short time the aquanauts' elevator to safety will be gone but a small diving bell will be substituted.

Then it will be ready for the Team 1 aquanauts to board it at 2 p.m. tomorrow. When they leave the bottom, three men of the new team already will be making themselves at home in the lab.

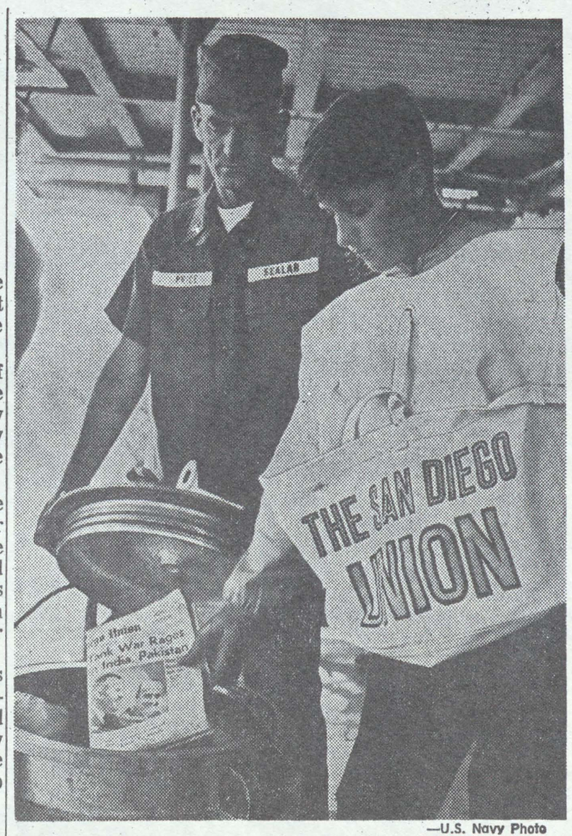
TESTS TODAY

Bond said that in addition to moving preparations, a heavy schedule of physiological tests would be carried on today and again tomorrow. A major purpose of the project is to detect the slightest changes in body chemistry or function that occur as a result of living in an artificial helium atmosphere.

So far no changes in the chemistry have been aanounced. Bond said that no significance could be attached to the data received until it can be compared with similar readings to be taken after the men return to normal air and pressure.

Among the studies have been series of electrocardiograms and electroencephalograms.

After the aquanauts have been transferred from the personnel transport capsule tomorrow and placed in a deck decompression chamber for at least 36 hours, all of them will be tested with a quick electroencephalograph system worked out by Dr. August Sem-Jacobsen of Oslo, Norway. Sem-Jacobsen will be permitted to enter the decompression chamber for the tests when the pressure is equal to that of 60 feet. He may stay 70 minutes.



—U.S. Navy Photo

Newspaperboy Jimmy Hoffman puts The San Diego Union into "pressure pot" to be lowered to SeaLab aquanauts under eye of master diver Daniel D. Price.

NEWS FOR SEALAB

Surfboard Eyed For Deliveries?

Jimmy Hoffman, a newspaperboy in La Jolla, never delivers The San Diego Union on his surfboard. But he may have to if he's going to keep one group of readers happy.

According to route maps in The San Diego Union's circulation department, SeaLab II resting on the bottom of the ocean off La Jolla, is on Jimmy's route. Or it would be, if paper routes went to sea.

2 COPIES DAILY.

The Navy is seeing to it that the aquanauts 205 feet down in SeaLab II get their morning paper. Two copies are included in deliveries lowered to the underwater station every morning from the mother ship Berkone on the surface.

Yesterday, however, Jimmy got a chance to do the honors himself. He rode out to the Berkone in a launch to see how newspapers and other important material are passed from "topside" to the ocean floor.

Jimmy, 14, lives at 1352 Torrey Pines Road. His father, Robert Hoffman, is a retired Navy pilot who now is studying biology at San Diego State.

VOICES 'SQUEAKY'.

"We could see them down there on the television screen. They were at the table eating," Jimmy said later. "When they talked their voices sounded squeaky. That's because of the helium in the air they breathe."

What if Jimmy were invited to take a dive to the SeaLab. Would he go? He hesitated. "Well . . . it would be quite an experience," he replied.

Jimmy, a ninth grader at Muirlands Junior High School, has not done any diving but he likes to surf.

As for delivering papers on a surfboard, how would you keep them dry?



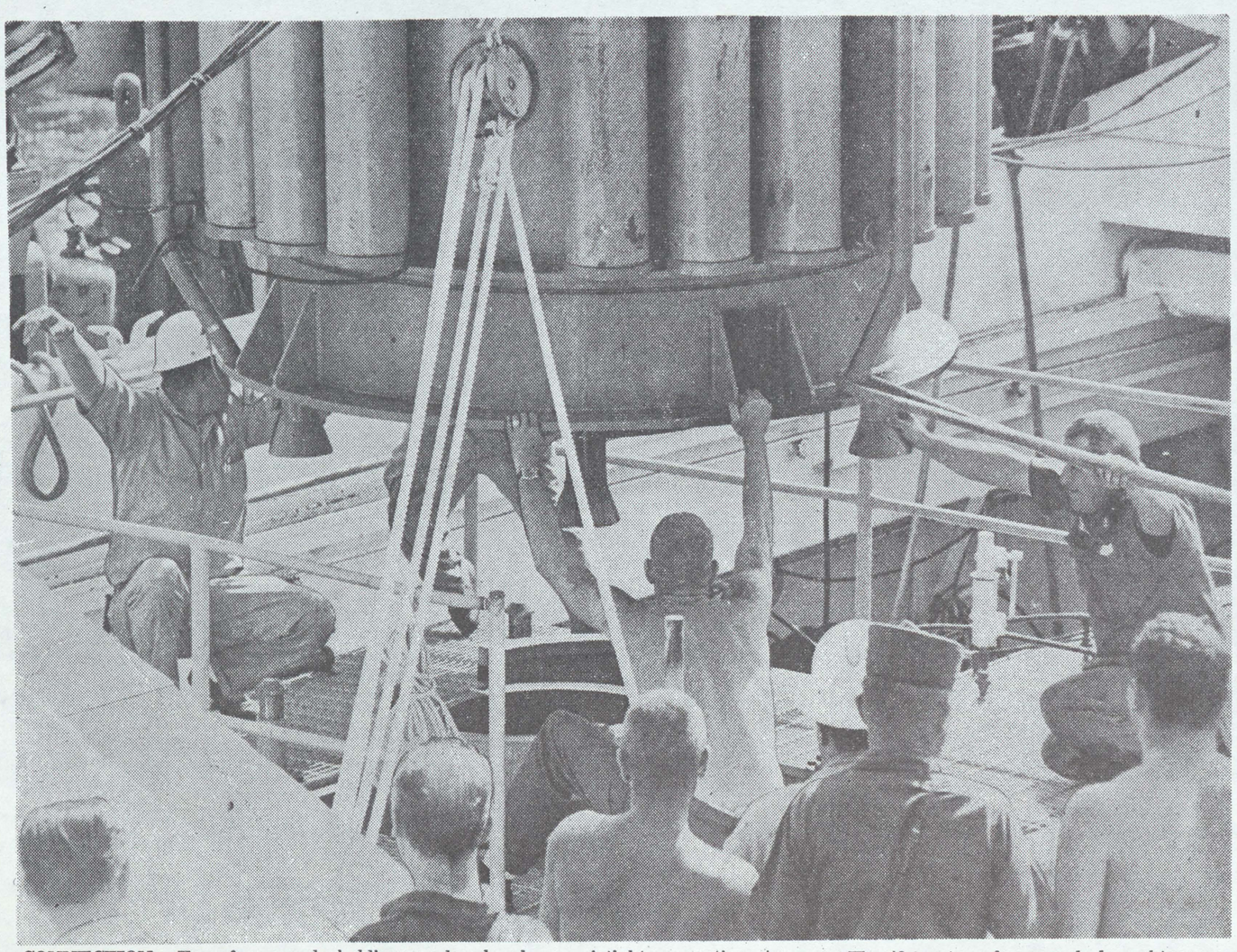
SAMPLE AQUANAUT BLOOD

Lt. Robert E. Sonnenburg takes blood sample from aquanaut Earl A. Murray as part of tests made 205 feet below surface of the Pacific off La Jolla, Calif. Murray and others are participating in Sealab 2 project, the Navy's underwater living experiment. (AP)

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EVENING TRIBUNE
SAN DIEGO, CALIFORNIA
Mon., Sept. 13, 1965

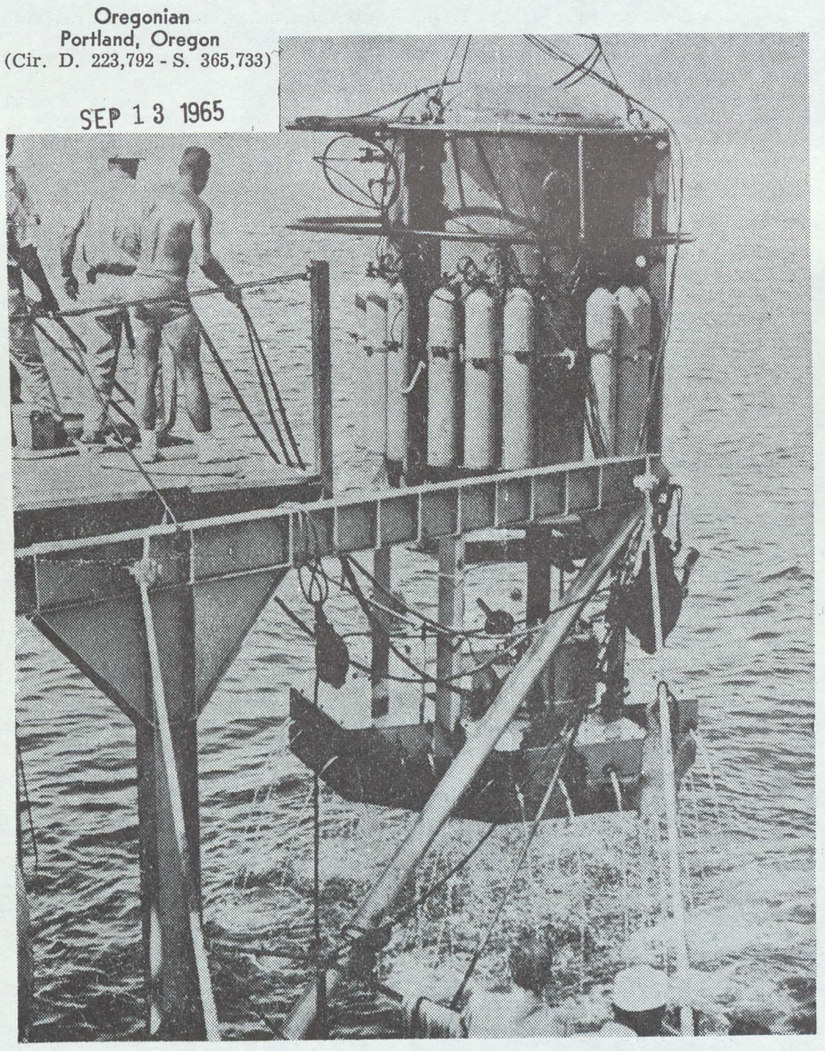
2nd Sealab Team Descends; Carpenter Treated for Sting



CONNECTION — Transfer capsule holding nine aquanauts of the first Sealab team is lowered to be joined with decompression chamber by an airtight connection. Aquanauts will remain in the chamber aboard mother ship Berkone until early tomorrow. The 13-ton transfer capsule brought aquanauts from Sealab II where they spent 15 days at 205-foot depth.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

SEP 13 1965



FIRST CREW of the Navy's Sealab 2 was brought to the surface Sunday after 15 days under the sea off La Jolla, Calif. This transfer tank was mated to a decompression chamber in which the men will have to stay for about 36 hours. (AP Photo)

Lurking Scorpion Fish Stings Scott Carpenter

LA JOLLA, Calif. (AP) — A scorpion fish stung astronaut-aquanaut M. Scott Carpenter Sunday as nine of his fellow crewmen were preparing to leave the Navy's Sealab 2 on the ocean bottom off La Jolla.

The departure of the nine was delayed while one of them — Lt. Robert Sonnenburg, a Navy doctor — treated Carpenter to see if he could stay as planned or would have to surface with the team. Plans call for Carpenter to stay down 15 more days.

After an hour-and-15-minute delay Lt. Sonnenburg said Carpenter was responding to treatment and would stay. The sting of the dorsal spines of the inches-long red fish is painful but not lethal. Carpenter, a Navy commander, was stung on the left index finger at Sealab's exit hatch.

15-Day Stay Ended

Three members of a fresh crew of nine aquanauts swam down earlier and were with Carpenter, who fell asleep on his bunk, after the other nine crewmen ended a 15-day stay in the 12-by-59 foot steel capsule 205 feet below the surface.

The other six new crewmen descended later.

A Navy spokesman said the scorpion fish sting wasn't unexpected because hundreds of the bottom-dwelling fish lurk in the gloomy depths near Sealab 2. Carpenter's sting was Sealab's first accident. He was treated with pain - killing drugs and cortisone.

The Navy said the nine men who were brought to the surface Sunday were in good shape — and had proved that man can live and work efficiently in the ocean depths.

The ascent in a pressurized transfer tank took about seven minutes after a delay caused when an aquanaut had to shift a hoist line into proper position.

On the deck of the staging vessel Berkone, the transfer tank was mated to a decompression chamber. There the nine members of Crew No. 1 will wait about 36 hours while the pressure is slowly reduced to that of sea level.

From SEP 13 1965
NEWS
Dallas, Texas

9 Aquanauts Surface; Fish Stings Carpenter

LA JOLLA, CALIF. (AP) — A scorpion fish stung astronaut-aquanaut M. Scott Carpenter Sunday as nine of his fellow crewmen were preparing to leave the Navy's Sealab 2 on the ocean bottom off La Jolla.

The departure of the nine was delayed while one of them—Lt. Robert Sonnenburg, a Navy doctor—treated Carpenter to see if he could stay as planned or would have to surface with the team. Plans call for Carpenter to stay down 15 more days.

After a 75-minute delay Lt. Sonnenburg said that Carpenter was responding to treatment and would stay. The sting of the dorsal spines of the inches-long red fish is painful but not lethal. Carpenter, a Navy commander, was stung on the left index finger.

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Mpls. (Minn.) Morning Tribune
MONDAY, SEPTEMBER 13, 1965

Fish Stings Aquanaut Carpenter

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"THEY'RE ALL safe and sound; everything is going beautifully," a Navy spokesman said after the nine returned to the surface.

A third team later will replace the second in the 45-day experiment, the Navy's most ambitious underwater living project.

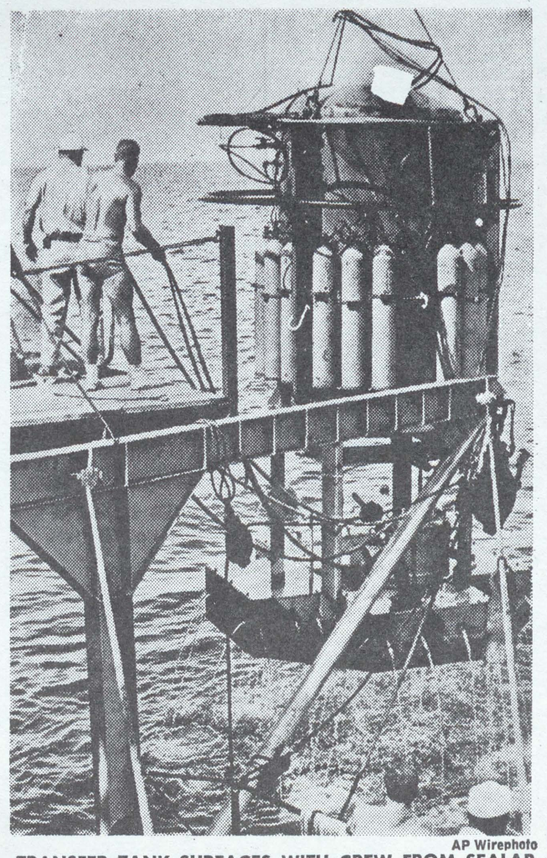
Its primary purpose is to determine whether man can live and work in the hostile environment of the ocean depths.

Since Aug. 28 the first crew has kept busy in and about the deepsea den a thousand yards off the shore of this scenic southern California resort.

IN WET SUITS the aquanauts have ventured forth to chart movements of ocean currents and sediment. They have set up an ocean-bottom weather station to see if there is a correlation between surface weather and recordings below.

Probably the most important benefit of the experiment, a Navy spokesman said, would be to show that deep-water salvage and rescue operations are possible after submarine, ship or plane disasters.

"These initial steps, if successful, also would open up the entire continental shelf to future exploration," he added. "We know there are tremendous deposits of magnesium waiting to be scraped up; huge untapped oil and gas reservoirs; mineral deposits we can only speculate about."



AP Wirephoto
TRANSFER TANK SURFACES WITH CREW FROM SEALAB Ascension after 15 days under water was delayed Sunday to treat Malcolm Scott Carpenter, stung by a scorpion fish.

Astronaut Stung In Aquanaut Test

LA JOLLA, Calif. — (AP) — Malcolm Scott Carpenter—unscratched in three orbits of earth in 1962 as an astronaut—was stung by a scorpion fish during a tricky transfer of crewmen of the Navy's Sealab 2 aquanauts in 205 feet of water.

Plans calling for Carpenter to stay another 15 days in the laboratory on the ocean bottom were almost scuttled as the 40-year-old astro-aquanaut, his left hand and arm swelling painfully, was brought back through Sealab's escape hatch.

Nine aquanauts who had been scheduled to ascend after 15 days under water postponed their departure while one, a doctor, treated Carpenter with pain-killing drugs and cortisone. He said he wanted to stay.

When Carpenter responded to treatment the nine aquanauts, 75 minutes late, continued the complicated maneuver designed to bring them back to man's normal environment: sea-level pressure and sea-level air.

They were raised to the surface Sunday afternoon in a capsule-like tank which maintained the pressure the crewmen had grown used to in Sealab: seven times that of the surface. The transfer unit was attached to a decompression chamber on the support vessel Berkone on the surface and the pressure slowly decreased.

The nine must spend 36 hours in the decompression unit before they can step out—early Tuesday morning—without suffering the diver's disease, bends, caused by bubbles in the bloodstream.

Nine new crewmen took the place of the men who ascended Sunday. The first three went down before Carpenter's accident. One of them, a Navy medical corpsman, attended Carpenter when the other aquanauts left. Six others went down after the original nine arose.

NEWS Detroit, Mich.
SEP 15 1965

AQUANAUTS REPORT

2 Weeks Under Ocean Produces 'Diaper Rash'

LA JOLLA, Calif., Sept. 15.—(AP)—Living at the bottom of the ocean gives a man a chill, ear trouble and something resembling diaper rash, say nine aquanauts who tried. The helium atmosphere they breathed gave them high-pitched voices.

But someday, they added, man may be able to roam under the seas comfortably in a mobile laboratory.

The first team of aquanauts aired their conclusions yesterday after emerging from 15 days in Sealab 2, lowered 205 feet down in the Pacific Ocean.

SURFACED SUNDAY

They surfaced Sunday, spent 33 hours in a decompression chamber, then met newsmen aboard the staging vessel Berkone.

Aquanaut Jay D. Skidmore said their voices sounded like a speeded-up phonograph record.

". . . It created a lot of hilarity at first," said Skidmore. "After a few days we got used to it and toward the last it seemed extremely normal."

Capt. George Bond, chief of the project, said it pointed toward eventual development of a vehicle in which 35 men could go anywhere in the world, do any underwater job and return while decompressing.

He said such mobility could best be obtained by modification of a nuclear submarine.

EFFICIENCY LIMIT

Bond said, however, that after three weeks underwater, the men's efficiency would begin to decrease.

Aquanaut Bill Coffman said he and Skidmore spent the longest time in the water at any one time—two hours and 44 minutes. Coffman said it was cold, but that they could have stayed out longer.

Lt. Thomas A. Clarke, team biologist, said he, however, could take only about 30 to 40 minutes in the water, which averages 51 to 53 degrees.

Sealab physician Lt. Robert Sonnenburg praised underwater living, but added he was unable to cure an ear infection suffered by the aquanauts. He treated them to alleviate discomfort.

The aquanauts developed a rash, similar to a baby's diaper rash, probably due to wet clothing and irritation.

CUT OXYGEN

The second team of aquanauts in Sealab 2 will have to get by on shorter rations of oxygen in an experiment starting today.

Officials said the oxygen content of the atmosphere in the 12-by-58-foot steel capsule will be reduced from 4.25 to 3.5 percent for the next three days.

Ten men are working in the project's second, or scientific, phase.

In reducing the oxygen content, scientists are seeking the most efficient breathing mixture for use in underwater projects.

The first team breathed a mixture of 4.25 percent oxygen, 20 percent nitrogen and 75.75 percent helium.

Extensive physiological tests will be conducted to determine if the reduction in oxygen will cause any changes in the aquanauts.

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Aquanauts Back, Describe Life Below

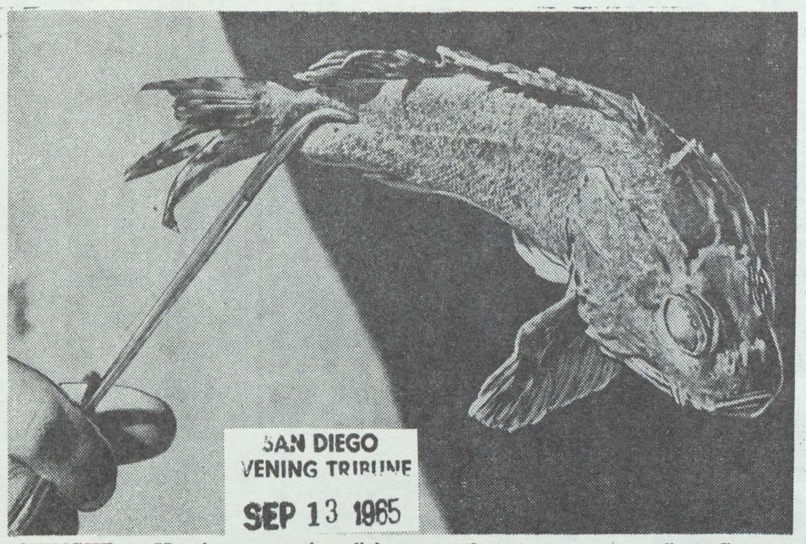


Aquanaut Thomas Clarke, in center holding microphone, tells newsmen about cold water and abundant sea life he and others on underwater team found around the Navy's SeaLab II. The aquanauts held press conference yesterday several hours after they had left the decompression chamber. Seated in a line nearest table are six other members of the aquanaut team, from left: Wilbur Eaton, Frederick Johler, Robert Sonnenburg, Cyril Tuckfield, Earl Murray and Berry Cannon. Not shown is aquanaut Billie L. Coffman, who re-enlisted during his underwater stay. (Story on a-1).

—San Diego Union Staff Photos



Frederick Johler was first member of the aquanaut team to leave decompression chamber after completing tests under sea. Greeting him at left is Capt. Walter Mazzone, who operates the decompression chamber.



STINGER — Here's a scorpion fish (Scorpaena guttata) similar to the one that stung aquanaut Scott Carpenter on left index finger yesterday.

5-YEAR PROJECTION

Vast Future Seen Aquanauts Report On SeaLab Living

Pictures—Page a-3

Additional SeaLab stories—Page a-4

By CLIFF SMITH

The Navy will have crews living and working under the sea at depths of 800 feet within five years, it was predicted yesterday as nine SeaLab II aquanauts told of their 15-day pioneering adventure.

Meanwhile, a second team of aquanauts spent a third day in the SeaLab, astronaut-aquanaut M. Scott Carpenter was reported fit after a 17th day in the lab and Tuffy, the Navy's trained porpoise, exercised in open water for the first time here.

The first team aquanauts breathed their first fresh air in nearly 17 days when they emerged from a decompression chamber aboard the SeaLab support vessel Berkone at 12:03 a.m.

After sleeping the balance of the night, they held a press conference to tell of their strange and challenging life under tremendous pressure in the cold, murky depths off La Jolla.

Capt. George (Pappa Topside) Bond (MC), director of the Navy's Man-in-the-Sea Program, predicted during the conference that Navy aquanauts will dot the ocean floors before the project is completed.

Fixed Bases Are Proposed

"We hope to have men on the bottom the year round doing useful work within five years," Bond said. "They will live and work at depths of 800 feet or more, certainly to the extent of the continental shelves.

"There will be many fixed bases similar to the SeaLab as well as completely mobile underwater laboratories and vehicles. Nuclear submarines are obviously best adapted for this purpose."

Bond said the experience of the first SeaLab II team indicates that future aquanauts will be able to work "efficiently" for periods up to three weeks. He envisioned an entire corps of Navy aquanauts that would man fixed underwater stations up to 50 miles from shore on a rotational basis, being decompressed safely while on their way to the surface in submarine-like vehicles.

Bond said such a program "could include military objectives."

All Feel Fine But Appear Tired

The aquanauts all appeared tired as they faced reporters and a bright sun at the 8 a.m. press conference held on the deck of the Berkone. Members of the team, however, said they felt fine and Bond said preliminary medical examinations showed they were in good condition.

Capt. Lewis B. Melson, director of SeaLab II, opened the meeting by reading a message from Secretary of the Navy Paul Nitze congratulating the nine on their mission.

Thomas A. Clarke, 25, a graduate student biologist at Scripps Institution of Oceanography, was the first of the nine aquanauts questioned. He told of taking fish population counts, studying their habits, and of sending unfamiliar specimens and earth core samples to the surface for examination. He said the only sharks seen were harmless angel sharks and the only potentially dangerous species seen were scorpion fish and a lone electric ray.

(Continued on a-2, Col. 7)

Lt. Robert Eric Sonnenburg (MC), said the only significant medical problem was an ear infection suffered by all members of the team except Torpedoman's Mate 1st Class Billie L. Coffman, 36, who swabbed his ears with alcohol before and after swims outside the lab.

"I found the ear infections annoying because I couldn't clear them up," Sonnenburg said. "We were able to treat it to some degree with a hair dryer (to dry their ears) but it never cleared up completely. I don't know what it is but I don't think it is a fungus even though it seems to be caused by the dampness and humidity. It didn't respond to systematic antibiotics and it produced sterile cultures."

Sonnenburg said Carpenter's ears still were infected when he left the SeaLab but the Navy commander was not suffering and was able to hold the ailment in check.

Sonnenburg said all members of the team also developed skin rashes under arms, around the groin and at the beltline, apparently because of the humidity and repeated swims.

Coffman revealed for the first time that he was stuck by one of the spiny, poisonous scorpion fish (sculpin) like that which punctured the finger of Carpenter. Coffman, who encountered the fish more than a week ago, said the severe pain from the spine puncture lasted only "about half an hour."

He and chief photographer Jay D. Skidmore also told of an anchor-positioning project that resulted in the "hardest work" and longest venture outside the SeaLab.

Planned To Free Tangled Line

Coffman said he and Skidmore ventured outside the lab the first day to untangle a three-inch manila line from the umbilical cord connecting the lab to the surface. He said they had hoped to use the line to guide a six-inch (circumference) nylon line from the lab to a 13,000-pound battleship anchor 180 feet away.

Finally they were forced to abandon plans to use the smaller line. The next day, Coffman said, he and Sonnenburg dragged the heavy nylon line over a hill to the anchor and connected it with a bowline knot.

Coffman said the job required 2 hours and 44 minutes and left him "a bit exhausted."

"Threading the line through a shackle on the lab and trying to get all the slack out was hard work," he said.

The aquanauts said the deepest they dived was to 225 feet and that they ventured no farther from the lab than 250 feet, usually taking a guideline to lead them back to safety.

Skidmore said the average visibility was limited to "about 10 feet" by silt and mud along the bottom.

"The best visibility we ever had was 27 feet," he said.

Average Water Temperatures

The team reported that the water temperature outside the lab averaged between 51 and 53 degrees. The lowest recorded temperature was 47 degrees.

All the aquanauts agreed that one of the most pleasurable pastimes while living inside the lab was watching the constant parade of varied animal life. Clarke said insufficient time prohibited collecting fish for two cages outside the SeaLab.

The first team, which descended to the lab Aug. 28, spent 30 hours in the Berkone decompression chamber.

After the press conference, Coffman, Sonnenburg and Chief Engineman Frederick J. Johler were taken to the Naval Hospital in San Diego for an exhaustive eight-hour physical examination, a preplanned part of the project. Last night they drove to Santa Barbara where today they will undergo cold temperature tolerance and adaptation tests at the University of California. Data obtained in the tests will be compared with identical tests taken before their long dive.

Davenport (Ia) Times-Democrat
FRIDAY, SEPTEMBER 17, 1965

Performance By 'Tuffy' Not So Hot

LA JOLLA, Calif. (UPI) — Tuffy, an impish dolphin, performed "bashfully" Thursday in a hide-and-go-seek game with two aquanauts in the depths of the Pacific Ocean as part of an experiment in underwater survival techniques.

His much ballyhooed debut was not an overwhelming critical success, but far from disappointing to the Navy.

In one series of dives from the surface, Tuffy responded to a buzzer 205 foot deep sounded by two "lost" aquanauts, came within "inches" of his target, paused and swam away, Sealab 2 officials said.

Capt. George Bond, principal investigator in the Navy's man-in-the-sea project, said Tuffy might have been scared by the aquanauts' "umbilical" cords and flood lights as well as sounds from the sealab.

Aquanauts John Reaves and Ken Conda left their underwater base, the steel cylinder Sealab 2, and pretended to get lost in the murky depths of underwater Scripps Canyon. When they positioned themselves, they sounded their special buzzers.

Tuffy, wearing a harness with a cable attached, successfully sought out the aquanauts who were about 150 feet away from Sealab, coming within "inches of Reaves and about 18 feet from Conda," Bond said.

"He (Tuffy) hovered there for a few seconds and then he made a vertical departure," Bond said. "His actions were bizarre as if he were leery of the lights and sounds.

101

Plumbing the Depths

Undersea Work Bases, Small Subs May Bring New Era in the Oceans

Deep-Diving Craft Can Tend Oil Rigs, Hunt Minerals; Divers' Efficiency Raised

'Sealab' Runs Salvage Tests

Wall St Journal 9/15/65

By PETER GALL
Staff Reporter of THE WALL STREET JOURNAL

LOS ANGELES—The murky world under the sea is losing some of its mystery, opening up the prospect of a whole new realm of scientific and industrial activity.

Astronaut Scott Carpenter, who won fame whirling through space, is currently 205 feet down in the Pacific off La Jolla in Southern California, living with other members of a Navy research team in a steel chamber. The project is one of several being undertaken with the aim of increasing man's capability to live and work in the sea.

Along the same stretch of coast, a yellow, saucer-shaped two-man submarine, driven by two jets of water and fitted with mechanical claws and vacuum attachments, probes the bottom at 1,000 feet. It collects rocks and scoops up sediment for later analysis on the surface —a probable forerunner of expeditions to hunt minerals on the floor of the sea.

Seventeen miles off Florence, Ore., a pyramid-shaped robot submarine churns along 300 feet down. Its two small propellers stop, and its two television camera eyes focus on an oil well drilled in the ocean bottom. Then, guided electrically via a cable from a ship above, the robot's single mechanical arm tightens each of 12 screws holding together a system of braces supporting the oil well pipe.

Improving Salvage Techniques

These invasions of the deep are merely a sample of the widespread efforts now under way to extend man's sway over the three-quarters of the glove covered by oceans. A raft of major U.S. corporations, including several that have made a name for themselves in outer space, are plunging into undersea enterprises. The military also is deeply involved in ocean research, with the goal of improving undersea warfare and salvage techniques and of advancing submarine rescue methods.

The research push in "oceanology"—a term that encompasses practical applications of the more basic science of oceanography—is producing an array of new equipment for plumbing the depths. One new tool with high potential is the deep-diving submarine, which can take men and outside manipulative attachments far beneath diver depths, free of the distance limitations and hazards of cable connections to surface vessels.

The deep-diving sub that until recently was gathering rocks and sediment off California was developed by French oceanographer Jacques-Yves Cousteau. The recent research work on the ocean bottom has been carried out by Scripps Institution of Oceanography at La Jolla, under a contract from the Navy. Capt. Cousteau's sub has also recovered torpedoes (worth over $75,000 each) that have gone off course and been lost on the ocean floor during ordnance tests.

Litton Builds a Sub

The 1,000-foot-depth capability of the Cousteau sub is far surpassed by some newer craft. Last month Litton Industries, Inc., delivered an ocarina-shaped sub, named the Alvin, to the Woods Hole Oceanographic Institution on Cape Cod. The Alvin already has carried a man down to 6,000 feet, its prescribed maximum depth.

Scoops and claws connected to the sub's mechanical arm can collect specimens of sea animals that burrow in the ocean floor and have been impossible to get at previously, as well as other ocean creatures and plants. The Alvin is also expected to prove useful for placing and maintaining various underwater electronic gear. Litton itself chipped in about half the Alvin's $2 million cost in hopes the experience gained in the project would pay off in future contracts for other deep-sea craft.

Looking like a bright orange whale, Reynolds Metals Co.'s 51-foot deep-diving sub, the Aluminaut, is test-diving off the Bahamas these days. It is designed to carry three men to depths of 15,000 feet for 33 hours at a time eventually. Reynolds hired the sub-building division of General Dynamics Corp. to build the $3 million craft. One aim was to point up the structural strength of aluminum under crushing pressures—7,000 pounds per square inch at 15,000 feet. But Reynolds also hopes the Navy, ocean-mining firms and salvage companies will find uses for the vessel, which is equipped with manipulative devices, television and sonar sensing gear. So far the Aluminaut's deepest dive has been 2,700 feet.

Westinghouse Electric Co., which says it sees a promising commercial market for deep-sea craft, this fall will deliver a diving saucer with a 4,000-foot capability to the Navy at San Diego under a one-year charter contract. Westinghouse is building a second deep-diving sub that it plans to rent at $5,000 to $7,000 for a dive of a few hours' duration. Lockheed Aircraft Corp. also has a sub in the works, and North American Aviation, Inc., may build a craft.

Besides the work on manned subs, there is considerable interest in robot subs linked to operators on the surface by control cables and closed-circuit television. The screw-tightening robot operating off the Oregon coast was built by Hughes Aircraft Co. for Shell Oil Co. to maintain exploratory underwater oil wells; according to Shell, it's now being used routinely.

The Navy has developed a similar robot. It is equipped with an arm that can be fitted with a grasping claw, a big scoop or a lasso-like snare. The Navy robot has been used successfully on two occasions to recover torpedoes lost during target practice off Long Beach, Calif., and is capable of other salvage work.

The experiment in undersea living that Scott Carpenter—now qualified as an "aquanaut" as well as an astronaut—is taking part in represents another avenue of ocean research. The goal is to enable groups of men to stay under water for long stretches, living in metal chambers and emerging periodically in diving suits to work.

The reasoning is that divers could accomplish much more if they didn't have to surface after each work stint. After a dive of only one hour at 250 feet, it takes up to five hours for a man's body to adjust to surface pressure again. This means a diver spends by far the greatest part of his work day "decompressing" in order to rid his blood stream of heavy concentrations of gas. In contrast, if a diver can spend days at a time under water, he can work and rest at will, with no drastic adjustment necessary until he surfaces for good when the job is done. Salvage jobs and other underwater projects could be greatly speeded.

A key development bringing such underwater work colonies nearer realization is the use of new gas mixtures for divers to breathe in their submerged chamber and as they work in the surrounding water, toting air tanks or linked to the chamber by air hoses. Old air systems employ mixtures containing as much as 80% nitrogen, a gas that sometimes causes dangerous narcotic effects that lead to fatal carelessness. A typical new formula contains 91% helium, 4% oxygen and only 5% nitrogen.

Tests with divers working from the surface show the helium-based mixture permits a man to work as long as half an hour as deep as 530 feet, compared with the 15-to-20-minute periods and 250-foot depth to which they were previously confined. The advantages of the new formula have been known for years, but use of the mixture required complex apparatus that only now has been reduced to manageable dimensions.

Capt. Cousteau, backed by the French government and the National Geographic Society, has been a pioneer in the development of underwater working communities. In shallow water tests in the Red Sea, Capt. Cousteau created a four-building "village" at levels of 36 feet and 90 feet. It included two dwelling units for seven men, a storage shed and a dry, gas-filled repair hangar for a diving saucer. Five of the men stayed down a month, making biological studies and diving to 132 feet. This week the Frenchman is beginning a test in which six men will live for two weeks in a spherical house about 300 feet down in the Mediterranean off Southern France.

Joint Venture Formed

Union Carbide Corp. and General Precision Equipment Corp. recently teamed up with inventor Edwin Link and a group of divers who work on sea-floor oil rigs to form a joint venture called Ocean Systems, Inc. The company, which uses a secret helium mixture formulated by Mr. Link, recently tested a 650-foot diving system in a dry land tank in New York. Around the end of the year divers will descend to 600-foot depths off Santa Barbara, Calif.

The next step will be to send four or more men down below 600 feet to live for a day or more sometime next year. Ocean Systems' ultimate objective is to provide teams of men to stay down at 1,000 feet days at a time, based in warm, gas-filled huts and emerging to do underwater oil pipe repair, construction of sewer pipes from shore to deep dumping areas, and mineral exploration.

In the Navy project off San Diego, the 10 aquanauts leave their 50-foot cylindrical home —the Sealab 2—periodically for sea floor work periods as long as two hours. Outside they wear rubber suits similar to those scuba divers wear but inflated with compressed air for insulation from the icy cold. They are trying out special underwater tools and salvage work techniques, including the injection of a buoyant foam into a sunken airplane to pop it back to the surface.

The underwater living test began Aug. 29 and is scheduled to run 45 days. Commander Carpenter is to spend 30 days under the sea, but the other aquanauts rotate after 15 days. So far there have been a few minor problems, including a rash of ear infections among the aquanauts as a result of the extreme humidity in the chamber, a painful scorpion fish sting suffered by Commander Carpenter and difficulties with the closed-circuit TV system. But the Navy says the project is going well in general.

Skeptical Businessmen

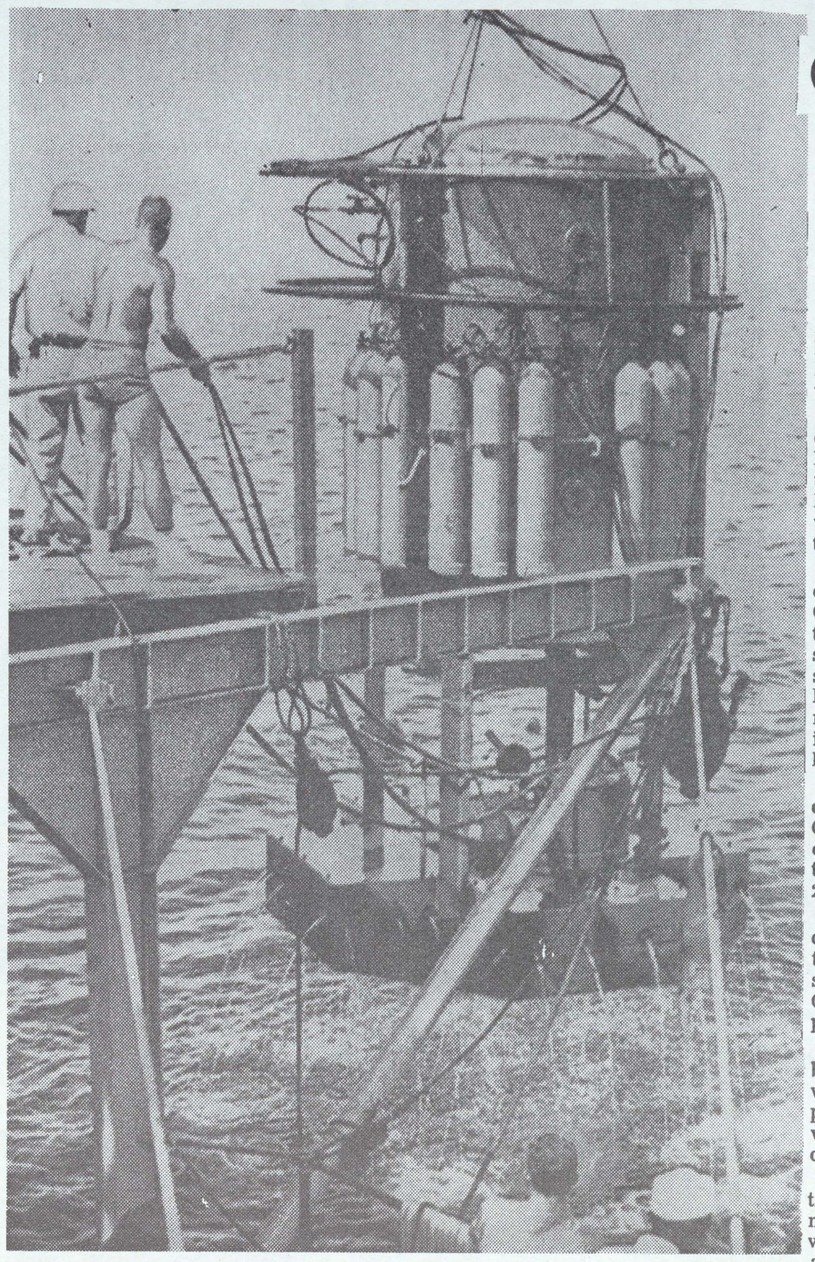
Though the usefulness of improved underwater technology in salvage undertakings and military applications is unquestioned, many corporate executives remain skeptical as to the commercial pay-off of the big investments some firms are making in the field. One fertilizer manufacturer doubts it will make economic sense in the foreseeable future to extract phosphate, a valuable soil nutrient, from the sea, as has been proposed. Some mining executives say that even when undersea ore is found, deposits will have to be extremely rich to justify the enormous expense involved in bringing it to the surface.

A number of companies, however, along with the U.S. Bureau of Mines, are taking a hard look at the possibility of mining lumps, or nodules, of manganese and phosphorite found on the ocean floor. Manganese nodules also contain copper and cobalt. These ocean mineral sources are expected to increase in value within a decade or two, as high-grade land deposits are diminished. The new deep-diving equipment could well prove highly valuable in prospecting for minerals in the sea.

While there is considerable debate over the prospects for extracting metallic ores and fertilizer components from the ocean at a profit, the development of huge new undersea oil fields appears to be a sure thing. After plumbing the shallow tidewater areas for many years, oil companies are now embarked on multimillion-dollar deep-sea drilling ventures in the North Sea and in the ocean waters off the U.S. West Coast and Alaska. Drilling and tending oil wells far under the ocean surface will require vast amounts of new equipment, such as the deep-diving manned and robot subs.

American firms will extract more than $500 million worth of gas and oil from undersea reserves this year, according to Norman Gaber of Battelle Memorial Institute, a nonprofit research organization. Oil "seems to offer the most spectacular promise of all" for useful applications of ocean research, he adds.

John Loudon, chairman of Royal Dutch Petroleum, believes the industry will be operating "several oil fields" in water 2,000 feet or so deep by 1990. By then, Mr. Loudon asserts, oil firms will find as much as a quarter of their new oil and gas discoveries under ocean beds. The Royal Dutch executive predicts that manned submarines will tend the undersea oil fields and that crude oil will be stored in gigantic sea floor containers or in natural deep sea caverns.



[AP Wirephoto]

Water pours from transfer tank as first crew of Sealab 2 is brought to surface after 15 days under sea. Tank was attached to decompression chamber, where the nine aquanauts will stay for 36 hours. *(Story on page 9, section 1*

Carpenter Is Stung By Fish

(Picture on back page)

La Jolla, Cal., Sept. 12 (AP) — A scorpion fish stung Astronaut-Aquanaut M. Scott Carpenter today as nine of his fellow crewmen were preparing to leave the navy's Sealab 2 on the ocean bottom off La Jolla.

The departure of the nine was delayed while one of them—Lt. Robert Sonnenburg, a navy doctor—treated Carpenter to see if he could stay as planned or would have to surface with the team.

After an-hour-and-15-minute delay, Lt. Sonnenburg said that Carpenter was responding to treatment and would stay. The sting of the dorsal spines of the small red fish is painful but not lethal. Carpenter, a navy commander, was stung on the left index finger at Sealab's exit hatch.

Three members of a fresh crew of nine aquanauts joined Carpenter after the other nine crewmen ended a 15-day stay in the 12-by-59-foot steel capsule 205 feet below the surface.

A navy spokesman said hundreds of scorpion fish lurk in the depths near Sealab 2 and a sting would not be unexpected. Carpenter was treated with pain-killing drugs and cortisone.

The navy said the nine men brought to the surface today were in good shape, and had proved that man can live and work efficiently in the ocean depths.

The ascent in a pressurized transfer tank took about seven minutes after a delay caused when an aquanaut had to shift a hoist line into proper position.

A third team later will replace the second in the 45-day experiment, the navy's most ambitious underwater living project. Its primary purpose is to determine whether man can live and work in the hostile environment of ocean depths.

Since Aug. 28 the first crew has kept busy in and about the deepsea den a thousand yards off the shore of this scenic Southern California resort.

In wet suits, the aquanauts have ventured forth to chart movements of ocean currents and sediment. They have set up an ocean-bottom weather station to see if there is a correlation between surface weather and recordings below.

Probably the most important benefit of the experiment, a navy spokesman said, would be to show that deep-water salvage and rescue operations are possible after submarine, ship or plane disasters.

"These initial steps, if successful, also would open up the entire continental shelf to future exploration," he said. "We know there are tremendous deposits of magnesium waiting to be scraped up, untapped oil and gas reservoirs, and mineral deposits that we can only speculate about.

"We also know that, in the next two or three generations, the ocean might be the source for half of the world's food."

A group of aquanauts remained 11 days at 192 feet in Sealab 1 off Bermuda last year. French experimenters have undertaken similar projects. But Sealab 2 is the longest such experiment at such depth.

From SEP 13 1965
TRIBUNE
Chicago, Ill.

A84LA

PMS BUDGET

AQUANAUTS (370)

BY RON ROACH

ASSOCIATED PRESS WRITER

LA JOLLA, CALIF., SEPT. 14 (AP)-A WATCHDOG-ERRAND BOY PORPOISE CALLED TUFFY BEGAN WORKING TODAY FOR AQUANAUTS LIVING IN SEALAB 2 ON THE OCEAN BOTTOM.

TUFFY, A 7-FOOT, 270-POUND MALE PORPOISE, WAS AIRLIFTED BY HELICOPTER FROM POINT MUGU, CALIF., YESTERDAY.

HIS DUTIES INCLUDE SIMULATED RESCUES AND MAIL AND MESSAGE DELIVERIES FROM THE SURFACE 205 FEET DOWN TO THE BOTTOM -- A 45-SECOND TRIP FOR TUFFY.

THE TRIP UP FOR THE FIRST TEAM OF AQUANAUTS WHO LIVED 15 DAYS IN SEALAB TOOK 10 MINUTES SUNDAY, BUT THE NINE DIVERS WERE CONFINED 33 HOURS IN A DECOMPRESSION CHAMBER UNTIL MIDNIGHT MONDAY.

TUFFY NEEDS NO DECOMPRESSION AND ONE OF HIS HANDLERS, AQUANAUT KENNETH J. CONDA, 32, PHOENIX, MICH., SAID HE EXPECTS THE MAMMAL TO MAKE ABOUT 20 TRIPS DAILY.

HE IS CALLED TUFFY BECAUSE OF HIS REPUTATION AS A SCRAPPER WITH SHARKS, EVIDENCED BY SCARS ON HIS BODY.

BUT CONDA SAID TUFFY HAS NEVER BEEN SEEN IN ACTION AGAINST SHARKS AND WON'T GO LOOKING FOR TROUBLE.

ONLY ONE SHARK HAS BEEN REPORTED IN THE AREA SINCE THE FIRST TEAM WENT DOWN AUG. 28. IT WAS A 5 1/2-FOOT-LONG BLUE SHARK, KILLED ON THE SURFACE BY A BOW AND ARROW.

"SHARKS DON'T USUALLY LURK IN DEEP WATERS," CONDA SAID, "ALTHOUGH I'VE BEEN CHASED DOWN BY THEM IN THE PAST.

"SHARKS HAVE A 65- TO 85-FOOT DEEP CRUISING RANGE."

TUFFY WAS CAPTURED IN BILOXI, MISS., AND TRAINED FOR HIS SEALAB MISSION AT POINT MUGU.

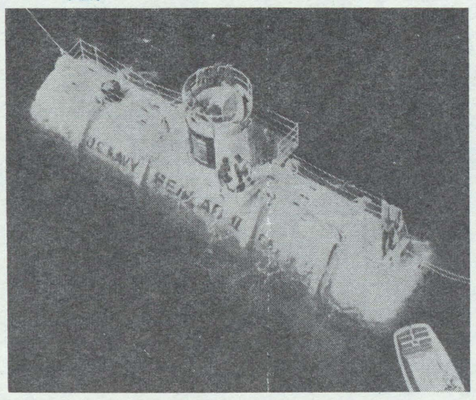
"TUFFY IS SPQM

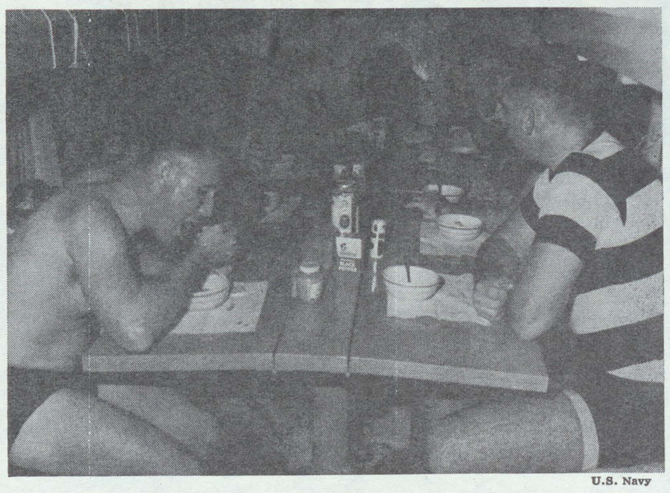
(MORE)

NY-614AED

107

From
NEWSWEEK MAGAZINE
SEP 13 1965





U.S. Navy

Sealab II (above) and crew: In between raids on the icebox, an attempt to labor and learn 205 feet beneath the ocean

SCIENCE AND SPACE

Life Under Pressure

The sea—murky, awesome and largely unexplored—cloaks 71 per cent of the earth's surface. For man, it is one of the great remaining mysteries of his planet, and also the greatest unexploited natural resource. Huge oil reserves lie beneath its depths; many parts of the ocean floor are littered with pure nodules of manganese, nickel, cobalt and copper. With its fish and plankton, the sea could supply enough protein to feed half of mankind.

Research into this swirling underworld holds a high priority in scientific exploration. And last week, to meet it, a ten-man team led by former astronaut Scott Carpenter descended 205 feet below the indigo waters of the Pacific. There, off San Diego, they set up housekeeping in Sealab II, a 12- by 57-foot steel canister set firmly on the sea floor. Like last year's briefer Sealab I experiment, Sealab II's purpose is as straightforward as it is ambitious: to determine if man can live, labor and learn within the very depths of the sea.

The Office of Naval Research is making every effort to separate the aquanauts from their world above and yet make them feel at home. Inside the white canister there are hot showers and comfortable bunks as well as cooking facilities to restore the aquanauts after a hard day's toil out in the dark, 50-degree waters. TV and Carpenter's ukulele fill the few idle hours.

Room Service: Also available for between-meal snacks is a well-stocked refrigerator placed under the motherly eye of a closed-circuit TV camera monitored on the support barge floating overhead. Icebox raiding has been so heavy that Carpenter last week had to ring topside for more lettuce and bread.

But life under the sea, for all the amenities aboard Sealab II, is still a jolting contrast to the surface above. The aquanaut team, composed of crack Navy divers and scientists from the Scripps Institution of Oceanography, swims in an alien environment where there is little light, where man is as weightless as an orbiting astronaut, where it is perilously easy to become disoriented. An astronaut can re-enter his world in a half hour, but once adjusted to the high pressure at a depth of 205 feet, a diver must spend 36 hours decompressing in order to rise safely to the surface without suffering a fatal case of the bends.

Even the air the aquanaut breathes inside his Sealab home is different. Its pressure is 98 pounds per square inch, more than six times higher than at sea level. Such pressure is necessary. It equals the pressure of the water outside and eliminates any need for watertight hatches; thus Sealab is open to the sea through ports at either end of its concrete floor. This permits the aquanauts to saunter out the ports (with air tanks) and explore their new world at will.

Duck Talk: In exchange for that freedom, they give up breathing ordinary air. At high pressure, the nitrogen in atmospheric air would be forced into the divers' bloodstreams, eventually causing nitrogen narcosis, often called "rapture of the deep." Most of the nitrogen has therefore been replaced with helium. But helium, the second lightest element, is not substantial enough to make vocal cords resonate fully; the aquanauts, he-men all, sound like Daisy Duck when they talk. So in telephone conversations with their colleagues on the support barge, a "speech unscrambler" must be used to deepen their voices to make them intelligible.

The ONR has set up a rigorous routine for the aquanauts. Working in two-hour shifts, they will slip through the ports to conduct fish censuses, collect samples of marine life and tackle a variety of salvage operations (e.g., refloating a sunken aircraft). In addition, they will test themselves, measuring their vision, perception and strength (it is impossible to swing a hammer in a medium 800 times denser than air). Above all, their reactions will be closely watched.

"The only thing we have found so far which bothers us a little," Navy captain and doctor George Bond said last week, "is that the stress indicators of these people rise above normal." There is little outward sign of this stress, nor do pulse rates and blood pressures climb unduly high. Instead, blood tests reveal an unusually high amount of adrenal hormones, for example, which are secreted in response to stress. "We don't know how much is psychological because of the hostile situation," Bond said, "or physiological because of the cold water or hard work, or a combination of both."

With Bond watching and taking blood samples all the time, the current team of aquanauts will remain in Sealab for fifteen days. Then two more teams will pull fifteen-day shifts. Carpenter, though, intends to remain below for a full month. When he surfaces, he ought to be able to judge whether space or the sea is more hostile—or whether both can be made the domain of man.

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

SEP 18 65

Fish Stings Aquanaut During SeaLab Shift

Carpenter Treated; 9 Men Brought Up

By S. A. DESICK

A seven-inch fish yesterday held up one of man's most ambitious undersea projects.

The piscatorial pest—a poisonous scorpion fish—stung Cmdr. Scott Carpenter, captain of the aquanauts aboard SeaLab II, on the left index finger.

The mishap occurred just as Carpenter's nine fellow aquanauts were preparing to leave after 15 days in their undersea home. They were to be hoisted onto SeaLab's mother ship, the Berkone, from 205 feet beneath the waters off La Jolla.

But the sting brought the whole operation to a temporary standstill.

HAND SWELLS

Carpenter's left hand and forearm swelled. Intense pain billowed up. One of the aquanauts, Dr. Robert Sonnenberg, a physician, immediately administered two pain killers, cortisone and aspirins.

Since Carpenter was slated to stay behind to captain the second team of aquanauts going down yesterday, everything had to wait until Sonnenberg was satisfied that Carpenter was all right.

If he wasn't, then he, too, would have to be brought up.

The wait lasted an hour and 15 minutes. By then, Carpenter, who had orbited the earth without suffering a scratch, was responding to the medication.

So the decision was given to bring the aquanauts up.

9 MEN BROUGHT UP

The operation went off without a hitch. The nine men crowded into a capsule 10 feet high and 6 feet in circumference. They sat in two rows of seats, one row on top of the other. They fastened seat belts and clamped on football helmets. This was a precaution against injuries from being knocked around as they were who had orbited the earth without suffering a scratch, was responding to the medication.

So the decision to bring up the aquanauts was given. The operation went off without a hitch. The nine men crowded into the capsule, which measures 10 feet high and six feet in circumference.

FOOTBALL HELMETS

They sat in two rows of seats, one row on top of the other. They clamped on football helmets and fastened seat belts. This was a precaution against injuries from being knocked around as they were swung onto the Berkone by a huge crane.

A more important precaution was to keep the pressure in the transfer capsule the same as in SeaLab, since any sudden change in pressure would endanger their lives.

Hoisting the capsule to the surface took about 10 minutes. As it broke water, a small porthole became visible to topside observers. And through the porthole peeked an eye. The crew on the Berkone had the feeling you get when you peek through a keyhole and find an eye looking back at you.

* * *

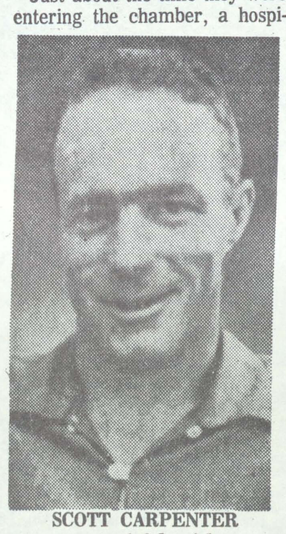
After the capsule was separated from its ballast platform, the crane lifted it onto a decompression chamber waiting on the Berkone's deck.

PRESSURE RAISED

The capsule and chamber were mated. By then, of course, the pressure in the chamber had been raised to seven atmospheres — to equal the pressure in the capsule. A hatch between them was opened, and the men stepped into the chamber.

They will stay there from 30 to 36 hours so that the gases that cause the bends will have dissipated from their tissues.

Just about the time they were entering the chamber, a hospital corpsman among the three new aquanauts already below sent up word that Carpenter was no longer in pain and that he had gone to sleep.



SCOTT CARPENTER
. . . painful mishap

So the rest of the second team started down—after the transfer capsule was returned to the bottom just in case an emergency made its use necessary. The men will carry out salvage operations, oceanographic and biological research, and undergo tests to determine man's ability to live and work under water.

The new aquanauts made it into SeaLab without any trouble—from scorpion fish or anything else.

HERALD TRIBUNE
New York, N. Y.
SEP 15 1965

Aquanauts' Story: Laughs and Slips

Nine aquanauts emerged from 30 hours in a decompression chamber, sucked greedily on cigarettes and started telling newsmen **how it feels to spend two weeks 205 feet underwater** aboard a 12-by-58-foot steel capsule—the 200-ton Sealab 2. The men ~~came up Sunday~~. They did their talking aboard the staging vessel Berkone anchored off La Jolla, Calif. They said they laughed themselves sore at the novelty at first, and they skidded around like pigs on ice when the capsule tilted. Later they got bored. Their experiment will help perfect operations of the capsule, which is intended for deep-diving rescue and salvage missions. Left down under were astronaut Scott Carpenter and nine other aquanauts, who will be putting Tuffy the lifeguarding porpoise to the test tomorrow.

POST
SEP 17 1965



UPI Telephoto

Tuffy Works Hard for His Dinner

Tuffy, a trained porpoise, gets a fish from trainer Wallace Ross after a trip to Sealab 2, some 205 feet below the ocean's surface off La Jolla, Calif. With Ross are Dr. Sam Ridgeway, right, a veterinarian, and Marty Conboy, a diver. Tuffy is trained to carry messages between Sealab and the surface and to protect aquanauts against sharks.

Wash Star 9/13/65

Carpenter Stays in Sealab Despite Scorpion Fish Sting

LA JOLLA, Calif. (AP)—M. Scott Carpenter—unscratched in three orbits of earth in 1962 as an astronaut—was stung by a scorpion fish during a tricky transfer of crewmen of the Navy's Sealab 2 aquanauts in 205 feet of water.

Plans calling for Carpenter to stay another 15 days in the laboratory on the ocean boottom were almost scuttled as the 40-year-old astro-aquanaut, his left hand and arm swelling painfuly, was brought back through Sealab's escape hatch.

Nine aquanauts who had been scheduled to ascend after 15 days underwater postponed their departure while one, a doctor, treated Carpenter with pain-killing drugs and cortisone. He said he wanted to stay.

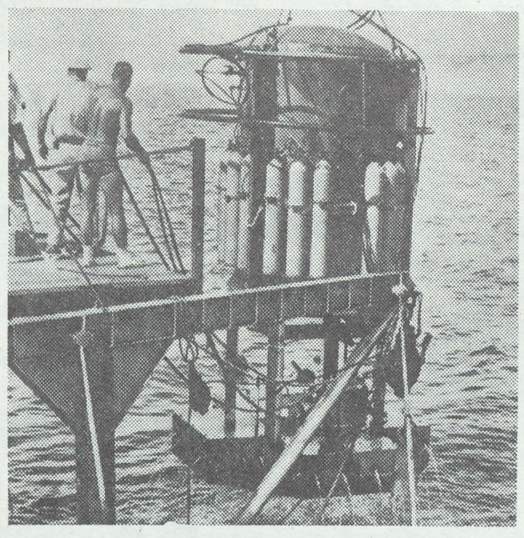
Responds to Treatment

When Carpenter responded to treatment, the nine aquanauts, 75 minutes late, continued the complicated maneuver designed to bring them back to man's normal environment: sea-level pressure and sea-level air.

They were raised to the surface yesterday afternoon in a capsule-like tank which maintained the pressure the crewmen had grown used to in Sealab: seven times that of the surface. The transfer unit was attached to a decompression chamber on the support vessel Berkone on the surface and the pressure slowly decreased.

The nine must spend 36 hours in the decompression unit before they can step out—early tomorrow morning—without suffering the diver's disease, bends, caused by bubbles in the bloodstream.

Nine new crewmen took the place of the men who ascended yesterday. The first three went down before Carpenter's accident. One of them, a Navy medical corpsman, attended Carpenter when the other aquanauts left. Six others went down after the original nine arose.



The first crew of the Navy's Sealab 2 is brought to the surface off La Jolla, Calif., in this transfer tank after 15 days at the bottom of the sea.—AP Wirephoto.

10-Minute Ride

The first group broke the surface late yesterday afternoon when a crane lifted their personnel transport capsule from the water after a 10-minute ride up from the ocean bottom.

When the 10-by-6 foot capsule rose dripping from the sea, newsmen saw the grinning faces of the aquanauts inside. They gave thumbs-up waves as a crane lifted the pressurized unit and matedit to the air lock on the 23-foot-long, 10-foot diameter decompression chamber.

Most of their stay inside will be spent relaxing on bunks. There is no television set, as there was on Sealab.

After the first team leaves the decompression chamber they will be taken to Balboa Naval Hospital in nearby San Diego for physical examinations. Then they will get 36 hours off before rejoining the project as support divers for the second and third teams.

The whole project calls for a 45-day stay on the bottom. The third crew is to go down when the second team ascends at the end of 15 days. Carpenter is supposed to come up with them.

From SEP 15 1965
JOURNAL, Atlanta, Ga.

'DIAPER RASH,' TOO

Chills and Shrills Pestered Aquanauts

LA JOLLA, Calif., Sept. 15 (AP). Living at the bottom of the ocean gives a man a high-pitched voice, a chill, ear trouble and something resembling diaper rash, say nine aquanauts who tried it.

But someday, they added, man may be able to roam under the seven seas in a mobile laboratory.

The aquanauts aired their conclusions Tuesday after emerging from 15 days in Sealab 2,205 feet below the Pacific Ocean surface.

They surfaced Sunday, spent 33 hours in a decompression chamber, then met newsmen aboard the staging vessel Berkone.

Aquanaut Jay D. Skidmore said the all-helium atmosphere they breathed gave them squeaky voices that sounded like a speeded-up phonograph record.

"It created a lot of hilarity at first," said Skidmore. "After a few days we got used to it and toward the last it seemed extremely normal.

Capt. George Bond, chief of the project, said the experiment pointed towards eventual development of completely mobile laboratory housing in which 35 men could go anywhere in the world, do any underwater job and return while decompressing on the way.

He said such mobility could best be obtained by modification of a nuclear submarine.

Bond said, however, that after three weeks underwater, the men's efficiency would begin to decrease.

Aquanaut Bill Coffman said he and Skidmore spent the longest time in the water at any one time — 2 hours and 44 minutes. Coffman said it was cold, but that they could have stayed out longer.

Lt. Thomas A. Clarke, team biologist, said he, however, could take only about 30 to 40 minutes in the water, which averages 51 to 53 degrees Fahrenheit around Sealab 2.

Sealab physician Lt. Robert Sonnenburg praised underwater living, but added he was unable to cure an ear infection suffered by the aquanauts.

The aquanauts developed a rash, similar to a baby's diaper rash, probably due to wet clothing and irritation.

The second team of aquanauts in Sealab 2 will have to get by on shorter rations of oxygen in an experiment starting today.

Officials said the oxygen content of the atmosphere in the 12x58-foot steel capsule will be reduced from 4.25 to 3.5 per cent for the next three days.

In reducing the oxygen content, scientists are seeking the most efficient breathing mixture for use in underwater projects.

The first team brathed a mixture of 4.25 per cent oxygen, 20 per cent nitrogen and 75.75 per cent helium.

The earth's normal atmosphere is constituted of 78.1 per cent nitrogen, 20.9 per cent oxygen, .9 per cent argon and minute, varying amounts of carbon dioxide and other elements.

103

AP110

SEALAB (NEW TOP)

(LA JOLLA, CALIFORNIA)--ASTRONAUT SCOTT CARPENTER WAS REPORTED RECOVERED TODAY FROM A SCORPION FISH STING AND BACK ON FULL DUTY WITH HIS FELLOW AQUANAUTS IN SEALAB TWO AT LA JOLLA, CALIFORNIA.

CARPENTER WAS STUNG YESTERDAY JUST BEFORE NINE FIRST-TEAM DIVERS ASCENDED FOR THE FIRST TIME SINCE AUGUST 28TH.

CAPTAIN GEORGE BOND, CHIEF INVESIGATOR FOR THE 20-FOOT DEEP UNDERWATER LIVING EXPERIMENT, SAID CARPENTER'S CONDITION IS NORMAL.

CARPENTER'S PLANNED 30-DAY STAY IN SEALAB TWO WAS JEOPARDIZED BY THE PAINFUL STING THAT CAUSED HIS LEFT HAND AND ARM TO SWELL. BUT HE WAS TREATED BY ONE OF THE DEPARTING AQUANAUTS, A DOCTOR, WITH PAIN-KILLING DRUGS AND CORTISONE. HE SAID HE WANTED TO STAY.

TD148PED 13

SAN DIEGO EVENING TRIBUNE

SEP 13 1965

Scorpion Fish Near Sealab 2 Stings Aquanaut Carpenter

LA JOLLA, Calif., Sept. 12 — (AP) — A scorpion fish stung astronaut-aquanaut M. Scott Carpenter Sunday as nine of his fellow crewmen were preparing to leave the Navy's Sealab 2 on the ocean floor off La Jolla.

The departure of the nine was delayed while one of them—Lt. Robert Sonnenburg, a Navy doctor—treated Carpenter to see if he could stay as planned or would have to surface with the team. Plans call for Carpenter to stay down 15 more days.

After an hour-and-15-minute delay, Lt. Sonnenburg said that Carpenter was responding to treatment and would stay. The sting of the dorsal spines of the inches-long red fish is painful but not lethal. Carpenter, a Navy commander, was stung on the left index finger at Sealab's exit hatch.

With Carpenter

Three members of a fresh crew of nine aquanauts swam down earlier and were with Carpenter, who fell asleep on his bunk, after the other nine crewmen ended a 15-day stay in the 12-by-59 foot steel capsule 205 feet below the surface.

The other six new crewmen were to descend later.

A Navy spokesman said the scorpion fish sting wasn't unexpected because hundreds of bottom-dwelling fish lurk in the gloomy depths near Sealab 2. Carpenter's sting was Sealab's first accident. He was treated with pain-killing drugs and cortisone.

The Navy said the nine men who were brought to the surface Sunday were in good shape—and had proved that man can live and work efficiently in the ocean depths.



Scott Carpenter

The ascent in a pressurized transfer tank took about seven minutes.

On the deck of the staging vessel Berkone, the transfer tank was mated to a decompression chamber. There the nine members of Crew No. 1 will wait about 36 hours while the pressure is slowly reduced to that of sea level.

"They're all safe and sound; everything is going beautifully," a Navy spokesman said after the nine returned to the surface.

A third team later will replace the second in the 45-day experiment, the Navy's most ambitious underwater living project.

Primary Purpose

Its primary purpose is to determine whether man can live and work in the hostile environment of ocean depths.

Since Aug. 28, the first crew has kept busy in and about the deep-sea den a thousand yards off the shore of this scenic Southern California resort.

Probably the most important benefit of the experiment, a Navy spokesman said, would be to show that deep-water salvage and rescue operations are possible after submarines, ship or plane disasters.

"These initial steps, if successful, also would open up the entire continental shelf to future exploration," he added. "We know there are tremendous deposits of magnesium waiting to be scraped up; untapped oil and gas reservoirs; mineral deposits we can only speculate about.

"We also know that, in the next two or three generations, the ocean might be the source for half of the World's food."

EVENING TRIBUNE

San Diego Sun-Established 1881 Evening Tribune-Established 1895 San Diego Daily Journal-Established 1944

3 PARTS—50 PAGES * SAN DIEGO, CALIF., MONDAY, SEPTEMBER 13, 1965 10 CENTS



COVER UP—Trainer Wallace Ross covers Tuffy the porpoise with a wet sheet to keep him from getting sunburned as he waits on the grass in Mission Bay Park for his handlers to carry him to a waiting boat. Copter which brought him from Point Mugu is in background. Tuffy is joining Sealab II.

LANDS IN COPTER

Tuffy the Porpoise Finally Arrives

By LEO BOWLER
EVENING TRIBUNE Science Writer

Tuffy the tardy porpoise arrived in San Diego today to take up his duties with Sealab II aquanauts.

He landed in a Navy helicopter at a parking lot in front of the Mission Bay Park headquarters shortly after noon. The event was delayed more than three hours because fog at Point Mugu grounded the helicopter for much of the morning.

Tuffy, 7 feet long and weighing 270 pounds, was attended by two trainers, a veterinarian and a public relations man and was met by a small army of newsmen and a few tourists.

He was carried from the helicopter in a litter and rested on the grass while his handlers unloaded their suitcases and Tuffy's supply of fish from the copter.

Then four men carried him to a waiting Navy crash boat and Tuffy was sped to the Sealab site off La Jolla where he will live for the next two weeks in a specially built floatng pen. He will begin working with the aquanauts the later part of this week.

Dr. Sam H. Ridgway, the veterinarian, and Wallace Ross, one of Tuffy's trainers, rode in the copter. They kept Tuffy wet during the trip by spraying him with water.

Tuffy has been trained to work in the open sea and to return when his trainer uses a sound-making device in the water. Some of the aquanauts will be equipped with signal devices to call Tuffy down to Sealab.

They will attempt to get him to tow a line from one diver to another and to carry messages between the surface and divers below.

Mpls. (Minn.) Morning Tribune
WEDNESDAY, SEPT. 15, 1965

Aquanauts Say Work Takes More Time Down in Sealab

LA JOLLA, Calif — (AP) — Nine aquanauts learned during 15 days on the ocean floor that it takes longer than anticipated to get things done. But their leader says the project shows that someday a mobile undersea lab will be able to cruise the seven seas.

Capt. George Bond, the chief investigator for the Sealab 2 project, said the experiment points toward the eventual development of a completely mobile laboratory with a crew of about 35.

SUCH A LAB, he said, could go anywhere in the world, do any underwater job, and return while decompressing on the way. Capt. Bond said such world-wide mobility could best be obtained by modification of a nuclear submarine.

He said the Navy hopes that within five years the Sealab experiments will make it possible for man to live and do useful work at a depth of 800 feet. But he said there are indications that after three weeks under water man's efficiency begins to fall off.

The nine men who spent 15 days under the Pacific offshore from this southern California community came to the surface Sunday from the capsule lying 205 feet down on the ocean bottom. They spent 30 hours in a decompression chamber and talked with newsmen aboard the staging vessel Berkone Tuesday.

AQUANAUT Jay D. Skidmore said they learned the important lesson about things taking more time. "Everything just takes longer because of the time consumed in transporting gear and getting ready for dives," he said.

The experts had estimated that it would take only a few days to set up housekeeping in the 12-by-58-foot steel capsule. "But," said aquanaut Billy Coffman, "it took us two weeks just getting ready for the second team."

The second team of nine men descended to Sealab 2 Sunday for 15 more days of research.

BARSTOW DISPATCH
9-13-65 P-1

Carpenter Ailing In Sealab II

LA JOLLA (UPI)—America's second team of Sealab 2 aquanauts joined "ailing" astronaut M. Scott Carpenter today in workaday experiments and tasks aboard their 57-foot steel cylinder 205 feet beneath the Pacific Ocean.

Three members of the nine-man relief team entered the craft Sunday morning and the remaining six followed in the afternoon.

The first team of aquanauts—excluding Carpenter — made a 50-minute trip from the Scripps Canyon ledge to the surface ship Berkone and were immediately placed in a decompression chamber aboard the ship.

Because pressures at the Sealab level are 6½ times that on the surface, the aquanauts must remain 36 hours in the chamber.

"Commander Carpenter had some swelling in his left hand up to his elbow," a Navy spokesman said. "But medication for the pain was adequate and he had no complaint."

The sting of the scorpion fish is not comparable to the often-fatal sting of the land scorpion.

Carpenter, the second U. S. astronaut to orbit the earth, will remain under a total of 30 days in the 45 - day project, which is testing man's ability to perform useful tasks underwater. Three teams are involved in the experiment.

Minneapolis (Minn.) Star
MONDAY, SEPTEMBER 13, 1965

ASTRO-AQUANAUT

Carpenter Suffers Painful Fish Sting

By RON ROACH

LA JOLLA, Calif.—(AP)—M. Scott Carpenter — unscratched in three orbits of earth in 1962 as an astronaut—was stung by a scorpion fish during a tricky transfer of crewmen of the Navy's Sealab-2 aquanauts in 205 feet of water.

Plans calling for Carpenter to stay another 15 days in the laboratory on the ocean bottom almost were scuttled as the 40-year-old astro-aquanaut, his left hand and arm swelling painfully, was brought back through Sealab's escape hatch.

Nine aquanauts who had been scheduled to ascend after 15 days underwater postponed their departure while one, a doctor, treated Carpenter with pain-killing drugs and cortisone. He said he wanted to stay.

When Carpenter responded to treatment the nine aquanauts, 75 minutes late, continued the complicated maneuver designed to bring them back to man's normal environment: Sea-level pressure and sea-level air.

They were raised to the surface Sunday afternoon in a capsule-like tank which maintained the pressure the crewmen had grown used to in Sealab: Seven times that of the surface. The transfer unit was attached to a decompression chamber on the support vessel Berkone on the surface and the pressure slowly decreased.

The nine must spend 36 hours in the decompression unit before they can step out—early Tuesday morning—without suffering the diver's disease, bends, caused by bubbles in the bloodstream.

Nine new crewmen took the place of the men who ascended yesterday.

The first group broke the surface late yesterday afternoon when a crane lifted their personnel transport capsule from the water after a 10-minute ride up from the ocean bottom.

12 SEPT

(LA JOLLA)--M. SCOTT CARPENTER--UNSCRATCHED IN THREE ORBITS OF EARTH IN 1962 AS AN ASTRONAUT -- WAS STUNG YESTERDAY BY A SCORPION FISH DURING A TRICKY TRANSFER OF CREWMEN OF THE NAVY'S SEALAB 2 AQUANAUTS IN 205 FEET OF WATER.

PLANS CALLING FOR CARPENTER TO STAY ANOTHER 15 DAYS IN THE LABORATORY ON THE OCEAN BOTTOM WERE ALMOST SCUTTLED AS THE 40-YEAR-OLD ASTRO-AQUANAUT, HIS LEFT HAND AND ARM SWELLING PAINFULLY, WAS BROUGHT BACK THROUGH SEALAB'S ESCAPE HATCH.

NINE AQUANAUTS WHO HAD BEEN SCHEDULED TO ASCEND AFTER 15 DAYS UNDERWATER POSTPONED THEIR DEPARTURE WHILE ONE, A DOCTOR, TREATED CARPENTER WITH PAIN-KILLING DRUGS AND CORTISONE. HE SAID HE WANTED TO STAY.

WHEN CARPENTER RESPONDED TO TREATMENT THE NINE AQUANAUTS, 75 MINUTES LATE, CONTINUED THE COMPLICATED MANEUVER DESIGNED TO BRING THEM BACK TO MAN'S NORMAL ENVIRONMENT: SEA-LEVEL PRESSURE AND SEA-LEVEL AIR.

104

GRIT - 94
208 W. Third Street W
Williamsport, Pa.
Circ. 834,076

September 12, 1965

Aquanauts in Steel Cylinder Exploring Depths of Pacific

Now Americans can follow the daring deeds of aquanauts as well as the space ventures of astronauts.

Aquanauts are men who explore the depths of the oceans, with much the same courage that astronauts explore space.

Ten aquanauts are in the midst of a 45-day expedition in the dark and dangerous world 205 feet below the surface of the Pacific Ocean in the vicinity of La Jolla, Calif. Their leader, oddly enough, is M. Scott Carpenter, who in May, 1962, was the second American astronaut to orbit the earth in a Mercury spaceship.

Underseas Home

The home of the aquanauts is Sealab 2, a steel cylinder 12 feet in diameter and 58 feet long, whose only links to the outside world are telephone and power cables running to a ship on the ocean surface.

Sealab has three hatches through which Carpenter and his divers can leave to map and explore the ocean around it and then return. Air pressure inside the chamber keeps the water out when the hatches are opened.

Below the main hatch is a wire-mesh cage with a door. This protects the divers against possible attacks by sharks when they would be most vulnerable—entering and leaving the chamber.

The 10 men now in Sealab will remain submerged for 15 days. A second team will then take over for 15 days, and a third team will complete the project with a 15-day stint. Carpenter, however, hopes to remain on the scene for the entire 45 days.

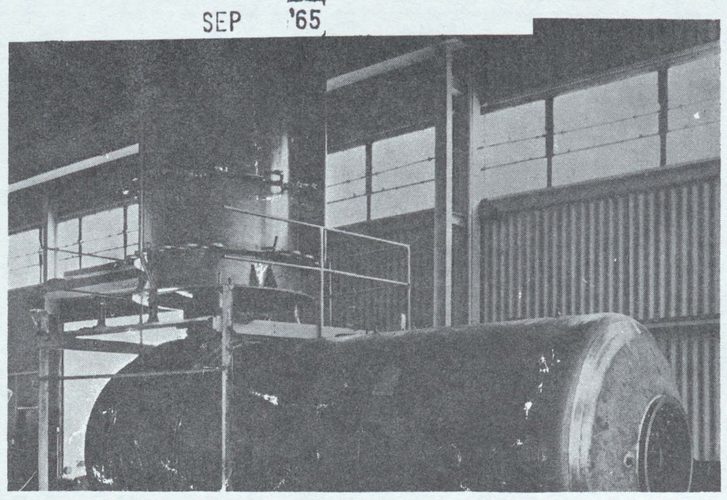
The project of ocean exploration is under the direction of the United States Navy and the National Academy of Sciences. If the mission is successful, similar explorations will be undertaken in other ocean areas which contain vast resources of food and minerals.



AQUANAUT LEADER: M. Scott Carpenter, the astronaut who is leader of the aquanauts engaged on a 45-day mission deep in the Pacific Ocean, talks on a communications line from the Sealab, the underseas home of the party.

BALTIMORE PURCHASER - 71
123 Market Place M
Baltimore 12, Md. Circ. 3,134

SEP '65



READY TO GO—Dixie Manufacturing's underwater taxi is shown here on top of the decompression chamber at the Baltimore firm's Patapsco avenue plant. Both are now at the bottom of the Pacific Ocean, near La Jolla, Calif.

Baltimore-Built Underwater Taxi and Decompression Chamber Playing Vital Roles in Navy Tests Under the Pacific Ocean

A Baltimore-built underwater taxi, which carried Astronaut-diver M. Scott Carpenter and nine other men to the bottom of the Pacific Ocean last month, is reported to be working out exceptionly fine in its vital part of the Navy's Sealab 2 Project.

The taxi, built by the Dixie Manufacturing Company here, is hauling men and supplies to and from Sealab 2, which is 205 feet beneath the Pacific, about a half mile off the coast of California, near La Jolla.

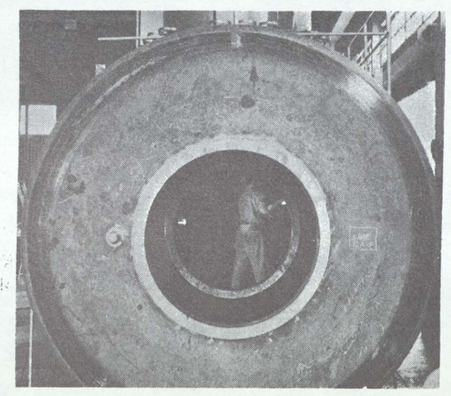
Sealab 2 is a 45-day project and an underwater barracks for three 10-men teams, with each team spending 15 days in the steel chamber. The chore of the Baltimore-built taxi is to take the aquanauts to and from Sealab 2.

Not only is Dixie playing a major part in the transportation of the Navy scientists, but it has built a special decompression chamber, which aquanauts who are returning from below must stay in until they are decompressed. The decompression chamber weighs 15 tons as compared with the taxi's nine tons.

Dixie, located in Southwest Baltimore at 1501 West Patapsco avenue, was awarded the $80,000 Navy contract several months ago. Russell C. Wolfe, vice-president of the company, reported that the contract was finished and delivered to the Navy in less than two months after it was awarded. Undoubtly an excellent purchasing system was a key factor in completing the contract.

A company of only about 100 persons, Dixie has had considerable experience in building decompression chambers for the Navy and commercial diving projects as well as other metal products.

A Dixie worker is shown here inside of the now-famous decompression chamber. The chamber has an eight foot diameter and is 23 feet long.



Sealab 2 Surfacing Will Be Long Trip, Short Distance

LA JOLLA, Calif. (AP) — Nine aquanauts made final preparations today for what might qualify as one of history's longest trips over a short distance.

The nine men are participants in the Navy's Sealab 2 underwater living project. They are scheduled to surface Sunday after spending two weeks 205 feet beneath the surface of the Pacific Ocean.

But their rise to fresh air will make a snail's pace look like a rocket in comparison.

Doctors say a swift rise to the surface would probably be fatal. So the aquanauts will enter a special personnel transfer capsule that will take them to the surface where they will enter a decompression chamber on the mother ship's deck.

From the time they enter the capsule until they emerge into fresh air at sea level, doctors say 36 hours will have elapsed.

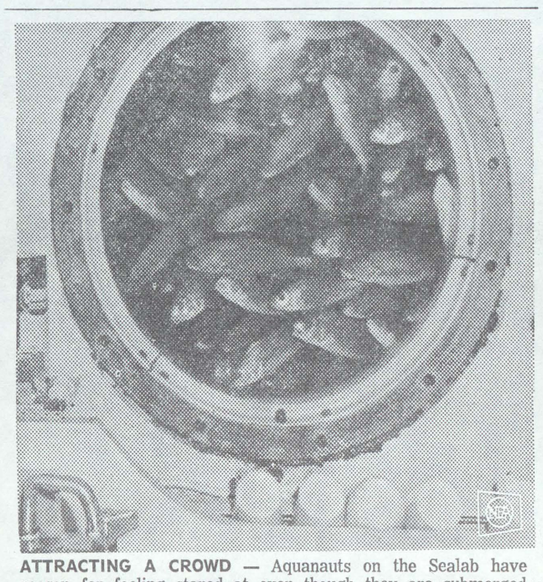
Watching the whole process — from his vantage point 205 feet below — will be astronaut-aquanaut M. Scott Carpenter. Carpenter, a Navy commander, will stay down another 15 days for a total of 30 days beneath the surface.

Carpenter will be joined Sunday by another group of nine divers, including a hospital corpsman who will make physiological studies of the divers, including blood tests to determine the amount of helium in their bloodstreams.

Friday the personnel transfer capsule was brought to the surface so divers could clean out a school of anchovies that had latched onto the steel chamber several days ago.

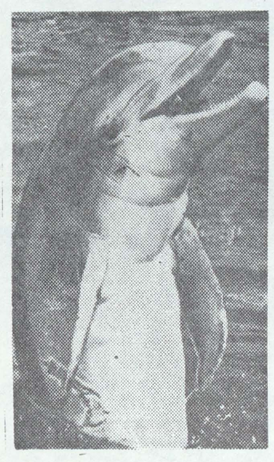
Navy officials said the anchovies apparently were attracted by the light of the nearby Sealab.

Scientists participating in the experiment have praised the project. A spokesman said Sealab 2 has so far furnished 100 times as much information as Sealab 1 produced last year in the Atlantic.



ATTRACTING A CROWD — Aquanauts on the Sealab have reason for feeling stared at even though they are submerged 205 feet beneath the Pacific off the California coast. Attracted by light, curious fish crowd around the Sealab's portholes. (NEA Telephoto)

de Post 9/14/65



Associated Press

TUFFY, THE PORPOISE

Sealab Team Gets Trained Ocean Guide

Los Angeles Times

LA JOLLA, Calif., Sept. 13 A seagoing "St. Bernard" arrived here today to work out with the second team of nine aquanauts who have joined Comdr. M. Scott Carpenter in the Navy's experimental Sealab 2.

The recruit was Tuffy, a 7-foot, 270-pound porpoise trained to find aquanauts lost in the murky depts at 205 feet and guide them back to their submerged base.

Tuffy arrived here by helicopter from the Naval Air Missile Station at Point Mugu, Calif., where he was trained by navy divers.

Tuffy has been conditioned to swim to the source of buzzer signals, which he can hear at 75 to 100 feet, but which are inaudible to human ears through more than three or four feet of water.

P-1 Superior (Wis.) Telegram, 11 Sept 1965

13 Sept.

(SEALAB)

FORMER ASTRONAUT SCOTT CARPENTER REPORTEDLY HAS RECOVERED FROM A SCORPION FISH STING AND IS BACK ON FULL DUTY UNDER WATER OFF THE COAST OF CALIFORNIA IN SEALAB TWO. CARPENTER--WHO IS SCHEDULED TO STAY UNDER WATER 30 DAYS--WAS STUNG YESTERDAY. BUT HE WAS TREATED UNDERWATER AND HIS CONDITION TODAY IS REPORTED NORMAL. THE FIRST TEAM OF DIVERS, WHICH WENT DOWN AUGUST 28TH, ARE CONTINUING THEIR SLOW RISE TO THE SURFACE.

Davenport (Ia) Times-Democrat
THURSDAY, SEPTEMBER 16, 1965

PORPOISE TO THE RESCUE

Tuffy Tackles His Tough Task Today

LA JOLLA, Calif. (AP) — Tuffy the porpoise, new messenger boy for the Sealab 2 aquanauts, has done just fine in a series of warmup dives and today he tackles his big undersea test: rescuing a "lost" diver.

He'll make new friends, too.

When aquanauts feel a tap on the shoulder, they'll know they've been rescued.

Tuffy was trained at the Point Mugu, Calif., Navy base to come up to simulated lost divers in murky depths, give them a nudge and hand over a life line.

He'll pick up the line at Sealab and follow the sound of a buzzer device to the distressed aquanaut. He's been trained to follow the sounds.

Like most playful porpoises, Tuffy's bound to make friends with the aquanauts, and his presence is more than pure friendship.

He could save their lives, say his trainers. The divers' biggest fear is that of losing sight of Sealab in the dark water. They have compasses but they don't function properly because of the metal Sealab.

Tuffy will also bring them messages, tools and other gear that can be clipped on a special harness.

The 7-foot, 270-pound mammal punched his time clock for the first time Tuesday and made 20 dives to the bottom from his floating pen.

He was getting accustomed to surroundings.

"Our main concern was that he get used to the sounds in a strange area — boats, motors, Sealab noises — so he can distinguish our underwater signal," a spokesman said.

He said Tuffy's first rescue mission will be carrying a line 70 feet to a diver and returning to the surface.

From SEP 13 1965
CONSTITUTION Atlanta, Ga.

Sealab's Carpenter Stung by a Scorpion

LA JOLLA, Calif. (AP)—A scorpion fish stung astronaut-aquanaut M. Scott Carpenter Sunday as nine of his fellow crewmen were preparing to leave the Navy's Sealab 2 on the ocean bottom off La Jolla.

The departure of the nine was delayed while one of them—Lt. Robert Sonnenburg, a Navy doctor—treated Carpenter to see if he could stay as planned or would have to surface with the team. Plans call for Carpenter to stay down 15 more days.

PAINFUL STING

After an hour-and-15-minute delay Lt. Sonnenburg said that Carpenter was responding to treatment and would stay. The sting of the dorsal spines of the inches-long red fish is painful but not lethal. Carpenter, a Navy commander, was stung on the left index finger at Sealab's exit hatch.

Three members of a fresh crew of nine aquanauts swam down earlier and were with Carpenter, who fell asleep on his bunk, after the other nine crewmen ended a 15-day stay in the 12-by-59 foot steel capsule 205 feet below the surface.

SIX MORE TO GO

The other six new crewmen were to descend later.

A Navy spokesman said the scorpion fish sting wasn't unexpected because hundreds of the bottom-dwelling fish lurk in the gloomy depths near Sealab 2. Carpenter's sting was Sealab's first accident. He was treated with pain-killing drugs and cortisone.

The Navy said the nine men who were brought to the surface were in good shape—and had proved that man can live and work efficiently in the ocean depths.

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

SEP 13 '65

Scorpion Fish Really Shy Fellow

The poisonous scorpion fish that stung SeaLab's Scott Carpenter on the finger yesterday is ordinarily a harmless fellow.

As a matter of fact, it likes to hide. The SeaLab people say that whenever they lower an open structure into the sea, such as the shark cage protecting SeaLab, the scorpion fish swim into the corners.

DEFENSE WEAPON

Their venom is strictly for defense — to keep bigger fish from dining on them.

The venom lies in sacs below a sharp hill -and - valley dorsal spine. Should you happen to prick your hand on the spine, as Carpenter did, the poison swiftly emerges into the wound.

Like snake venom, to which it's chemically related, it's neurotoxic — which means it attacks the nervous system.

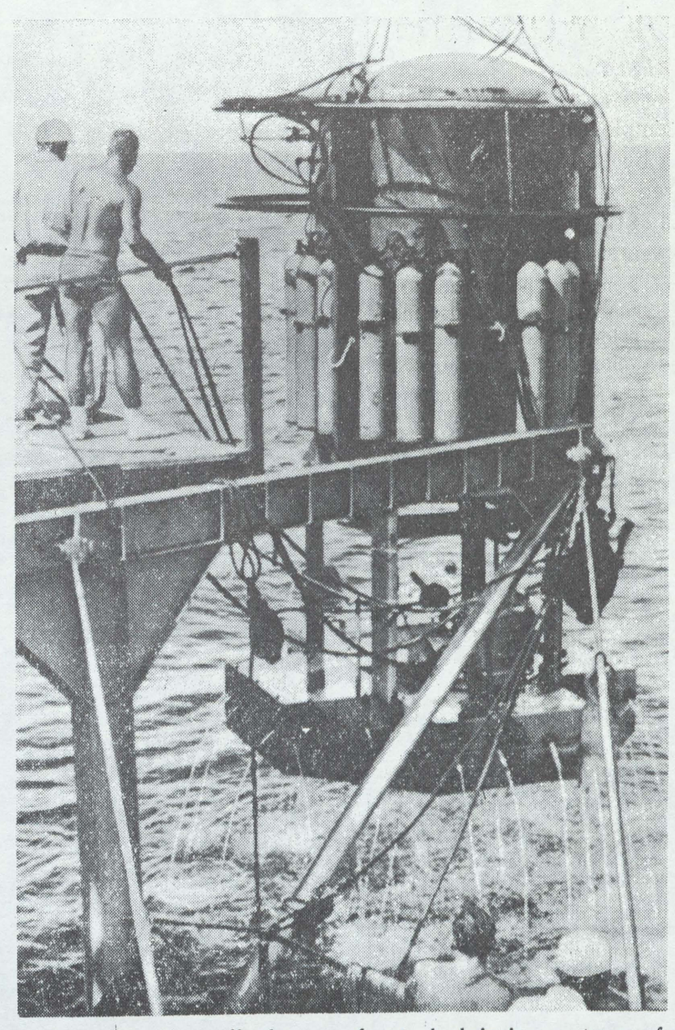
FISH WIDESPREAD

The scorpion fish is widespread throughout the Pacific. One variety in the waters around Polynesia is especially virulent.

Lowry

The Daily Telegraph, Tuesday, September 14, 1965

AQUANAUTS IN SEALAB-2 SURFACE AFTER 15 DAYS



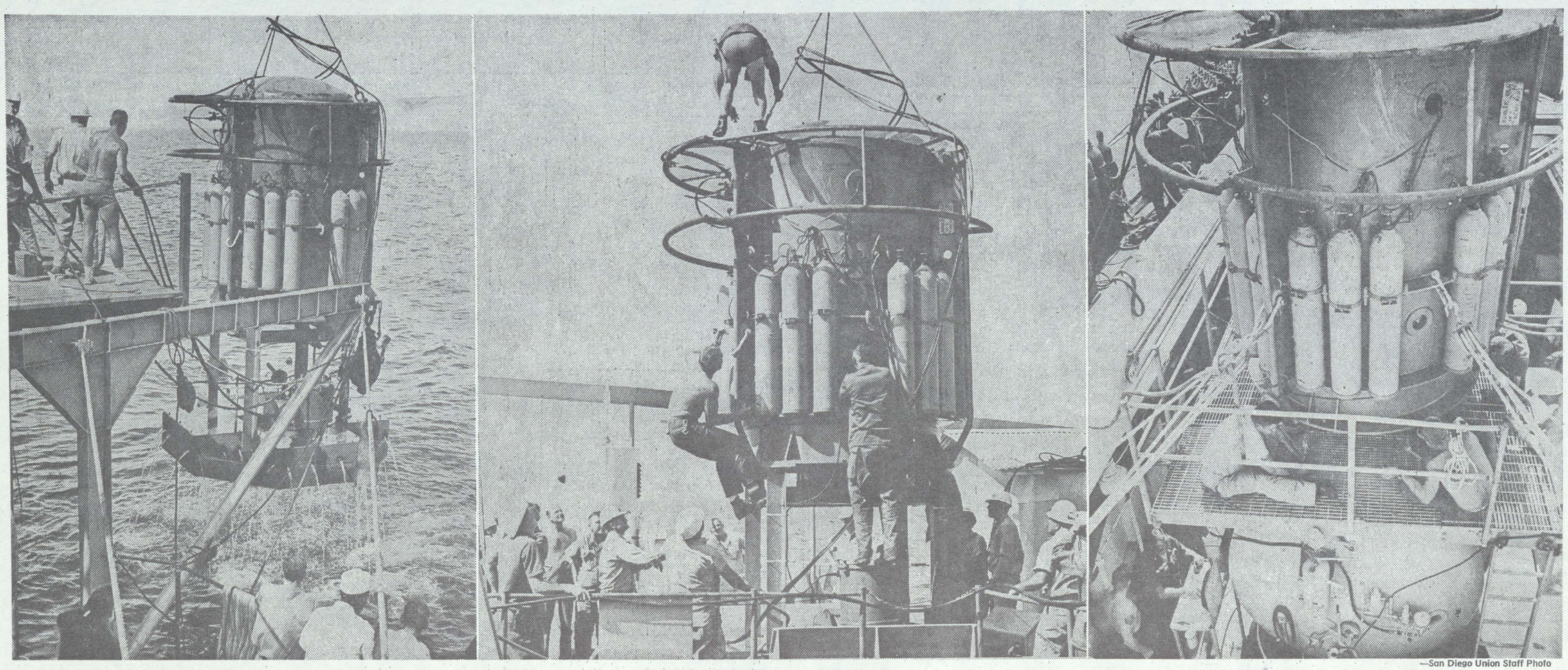
● Water pouring off the transfer tank bringing a team of American aquanauts to the surface after spending 15 days in Sealab-2 205ft down off La Jolla, California. The 10-man crew was the first of three teams taking part in a 45-day underwater living experiment.

105

The San Diego Union

ESTABLISHED 1868 TELEPHONE 234-7111 SAN DIEGO, CALIFORNIA, MONDAY MORNING, SEPTEMBER 13, 1965 ①* PAGE A-17

First Undersea Team Hoisted To Surface



—San Diego Union Staff Photo

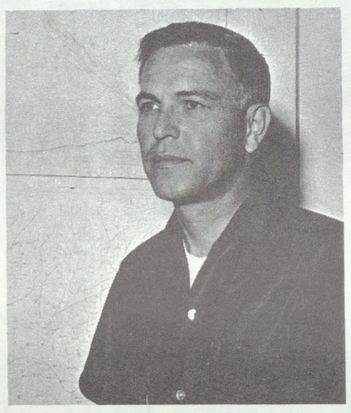
Members of SeaLab II's first team returned to surface yesterday. In left photo, personnel transport capsule with nine aquanauts aboard is hoisted from SeaLab to surface. Center, capsule is lowered to deck of Berkone, staging vessel for the project. Right, capsule is mated with an airtight connection to decompression chamber on the Berkone. The aquanauts will remain in chamber 30 to 36 hours.

DATA-MAGAZINE OF RESEARCH & DEVELOPMENT MANAGEMENT- 41
1808 Wisconsin Ave., N.W. M
Washington 7, D.C. Circ. 10,816

#680

SEP '65

Sealab II Program Capsulized By ONR Manager



INTERVIEW WITH
MR. HENRY A. O'NEAL

Program Manager, Sealab II
Office of Naval Research

HENRY ALGENON O'NEAL is a quiet, pipe-smoking man who has a way of getting things off the ground in rather zooming fashion, such as the historic Sealab project, which is his baby.

When the pioneer planners of undersea habitation are recorded, this soft spoken South Carolinian's name will have to be put down in fairly large letters among them.

Henry O'Neal, who attended the Citadel and M.I.T., got his Navy orientation which led to his present assignment by joining the sea service during World War II. But it wasn't an easy thing to do. He had to do some staunch talking . . . he'd lost the sight of one eye in a boyhood accident.

He was stationed at the Mine Defense Laboratory at Panama City, Florida, during the war, going into the service as an ensign and coming out as a lieutenant-commander. When the war was over, he kept on with his work at this important facility. He simply shed his uniform for civilian attire. He didn't even change desks. He remained there for some 10 more years before coming to the Office of Naval Research in Washington.

A native of Fairfax, South Carolina, he married the former Doris Garner of Dowdell, Maryland. They have three children, Michael, Susan and Sara.

Here's his answers to questions posed by DATA:

Q. *How did the* SEALAB *program get started?*

A. The concept of man living and working in the sea for protracted periods originated in this country by Captain George F. Bond, USN, in about 1957. He conducted laboratory experiments with animals, and later with human subjects, proving that life can exist with no effects of consequence under pressures greater than that of the normal atmosphere. In 1963, the Office of Naval Research originated the SEALAB program to confirm, in the open sea, these lab experiments, and to conduct experiments in other scientific disciplines to determine how man can best live and perform useful work under the seas.

In July 1963 four men lived and worked for eight days under 193 feet of water in the open sea near the island of Bermuda. They lived in a capsule filled with a special breathing gas mixture and having an open hatch in the bottom which permitted the aquanauts to enter the water to conduct work tasks. This year, three teams of 10 men each will spend a total of 45 days under about 210 feet of water near La Jolla, California to further explore man's ability to live and work under these conditions.

Q. *What are the basic objectives?*

A. The basic objectives are to confirm and extend the laboratory findings, to determine the characteristics of the life support systems which are required for adequate safety and comfort. to measure the effectiveness of humans under these conditions, and to determine how humans can best perform useful work under the sea, and to conduct experiments which in themselves will increase our knowledge of the environment and its effect on humans, equipments, and techniques.

Q. *What are the principal problems in living and working for long periods on the ocean bottom?*

A. The sea is still a hostile environment for human beings. The major problem areas therefore revolve around providing adequate life support in terms of breathing gas supplies, purification, monitoring, the problems involved in bringing men safely back to atmospheric pressure, the protection of the men from the cold water, and insuring an adequate degree of safety while the men are out working —being sure they don't lose their way, etc. Because helium makes the voice sound very peculiar, special communicating equipment must be provided.

Q. *What specifically does the Navy hope to learn from the* SEALAB-II *operation?*

A. It is hoped that data will be gathered which will point the way for design of life support systems, high pressure living facilities, and other support items required for operational systems which will enhance the naval capability for working in the oceans. It must be pointed out that there are many other aspects of the Navy program to enhance this capability. Other groups are working to increase the depth at which men can work safely, to improve all equipments, etc. The SEALAB program is but a part of the over-all picture.

Q. *What is the potential for industry in developing a capability to work for long periods on the ocean bottom?*

A. There is a very great industrial potential for developing such a capability. Several industrial concerns are currently working to do just that, and it is anticipated that industrial capability will develop concurrently with naval capability. It is expected that many joint programs will be pursued, and that interchange of information will assist both groups, military and industrial.

Q. *Now that we have* SEALAB II, *can we expect* SEALAB III?

A. There certainly will be further open sea experiments in ocean living as a part of the Navy's Man-in-the-Sea program. What it will be named has not been decided, nor has a firm schedule been established. In a field as new as this, we must take one step at a time, and evaluate each finding before proceeding to the next step. ■

From SEP 15 1965
DAILY NEWS
New York, N. Y.

9 Quit Sealab After 2 Wks. Below



(Associated Press Wirefoto)

Aquanauts John Reeves (left) and Kenneth Conda feed Tuffy the porpoise in La Jolla, Calif., tank during training. Porpoise is used in underwater experiments of Sealab 2. The men are members of the second team to go down in the experimental laboratory.

La Jolla, Calif., Sept. 14 (UPI) —Nine tired looking aquanauts today emerged from a decompression chamber after spending more than two weeks submerged 205 feet below the ocean's surface in Sealab 2.

The men had entered the 57-foot capsule Aug. 28 along with astronaut Scott Carpenter, who will spend 30 days in the 200-ton craft designed to determine how well man can live and work under the sea.

A spokesman said, "You could observe a reluctance on the part of the aquanauts to go back outside the chamber and into the water towards the end. They seemed to be rather hesitant unless it was a goodie-pot (shipment of sweets) sent down."

Aquanaut Earl A. Murray said everyone was congenial during their underwater stay.

Jay Dee Skidmore and Thomas Clarke said they enjoyed "looking at the fish; we spent hours watching them at the porthole."

Wednesday, Sept. 15, 1965 The Seattle Times

HIGH-PITCHED VOICES:

2235

Aquanauts Developed 'Diaper Rash'

LA JOLLA, Calif., Sept. 15.—(AP)—Living at the bottom of the ocean gives a man a high-pitched voice, a chill, ear trouble and something resembling diaper rash, say nine aquanauts who tried it.

But someday, they added, man may be able to roam under the seven seas in a mobile laboratory.

The aquanauts aired their conclusions yesterday after emerging from 15 days in Sealab 2.205 feet below the Pacific Ocean surface.

They surfaced Sunday, spent 33 hours in a decompression chamber, then met newsmen aboard the staging vessel Berkone.

AQUANAUT Jay D. Skidmore said the all-helium atmosphere they breathed gave them squeaky voices that sounded like a speeded-up phonograph record.

". . . It created a lot of hilarity at first," said Skidmore. "After a few days we got used to it and toward the last it seemed extremely normal."

Capt. George Bond, chief of the project, said it pointed toward eventual development of completely mobile laboratory housing in which 35 men could go anywhere in the world, do any underwater job and return while decompressing on the way.

He said such mobility could best be obtained by modification of a nuclear submarine.

BOND SAID, however, that after three weeks underwater, the men's efficiency would begin to decrease.

Aquanaut Bill Coffman said he and Skidmore spent the longest time in the water at any one time—two hours and 44 minutes. Coffman said it was cold, but that they could have stayed out longer.

Lieut. Thomas A. Clarke, team biologist, said he, however, could take only about 30 to 40 minutes in the water, which averages 51 to 53 degrees Fahrenheit around Sealab 2.

Lieut. Robert Sonnenburg, Sealab physician, praised underwater living, but added he was unable to cure an ear infection suffered by the aquanauts. He treated them to alleviate discomfort.

THE AQUANAUTS developed a rash, similar to a baby's diaper rash, probably due to wet clothing and irritation.

Capt. Walter F. Mazone, decompression chief, said he noticed only one physiological change: "This was that grown men can get a diaper rash."

Meanwhile, the second team of aquanauts in Sealab 2 will have to get by one shorter rations of oxygen in an experiment that began today.

Officials said the oxygen content of the atmosphere in the 12-by-58-foot steel capsule will be reduced from 4.25 to 3.5 per cent for the next three days.

Ten men are working in the project's second, or scientific, phase.

IN REDUCING the oxygen content, scientists are seeking the most efficient breathing mixture for use in underwater projects.

The first team breathed a mixture of 4.25 per cent oxygen, 20 per cent nitrogen and 75.75 per cent helium.

The earth's normal atmosphere is constituted of 78.1 per cent nitrogen, 20.9 per cent oxygen, .9 per cent argon and minute, varying abounts of carbon dioxide and other elements.

Extensive physiological tests will be conducted to determine if the reduction in oxygen will cause any changes in the aquanauts.

106

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BJT

PMS BUDGET

SEALAB 2 (400)

BY RON ROACH

ASSOCIATED PRESS WRITER

LA JOLLA, CALIF., SEPT. 13 (AP)-M. SCOTT CARPENTER -- UNSCRATCHED IN THREE ORBITS OF EARTH IN 1962 AS AN ASTRONAUT -- WAS STUNG BY A SCORPION FISH DURING A TRICKY TRANSFER OF CREWMEN OF THE NAVY'S SEALAB 2 AQUANAUTS IN 205 FEET OF WATER.

PLANS CALLING FOR CARPENTER TO STAY ANOTHER 15 DAYS IN THE LABORATORY ON THE OCEAN BOTTOM WERE ALMOST SCUTTLED AS THE 40-YEAR-OLD ASTRO-AQUANAUT, HIS LEFT HAND AND ARM SWELLING PAINFULLY, WAS BROUGHT BACK THROUGH SEALAB'S ESCAPE HATCH.

NINE AQUANAUTS WHO HAD BEEN SCHEDULED TO ASCEND AFTER 15 DAYS UNDERWATER POSTPONED THEIR DEPARTURE WHILE ONE, A DOCTOR, TREATED CARPENTER WITH PAIN-KILLING DRUGS AND CORTISONE. HE SAID HE WANTED TO STAY.

WHEN CARPENTER RESPONDED TO TREATMENT THE NINE AQUANAUTS, 75 MINUTES LATE, CONTINUED THE COMPLICATED MANEUVER DESIGNED TO BRING THEM BACK TO MAN'S NORMAL ENVIRONMENT: SEA-LEVEL PRESSURE AND SEA-LEVEL AIR.

THEY WERE RAISED TO THE SURFACE YESTERDAY AFTERNOON IN A CAPSULE-LIKE TANK WHICH MAINTAINED THE PRESSURE THE CREWMEN HAD GROWN USED TO IN SEALAB: SEVEN TIMES THAT OF THE SURFACE. THE TRANSFER UNIT WAS ATTACHED TO A DECOMPRESSION CHAMBER ON THE SUPPORT VESSEL BERKONE ON THE SURFACE AND THE PRESSURE SLOWLY DECREASED.

THE NINE MUST SPEND 36 HOURS IN THE DECOMPRESSION UNIT BEFORE THEY CAN STEP OUT -- EARLY TUESDAY MORNING -- WITHOUT SUFFERING THE DIVER'S DISEASE, BENDS, CAUSED BY BUBBLES IN THE BLOODSTREAM.

NINE NEW CREWMEN TOOK THE PLACE OF THE MEN WHO ASCENDED YESTERDAY. THE FIRST THREE WENT DOWN BEFORE CARPENTER'S ACCIDENT. ONE OF THEM, A NAVY MEDICAL CORPSMAN, ATTENDED CARPENTER WHEN THE OTHER AQUANAUTS LEFT. SIX OTHERS WENT DOWN AFTER THE ORIGINAL NINE AROSE.

THE FIRST GROUP BROKE THE SURFACE LATE YESTERDAY AFTERNOON WHEN A CRANE LIFTED THEIR PERSONNEL TRANSPORT CAPSULE FROM THE WATER AFTER A 10-MINUTE RIDE UP FROM THE OCEAN BOTTOM.

A62LA

WHEN THE 10-BY-6 FOOT CAPSULE ROSE DRIPPING FROM THE SEA, NEWSMEN SAW THE GRINNING FACES OF THE AQUANAUTS INSIDE. THEY GAVE THUMBS-UP WAVES AS A CRANE LIFTED THE PRESSURIZED UNIT AND MATED IT TO THE AIR LOCK ON THE 23-FOOT-LONG, 10-FOOT FIAMETER DECOMPRESSION CHAMBER.

MOST OF THEIR STAY INSIDE WILL BE SPENT RELAXING ON BUNKS. THERE'S NO TELEVISION SET, AS THERE WAS ON SEALAB.

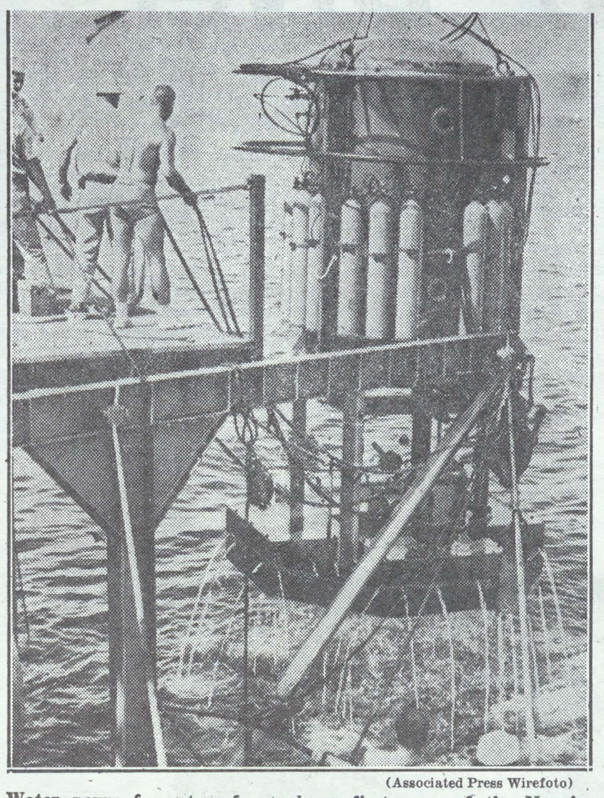
AFTER THE FIRST TEAM LEAVES THE DECOMPRESSION CHAMBER THEY'LL BE TAKEN TO BALBOA NAVAL HOSPITAL IN NEARBY SAN DIEGO FOR PHYSICAL EXAMINATIONS. THEN THEY'LL GET 36 HOURS OFF BEFORE REJOINING THE PROJECT AS SUPPORT DIVERS FOR THE SECOND AND THIRD TEAMS.

THE WHOLE PROJECT CALLS FOR A 45-DAY STAY ON THE BOTTOM. THE THIRD CREW IS TO GO DOWN WHEN THE SECOND TEAM ASCENDS AT THE END OF 15 DAYS. CARPENTER IS SUPPOSED TO COME UP WITH THEM.

EE234APD NM

DAILY NEWS
New York, N. Y.

SEP 15 1965



(Associated Press Wirefoto)

Water pours from transfer tank as first crew of the Navy's Sealab is brought up after 15 days below. They'll spend 36 hours in the decompression chamber atop the tank.

Scorpion Fish Nips Carpenter on Finger

La Jolla, Calif., Sept. 12 (UPI)—Astronaut-aquanaut M. Scott Carpenter was bitten on the finger by a scorpion fish today, but he was treated in the underwater Sealab 2 and reported in good condition.

"Comdr. Carpenter had some swelling in his left hand up to his elbow," said a spokesman for the Navy's Man-in-the-Sea project, "but medication for the pain was adequate and he had no complaint."



M. Scott Carpenter

Carpenter, the second U.S. astronaut to orbit the earth, was nipped on his left index finger while making a final inspection of the conveying capsule that carried the first team of nine acquanauts 205 feet up to the ocean surface after a 15-day stay.

Carpenter will remain in Sealab 2 a total of 30 days in the 45-day project testing man's ability to perform useful tasks underwater.

Treated by Corpsman

Chief Hospital Corpsman Glen Iley, one of three second-team aquanauts who descended to Sealab 2 this morning to replace the first group continued medication for Carpenter.

The remaining six members of the second squad descended later for their 15 days.

NAVY TIMES - 52
2201 M Street, N.W. W
Washington, D.C. 20037
Circ. 60,821

SEP 15 '65

A14

Sealab Bell Alarm Proves 'Clanging' Success in Test

LA JOLLA, Calif.—They've had their first alarm on Sealab 2. It was a test—and, says the Navy, it was a clanging success.

If the aquanauts are needed inside the 205-foot-deep Sealab, a ship's bell set up outside the entry port will be sounded. A shark cage surrounds the entry port as a safety precaution.

The bell alarm was tested and aquanauts working outside scurried through the cage and into the lab.

"There were four men outside and everybody was back at the lab in less than a minute," said Capt. George Bond, chief investigator of the 45-day project.

There's little danger of a fire aboard. There's no smoking.

The 10 aquanauts haven't had a smoke since they descended September 4. They were advised to quit the habit before going down.

The mainly helium atmosphere in Sealab—and pressure that is nearly seven times greater than that on the surface—won't support flames, not even a match.

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

SEP 15 1965

Aquanaut Oxygen Content To Be Cut

The oxygen content of the gas breathed by SeaLab II aquanauts today will be reduced substantially, the Navy revealed yesterday.

Capt. George Bond (MC), director of the Navy's Man-in-the-Sea Program, said the oxygen content of the breathing mixture will be cut from 4.25 per cent to 3.5 per cent for the next three days.

The purpose of the experiment is to find a breathing mixture that would be even more efficient for living under the pressure of the sea. The mixture so far has consisted of 4.25 per cent oxygen, 20 per cent nitrogen and 75.75 per cent helium. The oxygen to be taken from the mixture will be replaced with helium.

Mon., Sept. 13, 1965
SAN DIEGO, CALIFORNIA

Ocean Floor Transfer Made Off La Jolla

Aquanaut Leader Recovering From Scorpion Encounter

By LEO BOWLER
EVENING TRIBUNE Science Writer

The second team of Sealab aquanauts began their underwater work today while their leader, Cdr. Scott Carpenter, recuperated from an encounter with a poisonous scorpion fish.

Carpenter received a painful wound from the fish yesterday as he made a final check outside Sealab to see that all was in readiness for the team change.

Sealab officials reported this morning that Carpenter was up and had had his breakfast and expected to go on a full duty status later in the day. It was not known whether this would include a swim outside Sealab.

He was brought back inside Sealab, put to bed and given medication for the wound and a synthetic narcotic to deaden the pain.

Physicians Confer

The change of teams was delayed an hour and a quarter while physicians on the mothership Berkone conferred with Lt. Robert E. Sonnenburg, a San Diego Navy doctor who is one of the aquanauts.

Sonnenburg administered the medication. There is no doctor with the second team, but Sonnenburg is scheduled to return to Sealab with the third team which will enter the lab about Sept. 27.

Carpenter was wounded in the left index finger by the poisonous spines which protrude from the dorsal fin of the fish. Capt. George Bond, principal investigator for Sealab II, said Carpenter's hand and arm began to swell and he suffered enough pain to make the use of the narcotics necessary.

Bond said that there are no permanent effects from such wounds, but that sometimes there is a temporary loss of use of the part of the body affected.

Carpenter was left in care of Chief Hospital Corpsman Glenn Iley, an aquanaut of the second team who had already entered Sealab when the accident occurred.

Sonnenburg entered the personnel transfer capsule with the other first-team aquanauts and they were hauled to the surface.

Group Goes In

The capsule was attached to the top of a decompression chamber on the deck of the Berkone, the hatches between the capsule and the chamber were opened and the men entered the chamber.

The long period of decompression, which is expected to end early tomorrow, began about 4 p.m. yesterday. The decompression is necessary so that the aquanauts are brought back to normal atmospheric pressure slowly enough so that bubbles of gas do not form in their bloodstreams.

Ater the transfer capsule was put back on the sea floor near Sealab, the remaining six aquanauts of the second team made the trip to the bottom. Iley and two others had gone down before the first team came up.

He'll Stay Down

Carpenter is scheduled to remain on the bottom until the second team completes its 15-day stay and returns to the surface.

The nine new aquanauts who entered sealab are: Arthur C. Flechsig, 40, of Encinitas, an oceanographer with Scripps Institution of Oceanography; Robert A. Barth, 35, a Navy chief quartermaster from Panama City, Fla.; Howard L. Buckner, 36, a Navy chief steelworker from Morestville, Md.; Kenneth L. Conda, 32, a torpedoman's mate first class from Ledyard, Conn.; George B. Dowling, 39, a research physicist from Panama City; Iley, 36, of Groton, Conn.; Wallace T. Jenkins, 30, an equipment specialist of Panama City; John F. Reaves, 36, a Navy photographer first class of Oxnard, and William H. Tolbert Jr., 39, an oceanographer of Panama City.

THE EVENING STAR
Washington, D. C., Wednesday, September 15, 1965

Voices Rise in Deep Sea, Aquanaut Team Reports

LA JOLLA, Calif. (AP) — Living at the bottom of the ocean gives a man a high-pitched voice, a chill, ear trouble and something resembling diaper rash, say nine aquanauts who tried it.

But some day, they add, man may be able to roam under the seven seas in a mobile laboratory.

The aquanauts told of their conclusions Tuesday after emerging from 15 days in Sealab 2, 205 feet below the Pacific Ocean surface.

They surfaced Sunday, spent 33 hours in a decompression chamber, then met newsmen aboard the staging vessel Berkone.

Brings Squeaky Voice

Aquanaut Jay D. Skidmore said the all-helium atmosphere they breathed gave them squeaky voices that sounded like a speeded-up phonograph record.

"It created a lot of hilarity at first," said Skidmore. "After a few days we got used to it and toward the last it seemed extremely normal."

Capt. George Bond, chief of the project, said the experiment pointed toward eventual development of completely mobile laboratory housing in which 35 men could go anywhere in the world, do any underwater job and return while decompressing on the way.

He said such mobility could best be obtained by modification of a nuclear submarine.

Affected by Cold

Bond said, however, that after three weeks underwater, the men's efficiency would begin to decrease.

Aquanaut Bill Coffman said he and Skidmore spent the longest time in the water at any one time — 2 hours and 44 minutes. Coffman said it was cold, but that they could have stayed out longer.

Lt. Thomas A. Clarke, team biologist, said he, however, could take only about 30 to 40 minutes in the water, which averages 51 to 53 degrees Fahrenheit around Sealab 2.

Sealab physician Lt. Robert Sonnenburg praised underwater living, but added he was unable to cure an ear infection suffered by the aquanauts. He treated them to alleviate discomfort.

The aquanauts developed a rash, similar to a baby's diaper rash, probably due to wet clothing and irritation.

Oxygen Reduced

The second team of aquanauts in Sealab 2 will have to get by on shorter rations of oxygen in an experiment starting today.

Officials said the oxygen content of the atmosphere in the 12 by 58 foot steel capsule will be reduced from 4.25 to 3.5 per cent for the next three days.

In reducing the oxygen content, scientists are seeking the most efficient breathing mixture for use in underwater projects. The first team breathed a mixture of 4.25 per cent oxygen, 20 per cent nitrogen and 75.75 per cent helium.

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Sealab Divers Pale, Tired, Soggy

By LEO BOWLER
EVENING TRIBUNE Science Writer

The nine aquanauts of Sealab II, pale and looking a little tired, described today how they used a hair dryer on their infected ears and revealed other details of their 15 days on the floor of the ocean off La Jolla.

The men stepped from the decompression chamber aboard the Sealab mother ship Berkone at 12:03 a.m. today, got a few hours of sleep, then showed up for an 8 a... press conference.

They told of their life under the sea and dscribed the problems which they met while trying to work out a means of accomplishing all the objectives of the Sealab program.

Lt. Robert E. Sonnenburg, the San Diego Navy doctor who was one of the nine, said hsi biggest medical problems on the bottom were ear infections and skin rashes from which the men suffered.

Sonnenburg said he was not able to cure the ear infections but was able to clear them up enough so that the men weren't suffering any pain.

Then, he said, three men had renewed pain in their ears during decompression aboard the Berkone last night. Sonnenburg said he was one of the three. "This is a real problem down there," Sonnenburg said. "My ears are still bugging me now, but I except they will clear up as soon as they get dried out."

The doctor said the high humidity inside Sealab and inside the decompression chamber contributed as much to the infection as did swimming in the open sea.

"We used a hair dryer down there to dry the insides of our ears, and it helped," he said. The only aquanaut who didn't have trouble with ears was Billie L. Coffman, 36, a chief torpedoman's mate first class, from Willimantic, Conn.

Coffman swabbed his ears out with alcohol before and after each dive outside Sealab. Sonnenburg recommended that all future aquanauts do likewise.

The doctor said the men also suffered from skin rashes caused by the high humidity and recommended more changes of clothing for future aquanauts.

Sonnenburg said that aquanaut Scott Carpenter, who is remaining in Sealab for another 15 days, also suffered the ear problem, but that it had been cleared up, although it is not completely cured.

Carpenter's encounter with a poisonous scorpion fish and an encounter by Coffman earlier with a same type of fish were the only two accidents suffered by aquanauts.

Aquanaut Tom Clarke, 25, a graduate student at Scripps Institution of Oceanography, said that the scorpion fishand a few electric rays were the only dangerous animals encountered on the sea floor.

Clarke said that all the aquanauts were fascinated by the large numbers of fish which swarmed around Sealab and they all spent a lot of time watching them.

He said the only sharks they saw were of a type not usually considered dangerous.

Clarke said the biggest problem encountered in his study of marine life on the ocean floor was the cold.

"After stying outside for 35 or 40 minutes I was generally cold enough that I wanted to get back inside the lab," Clarke said.

Another problem encountered by the aquanauts was finding their way around the ocean floor. Clarke said the compasses they carried on their wrists were inaccurate because of the large mass of steel in Sealab. They depended upon lifelines which they attached to Sealab and carried out to the objects they were investigating.

Jav D. Skidmore. a chief photographer from Chula Vista, and Coffman spent the longest time outside Sealab in a single dive. Skidmore said he and Coffman were out for two hours and 40 minutes during one dive in which they untangled breathing hoses outside the lab and took many of the window covers off the outside.

Skidmore said the ride up Sunday afternoon in the personnel transfer capsule went very smoothly and that the aquanauts were comfortable inside the 6-by-10-foot steel container.

Before they went down to Sealab some of the aquanauts had expressed apprehension about the ride to the surface.

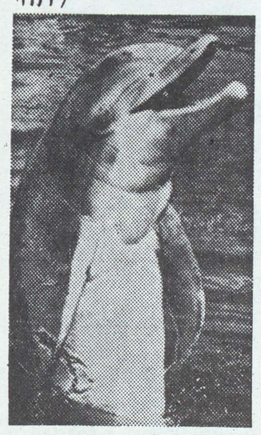
Earl Murray, a laboratory technician from Scripps Institution of Oceanography, described for newsmen the construction of an underwater weather station which he helped put into place. The construction of the station was one of the major achievements of the first aquanaut team.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)
SEP 14 1965

SAN DIEGO
EVENING TRIBUNE
SEP 14 1965
PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

From SEP 14 1965
DAILY NEWS
New York, N. Y.

WAS IT TAB 9/14/65



—AP Wirephoto
TUFFY

Aquanauts Try Porpoise As Mailman

LA JOLLA, Calif. (AP)—A watchdog-errand boy porpoise called Tuffy began working today for aquanauts living in Sealab 2 on the ocean bottom.

Tuffy, a 7-foot, 270-pound male porpoise, was airlifted by helicopter from Point Mugu, Calif., yesterday.

His duties include simulated rescues and mail and message deliveries from the surface 205 feet down to the bottom—a 45-second trip for Tuffy.

The trip up for the first team of aquanauts who lived 15 days in Sealab took 10 minutes Sunday, but the nine divers were confined 33 hours in a decompression chamber until midnight last night.

Tuffy needs no decompression and one of his handlers, aquanaut Kenneth J. Conda, 32, Phoenix, Mich., said he expects the mammal to make about 20 trips daily.

He is called Tuffy because of his reputation as a scrapper with sharks, evidenced by scars on his body.

Tuffy was captured in Biloxi, Miss., and trained for his Sealab mission at Point Mugu.

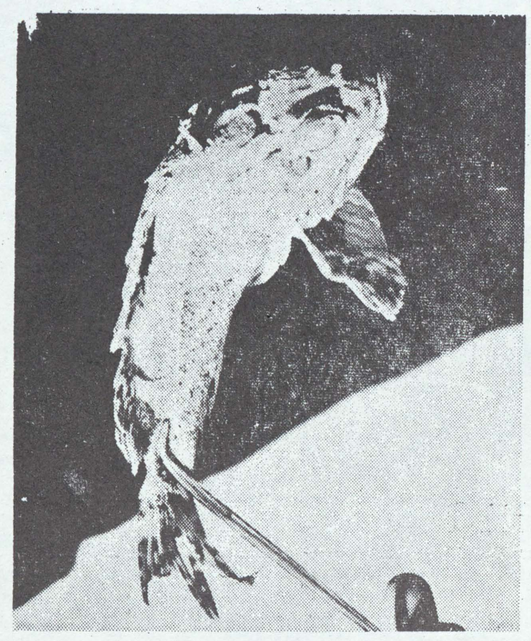
"Tuffy is so well-trained he can come down and tap a lost diver on the shoulder and hand him a life line," Conda said.

Aquanauts will pretend they are lost for Tuffy's benefit. But Conda said the divers' biggest actual fear is to become lost in the darkness of the depths.

They will carry buzzers during tests to summon Tuffy from the surface.

The second 10-man aquanaut team—including Cmdr. M. Scott Carpenter, leader of the first two teams—made its first swims outside their undersea laboratory yesterday.

The decompressed aquanauts were to be taken to Balboa Navy Hospital in nearby San Diego for physical examinations.



SCORPION FISH, which stung Astronaut-Aquanaut M. Scott Carpenter, is displayed to newsmen at La Jolla, Calif., as the first crew of the Navy's Sealab II was brought to the surface for inspection. (Associated Press)

Scorpion Fish Bite Slows Sealab Crew Transfer

LA JOLLA, Calif. (AP)— M. Scott Carpenter — unscratched in three orbits of earth in 1962 as an astronaut — was stung by a scorpion fish during a tricky transfer of crewmen of the Navy's Sealab 2 aquanauts in 205 feet of water.

Plans calling for Carpenter to stay another 15 days in the laboratory on the ocean bottom were almost scuttled as the 40-year-old astro-aquanaut, his left hand and arm swelling painfully, was brought back through Sealab's escape hatch.

Nine aquanauts who had been scheduled to ascend after 15 days underwater postponed their departure while one, a doctor, treated Carpenter with pain-killing drugs and cortisone. He said he wanted to stay.

Test Continues

When Carpenter responded to treatment the nine aquanauts, 75 minutes late, continued the complicated maneuver designed to bring them back to man's normal environment: sea-level pressure and sea-level air.

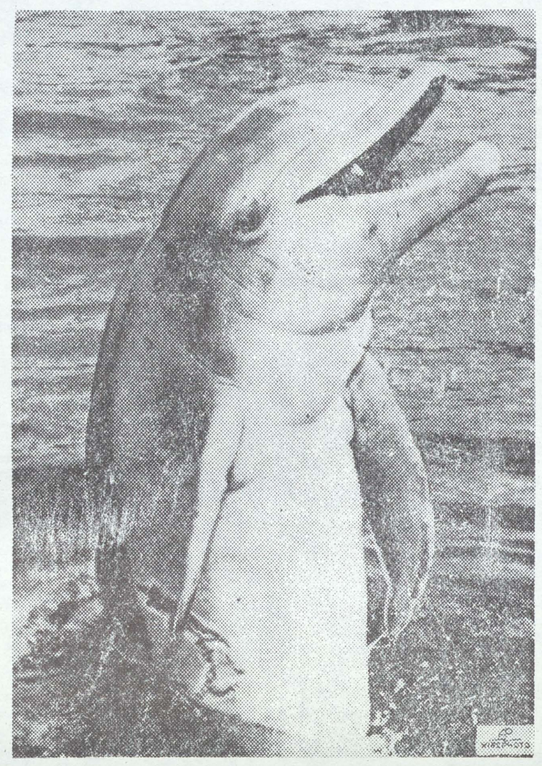
They were raised to the surface Sunday afternoon in a capsule-like tank which maintained the pressure the crewmen had grown used to in Sealab: Seven times that of the surface. The transfer unit was attached to a decompression chamber on the support vessel Berkone on the surface and the pressure slowly decreased.

The nine must spend 36 hours in the decompression unit before they can step out — early Tuesday morning — without suffering the diver's disease, bends, caused by bubbles in the bloodstream.

Nine new crewmen took the place of the men who ascended Sunday. The first three went down before Carpenter's accident. One of them, a Navy medical corpsman, attended Carpenter when the other aquanauts left. Six others went down after the original nine arose.



BACK TO NORMAL—Aquanaut Wilbur Eaton steps to deck of Sealab II mothership Berkone from decompression chamber he entered Sunday. Greeting him is Capt. Walter Mazzone, who operated the chamber.



THIS IS TUFFY—Tuffy, 7-foot, 270-pound porpoise, shown at Point Magu, Cal., is to be a "watchdog" for Sealab 2.

Nine Weary Divers Tell of Soggy Living

CONTINUED FROM PAGE 1

and Coffman spent the longest time outside Sealab in a single dive. Skidmore said he and Coffman were out for two hours and 40 minutes during one dive in which they untangled breathing hoses outside the lab and took many of the window covers off the outside.

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Earl Murray, a laboratory technician from Scripps Institution of Oceanography, described for newsmen the construction of an underwater weather station which he helped put into place. The construction of the station was one of the major achievements of the first aquanaut team.

Tuffy Appears Happy In New Surroundings

Tuffy, the porpoise who will dive down to Sealab II later this week, spent the day getting used to his temporary La Jolla home.

Tuffy was brought here yesterday from Point Magu by helicopter, landed at Mission Bay Park, and was taken by boat to the Sealab site off Scripps Pier.

He spent last night in a specially constructed floating pen near the Sealab mother ship Berkone. Today he was to make his first foray into the open sea around the pen.

His trainers expected to open the gate to the pen, let Tuffy out for a swim, then call him back with an underwater sound signaling device.

His trainers said he showed little effect from the long trip down from Point Mugu during which he was out of the water about four hours. During the trip his handlers kept him wet with water from a spray can and protected him from the burning effects of the sun with a wet sheet.

Today he was dining on mackerel and appeared well and happy in his new home.

Porpoise To Help Aquanauts As Watchdog And Mail Man

Balt. Sun 9/14/65

La Jolla, Cal., Sept. 13 (AP)—A versatile porpoise named Tuffy joined aquanauts of Sealab 2 today to assume tasks usually handled by watch dogs, guides, messengers and mail men.

"Tuffy is so well-trained he can come down and tap a lost diver on the shoulder and hand him a life line," said Kenneth J. Conda, 32, of Phoenix, Mich.

Navy Torpedoman First Class Conda and John F. Reaves, 36, photographer's mate first class of Robertsdale, Ala., are the aquanauts assigned to wirk with Tuffy.

Tuffy is 7 feet long and weighs 270 pounds. He carries scars from encounters with sharks, which explains his name.

Flown By Helicopter

Tuffy, trained by the Navy at Point Mugu, Cal., was wrapped in a blanket and flown to Sealab by helicopter. His pen is on the surface near the staging vessel Berkone.

"We think Tuffy will be able to make as many as twenty runs to Sealab every day, delivering mail and messages," Conda said.

"If a diver gets in trouble we just call up to the Berkone and they'll send Tuffy down to me," he said. "Tuffy can make the 205-foot trip in 45 seconds."

Porpoises have a characteristic of being friendly and aquanauts have wondered whether Tuffy will be a nuisance.

"Knows What To Do"

Conda isn't worrying, saying: "He's very gentle. He knows exactly what to do. Tuffy is very practical for the safety of divers."

Conda said Tuffy has been conditioned to respond to an underwater buzzer, which could be used by a distressed diver to summon the porpoise to the rescue.

Visibility at the depth is limited and aside from painful scorpion fish stings, about the only thing a diver fears is getting lost when they lose sight of Sealab.

"He once came to me without the buzzer in pretty dark water," Conda said.

Aquanauts will be careful that Tuffy doesn't stick his snout into Sealab through the open bottom hatch.

"The shark cage should prevent him from getting in, and we'll keep a close watch," Conda said.

Should Tuffy breathe the helium atmosphere inside the Sealab, it could be fatal for the mammal. Like humans, Tuffy has lungs, but he doesn't need to decompress after each dive. The lighter Sealab air could cause embolism, the obstruction of a blood vessel by air bubbles, Conda said.

Aquanaut William H. Tolbert, Jr., 39, an oceanographer from the Navy Mine Defense Laboratory, Panama City, Fla., said he's interested in meeting Tuffy.

"He's from my home town of Biloxi (Miss.)," said Tolbert, referring to where the mammal was caught.

"When I left home my daughter's last words were, 'Get a picture of Tuffy,'" he said.

Nine were scheduled to leave the chamber at midnight after 33 hours of decompression.

9 AQUANAUTS ARE TO LEAVE SEALAB TODAY

36 Hours To Be Needed To Return Them To Normal Living

La Jolla, Cal., Sept. 11 (AP)—Nine aquanauts in Sealab 2 check out their "Tiltin' Hilton" on the ocean floor tomorrow for a 205-foot, 36-hour trip back to sunshine and fresh air.

The men have lived and worked below the ocean's surface since August 28. Their ascent marks the end of the first phase of the Navy's most ambitious underwater living project.

While the trip to the surface is expected to take only about 5 minutes, the aquanauts will go directly into a decompression chamber for a slow return to sea-level pressure. This will take about 36 hours, officials said.

Second Team To Descend

Tomorrow's schedule also calls for the descent of the second team of nine divers to the 12x58-foot steel capsule.

The aquanauts have nicknamed the capsule the "Tiltin' Hilton" as an indication that the ocean bottom "hotel" is not exactly level. One end is slightly higher than the other and there is a list to one side.

When the aquanauts leave their deepsea den, they will swim to a transfer capsule—a sort of underwater elevator.

The hatches on the transfer capsule will be closed and, the pressure inside will remain at the seven atmospheres of sealab depth during its ascent.

Capsule Will Be Hoisted

The capsule then will be hoisted to the surface by cable and mated to a decompression chamber on the deck of the staging vessel, Berkone. The pressure inside the chamber will then be slowly released.

The transfer capsule, which has been on the bottom near the sealab since the project began, was brought up today for a thorough scrubbing.

Officials said anchovies attracted by the light had entered an open hatch in the bottom and died. It was cleaned out.

Astronaut Scott Carpenter is the only man in the first team who will not come up tomorrow. He stays down for another 15-day shift.

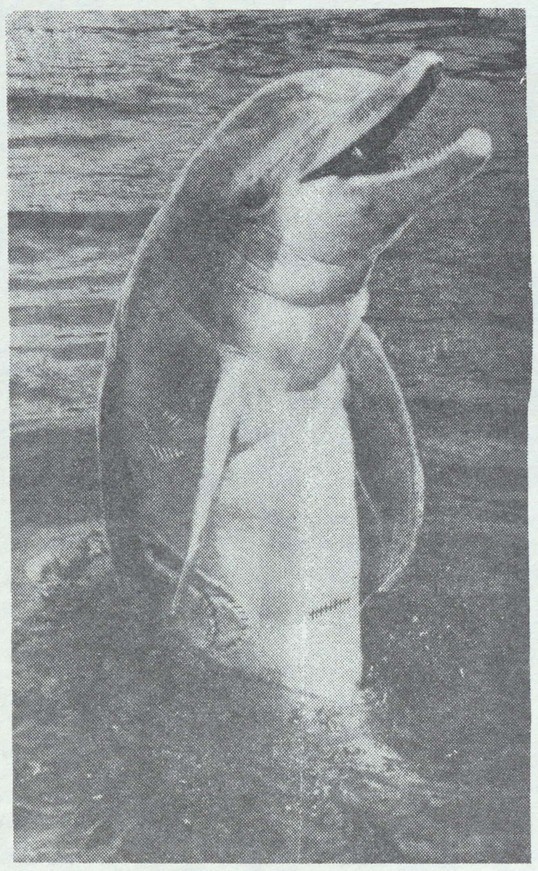
AQUANAUT ACTIVITIES 'AVAILABLE' TO PUBLIC

Activities in Sealab II 205 feet below the ocean surface off La Jolla, can now be viewed daily by the public on closed circuit television.

Viewing hours will be 11 a.m. to 3 p.m. Monday through Friday and 10 a.m. to 4 pm.. Saturday and Sunday in Sumner Auditorium at Scripps Institution of Oceanography.

The second team of nine aquanauts plus Cdr. Scott Carpenter, team leader, now are in Sealab, 3,000 feet off Scripps Pier. The project will continue for approximately a month.

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Tuffy, the 270-pound mailman for the aquanauts, pops to the surface. The scars on his body result from battles with sharks. Porpoise earned his name because of his roughness.

HERALD TRIBUNE
New York, N. Y.
SEP 14 1965

Porpoise May Carry Mail to Aquanauts

Tuffy, a Navy porpoise, starts working out today in the Pacific off La Jolla, Calif., to see if he can wear harness and a lifeline and swim 205 feet down to Sealab 2 aquanauts when they sound a buzzer. An official test of this lifesaving technique takes place Thursday and astronaut Scott Carpenter will be one of the Navy men working with Tuffy. Tuffy is supposed to make the underwater trip in 45 seconds. If the test is successful the porpoise will also start delivering mail to the aquanauts. The chief danger: that he'll become a ham like Flipper the TV porpoise and forget about his official duties.

From SUN-TIMES Chicago, Ill.
SEP 14 1965

Tuffy The Porpoise Is Deep Sea Guide To Sealab Aquanauts

LA JOLLA, Calif. (AP) — A versatile porpoise named Tuffy joined aquanauts of Sealab 2 Monday to assume tasks usually handled by watch-dogs, guides, messengers, and mailmen.

"Tuffy is so well-trained he can come down and tap a lost diver on the shoulder and hand him a life line," said Kenneth J. Conda, 32, of Phoenix, Mich.

Conda, a navy torpedoman first class, and John F. Reaves, 36, photographer's mate first class of Robertsdale, Ala., are the aquanauts assigned to work with Tuffy.

Scars Tell Talles

Tuffy is 7 feet long and weighs 270 pounds. He carries scars from encounters with sharks, which explains his name.

Tuffy, trained by the Navy at Point Mugu, Calif., was wrapped in a blanket and flown to Sealab by helicopter. His pen is on the surface near the staging vessel Berkone.

"We think Tuffy will be able to make as many as 20 runs to Sealab every day, delivering mail and messages," Conda said.

"If a diver gets in trouble, we just call up to the Berkone and they'll send Tuffy down to me," he said. "Tuffy can make the 205-foot trip in 45 seconds.

Porpoises have a habit of being friendly, and aquanauts have wondered whether Tuffy will be a nuisance.

He's Very Gentle

Conda isn't worrying. "He's very gentle. He knows exactly what to do. Tuffy is very practical for the safety of divers."

Conda said Tuffy has been conditioned to respond to an underwater buzzer, which could be used by a distressed diver to summon the porpoise to the rescue.

Visibility at the depth is limited and aside from painful scorpion fish stings, about the only thing a diver fears is getting lost when they lose sight of Sealab.

"He once came to me without the buzzer in pretty dark water," Conda said.

Aquanauts will be careful that Tuffy doesn't stick his snout into Sealab through the open bottom hatch.

Cage Is Barrier

"The shark cage should prevent him from getting in, and we'll keep a close watch," Conda said.

Should Tuffy breathe the helium atmosphere inside the Sealab, it could be fatal for the mammal. Like humans, Tuffy has lungs, but he doesn't need to decompress after each dive. The lighter Sealab air could cause embolism, the obstruction of a blood vessel by air bubbles, Conda said.

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"He's from my home town of Biloxi (Miss.)," said Tolbert, referring to where the mammal was caught.

Gets A Picture

"When I left home, my daughter's last words were, 'Get a picture of Tuffy,'" he said.

Meanwhile, the first team was reported "resting very well" in the decompression chamber. Nine were scheduled to leave the chamber after 36 hours Tuesday morning.

And Cmdr. M. Scott Carpenter, leader of the first two teams of divers, was fully recovered from a painful scorpion fish sting suffered Sunday. He was back on full duty Monday.

The second team of divers was busy conducting extensive physiological tests and planned to make its first exploration of the outside waters Monday.

New Ocean Cable

PARIS (UPI) — A new trans-Atlantic telephone cable linking France and the United States will go into operation on Wednesday, it was announced Monday.

Porpoise Joins Sealab's Team

LA JOLLA, Calif. (AP) — A versatile porpoise named Tuffy joined aquanauts of Sealab 2 Monday to assume tasks usually handled by watchdogs, guides, messengers and mailmen.

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From SEP 1 4
CONSTITUTION Atlanta

La Jolla, Calif.

Nine United States aquanauts returned to the ocean surface "safe and sound" after 15 days at 205 feet below in the Navy's 12-by-59-foot steel capsule, Sealab 2.

As they emerged, three members of a fresh crew of nine swam down from a surface staging vessel. Still below after 15 days was Astronaut M. Scott Carpenter, who plans to stay another 15 with the second crew.

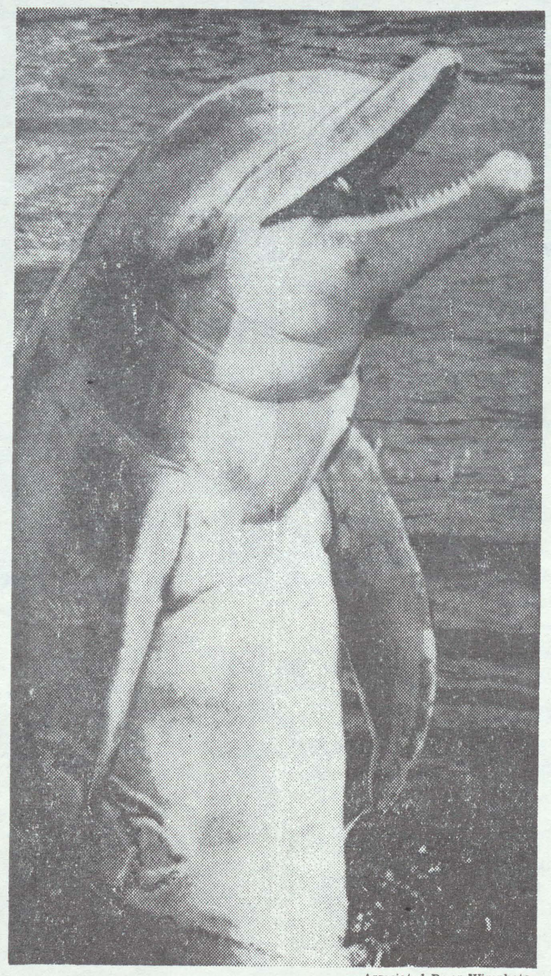
Compiled from Associated Press, Reuters, and the worldwide sources of this newspaper.

CHRISTIAN SCIENCE MONITOR
Boston, Mass.
SEP 14 1965

From SEP 14 1965
POST-GAZETTE
Pittsburgh, Pa.

New Mascot Is Jack-of-All Trades

'Tuffy' Gives Sealab 2 An All-Round Porpoise



--Associated Press Wirephoto
Tuffy, a 7-foot porpoise, leans in Sealab 2 pool.

Well-Trained Mammal Even Carries Mail

By RON ROACH
Associated Press Staff Writer

LA JOLLA, Calif., Sept. 13 —A versatile porpoise named Tuffy joined aquanauts of Sealab 2 today to assume tasks usually handled by watch oogs, guides, messengers and mail men.

"Tuffy is so well-trained he can come down and tap a lost diver on the shoulder and hand him a life line," said Kenneth J. Conda, 32, of Phoenix, Mich.

Navy Torpedoman First Class Conda and John F. Reaves, 36, Photographer's Mate First Class of Robertsdale, Ala., are the aquanauts assigned to work with Tuffy.

Scarred by Shark Fights

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Porpoises have a habit of being friendly an aquanauts have wondered whether Tuffy will be a nuisance.

Conda isn't worrying. "He's very gentle. He knows exactly what to do. Tuffy is very practical for the safety of divers."

Conda said Tuffy has been conditioned to respond to an underwater buzzer, which could be used by a distressed diver to summon the porpoise to the rescue.

Fear Getting Lost

Visibility at the depth is limited and aside from painful scorpion fish stings, about the only thing a diver fears is getting lost when they lose sight of Sealab.

"He once came to me with out the buzzer in pretty dark water," Conda said.

Aquanauts will be careful that Tuffy doesn't stick his snout into Sealab through the open bottom hatch.

"The shark cage should prevent him from getting in, and we'll keep a close watch," Conda said.

Should Tuffy breathe the helium atmosphere inside Sealab, it could be fatal for the mammal. Like humans, Tuffy has lungs, but he doesn't need to decompress after each dive. The lighter Sealab air could cause embolism, the obstruction of a blood vessel by air bubbles, Conda said.

ERRAND BOY-WATCHDOG

13 Porpoise Begins Work for Sealab Aquanauts

LA JOLLA, Calif — (AP) — A watchdog-errand boy porpoise called Tuffy began working today for aquanauts living in Sealab-2 on the ocean bottom.

Tuffy, a 7-foot, 270-pound male porpoise, was airlifted by helicopter from Point Mugu, Calif., Monday.

His duties include simulated rescues and mail and message deliveries from the surface 205 feet down to the bottom — a 45-second trip for Tuffy.

The trip up for the first team of aquanauts who lived 15 days in the Sealab took 10 minutes Sunday, but the nine divers were confined 33 hour in a decompression chamber until midnight Monday.

Tuffy needs no decompression and one of his handlers, aquanaut Kenneth J. Conda, 32, Phoenix, Mich., said he ex pects the mammal to make about 20 trips daily.

He is called Tuffy because of his reputation as a scrapper with sharks, evidenced by scars on his body

But Conda said Tuffy has never been seen in action against sharks and won't go looking for trouble.

Only one shark has been reported in the area since the first team went down Aug. 28. It was a 5½-foot-long blue shark, killed on the surface by a bow and arrow.

"Sharks don't usually lurk in deep waters," Conda said, "although I've been chased down by them in the past."

Tuffy was captured in Biloxi, Miss., and trained for his Sealab mission at Point Mugu.

"Tuffy is so well-trained he can come down and tap a lost diver on the shoulder and hand him a life line," Conda said.

Aquanauts will pretend they are lost for Tuffy's benefit..But Conda said the divers' biggest actual fear is to become lost in the darkness of the depths.

Minneapolis (Minn.) Star
TUESDAY, SEPTEMBER 14, 1965

SAN DIEGO
VENING TRIBUNE
SEP 14 1965

PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

Tuffy Appears Happy In New Surroundings

Tuffy, the porpoise who will dive down to Sealab II later this week, spent the day getting used to his temporary La Jolla home.

Tuffy was brought here yesterday from Point Magu by helicopter, landed at Mission Bay Park, and was taken by boat to the Sealab site off Scripps Pier.

He spent last night in a specially constructed floating pen near the Sealab mother ship Berkone. Today he was to make his first foray into the open sea around the pen.

His trainers expected to open the gate to the pen, let Tuffy out for a swim, then call him back with an underwater sound signaling device.

His trainers said he showed little effect from the long trip down from Point Mugu during which he was out of the water about four hours. During the trip his handlers kept him wet with water from a spray can and protected him from the burning effects of the sun with a wet sheet.

Today he was dining on mackerel and appeared well and happy in his new home.

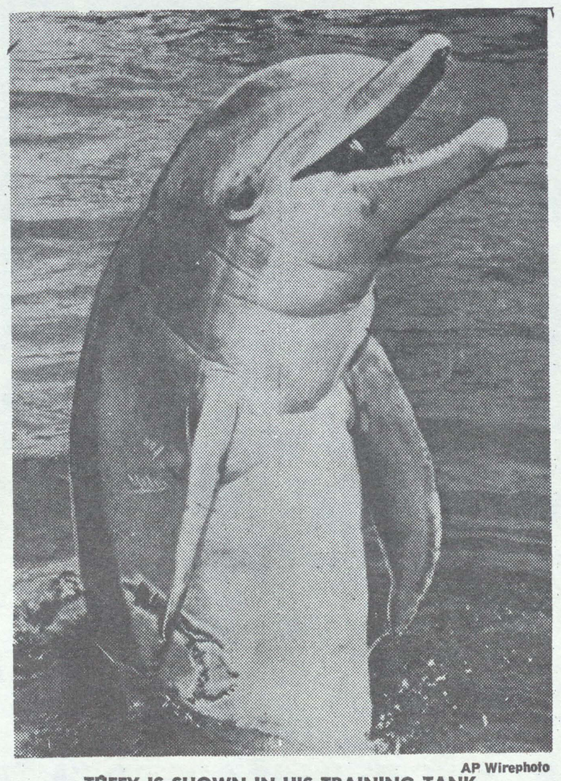
SAN DIEGO UN
SEP 14 1965
PUBLIC INFORMATION OFF
Eleventh Naval District
San Diego, California

TAKE A PEEK AT SEALAB II

Anyone who wants to see what it is like to live in SeaLab II can now do it by going to Sumner Auditorium on the campus of the Scripps Institution of Oceanography at the right times.

Closed circuit television monitors are set up in the auditorium. The auditorium will be open to the public from 11 a.m. until 3 p.m. on week days and from 10 a.m. until 4 p.m. on Saturdays and Sundays, the SeaLab headquarters announced.

POST
SEP 14 1965



AP Wirephoto
TUFFY IS SHOWN IN HIS TRAINING TANK
Scars on his side are from battles with sharks.

Tuffy the Porpoise Is Sealab Errand Boy

LA JOLLA, Calif.—(AP)—A watchdog-errand boy porpoise called Tuffy began working Tuesday for aquanauts living in Sealab 2 on the ocean bottom.

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His duties include simulated rescues and mail and message deliveries from the surface 205 feet down to the bottom—a 45-second trip for Tuffy.

The trip up for the first team of aquanauts who lived 15 days in Sealab took 10 minutes Sunday, but the nine divers were confined 33 hours in a decompression chamber until midnight Monday.

Tuffy needs no decompression and one of his handlers, aquanaut Kenneth J. Conda, 32, Phoenix, Mich., said he expects the mammal to make about 20 trips daily.

Scrapper With Sharks

He is called Tuffy because of his reputation as a scrapper with sharks, evidenced by scars on his body. But Conda said Tuffy has never been seen in action against sharks and won't go looking for trouble.

Only one shark has been reported in the area since the first team went down Aug. 28. It was a 5½-foot-long blue shark, killed on the surface by a bow and arrow.

Tuffy was captured in Biloxi, Miss., and trained for his Sealab mission at Point Magu.

"Tuffy is so well trained he can come down and tap a lost diver on the shoulder and hand him a lifeline," Conda said.

Aquanauts Play for Him

Aquanauts will pretend they are lost for Tuffy's benefit. But Conda said the divers' biggest actual fear is to become lost in the darkness of the depths.

They will carry buzzers during tests to summon Tuffy from the surface.

Aquanauts have also envisioned possible undersea combat with enemy divers in some future war in which a trained porpoise would be valuable.

New York 38, N. Y.
From SEP 14 1965
GLOBE DEMOCRAT
St. Louis, Mo.

Porpoise to Carry Mail, Assist Sealab Crews

By Associated Press

LA JOLLA, CALIF.—A versatile porpoise named Tuffy joined aquanauts of Sealab 2 Monday to assume tasks usually handled by watch dogs, guides, messengers and mail men.

"Tuffy is so well-trained he can come down and tap a lost diver on the shoulder and hand him a life line," said Kenneth J. Conda, of Phoenix, Mich.

Navy Torpedoman First Class Conda and John F. Reaves, 36, Photographer's Mate First Class of Robertsdale, Ala., are the aquanauts assigned to work with Tuffy.

Tuffy is seven feet long and weighs 270 pounds. He carries scars from encounters with sharks, which explains his name.

TRAINED BY NAVY

Tuffy, trained by the Navy at Point Mugu, Cal., was wrapped in a blanket and flown to Sealab by helicopter. His pen is on the surface near the staging vessel Berkone.

"We think Tuffy will be able to make as many as 20 runs to Sealab every day, delivering mail and messages," Mr. Conda said.

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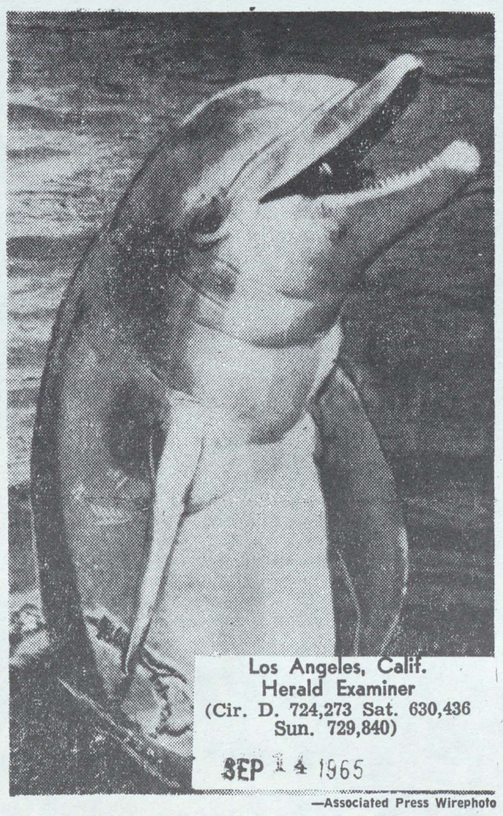
IN DECOMPRESSION

Meanwhile, the first team was reported "resting very well" in the decompression chamber.

Nine were scheduled to leave the chamber after 36 hours Tuesday morning.

And Cmdr. M. Scott Carpenter, leader of the first two teams of divers, was fully recovered from a painful scorpion fish sting suffered Sunday. He was back on full duty Monday.

109



Los Angeles, Calif.
Herald Examiner
(Cir. D. 724,273 Sat. 630,436
Sun. 729,840)
SEP 14 1965

—Associated Press Wirephoto

TUFFY—THE 'MAIL MAN'
He'll deliver messages to Sealab aquanauts

PORPOISE COURIER FOR SEALAB CREW

A trained porpoise today was mascot and courier of mail for aquanauts living in Sealab II on the ocean floor.

Tuffy, the 7-foot, 270-pound male porpoise, "is so well trained he can come down, tap a lost diver on the shoulder and hand him a line," said aquanaut Kenneth J. Conda.

The intelligent mammal, captured in Biloxi, Miss., and trained for his Sealab mission at Point Mugu, Calif., was airlifted by helicopter Monday to La Jolla.

His duties include simulated rescues and deliveries of mail and messages from the surface 205 feet to Sealab—a 45-second trip.

For the 20 trips per day Tuffy is expected to make, he'll receive about 14 to 15 pounds of fish daily at his surface pen.

Tuffy needs no decompression in surfacing, as did nine divers working with Sealab who spent 33 hours in a decompression chamber until midnight Monday.

In mock rescues, Conda said, aquanauts will summon Tuffy with buzzers to indicate they are "lost."

Aquanauts have also envisioned possible undersea combat with enemy divers in future wars in which a trained porpoise would be valuable.

Tuffy accompanied the second 10-man Sealab team — including Cmdr. Scott Carpenter — as they made initial ventures outside the undersea laboratory Monday.

The decompressed first team of aquanauts, who surfaced Sunday, were to undergo physical examinations today at Balboa Naval Hospital, San Diego.

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)
SEP 15 1965

Tuffy Leaps Right Into His New Job

Tuffy, the Point Mugu porpoise who will join SeaLab II aquanauts tomorrow for simulated rescue missions, yesterday made 20 dives to the ocean floor to get used to the area and its noises.

Dr. Sam H. Ridgway, research veterinarian at the naval missile center at Point Mugu, said Tuffy's dives were made about 100 yards closer to shore than SeaLab itself.

However, Tuffy was allowed to frolic in the water above SeaLab as his trainers watched for reactions to sound.

"Our main concern was that he get used to the sounds in a strange area — boats, motors, SeaLab noises — so he can distinguish our underwater signals," Ridgway said.

WORLD OF SOUND

The veterinarian said the porpoise's world is one of sound more than sight and yesterday's workout was highly successful.

His first mission with SeaLab divers will be to swim to SeaLab, carry a line about 70 feet to a "lost" diver and return to the surface, Ridgway said.

The doctor said Tuffy could stay underwater four minutes if necessary but he could make a 200 foot dive, carry a line 50 feet and return to the surface in one minute, 45 seconds.

At the end of such missions is the fishy reward.

WHOLLY MACKEREL

Ridgway said Tuffy eats 15 pounds of Pacific mackerel a day.

Tuffy was reported happy to get back in the water after the four-hour trip Monday from Point Mugu. He stays in a floating pen near the mother ship Berkone.

Tuffy the Porpoise Watchdog for Sealab

LA JOLLA, Calif — (AP) — A versatile porpoise named Tuffy joined aquanauts of Sealab 2 Monday to assume tasks usually handled by watchdogs, guides, messengers and mail men.

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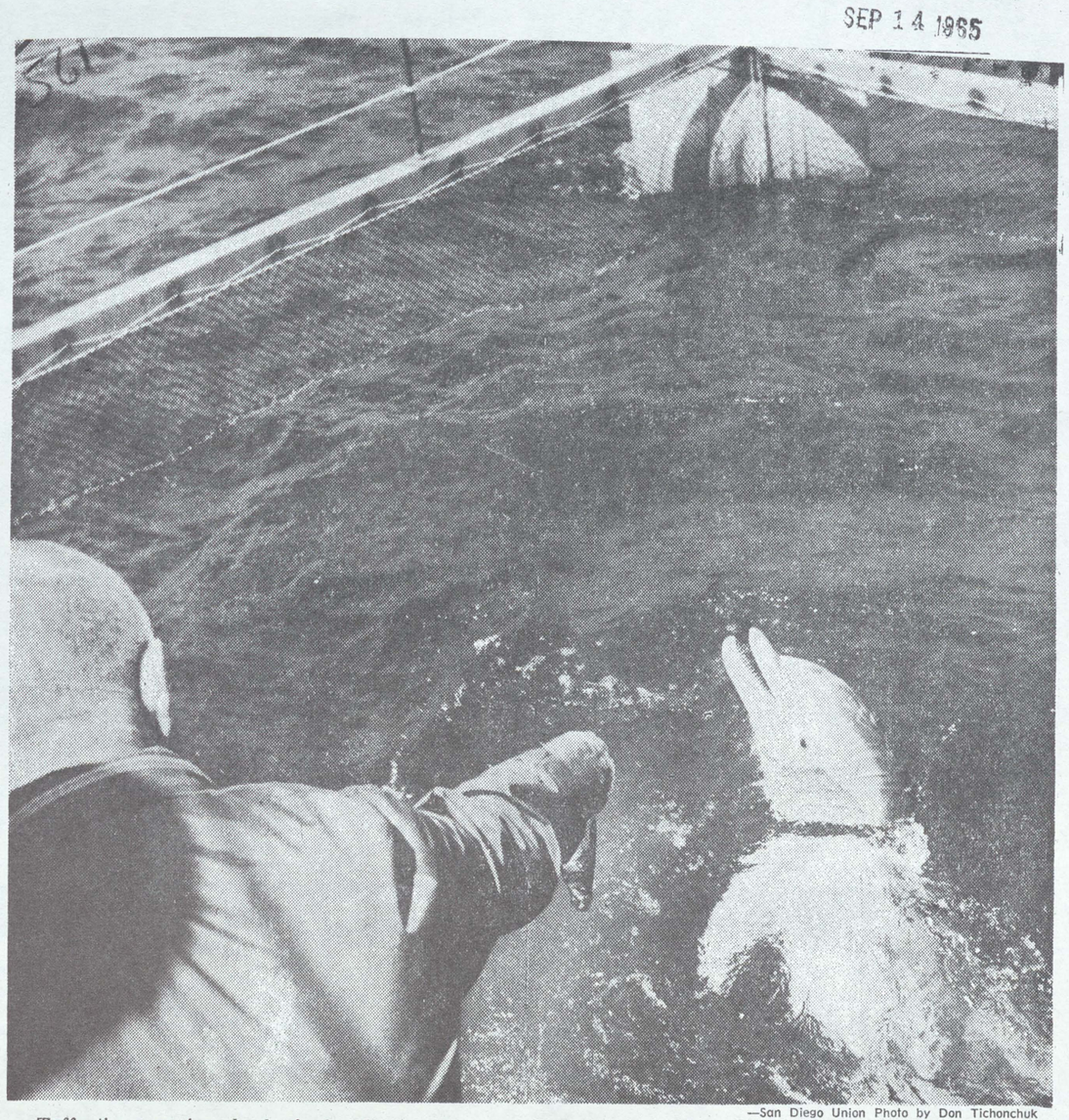
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San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)
SEP 14 1965



—San Diego Union Photo by Don Tichonchuk

Tuffy the porpoise checks in for duty at SeaLab II. He was flown in by helicopter from Point Mugu yesterday. Here he is in his pen near the Berkone, SeaLab's mother ship. That's his trainer, Wally Ross, tossing him a fish. Tuffy will be used in aquanaut-rescue experiments.

9 Aquanauts Back on Terra Firma

Nine decompressed U.S. aquanauts went about their duties in San Diego today with diaper rash.

Dr. Robert Sonnenburg, U.S. Navy physician, attributed the condition to the irritation of wet clothing worn during 15 days of research in Sealab 2, a marine capsule anchored 205 feet beneath the Pacific off La Jolla.

Relieved Sunday by a second aquanaut team, the researchers also suffered chills and a slight irritation while in Sealab 2, Lt. Sonnenburg said.

But the physician and aquanauts agreed after routine decompression ended yesterday that the experiment is a success, proving feasibility of a mobile undersea laboratory.

Tuffy Is Here To Join SeaLab—On Porpoise

By BRYANT EVANS
The San Diego Union's
Science Writer

The first porpoise to be drafted to help man living under the sea arrived here by air yesterday and reported for duty to SeaLab II scientists.

The sea mammal, whose name is Tuffy, will work with the second team of aquanauts, who descended to SeaLab Sunday.

The first team of nine men, who came up from the undersea home after spending 15 days there, were scheduled to leave their decompression chamber early today. They had been in the chamber for 32 hours to rid their tissues of gases that cause the bends.

Tuffy is so named because of his high spirits and obnoxious disposition when he was first brought to Point Mugu Naval Missile Center two years ago. Since then he has become gentle and an apt pupil.

Tuffy was brought in a helicopter from Point Mugu and arrived about 12:15—three hours late because of fog at Point Mugu. The craft landed at the Mission Bay headquarters at Quivira Basin.

Tuffy was carried out of the helicopter on a stretcher, posed for photographs and then was taken aboard a small boat for his ride to the SeaLab site. He rode lying on his side on a foam rubber pad and was frequently sprayed with water.

Out near the Berkone, mother ship of SeaLab II, off the Scripps Institution of Oceanography campus, Tuffy was lowered into his 17-foot by 17-foot pen. This floats in the water, with its floor 6 feet down. Tuffy could jump out without much trouble.

Once in the pen, he became very active and excited when he was fed frozen fish. He eats an average of 15 pounds of fish a day.

TRAINING START

This morning trainers will start getting Tuffy ready for his work with the SeaLab crew.

Marty Conboy, a Navy diver who has been working with Tuffy, said they wanted to get him used to the water and the noises in the area. They work with Tuffy by using buzzers to call him. When he responds, he is fed a fish.

Conboy said they would take him down a hundred feet or so in two training sessions during the day. Training will be repeated tomorrow and on Thursday a buzzer held down on the SeaLab level will lure him to the bottom.

Tuffy will wear a harness on which can be clipped such things as tools and lines. The purpose of the experiments is to determine whether porpoises can be used as practical assistants to men working under the water.

CARRIES LINE

In one experiment, he will carry one end of a line from SeaLab II to a diver presumably lost in the murky water.

Divers of team 2 who went down for a 15-day stay in SeaLab Sunday were getting accustomed to their home under the water yesterday.

Cmdr. M. Scott Carpenter, captain of both the first and second teams, yesterday was recuperating satisfactorily from a sculpin jab he received Sunday. He expected to be back at work in the water outside the lab today.

Aquanauts Meet Tuffy, a Porpoise With a Purpose

LA JOLLA, Calif. —(AP)— A versatile porpoise named Tuffy joined aquanauts of Sealab 2 Monday to carry out tasks usually handled by watchdogs, guides, messengers and mailmen.

"Tuffy is so well trained he can dome down and tap a lost diver on the shoulder and hand him a lifeline," said Kenneth J. Conda, 32, of Phoenix, Mich.

Conda, a Navy torpedoman first class, and John F. Reaves, 36, a photographer's mate first class from Robertsdale, Ala., are the aquanauts assigned to work with Tuffy.

* * *

TUFFY IS seven feet long and wieghs 270 pounds. He carries scars from encounters with sharks, which explains his name.

Tuffy, trained by the Navy at Point Mugu, Calif., was wrapped in a blanket and flown to Sealab by helicopter. His pen is on the surface near the staging vessel Berkone.

"We think Tuffy will be able to make as many as 20 runs to Sealab every day, delivering mail and messages," Conda said.

"If a diver gets in trouble we just call up to the Berkone and they'll send Tuffy down to me," he said. Tuffy can make the 205-foot trip in 45 seconds.

Porpoises have a habit of being friendly and aquanauts have wondered whether Tuffy will be a nuisance.

* * *

CONDA ISN'T worrying. "He's very gentle," he said. "He knows exactly what to do. Tuffy is very practical for the safety of divers."

Conda said Tuffy has been conditioned to respond to an

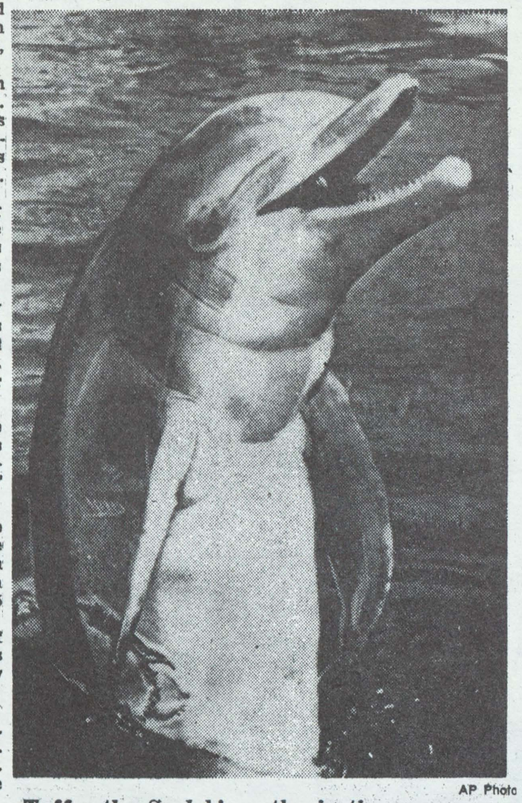
• Continued from Page One •

underwater buzzer which could be used by a distressed diver to summon the porpoise to the rescue.

Aquanauts will be careful that Tuffy doesn't stick his snout into Sealab through the open bottom hatch.

Should Tuffy breathe the helium atmosphere inside Sealab, it could be fatal. Like humans, Tuffy has lungs, but he doesn't need to decompress after each dive. The lighter Sealab air could cause embolism, the obstruction of a blood vessel by air bubbles.

New York 38, N. Y.
From SEP 14 1965
FREE PRESS
Detroit, Mich.



AP Photo

Tuffy, the Sealab's enthusiastic messenger

New York 38, N. Y.
From SEP 14 1965
NEWS
Dallas, Texas

Navy Trained 'Tuffy'

Porpoise Takes Job As Sealab 'Assistant'

LA JOLLA, Calif. (AP)—A versatile porpoise named Tuffy joined aquanauts of Sealab 2 Monday to assume tasks usually handled by watch dogs, guides, messengers and mail men.

"Tuffy is so well-trained he can come down and tap a lost diver on the shoulder and hand him a life line," said Kenneth J. Conda, 32, of Phoenix, Mich.

Navy Torpedoman First Class Conda and John F. Reaves, 36, photographer's mate first class of Robertsdale, Ala., are the aquanauts assigned to work with Tuffy.

TUFFY IS SEVEN FEET long and weighs 270 pounds. He carries scars from encounters with sharks, which explains his name.

Tuffy, trained by the Navy at Point Mugu, Calif., was wrapped in a blanket and flown to Sealab by helicopter. His pen is on the surface near the staging vessel Berkone.

"We think Tuffy will be able to make as many as 20 runs to Sealab every day, delivering mail and messages," Conda said.

"If a diver gets in trouble we just call up to the Berkone and they'll send Tuffy down to me," he said. "Tuffy can make the 205-foot trip in 45 seconds."

Porpoises have a habit of being friendly and aquanauts have wondered whether Tuffy will be a nuisance.

Conda isn't worrying. "He's very gentle. He knows exactly what to do. Tuffy is very practical for the safety of divers."

CONDA SAID TUFFY has been conditioned to respond to an underwater buzzer, which could be used by a distressed diver to summon the porpoise to the rescue.

Visibility at the depth is limited and aside from painful scorpion fish stings, about the only thing a diver fears is getting lost when they lose sight of Sealab.

"He once came to me without the buzzer in pretty dark water," Conda said.

Aquanauts will be careful that Tuffy doesn't stick his snout into Sealab through the open bottom hatch.

"The shark cage should prevent him from getting in, and we'll keep a close watch," Conda said.

SHOULD TUFFY breathe the Helium atmosphere inside the Sealab, it could be fatal for the mammal. Like humans, Tuffy has lungs, but he doesn't need to decompress after each dive. The lighter Sealab air could cause embolism, the obstruction of a blood vessel by air bubbles, Conda said.

Aquanaut William H. Tolbert Jr., 39, an oceanographer from the Navy mine defense laboratory, Panama City, Fla., said he's interested in meeting Tuffy.

"He's from my home town of Biloxi (Miss.)," said Tolbert, referring to where the mammal was caught.

"When I left home my daughter's last words were, 'Get a picture of Tuffy,' " he said.

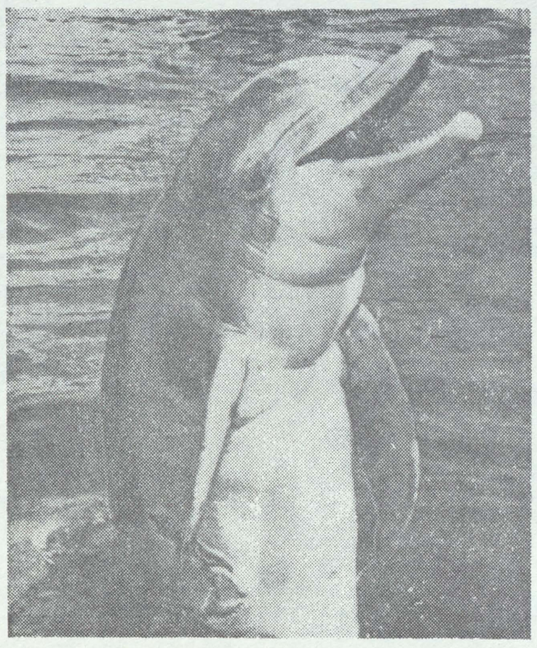
Meanwhile, the first team was reported "resting very well" in the decompression chamber. Nine were scheduled to leave the chamber after 36 hours Tuesday morning.

And Cmdr. M. Scott Carpenter, leader of the first two teams of divers, was fully recovered from a painful scorpion fish sting suffered Sunday. He was back on full duty Monday.

110

The Plain Dealer
Cleveland, O.
A.M.-circ. 339,112
Sun.-circ. 494,645

SEP 14 1965
32 W



Tuffy the porpoise AP Wirephoto

Trip Not Porpoiseless

Tuffy Is Rescuer of Lost Aquanauts

From Wire Reports

You're a Sealab 2 aquanaut, and you're lost in the murky darkness 205 feet below the ocean's surface off La Jolla, Calif. What do you do?

You ring for Tuffy, a versatile porpoise trained to assist the aquanauts as a sort of watchdog, messenger and mailman.

"Tuffy is so well trained he can come down and tap a lost diver on the shoulder and hand him a life line," said Kenneth J. Conda, 32, of Phoenix, Mich., one of two aquanauts assigned to work with the 7-foot-long, 270-pound porpoise.

Tuffy, trained by the Navy at Point Mugu, Calif., was flown to Sealab yesterday by helicopter. He will be penned on the surface near the staging vessel Berkone.

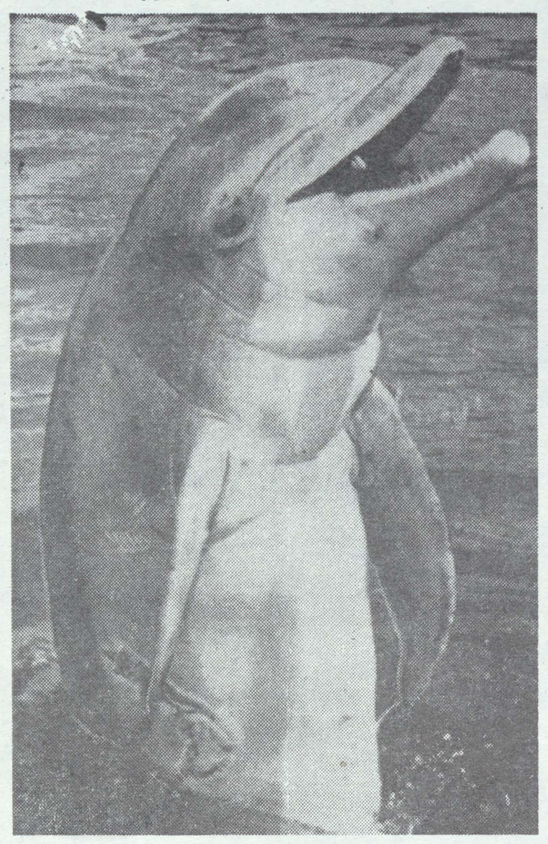
"We think Tuffy will be able to make as many as 20 runs to Sealab every day, delivering mail and messages," said Conda, a Navy torpedoman first class.

"If a diver gets into trouble we just call up to the Berkone and they'll send Tuffy down to me," he said. "Tuffy can make the 205-foot trip in 45 seconds."

Conda said Tuffy has been conditioned to respond to an underwater buzzer, which could be used by a distressed diver to summon the porpoise to the rescue.

Visibility at depth is limited and, aside from painful scorpion fish stings, about the only thing a diver fears is getting lost when he loses sight of Sealab.

From SEP 14 1965
JOURNAL, Atlanta, Ga.



Associated Press Wirephoto
TUFFY LEAPS INTO AIR DURING TRAINING
Scars on Side Are From Battles With Sharks

BATTLES SHARKS, TOO

Tuffy Makes Ace Sealab Watchdog

LA JOLLA, Calif., Sept. 14 (AP)—A watchdog-errand boy porpoise called Tuffy began working Tuesday for aquanauts living in Sealab 2 on the ocean bottom.

Tuffy, a 7-foot, 270-pound male porpoise, was airlifted by helicopter from Point Mugu, Calif., Monday.

His duties include simulated rescues and mail and message deliveries from the surface 205 feet down to the bottom — a 45-second trip for Tuffy.

The trip up for the first team of aquanauts who lived 15 days in Sealab took 10 minutes Sunday, but the nine divers were confined 33 hours in a decompression chamber until midnight Monday.

Tuffy needs no decompression and one of his handlers, aquanaut Kenneth J. Conda, 32, Phoenix, Mich., said he expects the mammal to make about 20 trips daily.

He is called Tuffy because of his reputation as a scrapper with sharks, evidenced by scars on his body.

Only one shark has been reported in the area since the first team went down Aug. 28. It was a 5 ½-foot blue shark, killed on the surface by a bow and arrow.

"Sharks don't usually lurk in deep waters," Conda said, "although I've been chased down by them in the past.

"Sharks have a 65-to-85-foot deep cruising range."

Tuffy was captured in Biloxi, Miss., and trained for his Sealab mission at Point Mugu.

"Tuffy is so well-trained he can come down and tap a lost diver on the shoulder and hand him a life line," Conda said.

Aquanauts will pretend they are lost for Tuffy's benefit. Conda said the divers' biggest actual fear is to become lost in the darkness of the depths.

They will carry buzzers during tests to summon Tuffy from the surface.

"He once came to me without the buzzer in pretty dark water," Conda said. "He knows exactly what to do."

Aquanauts have also envisioned possible undersea combat with enemy divers in some future war in which a trained porpoise would be valuable.

The second 10-man team — including Cmdr. M. Scott Carpenter, leader of the first two teams — made its first swims outside their undersea laboratory Monday.

The decompressed aquanauts were to be taken to Balboa Navy Hospital in nearby San Diego for physical examinations. After a debriefing, they'll relax for 36 hours before rejoining the project as surface support divers.

MPLS TRIB 9-12

Tuffy Is a Porpoise With a Purpose 9/15/65



Associated Press
Tuffy, the porpoise, a kind of watchdog and errand boy for the Sealab-2 project, came up for lunch served by his handlers at La Jolla, Calif. Tuffy works with Aquanauts John Reaves (left) and Kenneth Conda, both members of the team now underwater.

Tuffy Leaps Right Into His New Job

Tuffy, the Point Mugu porpoise who will join SeaLab II aquanauts tomorrow for simulated rescue missions, yesterday made 20 dives to the ocean floor to get used to the area and its noises.

Dr. Sam H. Ridgway, research veterinarian at the naval missile center at Point Mugu, said Tuffy's dives were made about 100 yards closer to shore than SeaLab itself.

However, Tuffy was allowed to frolic in the water above SeaLab as his trainers watched for reactions to sound.

"Our main concern was that he get used to the sounds in a strange area — boats, motors, SeaLab noises — so he can distinguish our underwater signals," Ridgway said.

WORLD OF SOUND

The veterinarian said the porpoise's world is one of sound more than sight and yesterday's workout was highly successful.

His first mission with SeaLab divers will be to swim to SeaLab, carry a line about 70 feet to a "lost" diver and return to the surface, Ridgway said.

The doctor said Tuffy could stay underwater four minutes if necessary but he could make a 200 foot dive, carry a line 50 feet and return to the surface in one minute, 45 seconds.

At the end of such missions is the fishy reward.

WHOLLY MACKEREL

Ridgway said Tuffy eats 15 pounds of Pacific mackerel a day.

Tuffy was reported happy to get back in the water after the four-hour trip Monday from Point Mugu. He stays in a floating pen near the mother ship Berkone.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

SEP 14 1965

Versatile Porpoise Aids Aquanauts In Sealab 2

LA JOLLA, Calif (AP) — A versatile porpoise named Tuffy joined aquanauts of Sealab 2 Monday to assume tasks usually handled by watch dogs, guides, messengers and mail men.

"Tuffy is so well-trained he can come down and tap a lost diver on the shoulder and hand him a life line," said Kenneth J. Conda, 32, of Phoenix, Mich

Navy Torpedoman First Class Conda and John F. Reaves, 36, photographer's mate first class of Robertsdale, Ala, are the aquanauts assigned to work with Tuffy.

Tuffy Said 'Tuff'

Tuffy is seven feet long and weighs 270 pounds He carries scars from encounters with sharks, which explains his name.

Tuffy, trained by the Navy at Point Mugu, Calif, was wrapped in a blanket and flown to Sealab by helicopter His pen is on the surface near the staging vessel Berkone.

"We think Tuffy will be able to make as many as 20 runs to Sealab every day, delivering mail and messages," Conda said.

"If a diver gets in trouble we just call up to the Berkone and they'll send Tuffy down to me," he said. "Tuffy can make the 205-foot trip in 45 seconds."

Porpoises have a habit of being friendly and aquanauts have wondered whether Tuffy will be a nuisance.

Conda isn't worrying. "He's very gentle. He knows exactly what to do. Tuffy is very practical for the safety of divers."

Conda said Tuffy has been conditioned to respond to an underwater buzzer, which could be used by a distressed diver to summon the porpoise to the rescue.

Visibility at the depth is limited and aside from painful scorpion fish stings, about the only thing a diver fears is getting lost when he loses sight of Sealab.

"He once came to me without the buzzer in pretty dark water," Conda said.

Aquanauts will be careful that Tuffy doesn't stick his snout into Sealab through the open bottom hatch.

"The shark cage should prevent him from getting in, and we'll keep a close watch," Conda said

Tuffy, an Aquanaut With Fins

Top-Rated Porpoise to Help Sealabbers

La Jolla, Calif., Sept. 13 (AP)—A versatile porpoise named Tuffy joined Aquanauts of Sealab 2 today to assume tasks usually handled by watchdogs, guides, messengers and mailmen.

"Tuffy is so well trained he can come down and tap a lost diver on the shoulder and hand him a life line," said Kenneth J. Conda, 32, of Phoenix, Mich.

Conda, a Navy Torpedoman 1st Cl., and John F. Reaves, 36, Photographer's Mate 1st Cl. of Robertsdale, Ala., are the aquanauts assigned to work with Tuffy.

Scarred by Sharks

The porpoise is seven feet long and weighs 270 pounds. He carries scars from encounters with sharks, which explains his name.

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Nuisance? Heck, No!

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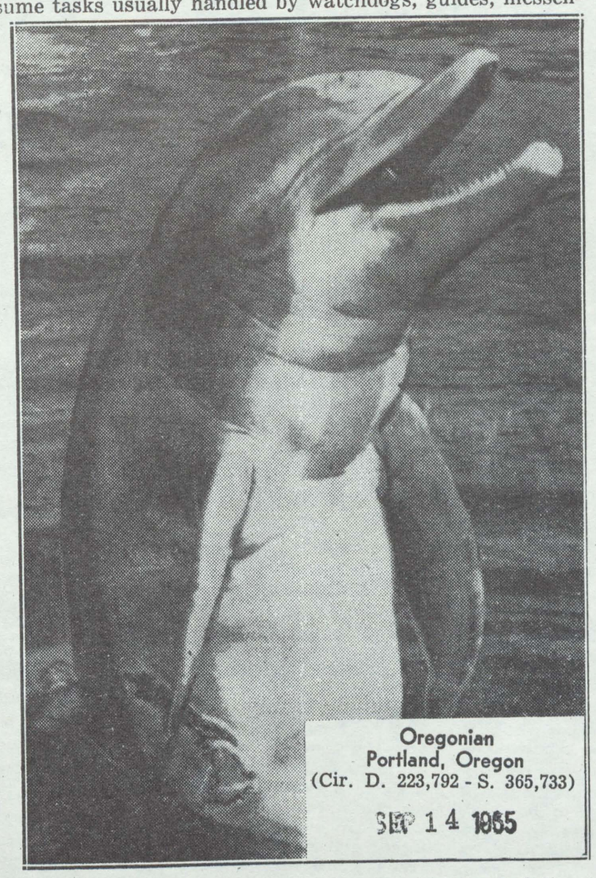
Conda said Tuffy has been conditioned to respond to an underwater buzzer, which could be used by a distressed diver to summon the porpoise to the rescue.

Visibility 205 feet deep is limited and, aside from painful scorpion fish stings, about the only thing a diver fears is getting lost.

"He once came to me without the buzzer in pretty dark water," Conda said.

Meanwhile, the first aquanaut team, which was relieved yesterday, was reported "resting very well" in a decompression chamber. Nine were scheduled to leave the chamber after 33 hours of decompression.

Comdr. Scott Carpenter, leader of the first two teams of divers was fully recovered from a painful scorpion fish sting suffered yesterday. He was back on full duty today.



Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)
SEP 14 1965

(Associated Press Wirefoto)
Shark-scarred Tuffy frolics in La Jolla, Calif., training pool.

Los Angeles, Calif.
Times
(Cir. D. 812,147 Sun. 1,149,295)

SEP 14 1965

PORPOISE WITH A PURPOSE

Undersea 'Guide Dog' Will Help Aquanauts

Exclusive to The Times from a Staff Writer

LA JOLLA—A sea-going "St. Bernard" arrived here Monday to work out with the second team of nine Aquanauts who have joined Comdr. M. Scott Carpenter in the Navy's experimental Sealab 2.

The recruit was Tuffy, a 7-foot, 270-pound porpoise trained to find aquanauts lost in the murky depths at 205 feet and guide them back to their submerged base.

Tuffy arrived here by helicopter from the Naval Air Missile Station at Point Mugu, where he completed his education under the tutelage of Navy divers.

"He's so well-trained he can come down, tap a lost diver on the shoulder, and hand him a life line," Torpedoman 1/C Kenneth J. Conda, 32, explained.

Tuffy has been conditioned to swim to the source of buzzer signals, which he can hear at 75 to 100 feet but which are inaudible to human ears through more than 3 or 4 feet of water.

Should an aquanaut become lost, Tuffy can be summoned to Sealab 2 from a surface "play-pen" near the mother-ship, USS Bercone, making the descent in 45 seconds.

A line from the submerged craft would then be attached the porpoise and Tuffy, hopefully, would swim to the lost diver's signal.

An air-breather, Tuffy must surface after five minutee, but he won't be allowed inside Sealab 2, where the helium atmosphere breathed by the aquanauts might prove fatal to him.

Meanwhile, Carpeter, who was stung on the left hand by a scorpion fish Sunday, was reported in good condition following medication supplied by Lt. Robert Sonnenberg, Navy surgeon.

Sonnenberg was a member of the first team of nine which was brought to the surface Sunday in a pressurized "personnel transfer capsule."

The nine will remain in a decompression chamber aboard the Bercone until today, the Navy said.

Carpenter and the second team will remain submerged for another 15-day tour in the depths, after which they will be relieved by a third team to complete the 45-day experiment.

11

WashSTAR 9/15/65



—AP Wirephoto
TUFFY

Aquanauts Try Porpoise As Mailman

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His duties include simulated rescues and mail and message deliveries from the surface 205 feet down to the bottom—a 45-second trip for Tuffy.

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Tuffy needs no decompression and one of his handlers, aquanaut Kenneth J. Conda, 32, Phoenix, Mich., said he expects the mammal to make about 20 trips daily.

He is called Tuffy because of his reputation as a scrapper with sharks, evidenced by scars on his body.

Tuffy was captured in Biloxi, Miss., and trained for his Sealab mission at Point Mugu.

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Aquanauts will pretend they are lost for Tuffy's benefit. But Conda said the divers' biggest actual fear is to become lost in the darkness of the depths.

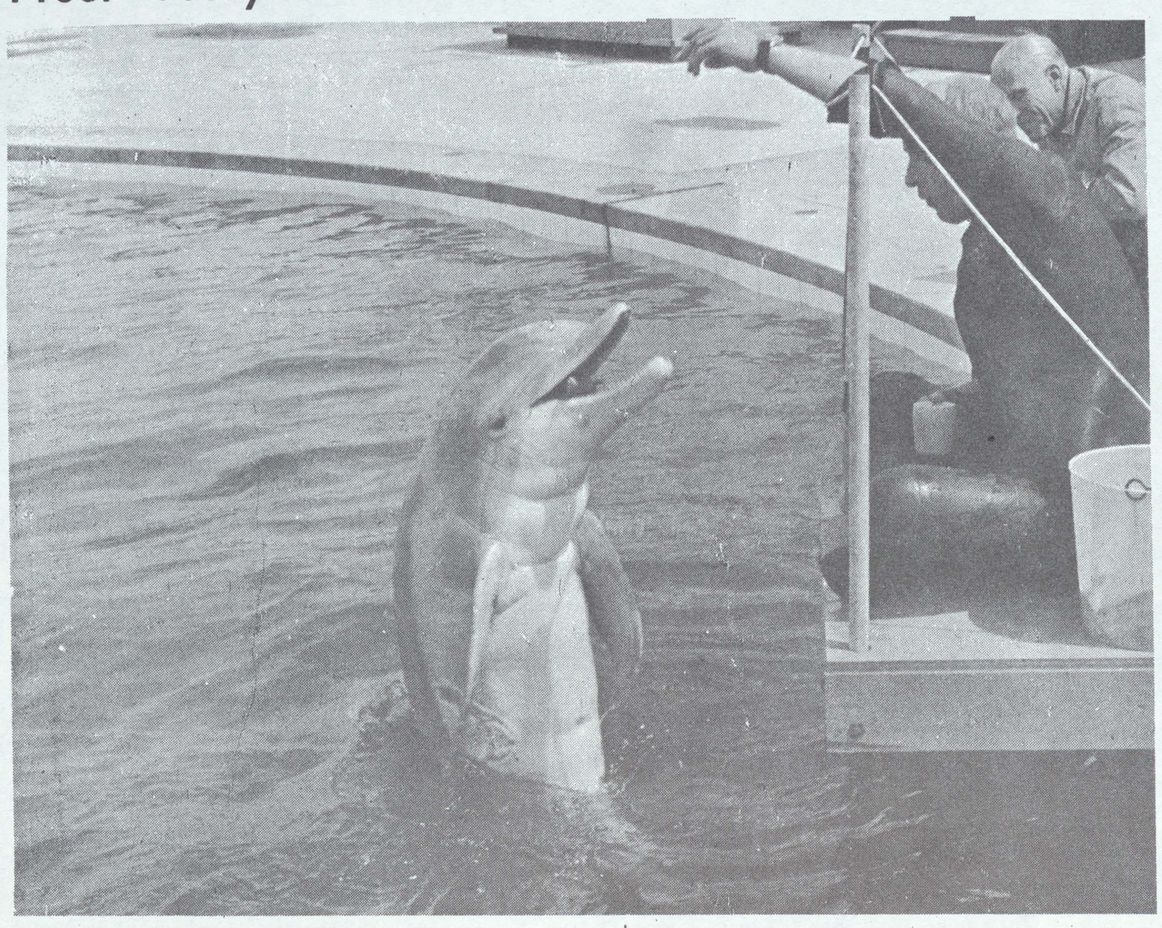
They will carry buzzers during tests to summon Tuffy from the surface.

The second 10-man aquanaut team—including Cmdr. M. Scott Carpenter, leader of the first two teams—made its first swims outside their undersea laboratory yesterday.

The decompressed aquanauts were to be taken to Balboa Navy Hospital in nearby San Diego for physical examinations.

JOLLA LIGHT
and
La Jolla Journal

Meet "Tuffy" . . .



"Tuffy," the latest addition to the team of aquanauts conducting experiments on the ocean floor off La Jolla, arrived this week from his ocean pen off Pt. Mugu. He is kept in a pen off the staging vessel, "Berkone," and will be used in acoustical and life-saving experiments. The public may watch daily activities in Sea Lab II, 205 ft. deep on the ocean floor off Scripps pier through closed-circuit television sets in Sumner auditorium on the Scripps Institution of Oceanography campus.

Scientific Porpoise Arrives for Sea Lab II Experience

By Gen Fortis

"Tuffy," the scientific porpoise, arrived this week from Pt. Mugu to participate in experiments of Sea Lab II 205 feet on the ocean floor off La Jolla Shores as the navy announced that activities of Sea Lab may be viewed through closed circuit television.

The television is available for viewing in Sumner auditorium on the campus of Scripps Institution of Oceanography off La Jolla Shores dr. Hours for viewing are 11 a.m. to 3 p.m., Monday through Friday, and 10 a.m. to 4 p.m., Saturday and Sunday.

"Tuffy" arrived by helicopter Monday from his training pen in the ocean off Pt. Mugu. He will be used by the second team of aquanauts beginning today in experiments to determine if he can find a "lost diver" and if he is capable of carrying tools and equipment to the surface staging mother ship "Berkone."

Naval officials said they are not too worried about losing Tuffy as he appears to like his association with his trainers and his new surroundings. He is in a pen with sides adjoining the Berkone and could easily jump the fence.

"We rely on his not going away in the ocean as he doesn't seem the least bit interested in leaving us," a navy spokesman said.

Another object of the second team of aquanauts, now on the ocean floor, is to test especially designed audio and visual equipment to determine ability to hear and see underwater. Special underwater speakers have been set up and the aquanauts will attempt to locate source of sound as well as test visual ability in the dark water.

LA JOLLA, CALIFORNIA, THURSDAY, SEPTEMBER 16, 1965

Tuffy Keeps Date With Sealab Team

By LEO BOWLER
EVENING TRIBUNE Staff Writer

Tuffy, the Point Mugu porpoise, made connections with aquanauts waiting for him outside Sealab in his first dive tests today.

Sealab officials said they thought there would be too much noise in the water from generators aboard the mothership Berkone. But Tuffy responded to a sound signal from the aquanauts and dived from the surface to them.

Sealab officials said they would try again later from a different location in hopes other tests would be successful.

Tuffy was taken from his floating pen which is tied up near the Berkone and allowed to swim freely nearby for a few minutes before starting to dive.

Yesterday, Capt. George Bond, chief investigator for the project, put on scuba gear for a final test swim with Tuffy.

When Bond came up after a 20-minute session with Tuffy, he called the porpoise a "wonderfully affectionate fellow" and gave his okay for the work to be conducted today with Tuffy by the aquanauts.

Responds to Buzzer

Bond dove to 30 feet, then called Tuffy with a buzzer, which the porpoise has been trained to recognize.

Tuffy immediately dove to Bond, then flipped over on his back so that Bond could reach the harness that Tuffy wears.

The porpoise has been trained to do this so that the divers with whom he works can attach a line to the harness if they want him to speed off to another diver and carry the line with him.

Tuffy Disappears

Bond said that Tuffy then disappeared for a moment. A little later the propoise came up from behind and nudged the captain in the back so the diver would know he was there.

After the workout, Tuffy was called back into his pen by one of his trainers.

Bond was accompanied on his dive by Robert Sheats, a master chief torpedoman who will be on the third team to occupy Sealab.

He said that the first team had completed most of the housekeeping chores so that the second team has more time for swimming outside.

Cdr. Scott Carpenter, the aquanauts' team leader, is again making dives outside the lab. He has recovered from the scorpion fish sting he received Sunday.

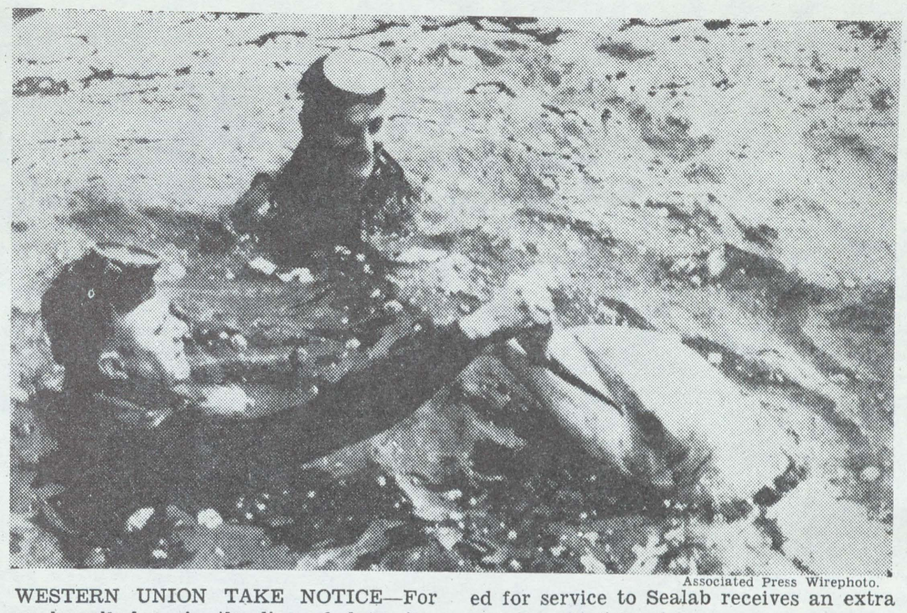
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LA JOLLA, CALIF.--FIRST ADD SEALAB A105LA X X X TROUBLE.

SAMANTHA IS A WILD SEA LION APPARENTLY ATTRACTED BY THE CURIOUS ACTIVITY AT SEALAB.

THE AQUANAUTS SAY SHE'S UNUSUALLY BRIGHT FOR A SEA LION, LEARNING TRICKS EVEN FASTER THAN SOME PORPOISES. ONE PORPOISE, TUFFY, SPENT A FEW DAYS AT SEALAB ACTING AS UNDERSEA MESSENGER BOY. TUFFY WAS TRAINED AT THE NAVY BASE AT POINT MUGU, CALIF., WHERE HE HAS SINCE RETURNED.

FH807APD NM£



Associated Press Wirephoto.

WESTERN UNION TAKE NOTICE—For work well done in the line of duty, the watchdog-messenger-boy-porpoise attached for service to Sealab receives an extra ration of fish from two aquanauts, members of the laboratory's second crew.

£A164!CX

POST-DISPATCH
St. Louis, Mo.

Aquanauts to See If Dolphin Can Help Them Back to Surface

LA JOLLA, Calif., Sept. 16 (UPI)—Tuffy, the Sealab 2 project's educated dolphin, and two aquanauts planned today to make a test of animal intelligence 205 feet down in the Pacific Ocean.

Aquanauts John Reaves and Ken Conda, in diving gear, were set to plunge to the ocean floor equipped with buzzers to signal their position to Tuffy. If all goes well, the dolphin, wearing a harness with a cable attached, should respond to the signal, find the divers in the murky depths and take the cable to them so they can find their way to the surface.

Scientists said that a dolphin's underwater vision far exceeds man's 10-to 20-foot undersea limit and the mammal can descend and ascend much faster than man.

Experimenters wanted to learn also whether Tuffy could carry messages to and from the diver as a sort of seagoing mailman.

"Our main concern is that he (Tuffy) get used to the sounds in a strange area—boats, motors and laboratory noises—so he can distinguish our underwater signal," said Dr. Sam H. Ridgway, research veternarian at the Navy Missile Center at Point Mugu, Calif., where Tuffy was trained.

To familiarize Tuffy with the expected sea noises, he was flown to La Jolla by helicopter Monday from Point Mugu and given special training Tuesday and yesterday.

Rigged with the harness and carrying a dummy package, Tuffy yesterday responded alertly to the electric buzzer that called him back to the Sealab 2 mother ship Berkone.

In yesterday's preliminary test, Tuffy worked with an old friend, Navy Capt. George Bond, chief investigator on the project. Tuffy went through his paces at the 170-foot level.

Although today's experiment was Tuffy's first major test, he already had achieved widespread public attention. His Navy friends refer to him as a "porpoise with a purpose."

The purpose of the Sealab 2 project is to learn how well man can live and work during prolonged periods underwater.

Getting Tasks Done Slow In Sealab-2

By the Associated Press

LA JOLLA, Calif., Sept. 15. — Nine aquanauts who spent 15 days under the Pacific in Sealab-2 said the most important lesson they learned is that it takes longer to get things done under water.

"Everything just takes longer because of the time consumed in transporting gear and getting ready for dives," aquanaut Jay D. Skidmore told a news conference.

The nine surfaced Sunday from their 205-foot-deep off-shore research home, spent 30 hours in a decompression chamber and talked to newsmen yesterday.

They said that experts thought it would take only a few days to set up housekeeping in their 12-by-58-foot steel capsule.

"But it took us two weeks just getting ready for the second team," Billy Coffman said.

Half of Tasks Finished

The first group of aquanauts did accomplish about one half of their other assigned tasks before the second team of nine descended Sunday.

Comdr. M. Scott Carpenter, who went down Aug. 28 with the first team, is staying an additional 15 days with the second.

Capt. George Bond, chief investigator for the U.S. Navy project, said the first team completed one of the main objects of the test—to show that man can live in the ocean.

He said the more than 100 hours of undersea work done by the divers would have required about 5,400 hours of decompression time using conventional methods.

By living on the bottom in the Sealab capsule when not diving, the decompression time was cut to about 30 hours.

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A54LA (AQUANAUTS)

(400)

LA JOLLA, CALIF., SEPT. 15 (AP)-LIVING AT THE BOTTOM OF THE OCEAN GIVES A MAN A HIGH-PITCHED VOICE, A CHILL, EAR TROUBLE AND SOMETHING RESEMBLING DIAPER RASH, SAY NINE AQUANAUTS WHO TRIED IT.

BUT SOMEDAY, THEY ADDED, MAN MAY BE ABLE TO ROAM UNDER THE SEVEN SEAS IN A MOBILE LABORATORY.

THE AQUANAUTS AIRED THEIR CONCLUSIONS YESTERDAY AFTER EMERGING FROM 15 DAYS IN SEALAB 2, 205 FEET BELOW THE PACIFIC OCEAN SURFACE. XXXIHEXXSERKEED SUNDAY, SPENT 30

FROM 15 DAYS IN SEALAB 2, 205 FEET BELOW THE PACIFIC OCEAN SURFACE.

THEY SURFACED SUNDAY, SPENT 33 HOURS IN A DECOMPRESSION CHAMBER, THEN MET NEWSMEN ABOARD THE STAGING VESSEL BERKONE.

AQUANAUT JAY D. SKIDMORE SAID THE ALL-HELIUM ATMOSPHERE THEY BREATHED GAVE THEM SQUEAKY VOICES THAT SOUNDED LIKE A SPEEDED-UP PHONOGRAPH RECORD.

". . .IT CREATED A LOT OF HILARITY AT FIRST," SAID SKIDMORE. "AFTER A FEW DAYS WE GOT USED TO IT AND TOWARD THE LAST IT SEEMED EXTREMELY NORMAL."

CAPT. GEORGE BOND, CHIEF OF THE PROJECT, SAID IT POINTED TOWARDS EVENTUAL DEVELOPMENT OF COMPLETELY MOBILE LABORATORY HOUSING IN WHICH 35 MEN COULD GO ANYWHERE IN THE WORLD, DO ANY UNDERWATER JOB AND RETURN WHILE DECOMPRESSING ON THE WAY.

HE SAID SUCH MOBILITY COULD BEST BE OBTAINED BY MODIFICATION OF A NUCLEAR SUBMARINE.

BOND SAID, HOWEVER, THAT AFTER THREE WEEKS UNDERWATER, THE MEN'S EFFICIENCY WOULD BEGIN TO DECREASE.

AQUANAUT BILL COFFMAN SAID HE AND SKIDMORE SPENT THE LONGEST TIME IN THE WATER AT ANY ONE TIME -- TWO HOURS AND 44 MINUTES. COFFMAN SAID IT WAS COLD, BUT THAT THEY COULD HAVE STAYED OUT LONGER.

LT. THOMAS A. CLARKE, TEAM BIOLOGIST, SAID HE, HOWEVER, COULD TAKE ONLY ABOUT 30 TO 40 MINUTES IN THE WATER, WHICH AVERAGES 51 TO 53 DEGREES FAHRENHEIT AROUND SEALAB 2.

A55LA

SEALAB PHYSICIAN LT. ROBERT SONNENBURG PRAISED UNDERWATER LIVING, BUT ADDED HE WAS UNABLE TO CURE AN EAR INFECTION SUFFERED BY THE AQUANAUTS. HE TREATED THEM TO ALLEVIATE DISCOMFORT.

THE AQUANAUTS DEVELOPED A RASH, SIMILAR TO A BABY'S DIAPER RASH, PROBABLY DUE TO WET CLOTHING AND IRRITATION.

CAPT. WALTER F. MAZONE, DECOMPRESSION CHIEF, SAID HE NOTICED ONLY ONE PHYSIOLOGICAL CHANGE: "THIS WAS THAT GROWN MEN CAN GET A DIAPER RASH."

MEANWHILE, THE SECOND TEAM OF AQUANAUTS IN SEALAB 2 WILL HAVE TO GET BY ON SHORTER RATIONS OF OXYGEN IN AN EXPERIMENT STARTING TODAY.

OFFICIALS SAID THE OXYGEN CONTENT OF THE ATMOSPHERE IN THE 12X58-FOOT STEEL CAPSULE WILL BE REDUCED FROM 4.25 TO 3.5 PER CENT FOR THE NEXT THREE DAYS.

TEN MEN ARE WORKING IN THE PROJECT'S SECOND, OR SCIENTIFIC, PHASE.

IN REDUCING THE OXYGEN CONTENT, SCIENTISTS ARE SEEKING THE MOST EFFICIENT BREATHING MIXTURE FOR USE IN UNDERWATER PROJECTS.

THE FIRST TEAM BREATHED A MIXTURE OF 4.25 PER CENT OXYGEN, 20 PER CENT NITROGEN AND 75.75 PER CENT HELIUM.

EXTENSIVE PHYSIOLOGICAL TESTS WILL BE CONDUCTED TO DETERMINE IF THE REDUCTION IN OXYGEN WILL CAUSE ANY CHANGES IN THE AQUANAUTS.

EE114APD NM AST

Life in Ocean's Depths Gives Aquanauts a Rash

Sealab Team, Like Babies, Suffers Effect of Prolonged Moisture in Sea Bottom Tests

LA Times 9/15/65

Exclusive to The Times from a Staff Writer

LA JOLLA—To the U.S. Navy, eagerly awaiting results of its Sealab 2 experiment with life in the ocean depths, came this bit of intelligence Friday:

"Adult sailors can still suffer from diaper rash."

The finding was reported by Navy surgeons examining the nine-man first team which surfaced Sunday after 15 days of living in the capsule submerged at a depth of 205 feet.

Medical tests begun Friday after the aquanauts completed 32 1/2 hours of decompressing in a tank aboard the mother ship USS Bercone showed that all nine were suffering from a superficial skin rash.

"It's exactly like diaper rash and due to the same cause — prolonged exposure to moisture," the Navy medical men concluded.

All of the aquanauts were in good physical condition except that eight of them had ear infections, also due to long immersion, it was reported.

The exception was Billie J. Coffman, 36, who took the precaution of swabbing his ears with alcohol before and after excursions outside the capsule.

Capt. George Bond, project chief investigator, said the progress of work underwater proved to be much slower than had been expected.

During their 15 days the first team managed only to install the equipment with which the second team and Comdr. M. Scott Carpenter are now working, he said.

"On the other hand," Bond added, "divers accomplishing the same amount of work from a surface base would require a total of 5,400 hours decompression time.

"Within five years, if the program continues as it has, I feel we will be doing useful work at 800-foot depths with crews of as many as 300 men living underwater for long periods of time."

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

SEP 15 1965

SEALAB DRAWBACK

Undersea 'Hotel's' Floor Has Tilt

By JUDITH MORGAN

The comforts of the "Tiltin' Hilton" were described yesterday by nine aquanauts who coined that name for SeaLab II during their 15-day stay on the sloping ocean floor off La Jolla.

"If SeaLab was level it would have been a dream," Aquanaut Billie L. Coffman of Willimantic, Conn., said after a news conference aboard the mother ship Berkone.

"We had to tie the pans to the stove when we cooked to keep them from slipping off."

SeaLab II tilts so the aquanauts have to walk up a 6 per cent grade from the laboratory end to their living quarters. The cylindrical habitat also lists about three degrees to port.

FEEL DIZZY

Jay Dee Skidmore, the photographer aquahaut from Chula Vista, said the angle made the aquanauts feel dizzy when they first climbed out of bed each morning, but then they became accustomed to it.

Another drawback of the underwater hotel was the helium-oxygen mixture breathed by the aquanauts. Not only did their voices sound like chipmunks, but they couldn't whistle.

"We'd sit down there and pucker up and blow and nothing happened," Tom A. Clarke, a student at Scripps Institution of Oceanography, said.

Clarke said the aquanauts tried to whistle all the way to the surface and finally managed "a little tune" just before emerging.

Clarke said he and another aquanaut wished once or twice that they had taken a deck of cards.

"I forgot cards, but no one really felt like sitting down and concentrating," Clarke said. "Some of the guys watched television, but I never do anyway."

Clarke took a harmonica and Cmdr. Scott Carpenter, chief aquanaut who stayed in SeaLab with the second team, took a ukelele. Clarke said both musical instruments were popular but their squeaky singing voice only made the aquanauts laugh.

SLEEP IS FIRST JOY

Aquanaut Earl A. Murray of Scripps said his first joy at being on the surface was getting a good night's sleep.

Coffman, who re-enlisted in the Navy for six more years during his SeaLab stay, said the extreme humidity in SeaLab the first two or three days was unpleasant.

Coffman reported that barley plants growing in the SeaLab bathroom as part of a joint experiment by the Mine Defense Laboratory of Panama City, Fla., and Texas Agricultural and Mechanical College are 3 inches high.

Wash Post 9/15/65

Aquanauts Surface

LA JOLLA, Calif.—Nine aquanauts who spent 15 days under the Pacific in Sealab II reported some of their findings: it took longer than expected to get things done, and the helium atmosphere in the lab made their voices sound squeaky. It was also noted that there are indications that after three weeks under water man's efficiency begins to fall off.

New York Herald Tribune, Paris
Wednesday, Sept. 15, 1965

9 Aquanauts Quit Pressure Chamber

Spent Over 2 Weeks 250 Ft. Below Surface

By United Press International

LA JOLLA, Calif., Sept. 14. — Nine tired-looking aquanauts today emerged from a decompression chamber after spending more than two weeks submerged 205 feet below the oceans surface in Sealab-2.

The men had entered the 57-foot capsule Aug. 28 with astronaut-aquanaut Scott Carpenter. He is still below, planning to spend 30 days in the 200-ton craft, designed to determine how well man can live and work under the sea.

Navy Capt. George Bond said that when the men came out of the decompression chamber "the first thing they enjoyed was breathing the fresh air, and the smokers wanted to smoke."

The nine came up to the mother ship Berkone, anchored above the Sealab 2 on Sunday and went directly to the chamber.

'Reluctant' at End

In discussing their feelings while inside the underwater capsule, a spokesman said, "You could observe a reluctance on the part of the aquanauts to go back outside the chamber and into the water toward the end. They seemed to be rather hesitant unless it was a goodie-pot (shipment of canady) sent down."

In another phase of the underwater experiment, which is to last 45 days, Tuffy, an "educated" dolphin, today began his final training as an underwater companion and possible guide for aquanauts who may get lost. Tuffy is to carry a lifesaving line from the capsule to the experimenters to lead them to "safety."

Wash. Post-9/15/65

Purposeful Porpoise

LA JOLLA, Calif.—Today is Tuffy-the-Porpoise's big day. He is setting out to rescue a "lost" Navy diver with a life line. The experiment is part of the underwater Sealab-2 project now being conducted off the California coast.

Tuffy has been trained especially by the Navy to carry out the mission by trailing the tinkles of the aquanaut's distress buzzer.

Tuffy can aim his 7 feet and 270 pounds straight down, and plunge 50 feet in 45 seconds, whipping the life-line along behind him. When he finds the diver, he nudges him on the shoulder and delivers.

Sometimes he wears a special harness, and can bring his Sealab-2 aquanaut friends messages, tools and other gear.

9/15/65 THE NEW YORK TIMES, WEDNESDAY, SEPTEMBER

AQUANAUTS TIRED, GLAD TO BE BACK

Efficiency a Problem, 9 Say After 2 Weeks Underwater

LA JOLLA, Calif., Sept. 14 (UPI) — Nine weary aquanauts stepped from a decompression chamber today after more than two weeks 205 feet underwater in Sealab 2.

Scientists conceded the men had reached the point of "reluctance" to re-enter the water.

Only Lieut. Comdr. M. Scott Carpenter, the austronaut, is staying down for 30 consecutive days. He is teaming now with nine other aquanauts and a dolphin named Tuffy for other experiments.

Navy Capt. George Bond summed up the reaction of the aquanauts after leaving the decompression chamber in which they had spent 15 days:

"The first thing they enjoyed was breathing the fresh air and the smokers wanted to smoke."

Captain Bond said scientists hoped the concept of saturation diving would be operational in five years for salvage and rescue operations as well as exploration of the continental shelf. He said the Sealab 2 operation could make it possible to descend 800 feet.

Earl A. Murray, a civilian aquanaut from Del Mar, Calif., described the sharply contrasting sensations felt by the men on their first day in the 200-ton, 57-foot laboratory.

"The first day we laughed so hard we were sore," he said. "We laughed because of the novelty. I think the efficiency fell off after two weeks."

Capt. Walter F. Mazzone, another Navy official, agreed about the limited effectiveness of the men who spent about 100 working hours each outside Sealab.

"The men's efficiency begins to fall off after three weeks," he said. "You could observe a reluctance on the part of the aquanauts to go back outside into the water toward the end."

Billy Coffman, a Navy torpedoman, said he, as well as Commander Carpenter, had been bitten by a scorpion fish on the first week beneath the surface.

Commander Carpenter is said to be still experiencing some irritation from an ear infection.

One of the assignments for the second team of the aquanauts is working with the dolphin to see if he can act as an underwater guide and possibly assist in rescue operations.

Tuffy arrived yesterday by helicopter and was placed in a pen adjoining the mother ship Berkone for more training before working with the aquanauts tomorrow.

Electrical buzzers will signal the location of a "missing" diver The dolphin is supposed to go to the rescue with a cable attached to his back, one end of which is to be grabbed by the aquanaut.

The visibility for a man is only about 10 to 20 feet, and one can not match the dolphin's ability to climb or descend rapidly for rescue work.

SAN DIEGO UN
SEP 15 1965

Aquanaut Oxygen Content To Be Cut

The oxygen content of the gas breathed by SeaLab II aquanauts today will be reduced substantially, the Navy revealed yesterday.

Capt. George Bond (MC), director of the Navy's Man-in-the-Sea Program, said the oxygen content of the breathing mixture will be cut from 4.25 per cent to 3.5 per cent for the next three days.

The purpose of the experiment is to find a breathing mixture that would be even more efficient for living under the pressure of the sea. The mixture so far has consisted of 4.25 per cent oxygen, 20 per cent nitrogen and 75.75 per cent helium. The oxygen to be taken from the mixture will be replaced with helium.

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POST, Denver, Colo.
SEP 15 1965



AP Wirephoto

AQUANAUTS REPORT ON EXPERIENCES DURING 15 DAYS IN SEALAB 2
From left are Frederick J. Johler, Robert E. Sonnenberg, Capt. George Bond, with microphone, project chief, and Earl L. Murray. They aired their conclusions Tuesday.

EARS, VOICE ALSO AFFECTED

Ocean's Bottom Irritating to Aquanauts

LA JOLLA, Calif. —(AP)— Living at the bottom of the ocean gives a man a high-pitched voice, a chill, ear trouble and something resembling diaper rash, say nine aquanauts who tried it.

But someday, they added, man may be able to roam under the seven seas in a mobile laboratory.

The aquanauts aired their conclusions Tuesday after emerging from 15 days in Sealab 2, 205 feet below the Pacific Ocean surface.

They surfaced Sunday, spent 33 hours in a decompression chamber, then met reporters aboard the staging vessel Berkone.

All-Helium Atmosphere Used

Aquanaut Jay D. Skidmore said the all-helium atmosphere they breathed gave them squeaky voices that sounded like a speeded-up phonograph record.

". . . It created a lot of hilarity at first," said Skidmore. "After a few days we got used to it, and toward the last it seemed extremely normal."

Capt. George Bond, chief of the project, said it pointed toward eventual development of completely mobile laboratory housing in which 35 men could go anywhere in the world, do any underwater job and return while decompressing on the way.

He said such mobility could best be obtained by modification of a nuclear submarine.

Bond said, however, that after three weeks underwater, the men's efficiency would begin to decrease.

Aquanaut Bill Coffman said Skidmore and he spent the longest time in the water at any one time — two hours and 44 minutes. Coffman said it was cold, but that they could have stayed out longer.

Lt. Thomas A. Clarke, team biologist, said he, however, could take only about 30 to 40 minutes in the water, which averages 51 to 53 degrees Fahrenheit around Sealab 2.

Sealab physician Lt. Robert Sonnenburg praised underwater living, but added he was unable to cure an ear infection suffered by the aquanauts. He treated them to alleviate discomfort.

Wet Clothing Blamed for Rash

The aquanauts developed a rash, similar to a baby's diaper rash, probably due to wet clothing and irritation.

Capt. Walter F. Mazone, decompression chief, said he noticed only one physiological change: "This was that grown men can get a diaper rash."

Meanwhile, the second team of aquanauts in Sealab 2 will have to get by on shorter rations of oxygen in an experiment starting Wednesday.

Officials said the oxygen content of the atmosphere in the 12 by 58-foot steel capsule will be reduced from 4.25 to 3.5 per cent for the next three days.

Ten men are working in the project's second, or scientific, phase.

San Francisco, Calif.
EXAMINER
&
NEWS CALL BULLETIN
SEP 16 1965

Sealab's Diving Mailman

LA JOLLA—(AP)—Sealab 2 aquanauts received their mail by porpoise parcel post Friday.

Tuffy, the handyman porpoise, delivered the mail in a performance officials said proves his value to the Navy's underwater living project.

Wally Ross, Tuffy's trainer, said the animal displayed none of the reluctance that dampened his tryouts Thursday.

TUFFY REPORTED for duty promptly Friday, and like many another working man carried his lunch with him in a sack.

The lunch—fish—was sent down to the aquanauts to be used in rewarding Tuffy for jobs well done.

Directed to the aquanauts by underwater buzzers, Tuffy made two dives to deliver the mail in sealed containers attached to his harness.

HE ALSO took down tools in a special bag.

Officials said they were pleased at the speed with which Tuffy completed a simulated rescue of a lost diver.

He took just over one minute to race to the bottom, carry a line from one aquanaut to another 50 fttt away and streak to the surface.

Carpenter Bitten by Fish, Hand Swells---He's Okay

New York 38, N. Y.
SEP 13 1965
From
JOURNAL, Atlanta, Ga.

LA JOLLA, Calif. (UPI) — Astronaut - Aquanaut Scott Carpenter was bitten on the finger by a scorpion fish Sunday but was treated in the Underwater Sealab 2 cylinder and reported in good condition.

"Commander Carpenter had some swelling in his left hand up to his elbow," said a spokesman for the Navy's 45-day man-in-the-sea project, "but medication for the pain was adequate and he had no complaint."

The spokesman said the bite of the scorpion fish is not comparable to the often-fatal sting of the land scorpion.

The astronaut was resting comfortably two hours after being bitten and was able to take a late afternoon nap.

Carpenter, the second U.S. astronaut to orbit the earth, was nipped on his left index finger while making a final inspection of the conveying capsule that carried the first team of nine aquanauts 205 feet up to the ocean surface.

The first nine made a 50-minute trip from the underwater Scripps Canyon to the surface ship Berkone. Because the pressures at the Sealab level are six and one-half times that on the surface, the first team began a 36-hour period at mid-afternoon in a decompression chamber aboard Berkone.

From
JOURNAL, Atlanta, Ga.

Mail on Porpoise

A PORPOISE named Tuffy has become an aquanaut, joining human types conducting experiments underwater in Sealab 2 at La Jolla, Calif.

His job will be to act as mailman and maybe even help in times of emergency.

His trainer says he can submerge and tap a lost diver on the shoulder and hand him a life line.

It is expected he will make as many as 20 runs a day delivering mail and messages.

He has advantages over ordinary mailmen. Cool, comfortable surroundings, no ankles to be snapped at, and no shoes to wear out.

Mpls. (Minn.) Morning Tribune
FRIDAY, SEPTEMBER 17, 1965

Noises During Sealab 2 Test Panic Porpoise

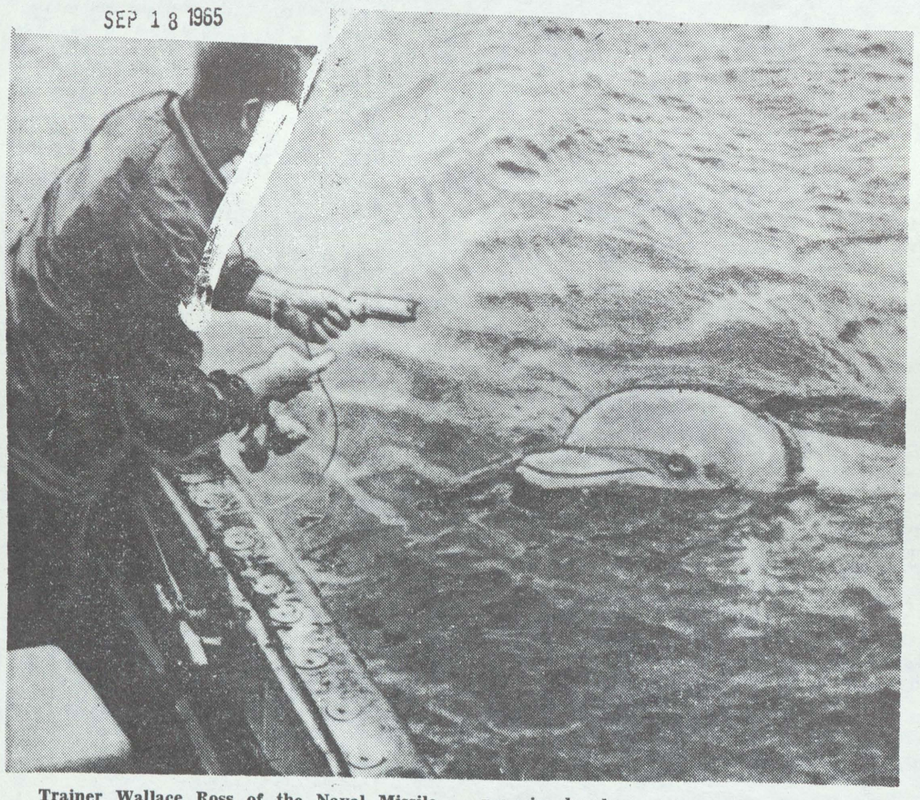
LA JOLLA, Calif. —(AP)— Tuffy the porpoise was only partly successful Thursday in his first attempt to act as errand boy for the aquanauts in Sealab 2.

The Navy said Tuffy appeared to be confused by the noise, wires and activity around the underwater living experiment.

When the noise was reduced Cmdr M. Scott Carpenter reported seeing Tuffy twice.

Another aquanaut also contacted Tuffy, but the animal was skittish and tools could not be removed from the container he had carried down.

ROCKY MOUNTAIN NEWS
Denver, Colo.
SEP 18 1965



Trainer Wallace Ross of the Naval Missile Center at Point Mugu, Calif., extends an acoustical homing device to which Tuffy, a 270-pound porpoise, has learned to respond. Tuffy is shown surfacing after a dive to make visual contact with two Sealab II aquanauts off La Jolla, Calif.
—UPI Telephoto

Sealab Aquanauts Get Porpoise Parcel Post

LA JOLLA, Calif., Sept. 17—(AP)—Sealab aquanauts received their mail by porpoise parcel post Friday.

Tuffy, the handyman porpoise, delivered the mail to Sealab 2 in a performance that officials said proved his value to the Navy's underwater living project.

Wally Ross, Tuffy's trainer, said the animal displayed none of the reluctance that dampened his tryouts Thursday for a job on the aquanaut team.

Aquanauts John F. Reaves and Kenneth Conda, reporting from the Sealab at 205 feet below the ocean's surface, also testified that Tuffy's exhibition was flawless.

Tuffy reported for duty promptly Friday, and like many another working man, carried his lunch with him in a sack.

The lunch—fish—was sent down to the aquanauts to be used in rewarding Tuffy for jobs well done.

Directed to the aquanauts by underwater buzzers, Tuffy made two dives to deliver the mail in sealed containers attached to his harness.

He also took down tools in a special bag.

Officials said they were surprised, and pleased, at the speed with which Tuffy completed a simulated rescue of a lost diver.

He took just a little over one minute to race to the bottom, carry a line from one aquanaut to another 50 feet away and streak back to the surface.

Tuffy was slightly skittish Thursday in his first workout with the aquanauts, and his trainers said the strange surroundings at the Sealab probably contributed to his nervousness.

Friday the experiment was moved a short distance from the undersea capsule.

Forrest G. Wood, head of the Marine Sciences Division at Point Mugu Naval Station where Tuffy was trained, said the porpoise performed Friday exactly as expected.

In further work Saturday, the aquanauts will extend the distance between them in the simulated rescue and move closer to the Sealab to condition Tuffy to the cables and hoses.

Completion of those tasks probably will wind up Tuffy's part in the current Sealab project and he will be returned to Point Mugu.

Tuffy Succeeds

POST 9/18/65

LA JOLLA, Calif.—At last, Tuffy did it. The trained porpoise won honors yesterday in his repeat attempts to rescue a "lost" aquanaut by successfully delivering an underwater lifeline.

On earlier tries, the seagoing St. Bernard shied away from bright lights near the submerged Sealab-2. But on the second go-around "he worked beautifully," according to Project Director Capt. George Bond. alright

From
POST-DISPATCH
St. Louis, Mo.

TUFFY PROVES GOOD MAILMAN FOR AQUANAUTS

LA JOLLA, Calif., Sept. 18 (AP) — Sealab aquanauts received their mail by porpoise yesterday.

Tuffy, the porpoise, delivered the mail to Sealab 2 in a performance that officials said proved his value to the Navy's underwater living project.

Aquanauts John F. Reaves and Kenneth Conda, reporting from the Sealab at 205 feet below the ocean's surface, said that Tuffy's exhibition was flawless.

Tuffy reported for duty promptly yesterday, and like many another working man, carried his lunch with him in a sack. The lunch — fish — was sent down to the aquanauts to be used in rewarding Tuffy for jobs well done.

Directed to the aquanauts by underwater buzzers, Tuffy made two dives to deliver the mail in sealed containers attached to his harness. He took down tools also in a special bag.

From SEP 18 1965
INQUIRER
Philadelphia, Pa.

Tuffy Is Hero In Sea Rescue

LA JOLLA, Calif., Sept. 17 (UPI). — Tuffy, an educated dolphin, completed the simulated rescue of an aquanaut 205 feet deep in the Pacific on Friday and peformed six other missions "beautifully" in experiments to develop underwater survival techniques.

In the rescue mission, aquanaut John Reeves pretended to be lost and sounded an electric buzzer to watch Tuffy respond-ed. The dolphin took a cable from another aquanaut, Ken Conda, and swam 50 feet with it to Reeves as part of the St. Bernard dog type rescue.

In his first dive, Tuffy delivered a package of fish to Cona and was rewarded with an underwater snack.

Friday's experiments were conducted several hundred feet from project equipment which seemed to have bothered Tuffy Thursday when the tests were started.

Cedar Rapids (Ia.) Gazette
SATURDAY, SEPTEMBER 18, 1965

Porpoise Tuffy Proving Worth

LA JOLLA, Calif. (AP)— Having proved his worth as a mailman and errand boy, Tuffy Saturday returned to the vital business of learning to save lives.

He is a porpoise working with Sealab aquanauts 205 feet below the surface of the ocean.

He has been trained to carry a line from one diver to another, in a simulated rescue, and Sealab officials said they were pleased at his prowess.

They were also pleased when Tuffy made two dives guided by underwater buzzers — to deliver mail in sealed containers to the aquanauts.

Later he carried a bag filled with fish—his reward for a job well-done.

Major Test Today

Houston Post — Sept. 18, 1965

Tuffy To 'Rescue' Diver

LA JOLLA, Calif —(AP)—Tuffy the porpoise, new messenger boy for the Sealab 2 aquanauts, has done just fine in a series of warmup dives and Thursday he tackles his big undersea test: Rescuing a "lost" diver.

When aquanauts feel taps on the shoulders, they'll know they've been rescued.

TUFFY WAS trained at the Point Mugu, Calif, Navy base to go up to simulated lost divers in murky depths, give them a nudge and hand over a life line.

He'll pick up the line at Sealab 2 and follow the sound of a buzzer device to the distressed aquanaut. He's been trained to follow the sounds.

Like most playful porpoises, Tuffy's bound to make friends with the aquanauts, and his presence is more than pure friendship.

HE COULD save their lives, say his trainers. Divers' biggest fear is that of losing sight of Sealab in the dark water. They have compasses but they don't function properly because of the metal in Sealab.

Tuffy will also take them messages, tools and other gear that can be clipped on a special harness.

The 7-foot, 270-pound mammal punched his time clock for the first time Tuesday and made 20 dives to the bottom from his floating pen. He was getting accustomed to surroundings.

"OUR MAIN concern was that he get used to the sounds in a strange area—boats, motors, Sealab noises—so he can distinguish our underwater signal," a spokesman said.

He said Tuffy's first rescue mission will be carrying a line 70 feet to a diver and returning to the surface.

Tuffy can stay below for four minutes if necessary but can make the dive, carry a line 50 feet and return to the surface in one minute, 45 seconds, the spokesman said.

THEN HE GETS a reward—part of his 15-pound daily supply of mackerel.

Meanwhile, the second team of aquanauts who descended Sunday for a 15-day stay will have to put up with the same "Tiltin' Hilton" in which the first team lived until it surfaced Sunday.

First-team diver Billie L. Coffman, Willimantic, Conn, described how "it would have been a dream if Sealab was level."

Sealab has a 6 per cent tilt as it sits on the ocean floor.

"We had to tie the pans to the stove when we cooked to keep them from slipping off," Coffman said.

Aquanauts aren't whistling while they work, either. Not that they don't want to. They can't.

"WE'D SIT down there and pucker up and blow and nothing happened," said Tom Clarke, La Jolla, also of the first team.

The lighter, helium-rich atmosphere inside the lab prevents whistling, and also gives a chipmunk-like pitch to their voices.



PORPOISE WITH A PURPOSE IS TUFFY, WITH 2 TRAINERS
John Reaves, Robertsdale, Ala, Left and Kenneth Conda, Phoenix, Mich
—AP Wirephoto

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Porpoise of Errand Boy

Tuffy, the porpoise that's joining the aquanauts in the ocean off La Jolla, Calif., gets a fish before departure on the assignment from John Reaves, left, and fellow aquanaut Kenneth Conda. Both men descended to the ocean floor to join astronaut-aquanaut Cmdr. Scott Carpenter who has already spent two weeks in Sealab II. Tuffy will run errands and deliver messages from the Sealab to the surface.

—UPI Telephoto.

ROCKY MOUNTAIN NEWS
Denver, Colo.
SEP 16 1965

Tuffy Carries Mail

Dolphin Makes 7 Dives at Sealab

LA JOLLA, Calif. (UPI)—Tuffy the dolphin made seven quick dives in his final Sealab 2 performance Friday and nodded his bollenoe goodby to the aquanauts 205 feet below the ocean.

The trained Atlantic bottle-nosed dolphin delivered mail and small objects to aquanauts John Reaves and Ken Conda, who were both away from the underwater laboratory.

Tuffy lingered outside the 12-foot-75-foot steel cylinder once and nodded to shouts of hello from the eight other aquanauts looking through the sealab portholes.

Later in the day, the dolphin was transported back to his home at Point Mugu, Calif., in a helicopter.

Tuffy performed "perfectly" in the last two days of his three days of participation in the 45-day project to test man's ability to survive and work underwater. the mammal apparently was bothered by wires and noises from the laboratory on his first day Thursday.

Tuffy's mission was to show how a trained dolphin coul find a "lost" diver and, with its greater eyesight under water and sens of edirction, fuide the aquanaut back to safetly.

EVENING NEWS

SEP 19 1965

9 of 10 Aquanauts Have Ear Trouble

LA JOLLA, Calif., Sept. 8 (UP).— Nine of the 10 aquanauts living 205 feet underwater in Sealab 2 have developed ear infections, but the ailments will not curtail their activities, Navy Dr. George Bond said Wednesday.

Capt. Bond said he thought the infections probably were caused by microorganisms in the water around Sealab and the aquanauts picked them up during excursions outside the submerged cylinder.

He said the aquanauts were being given antibiotics for the infections which were charaterized by pain and swelling and involved the outer ear canal, not the eardrum.

SEP 9 - 1965
INQUIRER
Philadelphia, Pa.

ROCKY MOUNTAIN NEWS
Denver, Colo.
SEP 16 1965

Tuffy's Job Easy, But With Porpoise

LA JOLLA, Calif., Sept. 15 — (AP) — Tuffy the porpoise, new messenger boy for the Sealab II aquanauts, has done just fine in a series of warmup dives and Thursday he tackles his big undersea test: Rescuing a "lost" diver.



Tuffy

He'll make new friends, too.

When aquanauts feel a tap on the shoulder, they'll know they've been rescued.

Tuffy was trained at the Point Mugu, Calif., Navy Base to come up to simulated lost divers in murky depths, give them a nudge and hand over a life line.

He'll pick up the line at Sealab and follow the sound of a buzzer device to the distressed aquanaut. He's been trained to follow the sounds.

Like most playful porpoises, Tuffy's bound to make friends with the aquanauts, and his presence is more than pure friendship.

He could save their lives, say his trainers. Divers' biggest fear is that of losing sight of Sealab in the dark water.

Picture on Page 10

They have compasses but they don't function properly because of the metal Sealab.

Tuffy will also bring them messages, tools and other gear that can be clipped on a special harness.

The 7-foot, 270-pound mammal punched his time clock for the first time Tuesday and made 20 dives to the bottom from his floating pen.

He was getting accustomed to surroundings.

"Our main concern was that he get used to the sounds in a strange area — boats, motors, Sealab noises—so he can distinguish our underwater signal," a spokesman said.

He said Tuffy's first rescue mission will be carrying a line 70 feet to a diver and returning to the surface.

Tuffy can stay below for four minutes if necessary but can make the dive, carry a line 50 feet and return to the surface in one minute, 45 seconds, the spokesman said.

Then he gets a reward — part of his 15-pound daily supply of mackerel.

He can make a straight dive in 45 seconds.

Meanwhile, the second team of aquanauts who descended Sunday for a 15-day stay, will have to put up with the same "Tiltin' Hilton" in which the first team lived until it surfaced Sunday.

First-team diver Billie L. Coffman, Willimantic, Conn., described how "it would have been a dream if Sealab was level."

Sealab has a 6 percent tilt.

"We had to tie the pans to the stove when we cooked to keep them from slipping off," Coffman said.

Tuffy Ready for Sealab Rescue Test

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SEP 16 1965
INQUIRER
Philadelphia, Pa.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

SEP 16 1965

Sea Spawns Diaper Rash

Men 'Squeaky' In Ocean Lab

LA JOLLA, Calif. (AP) — Living at the bottom of the ocean gives a man a high-pitched voice, a chill, ear trouble and something resembling diaper rash, say nine aquanauts who tried it.

But someday, they added, man may be able to roam under the seven seas in a mobile laboratory.

The aquanauts aired their conclusions after emerging from 15 days in Sealab 2, 205 feet below the Pacific Ocean surface.

They surfaced Sunday, spent 33 hours in a decompression chamber, then met newsmen aboard the staging vessel Berkone.

Aquanaut Jay D. Skidmore said the all-helium atmosphere they breathed gave them squeaky voices that sounded like a speed-up phonograph record.

" . . . It created a lot of hilarity at first," said Skidmore. "After a few days we got used to it and toward the last it seemed extremely normal."

Capt. George Bond, chief of the project, said it pointed towards eventual development of completely mobile laboratory housing in which 35 men could go anywhere in the world, do any underwater job and return while decompressing on the way.

He said such mobility could best be obtained by modification of a nuclear submarine.

Bond said, however, that after three weeks underwater, the mens efficiency would begin to decrease.

Aquanaut Bill Coffman said he and Skidmore spent the longest time in the water at any one time — two hours and 44 minutes. Coffman said it was cold, but that they could have stayed out longer.

Lt. Thomas A. Clarke, team biologist, said he, however, could take only about 30 to 40 minutes in the water, which averages 51 to 53 degrees fahrenheit around Sealab 2.

Sealab physician Lt. Robert Sonnenburg praised underwater living, but added he was unable to cure an ear infection suffered by the aquanauts. He treated them to alleviate discomfort.

The aquanauts developed a rash, similar to a baby's diaper rash, probably due to wet clothing and irritation.

Capt. Walter F. Mazone, decompression chief, said he noticed only one physiological change: "This was that grown men can get a diaper rash."

Meanwhile, the second team of aquanauts in Sealab 2 will have to get by on shorter rations of oxygen in an experiment starting Wednesday.

Officials said the oxygen content of the atmosphere in the 12x58-foot steel capsule will be reduced from 4.25 to 3.5 per cent for the next three days.

Ten men are working in the project's second, or scientific, phase.

In reducing the oxygen content, scientists are seeking the most efficient breathing mixture for use in underwater projects.

The first team breathed a mixture of 4.25 per cent oxygen, 20 per cent nitrogen and 75.75 per cent helium.

Extensive physiological tests will be conducted to determine if the reduction in oxygen will cause any changes in the aquanauts.

Aquanaut Adventure

OFF LA JOLLA, the Navy is making history. Its 45-day experiment, not yet half over, in Sealab 2 at 205 feet beneath the ocean, is the longest test of its kind ever undertaken at that depth.

The pioneering of Piccard and Cousteau has shown that living comfortably far beneath the sea's surface is possible. The Navy's current tests expand that basic information for future use. Three teams of aquanauts, along with Scott Carpenter, who is on loan from the astronaut program, are proving not only that several men at the same time can operate in a hostile marine environment but are also gathering and testing material and data to advance developing projects.

Already the experiment exceeds the results of a small pilot program a year ago in which work done by four aquanauts fell below normal performances. The use this time of larger teams of men, changes in the artificial atmosphere of the Sealab and fuller training of aquanauts appear to have eliminated that problem. But others exist—such as the high helium content of the Sealab's air which has ruined 10 television cameras and interrupted closed-circuit TV observation from topside. Astronauts can easily get lost in the black depths outside the capsule or be stung by poisonous fish, as was Carpenter.

The oceans' resources are as tantalizing as the mysteries waiting in space, at least to us with memories of Captain Nemo and the weird sea creatures we have read about in the National Geographic. The work of the aquanauts will undoubtedly lead to the opening up of still another vast area of human endeavor. Now that man has the intelligence to exploit the underwater world, its new availability will test his will to preserve it.

From SEP 16 1965
POST-GAZETTE
Pittsburgh, Pa.

Tuffy faces a tough dolphin assignments.

LA JOLLA, Calif. (UPI) — Can a trained dolphin do for a submerged diver what a St. Bernard dog does for a lost mountain climber?

Tuffy, the Sealab 2 project's "educated" dolphin, and two aquanauts planned today to put that question of animal intelligence to the supreme test 205 feet down in the Pacific Ocean.

Aquanauts John Reaves and Ken Conda, in diving gear, were set to plunge to the ocean floor equipped with buzzers to signal their position to Tuffy. If all goes well, the dolphin, wearing a harness with a cable attached, should respond to the signal, locate the divers in the murky depths and take the cable to them so they can find their way to the surface.

Scientists said a Dolphin's underwater vision far exceeds man's 10-to 20-foot undersea limit and the mammal can descend and ascend much faster than man.

Experimenters also wanted to learn whether Tuffy could carry messages to and from the diver as a sort of seagoing mailman.

"Our main concern is that he (Tuffy) get used to the sounds in a strange area—boats, motors and laboratory noises—so he can distinguish our underwater signal, said Dr. Sam H. Ridgway, research veterinarian at the Navy missile center at Point Mugu, Calif., where Tuffy was trained.

To familiarize Tuffy with the expected sea noises, he was flown here by helicopter Monday from point Mugu and given two days' special training Tuesday and Wednesday.

CHICAGO DAILY LAW BULLETIN - 45
34 N. La Salle Street D
Chicago 2, Ill. Circ. 7,300

SEP 16 '65

115

A SEAGOING 'ST. BERNARD'

Tuffy Joins Sealab II to Help the Aquanauts

LA JOLLA, Calif., Sept. 16 (UPI) — Tuffy, the 'educated' dolphin, joins America's 10 aquanauts in the Sealab II experiment today.

His assignment: to determine whether a trained dolphin can do for a submerged diver what a St. Bernard dog does for a lost mountain climber.

Tuffy and two aquanauts planned today to put that question of animal intelligence to the supreme test 205 feet down in the Pacific Ocean.

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MAILMAN'

Experimenters also wanted to learn whether Tuffy could carry messages to and from the diver as a sort of seagoing mailman.

Tuffy, who was flown here from the Point Mugu, Calif., Navy facility where he was 'educated,' has been given final training here in preparation for the experiment.

BETTER VISION

Man's visibility underwater is only about 10 to 20 feet and he can't match a dolphin's ability to climb or descend rapidly for rescue work.

The experiment will be conducted where the aquanauts have been living in the 200-ton, 57-foot-long Sealab II and working outside of it in chilly water.

The man-in-the-sea project began Aug. 28, when Astronaut/Aquanaut M. Scott Carpenter and nine other men entered Sealab II. The nine original aquanauts remained underwater 15 days and were replaced last week-end by nine other men.

CARPENTER STAYS

Cmdr. Carpenter remained submerged. He is the only member of the scheduled 45-day project who is supposed to remain underwater 30 consecutive days.

The purpose of the project is to learn how well man can live and work during prolonged periods underwater.



UPI Telep

Tuffy gets a fish from diver John Reaves of Sealab II as trained 80 feet down in the open ocean off Point Mugu.



THE TILTIN' HILTON—This is the first team of aquanauts which spent 15 days in Sealab. In top row, from left, are Cyril J. Tuckfield, Thomas Clarke, Robert E. Sonnenburg, and Billie L. Coffman. In second row, from left, are Earl Murray, Scott Carpenter and Berry L. Cannon. In bottom row, from left, are Frederick Johler, Wilbur Eaton and Jay D. Skidmore, Because of a six per cent tilt, their home was called Tiltin' Hilton.

Tuffy Serves as Messenger

Porpoise Helping Out With Sealab 2

LA JOLLA, Calif. (AP) — Tuffy the porpoise, new messenger boy for the Sealab 2 aquanauts, has done just fine in a series of warm-up dives and Thursday he tackles his big undersea test: rescuing a "lost" diver.

He'll make new friends, too.

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Tuffy was trained at the Point Mugu, Calif., Navy base to come up to simulated lost divers in murky depths, give them a nudge and hand over a life line.

HE'LL PICK up the line at Sealab and follow the sound of a buzzer device to the distressed aquanaut. He's been trained to follow the sounds.

Like most playful porpoises, Tuffy's bound to make friends with the aquanauts, and his presence is more than pure friendship.

He could save their lives, say his trainers. Divers' biggest fear is that of losing sight of Sealab in the dark water. They have compasses but they don't function properly because of the metal Sealab.

Tuffy will also bring them messages, tools and other gear that can be clipped on a special harness.

The 7-foot, 270-pound mammal punched his time clock for the first time Tuesday and made 20 dives to the bottom from his floating pen.

He was getting accustomed to surroundings.

"Our main concern was that he get used to the sounds in a strange area—oats, motors, Sealab noises—so he can distinguish our underwater signal," a spokesman said.

HE SAID Tuffy's first rescue mission will be carrying a line 70 feet to a diver and returning to the surface.

Tuffy can stay below for four minutes if necessary but can make the dive, carry a line 50 feet and return to the surface in one minute, 45 seconds, the spokesman said.

Then he gets a reward—part of his 15-pound daily supply of mackerel.

Meanwhile, the second team of aquanauts who descended Sunday for a 15-day stay will have to put up with the same "Tiltin' Hilton" in which the first team lived until it surfaced Sunday.

Tuffy Turns Mailman Today

By JUDITH MORGAN

The mail must go through 205 feet of water today, and Tuffy, the trained porpoise from Point Mugu, is ready to deliver.

Tuffy will work with SeaLab II aquanauts Kenneth J. Conda of Ledyard, Conn., and John Forrest Reaves of Oxnard who trained with the porpoise earlier this summer in Point Mugu.

Capt. George Bond, principal investigator for SeaLab, said Tuffy will deliver the mail to SeaLab about noon today. He will carry the letters in a collapsible plastic container.

Bond spent 20 minutes in the water with Tuffy yesterday near the propoise's pen which floats off the shore side of the support ship Berkone.

Bond dived 30 feet below the surface than gave the underwater sound signal and Tuffy came arcing toward him. Bond said Tuffy made several dives to him while out of his pen.

As the second team of aquanauts proceeded with physiological tests on the ocean floor, sharks and other fish put on a show around the Berkone.

Six-foot-long blue sharks were tempted to the Berkone's waters apparently by mackerel which came close by to feed on a school of anchovies.

The gray ball of anchovies looked like a coil of rope about 12 feet in diameter and hugged the ship. With an hour the circle became smaller and smaller as hungry mackerel leapt through the center for dinner.

Rick Grigg, a member of the third team of aquanauts, yesterday swam in Tuffy's 17 foot square pen taking underwater photographs of the smiling grey porpoise.

Grigg said Tuffy did not like flash bulbs and usually blinked and has his eyes closed in the pictures. When Grigg put away the flash, Tuffy began a swimming chase, diving under Grigg and changing directions.

For a while yesterday afternoon, the aquanauts had complete privacy from peeping officers topside. The underwater television camera which sends a constant picture from SeaLab's interior to the command post on the Berkone was out of service. Bond said a new one was being installed immediately because it was important to have the SeaLab picture 24 hours a day.

Capt. Lewis B. Melson, project director, said Cmdr. Scott Carpenter was outside SeaLab twice yesterday working on the underwater camera.

Carpenter and other aquanauts are testing an electrically heated wet suit which is batterv powered and. the first team reported, allows the diver to stay in the water with temperature comfort.

Melson said the underwater weather station installed by the first team is sending information on currents and water temperatures to shore at Scripps Institution of Oceanography. He said the station is permanent and should last two or three years.

Melson said eventually many such stations will be installed out from Scripps Canyon. Measurements and recordings from these stations will allow oceanographers to make underwater weather predictions.

SEP

NEWS
Dallas, Texas

Tuffy Makes Dive, Is Seen by Aquanauts

By LEO BOWLER
EVENING TRIBUNE Science Writer

Tuffy the Point Mugu porpoise made two successful dives to Sealab today.

The porpoise left the surface, swam down and was seen by aquanauts working outside Sealab on the bottom but shied away from light and lines which Sealab officials say cluttered the area.

At one point, during a series of attempts by handlers to get the porpoise to go to the bottom, the animal was underwater 4½ minutes. It apparently was on this dive that Tuffy contacted the aquanauts.

The two aquanauts who were outside Sealab during the dive are John F. Reaves, 36, a photographer First class from Oxnard, and Kenneth J. Conda, 32, a torpedoman's mate of Ledyard, Conn.

Reaves and Conda reported they saw Tuffy twice, but Sealab officials said they think that both sightings occurred during the single dive.

Earlier Tuffy had dived but was not seen by the aquanauts. Then the position on the surface from which the dives were made was changed in order to shorten the distance Tuffy had to travel.

Reaves and Conda signaled the porpoise from the bottom with special underwater sound devices. Tuffy has been trained to home on the sound.

Yesterday, Capt. George Bond, chief investigator for the project, put on Scuba gear for a final test swim with Tuffy.

When Bond came up after a 20-minute session with Tuffy, he called the porpoise a "wonderfully affectionate fellow" and gave his okay for the work to be conducted today with Tuffy by the aquanauts.

Bond dove to 30 feet, then called Tuffy with a buzzer.

Bond said that Tuffy then disappeared for a moment. A little later the propoise came up from behind and nudged the captain in the back so the diver would know he was there.

SAN DIEGO
EVENING TRIBUNE
SEP 16 1965

EVENING TRIBUNE
SAN DIEGO, CALIFORNIA
Thursday, Sept. 16, 1965 B-1

OCEAN SCIENCE NEWS 9/17/65

THE FIRST TEAM OF SEALAB II AQUANAUTS accomplished about 50% of the tasks scheduled during their 15-day sojourn in their underwater habitat off LaJolla, Calif. This, Navy officials assert, is "about what we expected." Members of Team I averaged about 100 hours each outside of the pressurized capsule during the two-week period, and admittedly as their time underwater drew toward the end, reached a point of "reluctance" to depart the capsule and to re-enter the water. Factors involved included the numbing cold of the water and the problem of unsuiting and suiting for forays outside.

Oddly enough, the water temperature -- despite the approach of fall weather topside -- has warmed up for the second team of aquanauts, who descended last weekend. Surface water temperature has dropped six degrees and is now 64°. However, at SEALAB -- 205 feet below the surface -- the water temperature is now 52°, an improvement of five degrees during the past two weeks. This, coupled with the success of experimental electrically-heated suits, is expected to result in an increase in both time in the water and individual efficiency by the second team.

De-briefing of the first team disclosed that both Lt. Cdr. M. Scott Carpenter, astronaut and team leader, and Torpedoman's Mate Billie F. Coffman, were stung (not bitten, as reported earlier) by scorpion fish (sculpin). The West Coast sculpin is quite common off the southern California coast and several swimmers have been reported stung in recent weeks. Medical authorities said that poison in the fins of the fish produce a painful reaction comparable to "a mild bee sting," when the skin is penetrated. They said the effect is not lethal unless several fish should sting the victim at the same time.

Incidentally, members of Team I concocted a high-energy, hot drink which may have some commercial application. After sorties in the frigid waters around SEALAB, the aquanauts simply mixed sweetened, fruit-flavored gelatin with hot water. They said it is both tasty and satisfying.

L.A. Herald-Examiner, editorial, 16 Sept 1965

Tuffy's in Deep

Tuffy is a porpoise. He has long been interested in the weird habits and peculiar utterances of humans. He believes they may have an intelligence approaching that of porpoises. He now has an opportunity to study them and determine whether he theorized correctly.

Tuffy has been stationed above the Sealab at La Jolla. He will carry the mail to the aquanauts, bring a lifeline 205 feet down if it's needed, guide a wandering biped back to the Sealab in the murky water, just about anything, maybe even answer the phone.

Come the day when Tuffy reads a treatise to his fellow porpoises in science meeting gathered, he ought to have some interesting notes on these curious people who think the ocean bed is a proper place to sleep on.

116

Tuffy Passes Exam for Sealab Duty

La Jolla, Cal., Sept. 15 (UPI) — Tuffy, a dolphin doing what comes naturally but this time for science, passed his first preliminary test today in the Sealab 2 project to explore underwater depths.

Rigged with a harness and carrying a dummy package, Tuffy responded alertly to an electric buzzer calling him back to the mother ship Berkone.

Picked for sea rescue training because of high-level intelligence unequaled by other sea creatures, plus a highly individualistic personality, Tuffy will work for the first time with Scott Carpenter and nine other aquanauts tomorrow.

This afternoon, Tuffy worked at the 170-foot level with an old friend, Navy Capt. George Bond, one of the men who helped prepare him for the Sealab project. Yesterday, the dolphin had time to frolic in addition to making 20 dives to the ocean floor to get used to the area around Sealab 2,205 feet beneath the ocean's surface.

The dolphin, sometimes called a Porpoise with a Purpose by his navy friends, has captured the imagination of the nation even tho he has not performed a major experiment.

The work of the aquanauts has established the valid techniques of prolonged stays under water to reduce the required decompression of divers under ordinary circumstances. Diver exploration of the continental shelf may be feasible on the basis of Sealab 2 experiments, and many more are scheduled.

Carpenter, the second American astronaut to circle the earth, and other divers experimented today with a different air mixture for breathing with in the Sealab, and in some extended work out of the underwater laboratory. Scientists reduced the oxygen content from 4¼ to 3½ per cent.

Helium constitutes the major element in the air mixture the aquanauts have been breathing.

Divers today worked further away from the Sealab, and deeper—233 feet—than in most other days.

One factor in more "sophisticated" diving programming was a larger number of electrical wet suits that increase the time an aquanaut can remain outside the laboratory. Four were in use today. Also the men installed equipment to measure sound and visual elements.

The project with Tuffy involves an attempt to determine if this or any other dolphin can lead divers bac kto the vessel from which they came, or to rescue ships in emergency situations. Tuffy also will carry messages in the experiment.

He'll pick up the line at Sealab and follow the sound of a buzzer device to the distressed aquanaut. He's been trained to follow the sounds.

Like most playful porpoises, Tuffy's bound to make friends with the aquanauts, and his presence is more than pure friendship.

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rom SEP 16 1965
TRIBUNE
Chicago, Ill.

Sealab's 'Tuffy' Passes 1st Test With Ease

By RON ROACH
Associated Press Staff Writer

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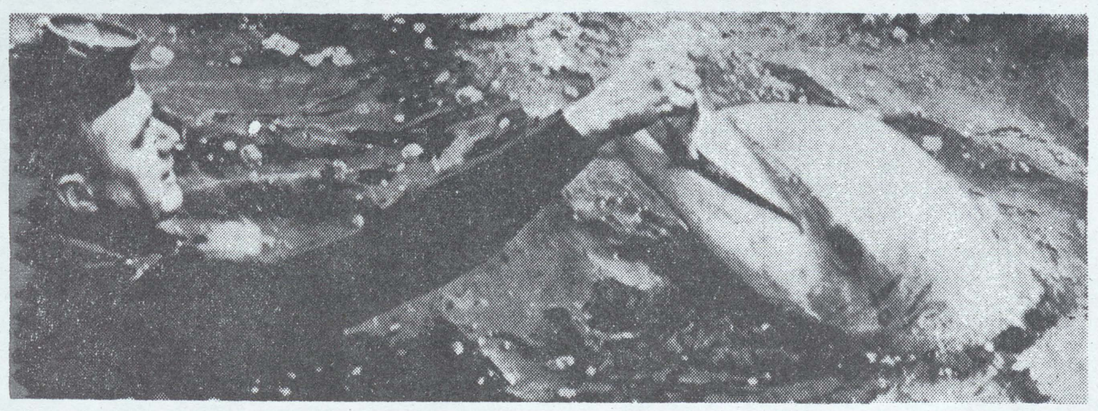
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—Associated Press Wirephoto

Aquanaut John Reaves, of Sealab No. 2 team, feeds fish to Tuffy at La Jolla, Calif.

He could save their lives, say his trainers. Diver's biggest fear is that of losing sight of Sealab in the dark water. They have compasses but they don't function properly because of the metal Sealab.

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WILL TRY TO RESCUE 'LOST' DIVER

Sealab 2 to Test Porpoise

By Associated Press

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NAVY TRAINING

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20 DIVES

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n
GLOBE DEMOCRAT
St. Louis, Mo.

A86LA

LA JOLLA, CALIF.--FIRST ADD AQUANAUTS A84 X X X POINT MUGU.

"TUFFY IS SO WELL-TRAINED HE CAN COME DOWN AND TAP A LOST DIVER ON THE SHOULDER AND HAND HIM A LIFE LINE," CONDA SAID.

ALTHOUGH HE MAY BECOME A PET, CONDA SAID HE SHOULDN'T BECOME A NUISANCE.

"TUFFY IS VERY PRACTICAL FOR THE SO

£ ALTHOUGH HE MAY BECOME A PET, CONDA SAID HE SHOULDN'T BECOME A NUISANCE.

"TUFFY IS VERY PRACTICAL FOR THE SAFETY OF DIVERS."

AQUANAUTS WILL PRETEND THEY ARE LOST FOR TUFFY'S BENEFIT. BUT CONDA SAID THE DIVERS' BIGGEST ACTUAL FEAR IS TO BECOME LOST IN THE DARKNESS OF THE DEPTHS.

THEY WILL CARRY BUZZERS DURING TESTS TO SUMMON TUFFY FROM THE SURFACE.

"HE ONCE CAME TO ME WITHOUT THE BUZZER IN PRETTY DARK WATER," CONDA SAID. "HE KNOWS EXACTLY WHAT TO DO." TUFFY HAS BEEN CONDITIONED TO RESPOND TO THE BUZZER.

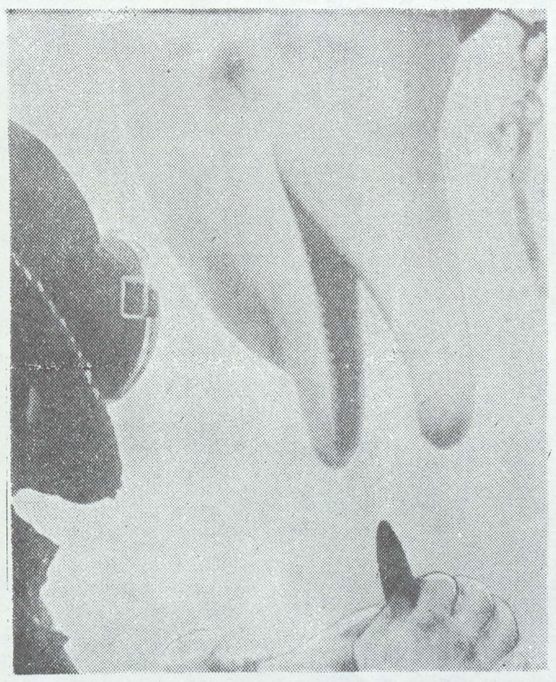
"MOST ANIMALS GET REWARDS FROM THEIR TRAINERS," CONDA SAID. "NOT TUFFY. BUT HE'LL BE FED 14 TO 15 POUNDS OF FISH EVERY DAY AT HIS PEN ON THE SURFACE."

AQUANAUTS HAVE ALSO ENVISIONED POSSIBLE UNDERSEA COMBAT WITH ENEMY DIVERS IN SOME FUTURE WAR IN WHICH A TRAINED PORPOISE WOULD BE VALUABLE.

THE SECOND 10-MAN TEAM -- INCLUDING CMDR. M. SCOTT CARPENTER, LEADER OF THE FIRST TWO TEAMS -- MADE ITS FIRST SWIMS OUTSIDE THEIR UNDERSEA LABORATORY YESTERDAY.

THE DECOMPRESSED AQUANAUTS WERE TO BE TAKEN TO BALBOA NAVY HOSPITAL IN NEARBY SAN DIEGO FOR PHYSICAL EXAMINATIONS. AFTER A DEBRIEFING, THEY'LL RELAX FOR 36 HOURS BEFORE REJOINING THE PROJECT AS SURFACE SUPPORT DIVERS.

EE323APD NM



Associated Press

TUFFY ON JOB—Tuffy, the porpoise trained to work with Sealab-2 divers on the Pacific Ocean floor off La Jolla, Calif., was rewarded Wednesday with a fish, offered by John Reaves, one of the aquanauts. Tuffy was scheduled for his final exams today to determine how well he will respond to a buzzer which summons him to Sealab-2. He was to take a cable, fastened to a harness, down to two divers on the ocean floor 205 feet below the surface. Purpose of the cable is to guide the divers to the surface.

Minneapolis (Minn.) Star
THURSDAY, SEPTEMBER 16, 1965

2-A Thursday, Sept. 16, '65 DETROIT FREE PRESS

Porpoise Ready for Big Test

LA JOLLA, Calif. — (AP) — Tuffy the Porpoise, new messenger boy for the Sealab 2 aquanauts, has done just fine in a series of warmup dives and Thursday he tackles his big undrsea test: Rescuing a "lost" diver.

He'll make new friends, too.

When aquanauts feel a tap on the shoulder, they'll know they have been rescued.

* * *

TUFFY WAS trained at the Point Mugu, Calif., Navy base to come up to simulated lost divers in murky depths, give them a nudge and hand over a live line.

He'll pick up the line at Sealab and follow the sound of a buzzer device to the distressed aquanaut. He's been trained to follow the sounds.

Like most playful porpoises, Tuffy's bound to make friends with the aquanauts, and his presence is more than pure friendship.

He could save their lives, say his trainers. Divers' biggest fear is that of losing sight of Sealab in the dark water. They have compasses but they don't function properly because of the metal Sealab.

Tuffy will also bring them messages, tools and other gear that can be clipped on a special harness.

The 7-foot, 270-pound mamal punched his time clock for the first time Tuesday and made 20 dives to the bottom from his floating pen.

HE WAS getting accustomed to surroundings.

"Our main concern was that he get used to the sounds in a strange area — boats, motors, Sealab noises — so he can distinguish our underwater signal," a spokesman said.

He said Tuffy's first rescue mission will be carrying a line 70 feet to a diver and returning to the surface.

Tuffy can stay below for four minutes if necessary but can make the dive, carry a line 50 feet and return to the surface in one minute, 45 seconds, the spoeksman said.

Then he gets a reward—part of his 15-pound daily supply of mackerel.

SEP 16 1965
FREE PRESS
Detroit, Mich.



AP Photo

TUFFY, THE errand boy porpoise, gets a fish from aquanaut John Reaves while another aquanaut, Kenneth Conda, of Phoenix, Mich., watches. Both the men are now down in Sealab 2.

117

TIME, SEPTEMBER 17, 1965

SCIENCE

OCEANOLOGY

Journey to Inner Space

From under the churning Pacific last week came the sound of a human voice: "Greetings, earth people." Far from a Jules Verne fantasy, it was the breezy salutation of one of the men of Sealab II, the U.S.'s capsule in inner space 205 ft. down on the ocean floor, one-half mile off the coast near La Jolla, Calif. The ten aquanauts on board, led there two weeks ago by Astronaut-turned-Aquanaut Scott Carpenter, were winding up the first part of a 45-day adventure that aims to discover man's capacity to live comfortably and work effectively at the lower depths.

A project of the U.S. Navy and the University of California's Scripps Institution of Oceanography, Sealab is the nation's most ambitious effort thus far to explore and eventually exploit the ocean's great store of food, oil and mineral resources. In Sealab I, which submerged last year off Bermuda, four Navymen proved that they could stay down at 192 ft. for nine days. Now three teams of ten aquanauts each plan to stay underwater for 15 days at a stretch, with Carpenter remaining a whole month.

Sealab II will enable the U.S. partly to catch up with, and in several respects to exceed, the undersea exploits of France's Jacques-Yves Cousteau (TIME cover, March 28, 1960). He has stationed teams of divers at 80 ft. for one week. This week, in his third major project, six French divers in a spherical capsule will live for 15 days at 330 ft. in the sea off the Riviera resort at Cap Ferrat.

Papa Topside. Built at a cost of $850,000, Sealab II is a 12-ft. by 57-ft. steel cylinder that houses a well-equipped scientific and medical laboratory, a compact galley and a dining area with bunks lining the walls. Standing by on the surface is a support barge linked to Sealab by an umbilical cable for power and communications. From the barge, Navy Captain George F. Bond, 50, whom the aquanauts call "Papa Topside," bosses the exercise, chats with them by intercom and observes them by closed-circuit television.

Topside keeps a careful watch over the aquanauts' condition. Each morning the doctor on board Sealab takes blood, saliva and urine samples, checks the aquanauts' heartbeats, brain waves and blood pressures. The aquanauts are tested for sight and hearing, strength and coordination. At night each man sits down to an Electrowriter to file a confidential report to the surface on how he feels and, as Bond says, "what stinks about the program."

Topsy-Turvy Life. Supplies are lowered to Sealab in a small, pressurized capsule—an aquatic dumbwaiter that brings in such goodies as chocolate cake and fresh meat to supplement the aquanauts' stock of freeze-dried food. The men can watch commercial TV but prefer to peer out the portholes at the fish looking in at them. During the flight of Gemini 5, Aquanaut Carpenter even chatted directly with Astronaut Gordon Cooper. In case of emergency, the men could get power and fresh water from a tube linking them to shore, and they could surface in a 14-ft. capsule anchored outside the Sealab.

In the pressurized, artificial atmosphere of the capsule, life can be trying and topsy-turvy. Matches will not burn and water boils only at temperatures above 300°. Fried foods are forbidden because of the greasy fumes. Fresh eggs can be dangerous: the toxic hydrogen sulfide given off by their yokes cannot be "scrubbed" out of the air with Sealab's purifying gear. The atmosphere has to be rigidly controlled. Because ordinary concentrations of oxygen become toxic when breathed under pressure for a long period (causing convulsions and pulmonary disease) and nitrogen has a narcotic effect, the aquanauts breathe a special mixture of gases: 4.3% oxygen, 18% nitrogen, and the rest helium. Even this mix is not perfect. Helium is so much lighter and less dense than nitrogen that the human voice resounds at a higher pitch than normal and words tumble out rapidly, producing a Donald Duck falsetto. To make themselves understood, the men must speak an octave lower and much slower than usual.

Deep Dangers. The aquanauts are doing more work than had been expected. They have set up an outdoor station to measure ocean currents, and are performing about 100 marine biology and oceanography experiments. Each morning at least two of them put on rubber "wet" suits, strap on Mark VI breathing apparatus and slip out through a hatch on the bottom of the capsule. (The hatches can be held open without flooding the Sealab because the pressure inside is equal to the pressure of the water outside.)

The sea's extreme cold limits trips in ordinary wet suits to two hours at most, and darkness and the dangers of the deep prevent the aquanauts from venturing beyond a 225-ft. perimeter. Neither do they swim more than 30 ft. up or down, lest they fall victim to the deep-sea diver's greatest fear—the bends. If a diver comes up too fast, gases that have dissolved in his bloodstream from breathing under pressure form bubbles that lead to dizziness, nausea or even death.

On the sorties outside, the aquanauts photograph the neighborhood, tag fish to record their movements, and collect marine samples. They are building concrete-block pyramids as fish homes, and will lay "sidewalks" with a gelatin mixture that is expected to harden into a firm surface on the soft ocean floor. To experiment with underwater salvage, the Navy will sink an old fighter plane, have the aquanauts fill it with lightweight polyurethane foam, then see if the foam displaces enough water and is buoyant enough for the plane to float to the surface.

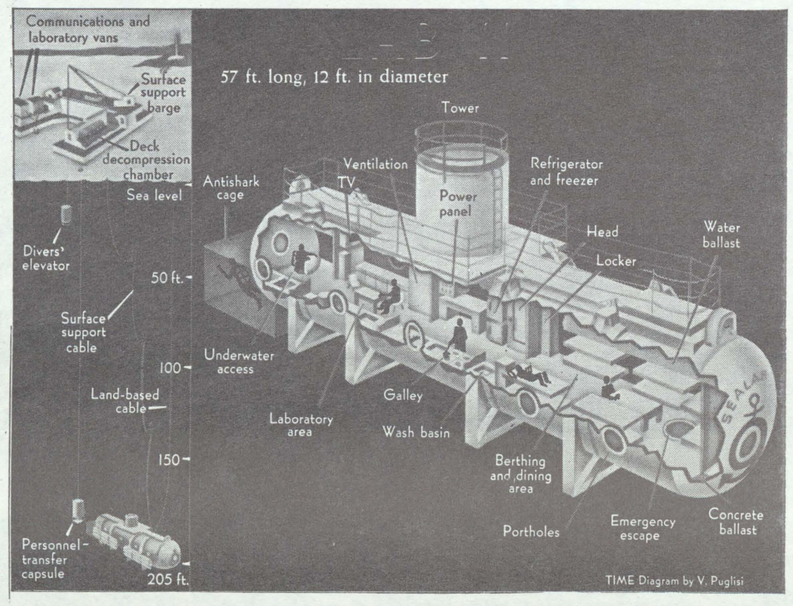
The aquanauts this week expect to get some help from a 7-ft., 270-lb. bottlenose porpoise named Tuffy. Trained by the Navy, Tuffy has been taught to come swimming at the sound of a buzzer. He will live in a pen near the support barge, carry messages and cables between the lab, its divers, and topside.

Blooming Health. As the first team prepared to leave the lab and be replaced by a second crew last week, the men were physically in top shape, except for minor ear infections that are common to divers who use hooded swim suits. Doctors reported that the men were in excellent psychological health. Sealab's Captain Bond was particularly impressed with the aquanauts' performance. "That's what this experiment is all about," he says, "to see what man can do underwater."

U.S. NAVY



AQUANAUT & PORPOISE
And ten men who sound like Donald Duck.



SAN DIEGO UN

SEP 17 1965

10.9 Million Asked For Ocean Study

UC Regents Unit OKs Application For National Science Foundation Funds

By CHARLES DAVIS
The San Diego Union's Education Writer

An application for $10,960,000 to study ocean floors deep in the Atlantic and Pacific yesterday was approved by a committee of University of California regents.

If granted by the National Science Foundation, funds would finance drilling operations at depths of 18,000 to 20,000 feet for a 45-month period starting Oct. 1.

Scientists from four oceanographic institutions formulated the proposal, but actual operations would be conducted through Scripps Institution of Oceanography.

FOUR INSTITUTIONS

The plan is called the "joint oceanographic institutions deep earth sampling program." It represents Scripps, the Institute of Marine Science of the University of Maimi, Lamont Geological Observatory of Columbia University and Woods Hole Oceanographic Institution.

If it is ratified as expected by the full Board of Regents today, UC President Clark Kerr would be authorized to solicit funds from the NSF.

3-YEAR PERIOD

Yesterday's approval was given by the regents' educational policy committee, which also authorized seeking $780,883 from the National Aeronautics and Space Administration for UCSD.

NASA funds would be used over a three-year period to expand by 40 students a predoctoral training program in space-related sciences and technology.

The deep-water oceanographic proposal involves drilling holes of 1,000 to 2,000 for clues to the history of the ocean floor.

BERKELEY GAIN TOLD

It would probe the origin of abyssal plains, rises and, perhaps, of continental drift.

In other matters, the committee received a report showing UC's Berkeley campus, despite a year of turmoil, in 1964-65 regained its position over UCLA as the largest recipient of private gifts and grants.

Berkeley, which received $6.4 million from private sources in 1962-63, gained 40.9 per cent in the following year for a total of $9,049,076.

Some of the campus' alumni and regents had expressed concern that the student outbreaks would have led to decreased support.

Private gifts and grants among the nine colleges increased the smallest — both in dollars and percentage — at UCSD. The local campus received $291,049 in 1964-65, up $22,540 or 8.3 per cent, from the previous year.

The committee also authorized a new UC study abroad program in Delphi, Greece, starting in April.

ROCKY MOUNTAIN NEWS
Denver, Colo.
SEP 17 1965

Tuffy Turns Bashful In Hide-Seek Rehearsal

LA JOLLA, Calif., Sept. 16—(UPI)—Tuffy, an impish dolphin, performed bashfully Thursday in a hide-and-seek game with two aquanauts in the depths of the Pacific as part of an experiment in underwater survival techniques.

His much ballyhooed debut was not an overwhelming critical success, but far from disappointing to the Navy.

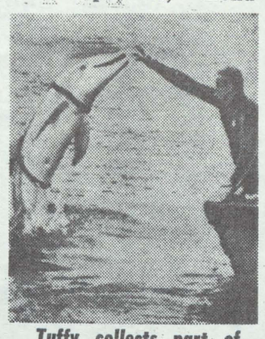
In one series of dives from the surface, Tuffy responded to a buzzer 205 feet deep sounded by two "lost" aquanauts, came withir "inches" of his target, paused and swam away, Sealab 2 officials said.

Capt. George Bond, principal investigator in the Navy's man-in-the-sea project, said Tuffy might have been scared by the aquanauts' "umbilical" cords and flood lights as well as sounds from the sealab.

Aquanauts John Reaves and Ken Conda left their underwater base, the steel cylinder Sealab 2, and pretended to get lost in the murky depths of underwater Scripps Canon. When they positioned themselves, they sounded their special buzzers.

Tuffy, wearing a harness with a cable attached, successfully sought out the aquanauts who were about 150 feet away from Sealab, coming within "inches of Reaves and about 18 feet from Conda," Bond said.

"He (Tuffy) hovered there for a few seconds and then he made a vertical departure," Bond said. "His actions were bizarre as if he were afraid of the lights and sounds."



Tuffy collects part of his salary.
—UPI Telephoto.

Tuffy returned to the aquanauts minutes later after apparently surfacing but he failed to get close enough for the aquanauts to pick up pliers and screwdrivers — as hoped for — attached to his harness.

Another piece of cargo carried by Tuffy was a letter written by Conda's wife. But it will have to be delivered via Tuffy in dives planned for Friday.

Aquanauts Try Deep Plunge Below Sealab

Carpenter Leads Second Attempt To Reach 256 Feet

By LEO BOWLER
EVENING TRIBUNE Staff Writer

Three aquanauts, led by Cdr. Scott Carpenter, were making the second attempt today to dive 50 feet below Sealab II in Scripps Canyon.

The three hoped to reach 256 feet below the surface by swimming northwest. A previous attempt failed when the aquanauts ran low on breathing gas and had to return to Sealab.

The two divers planning to go with Carpenter were Bob Barth and John Reaves. Barth is the only man in Sealab who was in the Sealab I project a year ago in the Atlantic.

Way Stations Sought

The three hoped to locate a way station lost when it was lowered to the bottom. The way stations are to be used to provide rest points where divers can find new breathing gas.

They are small steel houses a little larger than a telephone booth with attached ballast tanks filled with sand and gravel.

A second way station has also been lowered, according to Sealab officials, and one of the objectives of today's dive was to locate it and put it in service. The project has three such stations.

Tests Scheduled

The aquanauts were also performing tests today to give Sealab officials a better idea of how well a man can hear and see under water.

Three loudspeakers on the bottom will emit sounds of different intensities and pitches. The aquanauts will use special plastic plates and ordinary pensils to write their impressions when they hear the sounds while swimming.

They will also observe visual objects which have been set up to tell how far they can see and what colors and shapes they can distinguish best.

Yesterday Sealab divers stayed outside until 8:30 p.m. and logged seven hours and 40 minutes in the water. Officials described the work load as light.

Divers Sets Record

Aquanaut Walter Jenkins spent two hours and 53 minutes on one dive, a record for the project. Jenkins was wearing a special electrically-heated wet suit for his dive.

The suit has tiny wires inside which can be connected to a battery pack carried by the diver, or to the power supply in Sealab through a long cable.

Cold water has presented one of the most serious barriers to Sealab work. Officials hope the suits will solve the problem.

Porpoise Tuffy Chickens Out On Sealab Test

L.A. HERALD-EXAMINER
17 Sept 196!
5

By TED THACKREY JR.
Herald-Examiner Staff Writer

LA JOLLA, Sept. 17—The Navy's going to give Tuffy another chance to carry out his deep-diving assignment at Sealab II today.

If he makes it, fine.

If not—well—they'll probably bust him to Porpoise Second Class and ship him back to Pt. Mugu for reassignment; who knows, maybe even to the Seabees!

CHICKENED OUT

All he was supposed to do yesterday was swim down to Sealab and deliver a pair of pliers . . . but he chickened out, thus raising some question about his nickname.

Rigged up in his harness, with a watertight package containing the tool clipped to his back, Tuffy seemed willing enough when trainer Wally Ross and Navy veterinary Dr. Sam Ridgway took him from the pen, anchored about 100 yards off the staging vessel Berkone.

"That cage," commented Capt. George Bond, an old friend of the Purposeful Porpoise, "is kind of a farce, really.

"It's to keep other fish out—not to keep Tuffy in.

ANY TIME

"He can get out of the thing any time he wants to, just by jumping over the side. And I think he does it, too, at night when nobody's there to see him. Probably gets hungry for a midnight snack and goes to get one . . ."

Capt. Bond, nicknamed "Papa Topside" by the Sealab crew, is a diver himself. He worked with Tuffy at 170 feet below the surface Wednesday as part of the process of getting the porpoise ready for his first working dive.

Harnessed and loaded for his trip all the way to Sealab — which is 205 feet down, on the sea floor about a mile off the Scripps Institution of Oceanography dock—Tuffy splashed happily on the surface, awaiting the call to duty.

Below, in Sealab II, two divers were also preparing for the experiment.

LONG STAYS

The Sealab aquanauts have already established a valid technique for prolonged stays underwater, to reduce diver decompression time for exploration of the continental shelf.

Cdr. Scott Carpenter, second U.S. astronaut to circle the earth, is daily setting records for longevity of performance on the sea bottom.

He has been joined there by the second team of aquanauts, a different crew from the group who spent the first days in the submerged chamber with him. Of this second team, divers Ken Conda and John Reese were assigned to make first contact with the messenger-porpoise.

They dropped out of the pressurized Sealab into the dark depths, carrying a message-can which they were to exchange for the tool strapped to Tuffy's back when he arrived.

JUST BUZZ

To call him down, they had a "buzzer" which sends a long-range audible noise through the water.

"It worked well enough in all our practices," said Dr. Ridgway.

"Like most sea-mammals, and some fish, a porpoise can be made to understand that performance of a task usually — though not always — results in the reward of food.

"We can't give him food every single time, though. One of the experiments we hope to make involves a technique of rescuing a diver in trouble. That diver, of course, wouldn't have a fish to give . . ."

TWO KINDS

The proposed experiments with Tuffy were of two kinds.

First, the tool or message-delivery jobs. He was supposed to do this three times to demonstrate proficiency and the ability to adapt to changed conditions as the divers altered their positions on the bottom.

Second was the diver-rescue plan.

One diver — Conda — was to move off into the distance while his partner attached a line to Tuffy's harness. Then Conda was to sound the buzzer.

When Tuffy responded, the line attached to his back would be paid out on a reel—thus locating the diver, for rescue.

NO ATTEMPT

Alas, the second experiment was never even attempted.

So far, Tuffy had been trained in relatively normal surroundings. Normal for a porpoise, anyway. Just routine seabottom, and things like that.

On signal, he descended the 205 feet to Sealab and the waiting divers, all right. But there was something wrong there.

"He got down," diver Conda informed Capt. Bond by telephone, later. "In fact, he came straight down when the buzzer sounded. But then he just stood there, looking at us — and at the Sealab.

"You can't blame him.

"Tuffy never saw anything like THAT on the seabottom before.

A MONSTER

"I mean, there were lights on, shining out the windows, and a lot of mooring gear and other stuff strewn about. I suppose the Sealab looked like some kind of monster. And maybe a hungry one, at that . . ."

Tuffy circled the Sealab cautiously — just once.

Then he scooted for the surface, and turned a grinning face to trainer Ross.

Ross sighed and shook his head.

"Give him a little time to think it over," he said, herding the porpoise back to his pen. "After all, he's only 10 years old, and porpoises are pretty conservative types.

"A sea lion or a shark, now, will enter a cave or a tangle of seaweed without a qualm. But a porpoise never does anything like that. If he sees something he can't identify—he takes off until he figures things out.

"We'll try him again tomorrow."

So Tuffy went back to his pen, Conda and Reese went back to Sealab.

And the crew of the Berkone (which is a couple of barges welded together and anchored in place above Sealab) went to secure their mooring lines against the weather, which was beginning to show signs of rain.

Tuffy didn't mind a bit . . .

EVENING [illegible]
Newark, N. J.
SEP 20 1965

Experts Hail Sealab Gains

LA JOLLA, Calif. (AP)—The Navy's 45-day Sealab 2 underwater living experiment reached the half-way point yesterday and officials praised its progress lavishly.

"We are easily accomplishing or exceeding what we've planned to do," said Capt. George Bond, chief investigator of the experiment. "I hope the remaining half of the experiment goes as well."

Capt. Lewis B. Melson, project director, said "Sealab will be the stepping stone to full comprehension of life in aqua-space."

The second 10-man aquanaut team, except for Cmdr. M. Scott Carpenter, completed its seventh of 15 days in 205-feet-deep Sealab yesterday.

Carpenter, the astro-aquanaut, is in his 23rd day on the ocean bottom. He is scheduled to come up after 30 days.

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From
CHRISTIAN SCIENCE MONITOR
Boston, Mass.

SEP 17 1965



Associated Press Wirephoto

Porpoise with a purpose

Tuffy the watchdog, errand-boy porpoise receives fish during training for the Sealab 2 project. One of his handlers on bottom of sea is Aquanaut John Reaves, Robertsdale, Ala.

Sealab opens door to new frontier

By Curtis Sitomer
Staff correspondent of The Christian Science Monitor

San Diego, Calif.

"There's no question about it anymore—man can live and work effectively under the sea."

This conclusion was drawn by Capt. George F. Bond, project chief of the Navy's Sealab 2 operation.

Captain Bond enthusiastically greeted Sealab's first group of nine aquanauts as they came out of 30 hours of decompression at 12:06 a.m. Tuesday.

Commenting further on the results of the test, Captain Bond said the experiment points toward the development of a mobile laboratory that could go anywhere in the world and permit the crew to do any underwater job at a depth of 800 feet. The laboratory would be a modification of a nuclear submarine.

The team of Sealab 2 had spent 15 days at the bottom of La Jolla Canyon—215 feet under the Pacific—carrying on scientific and physiological experiments in and around their Sealab habitat.

Communication via TV

Sealab 2 is a submarine-type craft—fully equipped with living and working quarters. Aquanauts communicate with Navy personnel on a launching ship via closed-circuit television.

On Sunday, a second group of aquanauts descended to the depths of the sea to take the place of the first nine men. Team 2 will work specifically with marine biological and geophysical data, Captain Bond reports.

A third team—who will devote themselves to performing tasks in connection with the Navy's salvage program—will enter the Sealab in about two weeks. Astronaut M. Scott Carpenter is the man in charge of this Second group. Commander Carpenter, is scheduled to remain in the Sealab for a total of 30 days. This would be the longest period any human being has ever spent in the sea.

Team 1 seemed both happy and relieved as they faced questions about their underwater stay. They were interviewed aboard the launching ship, S. S. Berkone, some eight hours after decompression.

Dr. Robert E. Sonnenburg—a navy physician and second in command in the Sealab after Commander Carpenter—discussed the daily routine, the food, and his "favorite underwater pastime—fish watching."

The men ate specially packaged frozen foods and canned goods for the most part. They drank a quantity of fruit juices.

Seven a.m. reveille allowed aquanauts a full day's work after eight hours of sleep.

Picture problems

A surprise birthday party was held for Dr. Sonnenburg during the experiment. His wife sent down a cake, and Capt. Walter F. Mazzone and Captain Bond "went under" for the occasion.

Aquanaut J. D. Skidmore, a photographer, talked about his problems in taking pictures. "Visibility outside the lab averaged about 10 feet," he said. "At the bottom, it was even worse."

Chicago Sun – 9/17/65

Tuffy The Impish Dolphin Goofs In A Sealab Test

LA JOLLA, Calif. (UPI)—Tuffy, an impish dolphin, performed "bashfully" Thursday in a hide-and-go-seek game with two aquanauts in the depths of the Pacific Ocean as part of an experiment in underwater survival techniques.

His much-ballyhooed debut was not an overwhelming critical success, but far from disappointing to the Navy.

In one series of dives from the surface, Tuffy responded to a buzzer 205 feet deep sounded by two "lost" aquanauts, came within "inches" of his target, paused and swam away, Sealab 2 officials said.

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"He (Tuffy) hovered there for a few seconds and then he made a vertical departure," Bond said. "His actions were bizarre as if he were leery of the lights and sounds."

Tuffy returned to the aquanauts minutes later after apparently surfacing, but he failed to get close enough for the aquanauts to pick up pliers and screwdrivers attached to his harness.

Another piece of cargo carried by Tuffy was a letter written by Conda's wife. But it will have to be delivered via Tuffy in dives planned for Friday.

Scientists hoped to learn whether the dolphin would respond to an electric buzzer and, with his built-in natural radar or sonar, seek out the aquanauts, as a St. Bernard dog is trained to rescue the lost and injured.

In the simulated rescue, the aquanauts would use the cable to make their way to safety.

Eight sorties had been planned Thursday, but they were reset for Friday.

Tuffy, Flipper, and other mammals

CHRISTIAN SCIENCE MONITOR 20/65

Once, looking at a rural scene in his country, an Irishman told us that, while he could feel sympathetic toward hens, he could never really feel friendly toward them.

This has been our general attitude toward fish.

Then Flipper the movie-TV dolphin came along. A mammal, to be precise, but a big, wonderful fish to us. As Flipper answered the signals for help, swam to the rescue, saved the children — grinning porpoisely all the time — we knew we had found no mere object of sympathy but an all-weather friend.

Now, in the 20th-century manner of fact imitating fantasy, Flipper has an offscreen counterpart learning to be a rescue fish, a friend to higher mammals. Tuffy is the name of this dolphin—yes, Virginia, a real, live dolphin—which (we are tempted to say "who") is working as underwater messenger, tool carrier, and potential guide for aquanauts who stray out of sight of Sealab 2 in the murky depths off California.

Of course, it is no news that dolphins are "smart." They even seem to be saying something. We hope the code is soon cracked and full communications established. We'd like to tell Tuffy and Flipper and their friends how much we've enjoyed knowing them. As for what they might say, we don't underestimate what a fresh fish perspective could do for the dry facts of world affairs.

EVENING TRIBUNE
SAN DIEGO, CALIFORNIA
Mon., Sept. 20, 1965

Next Sealab Team Chosen

By LEO BOWLER
EVENING TRIBUNE Science Writer

Four San Diego area men were named today to the 10-man team that will man Sealab II for the final 15 days of the project.

The team will take up residence Sunday in Sealab, 205 feet beneath the surface of the ocean. Cdr. Scott Carpenter, leader of the first two teams in Sealab, will surface the same day and begin decompression.

The four San Diego area men are:

Lt. Robert A. Sonnenburg, 28, a Navy doctor, of 4367 Adams Ave.; William J. Bunton, 32, a civilian photographer from Navy Electronics Laboratory, of 3345 Eaton Ave.; Richard Grigg, 28, a Scripps Institution of Oceanography student, of 9388 Redwood Drive, and John Morgan Wells, 25, a Scripps research assistant, of Del Mar.

The other six men in the team are Robert Sheats, 49, a Navy master chief torpedoman, of Bremmerton, Wash.; Charles M. Coggeshall, 35, a chief gunner's mate, of Ft. Wayne, Ind; John J. Lyons, 35, an engineman first class, of Middletown, N.Y.; William D. Meeks, 34, a bosun's mate first class of Ponca City, Okla.; Lavern R. Meisky, 38, a chief shipfitter, of Lancaster, Pa.; and Paul A. Wells, 38, a chief mineman, of Ft. Lauderdale, Fla.

Sheats, the oldest aquanaut, will be team leader, taking over from Carpenter.

Sonnenburg was medical officer of the first team. His return to Sealab with the third team makes him the only man to serve two tours of duty on the bottom during the project.

Capt. Lewis B. Melson, Sealab director, named the team today.

Melson said that Sheats and Bunton will enter Sealab 24 hours before the second team comes to the surface. This will allow Carpenter time to brief Sheats.

Decrompression Longer

Carpenter and the other team members are expected to complete decompression about noon Monday. They will spend slightly more time in the decompression chamber than the first team because Carpenter has been on the bottom for 30 days.

The first team of aquanauts had the prime responsibility of setting up housekeeping in the undersea residence. The second team has been called the science team because of its concentration on scientific projects.

The third team will investigate underwater salvage techniques and will attempt to raise an airplane from the bottom.

It's 30 Days Under

Sealab's second team entered its seventh day Sunday in the 205-foot-deep under water laboratory at La Jolla, Calif., with "no complaints and all well." Navy Cmdr. M. Scott Carpenter leads the first two teams, and plans to stay below for 30 straight days. The nation's most ambitious test of man in the ocean involves three 10-man teams living in Sealab 2 for 15 days each. The aquanauts are continuing marine biological studies.

'HONORARY AQUANAUT'

Tuffy Finishes Job, Flies Home

By BRYANT EVANS
The San Diego Union's Science Writer

Tuffy, the Pt. Mugu porpoise, returned home by helicopter yesterday afternoon with the title of "honorary aquanaut of SeaLab II."

Early in the day he had completed seven more dives from the ocean surface to the vicinity of SeaLab II, a vertical distance of 205 feet.

Although the porpoise earlier had been leery of the lights and sounds of the undersea habitat of 10 aquanauts, yesterday he became so used to them that he peered through the portholes at the men, who waved affectionately to him.

On his trips he carried mail, tools and other small objects. He was sent back to Point Mugu Naval Missile Center because he had successfully completed all that had been planned for him to do.

At last, the aquanauts have erected a way station between the SeaLab and the underwater weather station which the first team had installed.

The way station is a little metal house where one aquanaut can stop to get warm and get a new supply of breathing gas. Originally, there were three brought to the site to be planted near the SeaLab. The first one toppled into Scripps Submarine Canyon where it, no doubt, will stay.

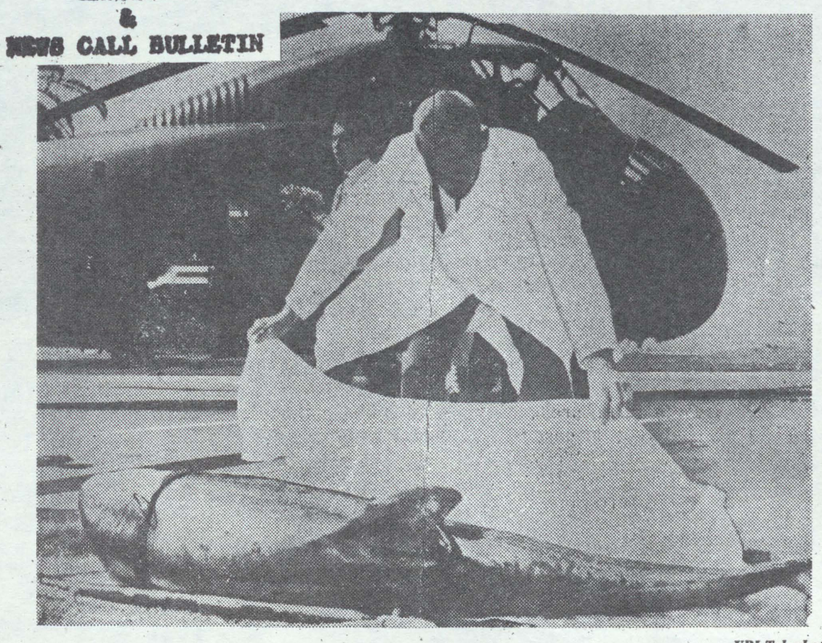
Yesterday afternoon two television cameras were being placed outside the portholes of SeaLab II in an effort to overcome the trouble that has beset the closed circuit video system that connects the SeaLab with the shore.

Technicians have blamed the difficulty on helium leaking into the cameras. In one case the helium was said to have reversed the polarity of the device and caused the pictures to come out as negatives.

Now the idea is for the camera to be kept in the water and be pointed into the lab.

Kiwanians at their western district convention Monday will have a chance to hear a conversation between Gov. Brown and Cmdr. M. Scott Carpenter, team captain of the men in SeaLab II. Between 10:15 and 10:30 a.m. the conversation will be broadcast at the meeting.

San Francisco, Calif
EXAMINER
&
NEWS CALL BULLETIN

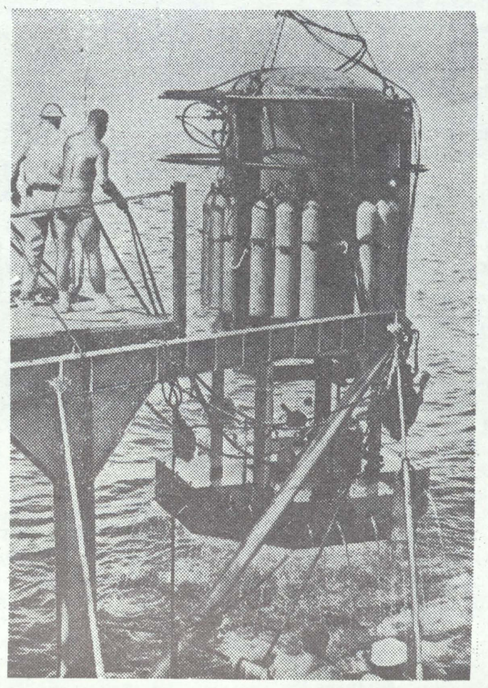


UPI Telephoto

Purposeful Men and a Porpoise

NINE weary aquanauts emerged last Sunday from 15 days below the ocean surface off La Jolla in the Navy's Sealab 2—an aluminum cigar-shaped research cylinder its crew had christened the "Tiltin' Hilton."

As they entered a decompression chamber for 36 hours a fresh crew replaced them in the Sealab—and Tuffy, a shark-scarred porpoise especially trained for the project, was helicoptered from Point Mugu to La Jolla, where he went to work delivering mail and messages, acting as a "guide-dog" and performing simulated rescues for the undersea scientists.



BALTIMORE, SUNDAY MORNING, SEPTEMBER 19, 1965

PET PORPOISE FINISHES JOB

Bids Good-By To Acquanauts On Sealab Mission

La Jolla, Cal., Sept. 18 (AP)—Tuffy the porpoise made seven successful dives today, then waved farewell to the aquanauts in Sealab 2.

Officials said Tuffy had completed his work with the underwater living project and would be taken back to his Point Mugu Naval Station training pool by helicopter.

The aquanauts crowded about portholes of their 12 by 58 foot steel capsule home to wave goodby to their watery friend.

Fear Of Cables

After a wary start three days ago, Tuffy busied himself delivering mail, test objects and lifelines to the aquanauts, working 205 feet below the surface.

In today's test, a spokesman said Tuffy had overcome his fear of the cables and wires that surround the capsule, making seven round-trip dives of about 1½ minutes each in 30 minutes.

In recognition of his service, Tuffy was made an honorary member of Team No. 2. The porpoise did not participate in the project's first two-week phase.

The Navy said results of physical tests made of the first team were favorable. A spokesman said members of Team No. 1, which surfaced over a week ago, had no appreciable loss of hearing and developed increased tolerance to cold water.

Only one aquanaut—Scott Carpenter—has been designated to remain through both phases.

Monday, Carpenter is scheduled to talk by phone with Gov. Edmund G. Brown. A special hookup will allow delegates to a district convention of the Kiwanis to listen in on the conversation.

Buddy System Praised

The Navy said the use of the buddy system helped one of the Sealab 2 aquanauts escape a dangerous ascent towards the surface today.

The quick action by a fellow swimmer, who brought the underweighted aquanaut back to the bottom, proved the value of the buddy system, the Navy said.

Neither aquanaut was identified and neither was injured, the Navy said.

It said the men swam out of the underwater lab wearing a new electrically heated swimsuit that is more buoyant than the suits the divers have been using.

Because he lacked sufficient weight, the suit's buoyancy began to lift him to the surface. His buddy grabbed him and held him down.

Sealab Second Team Enters Seventh Day

La Jolla, Cal., Sept. 19 (AP)—Sealab 2's second team entered its seventh day in the 205-foot-deep underwater laboratory today "with no complaints and all well," a spokesman said.

The nation's most ambitious test of man in the ocean involves three 10-man teams living in Sealab 2 for 15 days each.

Navy Cmdr. M. Scott Carpenter leads the first two teams. The astronaut plans to stay below for 30 straight days.

After church services today, the aquanauts were scheduled to conduct sorties to way stations, the underwater weather station and personnel transport capsule. They were also to continue marine biological studies. BALT SUN 9/20

Des Moines (Ia.) Register
SUNDAY, SEPTEMBER 19, 1965

Porpoise Ends Duty at Sealab

LA JOLLA, CALIF. (AP) — Tuffy the porpoise made seven successful dives Saturday, then waved farewell to the aquanauts in Sealab 2.

Officials said Tuffy had completed his work with the underwater living project and would be taken back to his Point Mugu Naval Station training pool by helicopter.

The aquanauts crowded about portholes of their 12-by-58-foot steel capsule home to wave good-by to Tuffy, who has been delivering mail, test objects and lifelines to the aquanauts, 205 feet below the surface.

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Los Angeles, Calif.
Times
(Cir. D. 812,147 Sun. 1,149,295)

SEP 17 1965

SHUNS CABLES

Porpoise Fails Sealab Tryout as Postman

Exclusive to The Times from a Staff Writer

LA JOLLA — Tuffy, the educated porpoise, carried the mail for the Navy's submerged Sealab 2 Thursday, but failed as an undersea postman when he refused to deliver it.

Claustrophobia apparently led the 7-foot, 270-pound sea mammal flown here Monday as an aide to the second team of 15 aquanauts experimenting with life and work on the ocean floor, to fluff his first assignment.

A wrench in a plastic bag was fixed to Tuffy's harness, then aquanaut Ken Conda, who trained the porpoise at Pt. Mugu, buzzed his buzzer to summon Tuffy to the Sealab, 205 feet down.

"Tuffy read him loud and clear," a Navy spokesman reported, "but he dived only part of the way, evidently confused by the sounds of other boats in the area."

Skirts Capsule

In a second attempt the porpoise dived to the vicinity of Sealab, but when he saw the complex of cables and wires associated with its equipment, he gave the undersea capsule a wide berth.

Aquanaut John Reaves, who was about 50 feet from the lab, clicked his photographic strobe light, and Tuffy swam to him, but wouldn't approach close enough for his load to be unhitched.

"Porpoises are afraid of being trapped under water because they'll drown if they don't surface within five minutes," the Navy spokesman apologized.

"Apparently Tuffy thought the wires and cables were some kind of a net. Just a case of claustrophobia, I guess."



WELL, IT WAS A GOOD TRY—Tuffy leaps out of the water for his reward of a fresh fish after diving down to Sealab 2 as he was trained to do. But the porpoise fluffed the assignment when he spotted strange cables and wires and now faces more training.
UPI Telephoto

From
TRIBUNE
Chicago, Ill.

Aquanauts Buzz, Tuffy Finds 'em (Well, Almost)

La Jolla, Cal., Sept. 16 (UPI)—Tuffy, an impish dolphin, performed "bashfully" today in a hide-and-go-seek game with two aquanauts in the depths of the Pacific ocean as part of an experiment in underwater survival techniques.

His much ballyhooed debut was not an overwhelming success, but far from disappointing to the navy.

In one series of dives from the surface, Tuffy responded to a buzzer 205 feet deep sounded by two "lost" aquanauts, came within "inches" of his target, then paused and swam away, Sealab 2 officials said.

Sound Buzzers

Aquanauts John Reaves and Ken Conda left their underwater base, the steel cylinder Sealab 2, and pretended to get lost in the murky depths of underwater Scripps canyon. When they positioned themselves, they sounded their special buzzers.

Tuffy, wearing a harness with a cable attached, successfully sought out the aquanauts, who were about 150 feet away from Sealab. He came within "inches of Reaves and about 18 feet from Conda," said Capt. George Bond, principal investigator for the man-in-the-sea project.

Tuffy Carries Letter

Tuffy returned to the aquanauts minutes later after apparently surfacing, but he failed to get close enough for the aquanauts to pick up pliers and screwdrivers attached to his harness.

Another piece of cargo carried by Tuffy was a letter written by Conda's wife. But Tuffy will have to deliver it tomorrow.

While the lost-and-found experiments were under way, Aquanaut-Astronaut M. Scott Carpenter and his partner, Howard Buckner, were slated to go down to 250 feet, the deepest penetration planned in the project thus far.

Scientists hoped to learn whether the dolphin would respond to an electric buzzer—and with his built-in natural radar or sonar—seek out the aquanauts. Tuffy and other dolphins may be used in the future as underwater St. Bernard dogs to rescue lost divers, scientists said.

Trained at Point Mugu

Tuffy was trained at Point Mugu, by Dr. Samuel H. Ridgeway, research veterinarian.

The man-in-the-sea project—designed to determine how a human being reacts to a prolonged stay under water—was started Aug. 28 when 10 aquanauts, led by Carpenter, descended to Sealab 2.

BALKY BELOW SURFACE

Tuffy Goofs Off In Mail Mission

By CLIFF SMITH

Tuffy, the Navy's trained porpoise, dove 200 feet to SeaLab II yesterday, but refused to fully obey sound signals transmitted by aquanauts.

The animal's balky behavior stalled plans for the world's first underwater mail delivery by dolphin express.

The SeaLab operation also was hampered by rough weather, a faulty television camera that remained out of service and a delay in the experimental breathing of a new gas mixture.

But all the difficulties were minor and were more than balanced by good news: physical and psychological tests were proceeding on schedule, astronaut-aquanaut M. Scott Carpenter felt good enough on his 19th consecutive day underwater for an excursion dive with teammate Howard Buckner to 250 feet, a lab record, and all the aquanauts were enthused over the good performance of electrically-heated wet suits.

Tuffy made his debut in a grandstanding fashion, leaping and splashing as he was escorted by a training boat from his floating cage to a position near the Berkone, the SeaLab's mother ship.

The 270-pound mammal flashed his smile and winked repeatedly for photographers and proudly displayed his working harness with some tail stands.

But when it got down to the serious business of the day, Tuffy disappointed his keepers who had been optimistic enough to issue a special invitation to newsmen.

Wally Ross, Tuffy's trainer, later admitted "a sneaking suspicion he wouldn't go right up to the lab."

"He didn't care about coming up to the Berkone either," Ross said. "It took quite a few pieces of fish to get him here. But I think he will do much better tomorrow. His reliability when he is loose is exceptional in my opinion."

Ross said Tuffy probably was frightened by the noises emanating from the Berkone and the SeaLab's lights and many lines stretched in all directions.

Aquanauts Kenneth J. Conda and Forrest Reaves swam outside the lab twice to call Tuffy from the surface with battery operated buzzers barely audible to humans but loud and clear to dolphins.

Reaves first sounded his buzzer at 9:41 a.m. After a few false starts, Tuffy dived and stayed below the surface for three minutes but never showed himself in the vicinity of the aquanauts.

Forty-five minutes later the aquanauts signaled again after a rest inside the lab.

This time Tuffy plummeted to the bottom on cue.

NO CONTACT

Conda later reported that Tuffy came within 20 feet of him twice and swam a wide circle to inspect the lab. Reaves said Tuffy came "within inches" of him and then bolted away.

But the plans called for Tuffy to gently nudge Reaves' buzzer and wait for further instructions. Then Conda, stationed 50 feet away, would have summoned the dolphin with a higher pitched buzzer, after Reaves had attached a rope to a ring on the animal's harness. This exercise was to simulate the rescue of a lost diver.

Tuffy also was scheduled to deliver and pickup the aquanauts' mail. Eighteen envelopes bearing pictures of a dolphin delivery were waiting on the Berkone for Tuffy after he passed the first test. These had to be sent later in the conventional manner, by dumb waiter.

ONE LETTER HELD

But Ross kept a letter to Conda from his wife in Ledyard, Conn., bearing the instruction "To be delivered by Tuffy." Ross promised delivery as ordered, probably today. The letter will be placed inside a small plastic tube.

Tuffy carried two screwdrivers, a pair of pliers and a small wrench fastened to his harness in the underwater mission yesterday. Reaves was to have received the tools to prove the work capability of Tuffy.

Dr. Sam H. Ridgway, a veterinarian and director of the Navy's marine sciences laboratory at Pt. Mugu, timed the duration of Tuffy's dive at 4½ minutes, a measured record for the dolphin. Ridgway said it also was Tuffy's deepest dive.

SAN DIEGO UN
SEP 17 1965

Houston POST 9/18/65

Sealab Mail Sent Via Porpoise Parcel Post

LA JOLLA, Calif — (AP) — Sealab aquanauts received their mail by porpoise parcel post Friday.

Tuffy, the handyman porpoise, delivered the mail to Sealab 2 in a performance that officials said proved his value to the Navy's underwater living project.

Aquanauts John F. Reaves and Kenneth Conda, reporting from the Sealab at 205 feet below the ocean's surface, testified that Tuffy's exhibition was flawless.

TUFFY REPORTED for duty promptly Friday, and like many another working man, carried his lunch with him in a sack.

The lunch — fish — was sent down to the aquanauts to be used in rewarding Tuffy for jobs well done.

Directed to the aquanauts by underwater buzzers, Tuffy made two dives to deliver the mail in sealed containers attached to his harness. He also took down tools in a special bag.

OFFICIALS SAID they were surprised and pleased at the speed with which Tuffy completed a simulated rescue of a lost diver.

He took just a little over one minute to race to the bottom, carry a line from one aquanaut to another 50 feet away and streak back to the surface.

NEWS
Dallas, Texas

Project Halfway

Aquanauts in Sealab 2 Receive Underwater Rest

LA JOLLA, Calif. (UPI)—Sealab 2's aquanauts received a "much needed rest" Sunday morning as the ambitious man-in-the sea project neared its half-way point.

The afternoon was busy, however. Working 205 feet below the Pacific, the men planned to check their underwater weather station, study marine liefe and examine the personnel transfer capsule.

The 45-day project, which also demonstrated a trained dolphin's value as messenger and rescuer, comes to its half-way point Monday.

Navy Capt. George Bond set a meeting for Monday to decide when a third team of 10 aquanauts would relieve the second team now residing in the 12-foot-by-57 foot cylinder resting on a ledge in Scripps Canyon.

Tuffy the dolphin zipped through his final maneuvers Saturday, then nodded his nose goodby to aquanauts peering through the Sealab portholes, including astronaut-aquanaut M. Scott Carpenter.

For the second straight day Saturday, Tuffy "rescued" two lost aquanauts outside of the steel cylinder, and delivered mail and messages. The mammal was then transported back to his home at Pt. Mugu, Calif.

The aquanauts logged a cumulative 469 minutes outside the underwater laboratory Saturday—an "average" workday, according to a project spokesman.

Bond, the project's chief investigator, said the aquanauts "are feeling fine and have no complaints."

Navy Cmdr. Carpenter, who descended into Sealab with the first team on Aug. 28, was scheduled to end his 30-day underwater stay on or about Sept. 27.

Modern Pioneers

A hearty "well done, all hands" is due the first team of aquanauts returning to San Diego sunshine after living 15 days more than 200 feet below the sea off the coast of La Jolla.

The aquanauts are truly 20th Century pioneers, as much as the men conquering space or the 19th Century American pioneers who opened a new nation. The dangers they face are no smaller than the dangers faced by other pioneers, only different.

As in the case of other pioneers, the rewards for the future also hold a great potential from the standpoints of both economics and security.

The aquanauts are advancing the frontier of knowledge and the nation will benefit. San Diego, proud to be host to the aquanauts, will reap immediate benefits as eyes of the nation focus on their accomplishments.

THE SAN DIEGO UNION
Mon., Sept. 20, 1965
SAN DIEGO, CALIFORNIA

SEP 15 1965

Deep Sea Tunes Up High C

Aquanauts Amused by High-Pitched Voice Effect

LA JOLLA, Calif. (AP) — Living at the bottom of the ocean gives a man a high-pitched voice, a chill, ear trouble and something resembling diaper rash, say nine aquanauts who tried it.

But some day, they added, man may be able to roam under the seven seas in a mobile laboratory.

The aquanauts aired their conclusions yesterday after emerging from Sealab 2, after 15 days 205 feet below the Pacific Ocean surface.

They surfaced Sunday, spent 33 hours in a decompression chamber, then met newsmen aboard the staging vessel Berkone.

Squeaky

Aquanaut Jay D. Skidmore said the part-helium atmosphere they breathed gave them squeaky voices that sounded like a speeded-up phonograph record.

"It created a lot of hilarity at first," said Skidmore. "After a few days we got used to it and toward the last it seemed extremely normal."

Capt. George Bond, chief of the project, said the experiment pointed towards eventual development of completely mobile laboratory housing in which 35 men could go anywhere in the world, do any underwater job and return while decompressing on the way.

He said such mobility could best be obtained by modification of a nuclear submarine.

Bond said, however, that after three weeks underwater, the men's efficiency would begin to decrease.

Aquanaut Bill Coffman said he and Skidmore spent the longest time in the water at any one time — 2 hours and 44 minutes. Coffman said it was cold, but that they could have stayed out longer.

Lt. Thomas A. Clarke, team biologist, said he, however, could take only about 30 to 40 minutes in the water, which averaged 51 to 53 degrees Fahrenheit around Sealab 2.

Sealab physician Lt. Robert Sonnenburg praised underwater living, but added he was unable to cure an ear infection suffered by the aquanauts. He treated them to alleviate discomfort.

The aquanauts developed a rash, similar to a baby's diaper rash, probably due to wet clothing and irritation.

The second team of aquanauts in Sealab 2 will have to get by on shorter rations of oxygen in an experiment starting today.

New Mixture

Officials said the oxygen content of the atmosphere in the 12x58-foot steel capsule will be reduced from 4.25 to 3.5 per cent for the next three days.

In reducing the oxygen content, scientists are seeking the most efficient breathing mixture for use in underwater projects.

The first team breathed a mixture of 4.25 per cent oxygen, 20 per cent nitrogen and 75.75 per cent helium.

Sealab Crew Has Civilian Competition

Commercial divers on a Virginia dam project are living under conditions similar to Sealab II aquanauts, but they are making more money — up to $2,000 a week each.

Sealab II aquanauts here have been averaging 40 minutes a day outside their undersea residence, according to project officials.

Work in Shifts

Divers for Marine Contracting, Inc. are working for four hours a day in 200 feet of water at the bottom of Smith Mountain Lake, according to George Wiswell, president of the firm.

Both Sealab II and the Smith Lake project are designed to cut the time wasted in decompression by keeping the divers under a pressure equal to that encountered at the depths where they work.

In the Sealab II project here, the divers remain under pressure at the bottom of the sea. In the Smith Lake project, the divers are brought to the surface at the end of their shifts, but they stay pressurized in a chamber similar to the deck decompression chamber used in Sealab.

After resting, they are returned to the bottom next day without decompression. The trips up and down are made in a transfer capsule like the one used here to bring the aquanauts back to the surface.

Water is Colder

The water in Smith Lake is 10 degrees colder than the water around Sealab II, but Wiswell says his men have not been bothered by the cold. They are wearing special wet suits. Warm water is injected into the suits to keep the men comfortable.

Their job is to bolt trash barriers to the outlets of the dam. Wiswell says he expects the job to take a little over a month, but the men do not stay pressurized for that length of time.

They come out of their chamber on weekends.

The men work in a 12 hour cycle. Each makes two excursions of 2 hours duration during the cycle. Four men are involved at one time, two in the water and two in the capsule. They rotate on their excursions.

"That way we are able to get [illegible] hours work each day from a crew of four divers," Wiswell told the Evening Tribune in a telephone interview.

Sealab officials here say they have inspected Wiswell's equipment. They call it a "good outfit, a real advance in the business."

SEP 1965

TRIBUNE
Chicago, Ill.

NO COMPLAINT, SAYS SEALAB'S SECOND TEAM

La Jolla, Cal., Sept. 19 (AP) — Sealab's second team entered its seventh day in the 205-foot-deep underwater laboratory today "with no complaints and all well," a spokesman said.

The nation's most ambitious test of man-in-the-ocean involves three 10-man teams living in Sealab for 15 days each.

Navy Comdr. M. Scott Carpenter leads the first two teams. The astronaut plans to stay below for 30 straight days.

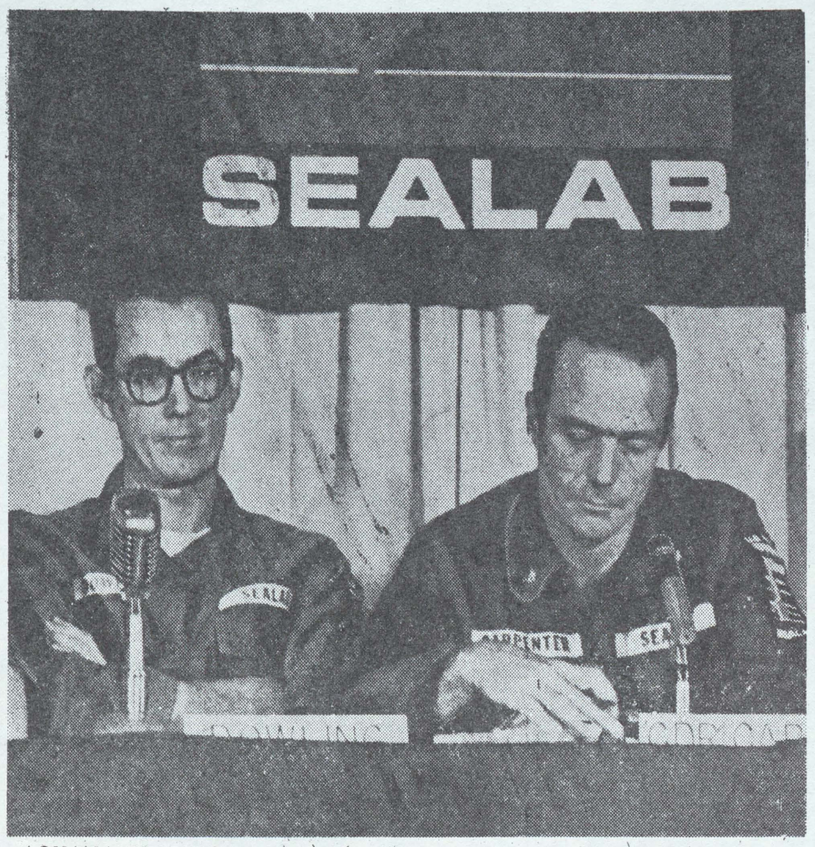
From
EVENING SUN
Baltimore, Md.

Sealab Is Praised At Halfway Point

La Jolla, Cal., Sept. 20 (AP)—The Navy's 45-day Sealab 2 underwater living experiment reached the half-way point yesterday and officials praised its progress lavishly.

"We are easily accomplishing or exceeding what we've planned to do," said Capt. George Bond, U.S.N., chief investigator of the experiment. "I hope the remaining half of the experiment goes as well."

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AQUANAUTS REPORT—Navy Comdr. M. Scott Carpenter, at right, leader of teams that lived aboard the Sealab 2, sits beside one of the other aquanauts, George Dowling, at a news conference at Scripps Institute of Oceanography.
Times photo by Ray Graham

Dolphins Fail Test

Can't Deliver to Sealab Men

LA JOLLA, Calif. (UPI)—An "educated" dolphin and two aquanauts resumed a game of hide-and-seek today 205 feet beneath the ocean. It's all in the name of science.

The experiment involving Tuffy, the trained dolphin, and aquanauts John Reeves and Ken Conda began yesterday with partial success. Tuffy, wearing a harness with a cable, was supposed to plumb the ocean depths and "rescue" two "lost" divers at the sound of a buzzer carried by the men.

In one series of dives from the surface, Tuffy responded to the buzzer. He came within "inches" of his aquanaut target, but paused and shot back to the surface without completing his mission.

Capt. George Bond, principal investigator for the Navy's Man-in-the-Sea project, said Tuffy might have been frightened by the aquanauts' paraphernalia and sounds from Sealab 2, their 200-ton, 57-foot-long underwrater laboratory-home.

Bond said Tuffy dove to within "inches of Reeves and about 18 feet from Conda," who were about 150 feet away from Sealab 2.

"He (Tuffy) hovered there for a few seconds and then he made a vertical departure," Bond said. "His actions were bizarre, as if he were leery of the lights and sounds."

Minutes later, Tuffy returned to the aquanauts, but failed to get close enough for the men to collect pliers and screwdrivers attached to the dolphin's harness.

Qualified Success

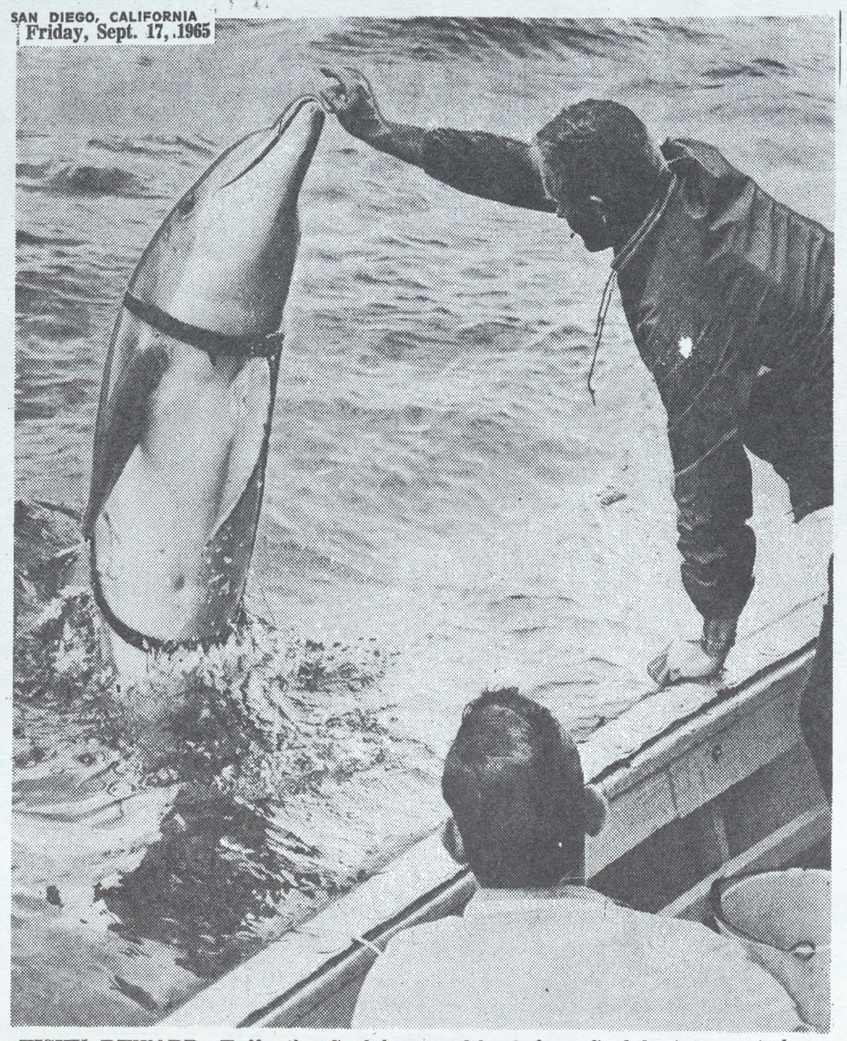
Yesterday's experiment was considered by project officials as a qualified success. But Dr. Samuel H. Ridgeway, research veterinarian at the Naval missile center at Point Mugu, Calif., said "it didn't work as well as we hoped"

Scientists hoped the experiment would prove that dolphins could be used to rescue divers and carry supplies to them, expanding their ability to work underwater. Dolphins can see farther undersea and have built-in sonar that lets them find their way about easier than man.

POST

SEP 17 1965

EVENING TRIBUNE
SAN DIEGO, CALIFORNIA
Friday, Sept. 17, 1965



FISHY REWARD—Tuffy the Sealab porpoise gets a fish reward from trainer Wally Ross after a swim down and back from Sealab. Aquanauts below got mail and tools today from the fast swimming messenger.

Tuffy Reaches the Heights In Carrying Mail to the Depths

By LEO BOWLER
EVENING TRIBUNE Science Writer

Tuffy the porpoise made seven dives to Sealab II today in what officials termed a beautiful performance.

All seven dives were made within a period of less than 20 minutes.

In that rapid-fire sequence Tuffy delivered the mail to the aquanauts, carried packages of tools down to them and brought his own lunch down so they could feed him.

Performance Flawless

Aquanauts John F. Reaves and Kenneth Conda sent word back to the surface that Tuffy's performance was flawless.

On several of the dives Tuffy went to one aquanaut on signal and then sped to the other in a simulated rescue mission.

Forrest G. Wood, head of the Marine Sciences Division at Point Mugu, said Tuffy's performance today was exactly what they had expected of him.

Aquanauts Move Away

During dives yesterday Tuffy shied away from Sealab because of the large amount of noise and the lights in the area around Sealab. Today the aquanauts who worked with him swam a little farther away from Sealab before beginning the series of tests.

Tuffy responded within moments after they turned their buzzers on. The buzzers are carried on the aquanauts' wrists and Tuffy has been trained to home on them.

The porpoise wears a harness to which items can be attached.

Lunch Taken Down

On his first dive today trainer Wally Ross attached a plastic bag full of fish to the harness. The aquanauts below detached the bag and fed the fish to Tuffy.

On two separate dives mail pouches were attached to the harness and delivered to the aquanauts.

Tuffy apparently became more accustomed to the strange sights and sound in the area during his stay overnight in the portable pen which is tied near the Sealab mother ship Berkone.

"Getting him to approach Sealab is like getting a person inside a boiler factory for the first time," Dr. Sam H. Ridgway, Tuffy's veterinarian, said.

"Porpoises have remarkably acute hearing. They can hear hundreds of times better underwater than a human does. All the underwater sounds put out by Sealab and the mothership Berkone must sound like a real din to Tuffy."

The aquanauts also made further tests yesterday afternoon of an electrically heated wet suit. The first team of aquanauts who wore regular suits all said that the cold bothered them. The subsequent aquanauts report that they like the new suits.

Capt. George Bond, principal investigator for Sealab, said that divers can stay outside Sealab much longer in the heated suits and that the limiting factor becomes the amount of breathing gas they can carry while swimming outside rather than the length of time they can endure the cold.

The water temperature around Sealab yesterday was 51 degrees.

Cdr. Scott Carpenter and Chief Robert Barth were forced to turn back after reaching 231 feet in a planned dive to 250 feet when their breathing supply neared the critical half-way mark.

The 250-foot dive would have been the deepest of the Sealab experiment. Carpenter and Barth were going to install new lights and rearrange others already installed around the Sealab.

The aquanauts plan a series of dives, eventually to 350 feet.

Aquanaut Howard Buckner became the second Sealab scorpion fish casualty yesterday afternoon. He was stung on the bottom of the right foot by the same type of spiny fish which stung Carpenter earlier.

Sea More Hostile Than Space, Carpenter Says

Worst Problem Is Going From Air to Water, Astronaut Reports After Month in Sealab

BY CHARLES HILLINGER
Times Staff Writer

LA JOLLA—"The sea is a tough adversary—much more hostile an environment than space," astro-aquanaut M. Scott Carpenter said Tuesday after living a month on the floor of the ocean.

Navy Comdr. Carpenter, 40, second American to orbit the earth, lived deeper—205 feet—in the sea aboard the Navy's Sealab II and longer than any person in history.

"One of the worst features of underwater work is facing the problem of passing from one medium (air) to another (water)," Carpenter said at a press conference at the Scripps Institute of Oceanography. Carpenter emerged from Sealab Sunday and has been in a decompression chamber since.

Leads Two Teams

The world's first astro-aquanaut led the initial two teams of 20 men living in the 57-foot capsule submerged 3,000 feet out from the Scripps pier.

He said hostile elements in space are not experienced in water, such as radiation, "but we don't know how to combat excessive pressures in water. And we do know how to combat the lack of pressure in space."

Carpenter said weightlessness in water is different from weightlessness in orbit.

"In the sea you have to fight the denser medium (800 times more dense 200 feet down than at the surface) to get around. Working in water is a very fatiguing thing. Energy is required to stay warm to move around in water.

"I have never worked harder in my life than in Sealab. Harder physical labor is required than in space.

"Nothing is easier than being weightless in space—it's the most completely relaxing thing you can experience.

Carpenter expressed amazement at the ability of the human body to adapt to stresses. He said, "Man has an incredible faculty to adapt to hostile environments."

"We did a lot of oceanographic and scientific work, learned a lot about marine biology, marine geology — paved the way for future explorations of the sea.

"We learned a great deal more than we have ever known about human reaction to prolonged exposure to high pressure.

"You can't appreciate what we've gained, what we've learned, what we've accomplished until you've been there to see the problems involved."

He said: "When we first went down, we would swim 25 or 30 minutes, then shiver so badly it was unbelievable. It hurt pretty bad lots of times.

"Water temperatures are cold — 50 degrees doesn't mean much to people who are not divers. You have to swim in it to realize just how cold."

Carpenter said it took two weeks for the aquanauts to become acclimated to the cold water.

He told of waking up at night, "feeling cold but perspiring, not knowing whether we were hot or cold."

Carpenter said he sees no difference in the length of time man can stay at great depths beneath the sea, or in isolated areas such as DEW line sites. "If a person can stay in isolation anywhere else, he can stand it at the bottom of the ocean," he said.

"I'm convinced that with proper heated suits man will be able to spend eight hours a day working deep in the sea. The only limitations will be hunger and fatigue, that will necessitate return to the habitat."

Carpenter said it was thought by many before the program was launched that divers would not be able to get along together — that "ten men in that small space would have a lot of personal problems.

"This turned out not to be true at all. There wasn't a cross word during the 30 days I was down. All the men were highly motivated. It reaffirmed my faith in human nature.

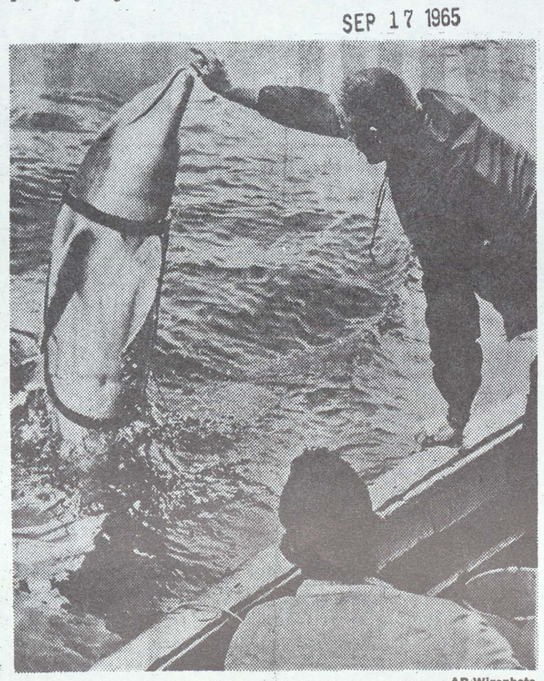
"For all of us, it was the best time we've ever had, made us feel we weren't working hard enough. Shouldn't be this much fun."

Carpenter described the bite on his left index finger by a sculpin Sept. 12 as "painful, like a cobra bite. It's a potent little animal. Poison from this fish is still not too well known."

He and the other aquanauts agreed that too much time is spent below in housekeeping and bringing supplies aboard and not enough time gathering meaningful scientific data.

★ Los Angeles Times

SEP 17 1965



AP Wirephoto
TUFFY SURFACES FOR HIS SUPPER
Porpoise failed his first assignment Thursday.

Porpoise Tuffy Flunks Test Run as Mailman

Copyright 1965, The Denver Post-Los Angeles Times

LA JOLLA, Calif.—Tuffy, the educated porpoise, "carried the mail" for the Navy's submerged Sealab 2 Thursday but failed as a piscatorial postman when he refused to deliver it.

Claustrophobia apparently led the 7-foot, 270-pound sea mammal, flown here Monday as an aide to the second team of 15 aquanauts experimenting with life and work on the ocean floor, to fluff his first assignment.

A wrench in a plastic bag was fixed to Tuffy's harness, then aquanaut Ken Conda, who trained the porpoise, buzzed to summon Tuffy down to the 205-foot deep Sealab.

"Tuffy read him loud and clear," a Navy spokesman reported, "but he dived only part of the way, evidently confused by the sounds of other boats in the area."

In a second attempt, the porpoise dived to the vicinity of Sealab, but when he saw the complex cables and wires associated with its equipment, he gave the undersea capsule a wide berth.

Aquanaut John Reaves, who was about 50 feet from the lab, clicked his photographic strobe light, and Tuffy swam to him, but wouldn't approach close enough for his load to be unhitched.

"Porpoises are afraid of being trapped under water because they'll drown if they don't surface within five minutes," the Navy spokesman apologized.

"Apparently Tuffy thought the wires and cables were some kind of a net. Just a case of claustrophobia, I guess."

Bashful Porpoise

LA JOLLA, Calif.—Tuffy the Porpoise dove 205 feet yesterday, located two Navy divers, simulating distress, hovered near them with a life line for seconds—then surfaced abruptly.

A Navy spokesman said it was "a bashful" performance for the sea-going St. Bernard. The 7-foot, 270-pound porpoise had been trained to bring help to two Sealab 2 aquanauts.

The experiment was termed a "qualified success" when Tuffy shied away from glaring underwater lights, and failed to deliver the line, which was secured to his specially fitted harness. Tuffy tries again today.

POST 9/17/65

From
INQUIRER
Philadelphia, Pa.

Mail Chore Licks Tuffy

Special to The Inquirer

LA JOLLA, Calif., Sept. 16—Tuffy, the educated porpoise, "carried the mail" for the Navy's submerged Sealab 2 Thursday, but failed as a piscatorial postman when he refused to deliver it.

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SEAFARERS' LOG - 101
675 Fourth Ave. M
Brooklyn, N.Y. 11232

SEP 17 '65

Project Sealab II

Living Beneath The Sea Proves To Be A Tougher Job Than Scientists Expected

LA JOLLA, Calif. — Project Sealab 2 is underway right now, 205 feet below the Pacific Ocean near here. After being beset by numerous difficulties, not the least of which was the vagaries of ocean weather and currents, the experiment in which men are to live and work on the sea floor for 45 days under pressure 6½ times that on land, began on August 29.

In one of the first experiments conducted from the 57-foot cigar-shaped steel cylinder, aquanaut M. Scott Carpenter, a Navy Lt. Commander who also won fame as an astronaut, talked by radio with Lt. Colonel L. Gordon Cooper as Cooper passed by more than 100 miles above the earth in the Gemini 5 spacecraft. The experiment went off well and both voices came through loud and clear — although Carpenter's voice sounded high pitched and nasal, a little like Donald Duck, as result of the high pressure and special atmosphere of the capsule beneath the sea.

Sealab 2 is primarily a test of how well men can live and work for extended periods beneath the sea. Three teams of divers are scheduled to spend 15 days each in the capsule. Carpenter is slated to stay down for 30 days. Experiments are to include taking specimens of sealife, an attempt to establish the first underwater weather station, and the salvage of a sunken Navy fighter airplane. The major experiment however, involves seeing how the men and equipment stand up under the rigorous undersea routine as they go about their assigned tasks.

No Easy Task

The Navy is rapidly learning from Sealab 2 that the sea is a tough environment for both men and machines. The initial lowering of the capsule to the sea floor was delayed several times by problems which kept cropping up, the last of which occuring when a bee-hive shaped communications and power pod was wrecked during lowering after a sudden surge of ocean currents smashed it against the bottom, cracking its concrete shell. The pod was raised again and a new shell constructed hurriedly at a nearby Naval electronic laboratory.

Since swimming down the 200 feet to the capsule in scuba diving gear, the aquanauts have been beset by one problem after another, both physical and mechanical. For example:

- Nine of the 10 men are suffering from painful ear infections.
- Some of the protective "wet suits" the men wear when working outside the capsule have proven inadequate, resulting in paralyzing coldness that forces the men to break-off work sessions.
- An invasion of stinging scorpion fish has been harassing the aquanauts and adding to the apprehension caused by the ever-present danger of sharks.
- Leaks have developed in the capsule's steel port covers.
- A possibility has developed that the capsule might slip off its shelf, breaking its "unbilical cord" which links it with the mother ship on the surface.
- Curious changes have been observed in the blood chemistry of several of the aquanauts as well as symptoms of incipient hypertension.
- The high helium content of the capsule's atmosphere has destroyed 10 TV cameras and inhibited continuous observation of the aquanauts by means of a closed-circuit television setup with the mother ship. Sealab's atmosphere is 85 percent helium, 11 percent nitrogen and 4 percent oxygen.

In spite of these adverse conditions, the aquanauts are proving that they can work beneath the sea with a high degree of efficiency. Constant checks are being made on their physical condition and a great amount of data is being compiled which should aid in setting up future projects. Equipment is being tested and defects and shortcomings noted to aid in the design of better, more dependable underwater equipment.

One of the project's more interesting experiments is slated to begin soon, when the aquanauts are joined outside the lab by a trained porpoise named Tuffy. It is hoped that the undersea creature, noted for its intelligence and special training, will aid the aquanauts as a guide and by handling hoses and other equipment.

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9 Aquanauts Tell 2 Weeks Inside Sealab

LA JOLLA, Calif. (UPI) — Nine tired-looking aquanauts Tuesday emerged from a decompression chamber after spending more than two weeks submerged 205 feet below the ocean's surface in Sealab 2.

The men had entered the 57-foot capsule Aug. 28 along with astronaut M. Scott Carpenter, who will spend 30 days in the 200-ton craft designed to determine how well man can live and work under the sea.

Navy Capt. George Bond said when the men came out of the decompression chamber at 12:03 a.m. "the first thing they enjoyed was breathing the fresh air and the smokers wanted to smoke."

Meet The Press

The nine came up to the mother ship Berkone anchored above the Sealab 2 on Sunday and went directly to the chamber. Tuesday they met reporters aboard the Berkone.

In discussing their feelings aboard the underwater capsule, a spokesman said "You could observe a reluctance on the part of the aquanauts to go back outside the chamber and into the water towards the end, they seemed to be rather hesitant unless it was a goodiepot (shipment of sweets) sent down."

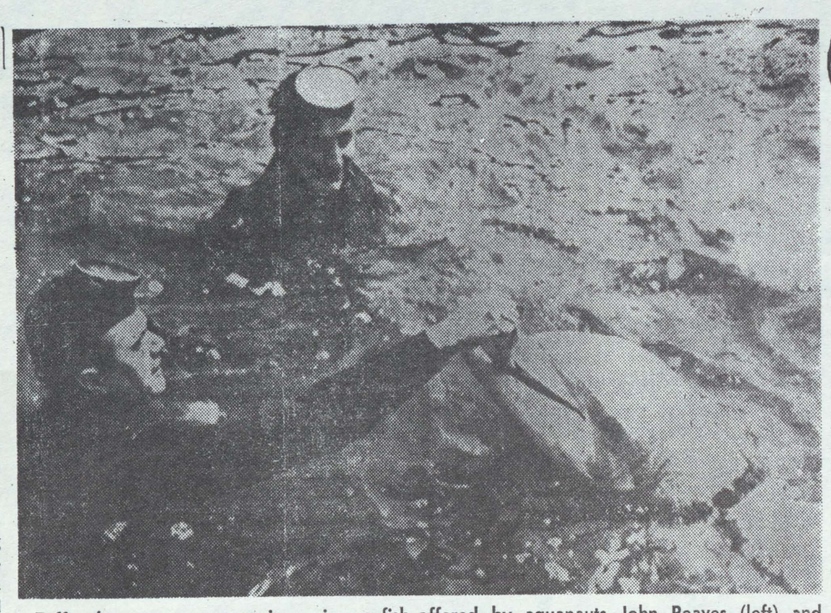
Aquanaut Earl A. Murray said everyone was congenial during their underwater stay and "the first days we laughed so hard we were sore, we laughed because of the novelty of it."

Fish Watching

Jay Dee Skidmore and Thomas Clarke said they enjoyed "looking at the fish, we spend hours watching them at the porthole." The aquanauts said daylight appeared every day about 10 a.m. and that they ate a lot because "the food was readily available."

In another phase of the underwater experiment that is to last 45 days, Tuffy, an educated dolphin, Tuesday began his final training as an underwater companion and possible guide for aquanauts.

In Tuffy's final experiment buzzers will be attached to Sealab 2, resting on a shelf 205 beneath the ocean surface and to supposedly "lost" aquanauts. The aquanauts will sound the buzzer and if all goes as planned, Tuffy will carry a lifesaving line from the capsule to the experimenters to lead them to "safety."



Tuffy, the messenger porpoise, enjoys a fish offered by aquanauts John Reaves (left) and Kenneth Conda during training off La Jolla, Calif. (AP)

SAN DIEGO EVENING TRIBUNE
SEP 18 1965

UNDERWATER GREETING SET FOR KIWANIS

Aquanaut Scott Carpenter will welcome 1,500 delegates to the Kiwanis convention here Monday but they won't see him.

Carpenter will talk by telephone from Sealab II which is under 250 feet of water off La Jolla.

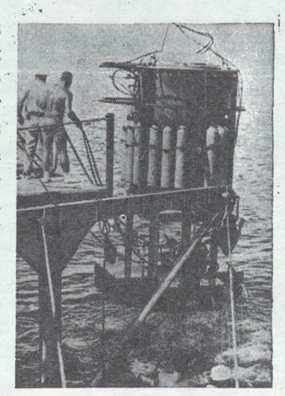
Gov. Brown made final arrangements with Sealab officials today for the conversation. The governor will place the call to Sealab Monday about 10:15 a.m. and Carpenter will be standing by to receive it.

Then the call will be put on the public address system at the Community Concourse for the delegates to hear. The aquanaut will talk through the Sealab helium unscrambler which helps to compensate for the voice distortion the helium in the atmosphere of Sealab causes.

News briefs

BUSINESS WEEK SEP 18 1965

Success of Sealab's 15-day plunge points to new areas for undersea oil and mining



Oil and mining companies were agreed this week that a whole new area of commercial operation under water had been opened as a transfer chamber from the Navy's Sealab II surfaced. The men had lived and worked 205 ft. below the surface for 15 days [BW Sep.11'65,p66].

The first team of aquanauts was given a clean bill of medical and psychological health after they emerged. They had put in a full 200 hours of work on the ocean floor; with conventional diving procedures, it would have taken 5,000 hours of decompression time.

The pioneer group concentrated on setting up the working area and a sea-bottom weather station. The second group, already on the bottom, will test man's ability to see and hear under water. The third, due to descend Sept. 28, will perform salvage and mining experiments.

Aquanaut Dives Up, Rescued by Buddy

Use of the buddy system by divers swimming outside Sealab has averted an accident that could have killed one of the aquanauts.

The victim left Sealab without putting enough weight on his belt and started spiraling toward the surface.

A sudden return to the surface from Sealab could result in death from the bends, a condition in which bubbles of gas form in the blood.

The aquanaut, who was not identified by Sealab officials when they disclosed the incident today, was saved by a buddy who went after him.

No Ill Effects

The second diver, properly weighted, was able to bring the first man back to the bottom. Neither incurred any ill effects.

Both were wearing electrically heated wetsuits and Mark VI underwater breathing apparatus. The Mark VI gear allows the diver to breathe a helium-based gas mixture, and it partially recycles the exhaled breath so that some of the gas can be breathed again.

The use of the electrically heated suit, Sealab officials say, accounts for the failure to use the proper amount of lead weights.

Suits Tested

The suits are new and are being tested by the men in Sealab. They make the wearer more buoyant than an ordinary wet suit does, and the aquanauts have to find the proper weight to carry by trial and error.

"That's one of the reasons we want them to stay close to a line so they can hold onto it while they are outside," said Capt. George Bond, principal investigator for the project. "If they can grab something to keep them on the bottom, they will be all right."

Bond said that the aquanauts have been taught another safety measure in case they should start to float upward out of control.

Sink to Bottom

The Mark VI suit has an exhaust bladder which is filled with gas. The aquanauts have been told to dump the gas in an emergency to make them heavier. The man doing it would then sink to the bottom.

But he would not be able to breathe again until he reached around behind him and turned a valve to refill the bladder. And as soon as the bladder refilled, he would again start floating up.

An aquanaut in this predicament would have to hold his breath and swim for safety; then refill the bladder to breathe, dump the gas out again and swim some more.

The aquanauts have been told to use this precedure despite its disadvantages, and have practiced doing it.

SAN DIEGO EVENING TRIBUNE
SEP 18 1965

PORPOISE HEADS HOME

Tuffy 'Reports' Mission Accomplished at Sealab

Tuffy, the porpoise, prepared today to go home to Point Mugu in triumph after his seven dives, and aquanauts went back to their routine occupations.

Tuffy's diving session yesterday was termed a success by Sealab officials. The porpoise did so well that they decided that he had proved his usefullness to the aquanauts, and his trainers ordered a helicopter to take him back to his Point Mugu home.

The aquanauts spent the rest of the day in 200 feet of water off Scripps Pier tending their scientific equipment on the sea floor, installing new television cameras to replace ones damaged by the helium in their atmosphere and locating a spot for a way station.

The way station is a sort of miniature Sealab where aquanauts can take refuge if they tire or run out of breathing gas during a swim.

Sealab officials yesterday said that evaluations of the performance of the first team of aquanauts show that men can live and work successfully on the ocean floor.

They quoted the aquanauts as saying they felt they would remain effective about 25 days on the bottom and would be willing to stay down that long.

All the divers showed an increased tolerance to the cold water after their stay, but two reported slight symptoms of narcosis from the atmosphere they breahed. They said it did not interfere with their work.

The men said they would like to see a larger entrance area built into any future Sealab, and asked for better control of humidity and sound damping.

Porpoise Carries Mail To Undersea Aquanauts

LA JOLLA, Calif. (AP) — Sealab aquanauts received their mail by porpoise parcel post Friday.

Tuffy, the handyman porpoise, delivered the mail to Sealab 2 in a performance that officials said proved his value to the Navy's underwater living project.

Wally Ross, Tuffy's trainer, said the animal displayed none of the reluctance that dampened his tryouts Thursday for a job on the aquanaut team.

Aquanauts John F. Reaves and Kenneth Conda, reporting from the sealab at 205 feet below the ocean's surface, also testified that Tuffy's exhibition was flawless.

Tuffy reported for duty promptly, and like many other working man, carried his lunch with him in a sack.

The lunch—fish—was sent down to the aquanauts to be used in rewarding Tuffy for jobs well done.

Directed to the aquanauts by underwater buzzers, Tuffy made two dives to deliver the mail in sealed containers attached to his harness.

He also took down tools in a special bag.

Officials said they were surprised, and pleased, at the speed with which Tuffy completed a simulated rescue of a lost diver.

He took just a little over one minute to race to the bottom, carry a line from one aquanaut to another 50 feet away and streak back to the surface.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)
SEP 18 1965

SAN DIEGO EVENING TRIBUNE
SEP 15 1965

IMPACT ON AQUANAUTS STUDIED

Oxygen Supply Reduced in Sealab II

The Sealab II oxygen supply was cut by a minute fraction today as the 10 aquanauts began three days of tests to determine the effect of the change in their atmosphere.

The men had been breathing a mixture of gases less than one fifth as rich in oxygen as the normal earth atmosphere.

Mixture Dropped More

Today the mixture was dropped .75 per cent, giving the Sealab capsule a 3.5 per cent oxygen mixture. The remainder of the atmosphere is composed of 80.5 per cent helium and 16 per cent nitrogen.

Sealab officials said the aquanauts will be spending much of the next three days in extensive physiological tests to see what effects, if any, the change causes in their systems.

Minor Ear Infections

The nine aquanauts who composed the first team to descend to the capsule resting on the bottom of 205 feet depth off La Jolla still show no ill effects for the experience, except for minor ear infections and skin rashes suffered by all but one, a Sealab spokesman said yesterday.

The replacement team spent most of yesterday in physiological tests to check their systems on the third day they had been at the 205 footh depth. No ill effects have shown up.

Today, Capt. George Bond, chief investigator for the Sealab project, and Capt. Walt Mazzone, atmospheric control officer, were scheduled to swim with Tuffy, the aquanauts' trained porpoise.

The purpose of the swim is to "let them get to know each othre," said a Sealab spokesman.

Tuffy was allowed out of his pen for a short time yesterday, then called back by sound signals he has been trained to follow.

Sealab officials said Tuffy did not miss a cue, and will probably be sent down to join the aquanauts tomorrow.

Once there, he will be put to work as a combination messenger boy and guinea pig, carrying messages and small pieces of equipment between the capsule and the surface, and helping to probe the feasibility of using porpoises as an aid to underwater exploration.

The first team of aquanauts to descend — with the exception of Scott Carpenter, who will remain down with the second team — told newsmen yesterday that the main problems of undersea living seem to be finding enough time to get required work done.

The only physical ill effects suffered by the men were skin rashes and minor ear infections attributed to the high humidity of the Sealab atmosphere, said Lt. Robert E. Sonnenburg, the San Diego Navy doctor who was with the team.

The men soon discovered that it takes longer to get a job done underwater than it does at the surface.

"Everything just takes longer because of the time consumed in transporting gear and getting ready for dives," said Jay D. Skidmore, one of the aquanauts.

Sealab technicians predicted it would take only a few days to set up housekeeping in the 12-by-58-foot steel capsule.

"But it took us two weeks just getting ready for the second team," said aquanaut Billy Coffman.

But Bond reported that they made several excursion dives anyway to place new equipment outside the lab and to test electrically heated exposure suits. Bond said a planned test in which the aquanauts will breathe a new gas mixture with less oxygen still was being postponed.

First team aquanauts who left the SeaLab Sunday after 15 days underwater completed debriefing and post dive physical tests yesterday.

The Navy issued a report stating that tests showed that none experienced "appreciable loss of hearing," a common occurence in diving, and that all showed increased tolerance to cold water.

The aquanauts concurred that the SeaLab needed better humidity control, a larger entrance, more storage space and better sound damping, communications and outside lights.

All the aquanauts said they would be willing to return to the lab and stay an average of 25 days.

The Navy said tests and interviews indicated that morale among the first team was "high" and that no "conflicts or hostility" occurred.

SAN DIEGO UN
SEP 1 8 1965

'RESCUES' DIVER

A Tougher Tuffy Carries The Mail

By CLIFF SMITH

Tuffy the dolphin made postal history and became a naval hero yesterday when he carried the mail to SeaLab II and "rescued" a diver pretending to be lost.

It took Tuffy less than 20 minutes to make seven dives 205 feet deep during which he performed all his missions "beautifully" and took time out for a midmorning snack of mackerel offered by an aquanaut.

A Navy spokesman said the 10 aquanauts, making history on their own by living in the pressurized tank, received only two letters and Tuffy delivered both of them.

One letter was for torpedoman's mate 1.C. Kenneth L. Conda, 31, from his wife, Elsbeth, in Ledyard, Conn. The other letter went to Photographer 1.C. John F. Reaves, 36, from his wife, Hilda of Oxnard.

Tuffy also carried 18 special envelopes bearing his picture and the SeaLab designation to the aquanauts. They will use the envelopes for outgoing letters destined to become philatelic treasures.

Tuffy also did the double-dolphins insignia of submariners proud by proving that his kind can perform useful survival missions.

The streamlined mammal needed only 1 minute and 10 seconds to streak from the surface to Reaves, carry a rope 60 feet to Conda hidden in the murky depths and return to the surface.

In lieu of a dolphin's diploma, Capt. George Bond, director of the Navy's Man-in-the-Sea Program, offered a verbal commendation: "He did his work just beautifully."

Skepticism ran high on the SeaLab support ship Berkone yesterday as Tuffy was released from his floating pen and jumped for joy. It looked like the beginning of Thursday's performance when he failed to obey the commands he learned in school at Pt. Mugu.

But when Reaves turned on the portable buzzer taped to his forearm Tuffy zeroed in on the faint sound with his radar-like directional hearing and descended without delay.

On the first dive, Tuffy carried a plastic bag of chopped mackerel clipped to a ring in a rubberized canvas harness he wears while working. Reaves unfastened the bag and rewarded Tuffy with the contents.

On subsequent dives, which included three mail runs, Tuffy also carried tools below and performed his rescue mission. The dolphin is signaled to the surface with an electric clicking device.

Reaves and Conda moved away from the SeaLab yesterday for the exercise with Tuffy in the belief that their proximity to the noisy, lighted underwater house Thursday was what made the porpoise leary.

Tuffy's trainers said he would be ordered to serve the divers positioned farther apart and closer to the lab now that he is familiar with its maze of guy wires and eerie character.

If more purposeful tests can be devised, they said, Tuffy will stay over a few days but may return home to Pt. Mugu this afternoon.

Yesterday was the second short day in the row with poor visibility for the aquanauts because of dark storm clouds that blocked the sun.

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RETURNS HOME

Tuffy Nods Goodbye To Aquanaut Pals

LA JOLLA, Calif. (UPI) — Tuffy, the dolphin made seven quick dives in his final Sealab 2 performance Saturday, and nodded his bottle nose goodbye to the aquanauts 205 feet below the ocean.

The trained Atlantic bottle-nosed dolphin delivered mail and small objects to aquanauts John Reaves and Ken Conda, who were both away from the underwater laboratory.

Tuffy lingered outside the 12-foot-75-foot steel cylinder once and nodded to shouts of hello from the eight other aquanauts looking through the sealab portholes.

Later in the day, the dolphin was transported back to his home at Point Mugu, Calif., in a helicopter.

Tuffy performed "perfectly" in the last two days of his three days of participation in the 45-day project to test man's ability to survive and work underwater. The mammal apparently was bothered by wires and noises from the laboratory on his first day, Thursday.

Tuffy's mission was to show how a trained dolphin could locate a "lost" diver and, with its greater eyesight under water and sense of direction, guide the aquanaut back to safety.

Project officials said astronaut-aquanaut M. Scott Carpenter would talk by telephone Monday with California Gov. Edmund G. Brown at the opening of the western district convention of the Kiwanis International in San Diego.

Davenport (Ia) Times-Democrat
SUNDAY, SEPTEMBER 19, 1965

Taffy Ends His Work, Goes Home

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SEP 19 1965
San Francisco, Calif
EXAMINER
Circ. 289,469

Tuffy Spent a Year in Training for Sealab

LA JOLLA, Calif. — (UPI) — Tuffy, a 270-pound porpoise with a star role in Sealab II, has trained more intensively for his mission than any of the aquanauts he assists.

The 7-foot-long mammal, believed to be about 10 years old, spent more than a year learning to be a seagoing St. Bernard. He wears a harness on which he can carry messages and equipment or, if a diver is lost, a lifeline that would lead him to safety.

TUFFY GOT his diploma in sea rescue training when he found a "lost" aquanaut Friday in an underwater hide - and - seek game designed to develop survival techniques. After a skittish start on Thursday, the porpoise made seven dives Friday, carrying messages to aquanauts.

The bottle - nosed porpoise made seven more successful dives Saturday in his final performance. To the eight aquanauts peering through portholes in the Sealab cylinder, he nodded goodby, sped back to the surface and was flown to shore by helicopter.

In Thursday's test, Tuffy appeared to be bothered by guy wires and other paraphernalia near Sealab 2. So on Friday he was moved farther from the lab and everything went well.

He was made an official member of the Sealab crew yesterday.

The porpoise can plunge in less than 20 seconds to the 205 foot depth where Sealab rests and stay submerged for five minutes. Tuffy would die if he breathed the helium atmosphere in the aquanauts' 57-foot-long habitat. He must surface for each breath.

THE PORPOISE, who was captured in the Atlantic in September, 1962, for a Gulfport, Miss., oceanarium, joined the Navy after appearing for a



United Press International
TRAINED PORPOISE
Tuffy passes tests

time at Pacific Ocean Park.

In early training sessions he often attacked his trainer and otherwise displayed the ill-tempered disposition that earned him the name Tuffy. But he became tractable during the summer of 1964 under the tutelage of Deborah Duffield, who taught him to retrieve objects, wear a blindfold and swim through hoops.

The propoise has made several dives to depths of 300 feet and hundreds of trips to lesser depths. He has responded to an acoustic homing signal from distances up to 550 yards while working as far as two miles from shore.

Tuffy arrived at the scene of the Sealab II project in style, reclining on a rubber mattress aboard a helicopter. His performance underwent two months of training before entering their submarine habitat, may tell whether a porpoise can aid man in the scientific exploration of the sea.

Minneapolis (Minn) Sunday Tribune
SUNDAY, SEPTEMBER 19, 1965

HOUSTON POST
SUNDAY, SEPTEMBER 19, 1965

On Porpoise

Tuffy Completes 7 Sealab Trips

LA JOLLA, Calif — (AP) — Tuffy the porpoise made seven successful dives Saturday, then waved farewell to the aquanauts in Sealab 2.

Officials said Tuffy had completed his work with the underwater living project and would be taken back to his Point Mugu Naval Station training pool by helicopter.

THE AQUANAUTS crowded about portholes of their 12 x 58 foot steel capsule home to wave goodbye to Tuffy.

After a wary start three days ago, Tuffy busied himself delivering mail, test objects and lifelines to the Aquanauts, working 205 feet below the surface.

In Saturday's test, a spokesman said Tuffy had overcome his fear of the cables and wires that surround the capsule, making seven round-trip dives of about one-and-a-half minutes each in 30 minutes.

In recognition of his service, Tuffy was made an honorary member of Team 2. The porpoise didn't participate in the project's first two-week phase.

THE NAVY said results of physical tests made of the first team were favorable. A spokesman said members of Team 1, which surfaced over a week ago, had no appreciable loss of hearing and developed increased tolerance to cold water.

Only one aquanaut—Astronaut Scott Carpenter — has been designated to remain through both phases.

Monday, Carpenter is scheduled to talk by phone with Gov Edmund G. Brown. A special hookup will allow delegates to a district convention of Kiwanis International to listen in on the conversation.

'HONORARY AQUANAUT'

Tuffy Finishes Job, Flies Home

By BRYANT EVANS
The San Diego Union's Science Writer

Tuffy, the Pt. Mugu porpoise, returned home by helicopter yesterday afternoon with the title of "honorary aquanaut of SeaLab II."

Early in the day he had completed seven more dives from the ocean surface to the vicinity of SeaLab II, a vertical distance of 205 feet.

Although the porpoise earlier had been leery of the lights and sounds of the undersea habitat of 10 aquanauts, yesterday he became so used to them that he peered through the portholes at the men, who waved affectionately to him.

On his trips he carried mail, tools and other small objects. He was sent back to Point Mugu Naval Missile Center because he had successfully completed all that had been planned for him to do.

At last, the aquanauts have erected a way station between the SeaLab and the underwater weather station which the first team had installed.

The way station is a little metal house where one aquanaut can stop to get warm and get a new supply of breathing gas. Originally, there were three brought to the site to be planted near the SeaLab. The first one toppled into Scripps Submarine Canyon where it, no doubt, will stay.

Yesterday afternoon two television cameras were being placed outside the portholes of SeaLab II in an effort to overcome the trouble that has beset the closed circuit video system that connects the SeaLab with the shore.

Technicians have blamed the difficulty on helium leaking into the cameras. In one case the helium was said to have reversed the polarity of the device and caused the pictures to come out as negatives.

Now the idea is for the camera to be kept in the water and be pointed into the lab.

Kiwanians at their western district convention Monday will have a chance to hear a conversation between Gov. Brown and Cmdr. M. Scott Carpenter, team captain of the men in SeaLab II. Between 10:15 and 10:30 a.m. the conversation will be broadcast at the meeting.

THE SAN DIEGO UNION
Sun., Sept. 19, 1965
SAN DIEGO, CALIFORNIA A37

From SEP 19 1965
INQUIRER
Philadelphia, Pa.

Tuffy Ends Sealab Job

LA JOLLA, Calif., Sept. 18 (AP). — Tuffy the porpoise made seven successful dives Saturday, then waved farewell to the aquanauts in Sealab 2.

Officials said Tuffy had completed his work with the underwater living project and would be taken back to his Point Mugu Naval Station training pool by helicopter.

The aquanauts crowded about portholes of their 12-by-58-foot steel capsule home to wave good-by to their watery friend.

After a wary start three days ago, Tuffy busied himself delivering mail, test objects and lifelines to the aquanauts, working 205 feet below the surface. In recognition of his service, Tuffy was made an honorary member of Team No. 2.

SEP 19
NEWS
Dallas, Texas

Tuffy the Porpoise Has His Troubles

LA JOLLA, Calif. (AP) — Tuffy the porpoise was only partly successful in his first attempt to act as errand boy for the aquanauts in Sealab 2.

In his first dive, noise from boats and equipment apparently prevented the porpoise from hearing the underwater buzzer that was supposed to call him to the aquanauts on the ocean bottom.

The noise was reduced for the second dive and Cmdr. M. Scott Carpenter reported seeing Tuffy twice.

Tuffy Nods Out After 'Perfect' Test at Sealab

LA JOLLA, Calif., Sept. 18 — (UPI) — Tuffy the dolphin made seven quick dives in his final Sealab 2 performance Saturday and nodded his bottle nose goodby to the aquanauts 205 feet below the ocean surface.



Tuffy

Tuffy delivered mail and small objects to aquanauts John Reaves and Ken Conda, who were both away from the underwater laboratory.

Tuffy lingered outside the 12-foot-75-foot steel cylinder once and nodded to shouts of hello from the other eight aquanauts looking through the Sealab portholes.

Later in the day, the dolphin was transported back to his home at Point Mugu, Calif., in a helicopter.

Tuffy performed "perfectly" in the last two days of his three days of participation in the 45-day project to test man's ability to survive and work underwater.

Tuffy's mission was to show how a trained dolphin could locate a lost diver and, with its greater eyesight underwater and sense of direction, guide the aquanaut to safety.

Project officials said Scott Carpenter would talk by telephone Monday with California Gov. Edmund G. Brown at the opening of the western district convention of the Kiwanis International in San Diego.

ROCKY MOUNTAIN NEWS
Denver, Colo.
SEP 19 1965

Navy Sealab's Porpoise Honorably Discharged

LA JOLLA, Calif.—(AP)—Tuffy the porpoise made seven successful dives Saturday, then waved farewell to the aquanauts in Sealab 2.

Officials said Tuffy had completed his work with the underwater project and would be taken back to his Point Mugu Naval Station training pool by helicopter.

The aquanauts crowded about portholes of their 12-by-58-foot steel capsule to wave goodby to their finny friend.

After a wary start three days ago, Tuffy busied himself delivering mail, test objects and lifelines to the aquanauts, working 205 feet below the surface.

In Saturday's test, a spokesman said Tuffy had overcome his fear of the cables and wires that surround the capsule, making seven round-trip dives of about 90 seconds each in 30 minutes.

In recognition of his serviee, Tuffy was made an honorary member of Team No. 2. The porpoise didn't participate in the project's first two-week phase.

The Navy said results of physical tests made of the first team were favorable. A spokesman said members of Team No. 1, which surfaced more than a week ago, had no appreciable loss of hearing and developed increased tolerance to cold water.

Only one aquanaut — Astronaut Malcolm Scott Carpenter — has been designated to remain through both phases.

POST,
SEP 19 1965

SAN DIEGO UN
SEP 19 1965

Status Of Ocean Sciences Studied

The status and problems of the ocean sciences as viewed by San Diego scientists and business leaders was studied here for the last two days by 10 members of the oceanographic panel of the President's Scientific Advisory Committee.

Dr. Gordon MacDonald, chairman of the panel and a professor at the Institute of Geophysics and Planetary Physics of the University of California, said the panel would meet in San Diego again before completing its report to the President.

"It is evident that San Diego has the largest concentration of oceanographic activity on the West Coast," he said.

PANEL GETS REPORTS

The panel met members of the Chamber of Commerce oceanographic committee at breakfast in the La Jolla Beach and Tennis Club yesterday morning. MacDonald said the panel was given a thorough rundown of San Diego's interest in oceanographic technology by Finn Claudi-Magnussen, committee chairman, and other committeemen.

MacDonald said that most of the committee's time had been spent in conferences with scientists from the Scripps Institution of Oceanography and the Navy Electronics Laboratory.

TWO PHASES STRESSED

Two phases of the nation's oceanographic problem in which the panelists were particularly interested, he said, is the skilled manpower supply and the development of oceanographic technology.

Although the number of students studying oceanography is increasing, he said, it appears that the supply of trained oceanographers may not be sufficient to meet the demand of the expanding need of the ocean sciences.

SEP 19 1965
The Plain Dealer
Cleveland, O.
A.M.-circ. 339,112
Sun.-circ. 494,645

Aquanauts Bid Tuffy Good-by

LA JOLLA, Calif. (AP)—Tuffy the porpoise made seven successful dives yesterday, then waved farewell to the aquanauts in Sealab 2.

Officials said Tuffy had completed his work with the underwater living project and would be taken back to his Point Mugu naval station training pool by helicopter.

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Tuffy had busied himself delivering mail, test objects and lifelines to the aquanauts, working 205 feet below the surface.

From SEP 19 1965
TRIBUNE
Chicago, Ill.

DOLPHIN PUTS ON FINAL ACT AT SEALAB 2

La Jolla, Cal., Sept. 18 (UPI)—Tuffy the dolphin made seven quick dives in his final Sealab 2 performance today, and nodded his bottle nose goodby to the aquanauts 205 feet below the ocean.

The dolphin delivered mail and small objects to Aquanauts John Reaves and Ken Conda, who were both away from the underwater laboratory.

Tuffy lingered outside the 12 by 75 foot steel cylinder once and nodded to shouts of hello from the other eight aquanauts looking through portholes. Later in the day, the dolphin was transported back to his home at Point Mugu, Cal., in a helicopter.

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A36LA

PMS BUDGET

SEALAB 2 (900)

EDITOR'S NOTE: IN THIS EXCLUSIVE INTERVIEW WITH ASSOCIATED PRESS NEWSFEATURES WRITER BERNARD GAVZER, ASTRO-AQUANAUT M. SCOTT CARPENTER COMPARES LIFE IN OUTER SPACE WITH CONDITIONS IN THE NAVY'S CURRENT 45-DAY EXPERIMENT IN LIVING ON THE FLOOR OF THE OCEAN.

BY BERNARD GAVZER

ASSOCIATED PRESS NEWSFEATURES WRITER

ABOARD THE SUPPORT VESSEL BERKONE, LA JOLLA, CALIF., SEPT. 21 (AP)-COMMANDER M. SCOTT CARPENTER, THE FIRST HUMAN TO LIVE IN BOTH INNER AND OUTER SPACE, SAYS LIFE ON THE OCEAN BOTTOM IS "VERY TOUGH," BUT "I THINK THERE IS A POTENTIAL FOR FAR MORE DANGER IN SPACE."

CARPENTER, THE ASTRONAUT WHO ORBITED THE EARTH IN MAY 1962, HAS LIVED 205 FEET BENEATH THE PACIFIC OCEAN SURFACE SINCE AUG. 29 AS PART OF THE 45-DAY NAVY MAN-IN-THE SEA PROGRAM.

HE WAS INTERVIEWED LATE MONDAY FROM THE CONTROL CABIN OF THE NAVY'S SUPPORT VESSEL MORE THAN ONE-HALF MILE OFF LA JOLLA, CALIF.

RECALLING HIS SPACE FLIGHT AND THE CURRENT BENEATH-THE-SEA EXPERIENCES WHICH HE COULD COMPARE WITH IT, CARPENTER CONFESSED THAT THERE WERE OUTER SPACE VIEWS THAT WERE BEYOND ANY COMPARISON.

"I'VE SEEN GREATER BLISS, GREATER BEAUTY FROM SPACE. I THINK THE BEAUTY OF A SUNSET IS VERY HARD TO MATCH. IT'S A VERY IMPRESSIVE THING.

"BUT TO SEE THE LIGHTS, THE LIFE AT SEA DOWN HERE IS VERY IMPRESSIVE TOO.

"I'VE BEEN IMPRESSED IN OTHER WAYS FROM WHAT I'VE SEEN DOWN HERE AS FROM WHAT I'VE SEEN IN ORBIT," HE SAID.

THERE WAS NO OPPORTUNITY TO ASK HIM ABOUT THE REFERENCE TO LIGHTS. THE POSSIBILITY IS THAT THE WORD WAS DISTORTED. BECAUSE OF THE HIGH HELIUM CONTENT OF THE GASES WHICH THE AQUANAUTS BREATHE, THEIR VOICES HAVE A HIGH PITCH, AND THE SOUND IS TREATED ELECTRONICALLY TO LOWER IT. THE RESULT IS THAT CARPENTER SOUNDS AS THOUGH HE IS HOLDING HIS NOSE.

A37LA

HE WAS ASKED ABOUT THE SENSATION OF WEIGHTLESSNESS, SEA VARIETY AND SPACE VARIETY. IN SPACE TERMS, IT'S CALLED "GRAVITY FREE FLIGHT," AND IN OCEAN ENVIRONMENT, ITS "NEUTRAL BUOYANCY."

"THERE'RE QUITE SIMILAR," CARPENTER SAID.

"BUT WHEN IT COMES TO DOING WORK, IT IS EASIER TO DO WORK DOWN HERE BECAUSE YOU HAVE A LITTLE PURCHASE ON HAND. THE VISCOSITY GIVES YOU MEANS AND THE DENSITY GIVES YOU MEANS.

"YOU KNOW, YOU CAN USE THE WATER TO SWIM AND TO PROPEL YOURSELF.

"YOUR AGILITY IS SEVERELY RESTRICTED BY THE WATER, WHERE IT IS NOT IN SPACE."

THE UMBILICAL CORD FROM THE SUPPORT VESSEL BERKONE TO SEALAB 2 CONTAINS A CLOSED-CIRCUIT TELEVISION LINK AND CARPENTER COULD BE SEEN SITTING IN FRONT OF ONE OF THE 11 PORTHOLES IN THE 12 BY 57 FOOT UNDERSEA CHAMBER FROM WHICH HE AND NINE OTHER AQUANAUTS ARE CONDUCTING EXPLORATION AND EXPERIMENTS."

DEEP SEA FISH ATTRACTED BY LIGHTS OF SEALAB 2 COULD BE SEEN SWIMMING PAST THE PORTS IN BUSY PROFUSION. ONCE IN A WHILE A BIG FISH WOULD GOBBLE UP A SMALL FISH.

CARPENTER STILL WORE AN ELECTRICALLY HEATED WET SUIT WHICH WAS BEING TESTED IN HOPES THAT IT WOULD PERMIT AQUANAUTS TO LEAVE THE SEALAB FOR PERIODS AS LONG AS THREE HOURS. THERE WERE SOME PRIOR DIFFICULTIES WITH THE SUITS, BUT THE EXACT NATURE OF ANY SHORTCOMINGS WAS NEVER REVEALED.

AS I WATCHED CARPENTER ON THE TV MONITOR CAPT. GEORGE BOND, WHO CARRIES THE TITLE OF PRINCIPAL INVESTIGATOR IN THE NAVY RESEARCH PROGRAM, RELAYED QUESTIONS. CARPENTER WOULD RAISE HIS HANDS TO HIS HEAD AT EACH QUESTION, THEN SAY, "WELL, LET'S SEE NOW," THEN PAUSE AND SORT OF REPHRASE THE QUESTION BEFORE TRYING TO ANSWER IT.

A38LA

HE WAS ASKED WHICH HE PERSONALLY FOUND MORE HOSPITABLE, OUTER SPACE OR THE INNER SPACE OF THE SEA.

"INNER SPACE IS MORE HOSPITABLE," HE REPLIED.

BUT LATER, IN DUSCUSSING WHAT OCEANOGRAPHERS HAVE DESCRIBED AS THE "GENTLE PHYSICAL ENVIRONMENT OF THE SEA," CARPENTER COMMENTED THAT "SPACE IS A VERY GENTLE PLACE. EVERYTHING IS VERY GENTLE.

"I THINK THE SEA IS VERY TOUGH. IT IS A VERY HARD LIFE. IT IS MORE HOSTILE IN SOME WAYS."

STILL, IN CONSIDERING WHAT COULD HAPPEN TO MAN IN SPACE OR BENEATH THE OCEAN, CARPENTER DECIDED THAT SPACE WAS POSSIBLY THE MOST HOSTILE -- PRESUMABLY BECAUSE OF SUCH HAZARDS AS TOXIC GASES AND THE PUNCTURING OF SPACE SUITS BY METEORITES.

"I THINK THERE IS A POTENTIAL FOR FAR MORE DANGER IN SPACE THAN THERE IS AT SEA," HE SAID WITH ELABORATING.

WHETHER MAN ATT

THERE IS AT SEA," HE SAID WITHOUT ELABORATING.

WHETHER MAN ATTEMPTS TO MAINTAIN LIFE IN SPACE OR IN THE OCEAN, HE IS GOING TO FACE SOME BASIC PROBLEMS THAT ARE MUCH THE SAME AS CARPENTER INDICATED.

"I DON'T THINK THERE WOULD BE ANY REAL DIFFERENCES. YOU STILL HAVE TO BUILD YOUR HOUSE. YOU HAVE TO ADAPT TO BOTH ENVIRONMENTS. YOU HAVE TO DEVELOP PROPER EQUIPMENT," HE SAID.

CARPENTER APPEARED QUITE FIT AND SELF-CONTAINED.

"HE'S IN GOOD SHAPE," SAID CAPT. BOND.

A39LA

THE ASTRO-AQUANAUT, WHO IS TEAM LEADER OF THE 10 MEN NOW BENEATH THE SURFACE, GAVE THE CAPTAIN A RUNDOWN OF THE ACTIVITIES PLANNED FOR TODAY, SAYING HE INTENDED TO LEAVE THE SEALAB AND DESCEND 266 FEET ON AN EXCURSION. THAT DEPTH WOULD BE THE LOWEST YET ACHIEVED IN A FREE SWIM FROM THE CYLINDER THAT HAS BEEN THE BASE OF THE OPERATION.

CARPENTER IS THE ONLY ONE WHO WILL HAVE WORKED BELOW FOR 30 CONTINUOUS DAYS. ONE OF THE MEN WHO SPENT T E FIRST 15 DAYS WITH THE FIRST TEAM, WILL JOIN THE THIRD TEAM WHEN IT BEGINS ITS TOUR SUNDAY. ON THAT DAY CARPENTER IS SCHEDULED TO COME UP.

ONE OF THE EXPERTS SAID CARPENTER "SAYS HE'S HAVING A BALL, BUT THAT'S BECAUSE THE DAYS ARE GETTING SHORTER AND HE'S COMING TO THE END OF IT. HE'S SAID HE'S NEVER WORKED AS HARD IN HIS ENTIRE LIFE AND YOU CAN BELIEVE HIM. BESIDES THE WORK THERE'S ALSO ONE FRUSTRATION AFTER ANOTHER WITH THE COLD AND WITH NEW DEVICES, AND THAT TAKES ITS TOLL."

WHEN THE INTERVIEW WAS COMPLETED, THANKS WERE EXPRESSED TO CARPENTER AND HE HAD WHAT ALMOST SEEMED LIKE A MOMENT OF LEVITY.

HE SAID, "WHAT WAS THAT?" AND CAPT. BOND REPEATED THE MESSAGE OF THANKS AND CARPENTER THEN SAID, "DE NADA," SPANISH FOR "IT IS NOTHING."

EE1227APD NM

LA JOLLA, CALIF., SEPT. 20 (AP)-THE NAVY'S 45-DAY SEALAB 2 UNDERWATER LIVING EXPERIMENT REACHED THE HALF-WAY POINT SUNDAY AND OFFICIALS PRAISED ITS PROGRESS LAVISHLY.

"WE ARE EASILY ACCOMPLISHING OR EXCEEDING WHAT WE'VE PLANNED TO DO," SAID CAPT. GEORGE BOND, USN, CHIEF INVESTIGATOR OF THE EXPERIMENT. "I HOPE THE REMAINING HALF OF THE EXPERIMENT GOES AS WELL."

CAPT. LEWIS B. MELSON, USN, PROJECT DIRECTOR, SAID "SEALAB WILL BE THE STEPPING STONE TO FULL COMPREHENSION OF LIFE IN AQUASPACE."

THE SECOND 10-MAN AQUANAUT TEAM, EXCEPT FOR CMDR. M. SCOTT CARPENTER, COMPLETED ITS SEVENTH OF 15 DAYS IN 205-FEET-DEEP SEALAB SUNDAY.

CARPENTER, THE ASTRO-AQUANAUT, IS IN HIS 23RD DAY ON THE OCEAN BOTTOM. HE'S SCHEDULED TO COME UP AFTER 30 DAYS.

XZ4ACS &A73KX (110) AP

AMA NEWS - 50
535 N. Dearborn Street W
Chicago, Ill. 60610
Circ. 283,766

SEP 20 '65

Aquanauts' First Experiment Successful

The first phase of a multimillion dollar medical experiment ended this week with a preliminary but perhaps epoch-making conclusion: That man can live and work beneath the sea.

The experiment is the U.S. Navy's Sealab II, in which scientists and swimmers are spending 15 to 45 days eating, sleeping and working some 205 feet beneath the surface of the Pacific Ocean about a mile off the coast of La Jolla, Calif.

Relay of Teams: A first team of 10 aquanauts this week completed the first 15 days of living in a 57 by 12 foot cylinder, complete with bunks, kitchen and laboratories, at the bottom of the sea. Nine returned to the surface and were replaced by nine others. The tenth aquanaut and the group's commander, is Cmdr. M. Scott Carpenter, USN, one of the nation's astronauts. A skin-diving enthusiast, Carpenter volunteered to leave his NASA duties temporarily to lead the underwater team. He will remain below with the new group.

Director of the project is Capt. George F. Bond, (MC) USN, a former general practitioner from the rural area of Bat Cave, N.C., and a member of the AMA's Council on Rural Health from 1947 to 1957. He has been on active duty with the Navy since 1953 and has qualified as a diving and submarine medical officer. From 1958 to 1964 he was officer-in-charge of the Navy's Medical Research Laboratory.

A visitor to the command post on a barge that floats above Sealab II soon learns that Capt. Bond, a tall, deeply tanned man, does not limit his supervision to the medical aspects of the underwater experiment. Dressed in shorts and a dungaree jacket, he is at one moment at the rail of the barge to supervise the lowering of a personnel carrier and at the next moment talking to Carpenter about the gas mixtures in Sealab II.

"You have to know almost as much engineering as medicine in this job," he said.

Nickname for MD: Capt. Bond wears a name-tape on his jacket which reads "P. (for Papa) Topsi[illegible]" the nickname given him by the aquanauts.

Sealab II is connected to the surface by an umbilical cable which provides the required atmosphere, by communications lines and by a fresh water line. The pressure within the capsule is slightly greater than the surrounding water — about 100 pounds per square inch as compared to 14.3 pounds at the surface. As a result, a hatch at the bottom of the capsule can remain open for entrance and exit by the aquanauts.

Long-term breathing of normal air at such pressure could be deadly. So the aquanauts are provided with an atmosphere of approximately 84% helium, 12% nitrogen, and 4% oxygen. At these depths, this amount of oxygen is equivalent in quantity to slightly more than the 21% obtained from breathing air at the earth's surface.

The aquanauts appear to adjust easily to the gas mixture, Capt. Bond said, although the helium affects the vocal cords so that their voices sound much like the quacking-speech of Donald Duck. An electronic speech unscrambler makes clear communication with the surface possible.

Research Aspects: The two broad aspects of the research are tests of the men's ability to function and work under such conditions and detailed observations of the physiological and psychological effects of the environment on the aquanauts.

So far, Capt. Bond said, the men are "doing very well" on both counts. Swimming from Sealab with aqualungs and wearing rubber diving suits they have accomplished a number of tasks, including the establishment of an automated underwater weather station. Soon they will try to salvage the body of an airplane which will be sunk at the site.

Physiological observations involve drawing up to 45 blood samples a day, repeated EKGs and EEGs and repeated collection of urine and saliva samples for metabolic studies.

"I can't make any definite statements about these results until the tests are repeated on the surface," Capt. Bond said. "But so far the results of all major tests show no significant deviations from the normal."

Decompression Period: The aquanauts undergo 30 to 36 hours of decompression and a medical debriefing after they return to the surface.

With the aquanauts during their two weeks beneath the sea and with them still in the decompression chamber is a tall, husky physician and diver, Lt. Robert E. Sonnenburg, (MC) USN. He has conducted the physiological tests, has himself served as a subject, and has treated reported ear infections and headaches among the aquanauts. His one emergency call came when Cmdr. Carpenter was stung on the left index finger by a scorpion fish. Lt. Sonnenburg treated Carpenter with cortisone and aspirin.

Lt. Sonnenburg provided one of the few diversions during the 15 days when the Navy sent to the bottom in a steel capsule a cake baked by the physician's wife for his 28th birthday.

The impact of the outcome of the Sealab project and similar civilian experiments scheduled for later this year could be extraordinary. The underwater continental shelves are believed to contain rich resources.

In regard to clinical medicine, Capt. Bond believes the Sealab findings may be of significance for environmental and hyperbaric medicine.

SAN DIEGO UN

SEP 21 196[illegible]

Oceanography Bill Passed By House

Copley News Service

WASHINGTON — Culminating more than six years of study, the House yesterday passed legislation intended to put oceanography on a par with the conquest of space.

The bill goes to the Senate, which six weeks ago passed a different version of the legislation. The Senate can either accept the House measure or insist on a conference to work out a compromise.

Both bills would pin responsibility for the marine sciences on the President. Now, authority for oceanographic programs is shared by about 20 federal agencies.

The House version calls for establishment of a 15-member commission to chart long-range oceanographic programs. The commissioners would be appointed by the President from government, industry and the academic community.

Under the Senate bill, a Cabinet-level council, similar to the National Space Council, would be created. House members complained that a council simply would duplicate functions of government agencies.

The House Merchant Marine and Fisheries Committee said its bill was the outgrowth of a "comprehensive congressional study" that began in February, 1959.

In its report, the committee said it shaped the legislation only after considering 16 different House bills.

"Your committee cannot emphasize enough the need to accelerate and enlarge the (oceanographic) program," the report said.

The President would be required to report annually to Congress on oceanographic developments, thus giving oceanography a "statutory assurance of continuity," the committee said.

Rep. Bob Wilson, R-San Diego, told the House that oceanographic progress is "crucial" from the standpoints of national defense and the search for new supplies for food, minerals and water.

Sealab Second Team Enters Seventh Day

La Jolla, Cal., Sept. 19 (AP)—Sealab 2's second team entered its seventh day in the 205-foot-deep underwater laboratory today "with no complaints and all well," a spokesman said.

The nation's most ambitious test of man in the ocean involves three 10-man teams living in Sealab 2 for 15 days each.

Navy Cmdr. M. Scott Carpenter leads the first two teams. The astronaut plans to stay below for 30 straight days.

After church services today, the aquanauts were scheduled to conduct sorties to way stations, the underwater weather station and personnel transport capsule. They were also to continue marine biological studies.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

SEP 21 1965

Navy Praises Sealab Tests

LA JOLLA, Calif. (AP) — The Navy's 45-day Sealab 2 underwater living experiment reached the half-way point Sunday and officials praised its progress lavishly.

"We are easily accomplishing or exceeding what we've planned to do," said Capt. George Bond, USN, chief investigator of the experiment. "I hope the remaining half of the experiment goes as well."

Capt. Lewis B. Melson, USN, project director, said "Sealab will be the stepping stone to full comprehension of life in aquaspace."

SAN DIEGO UN

SEP 20 1965

PUBLIC INFORMATION OFF
Eleventh Naval District
San [illegible]o, Californi

SeaLab II Hits Halfway Mark For Project

Editorial—Page b-2

The 45-day SeaLab II underwater living experiment off La Jolla reached the halfway mark yesterday amid praise from appraising Navy officials.

"We are easily accomplishing or exceeding what we planned to do," said Capt. George Bond, USN, chief investigator for the project.

Capt. Lewis B. Melson, USN, project director, said the experiment "confirms our belief that the challenge of the deep ocean is utterly fascinating and incredible. SeaLab will be the stepping stone to a full comprehension of life in aquaspace."

AFTERNOON SORTIES

The 10 aquanauts on SeaLab rested yesterday morning, but in the afternoon a number of them made sorties outside the capsule lying 205 feet below the surface.

Some checked the weather station that has been set up nearby. In case you're wondering why such a station is needed, it's because there's plenty of "weather" underseas — raging disturbances caused by currents, sudden upward shifts of cold masses that bring on the red tide, and other phenomena.

RESEARCH DONE

Other aquanauts did research on marine life. Already, some uncommon fish have been spotted.

Another chore involved talking under water by means of an electric bullhorn. The aquanauts want to see how far their voices will carry through the instrument.

SPECIAL BULLHORN

The bullhorn carries waterproof batteries. It has a headphone and a special mouthpiece.

The current team of aquanauts has eight more days to go in SeaLab. The third and final team, whose names will be announced today, is scheduled to go down next week.

When the second team ascends, astro-aquanaut Scott Carpenter will come up with them. He will by then have spent 30 days in SeaLab, longer than any other aquanaut.

POST-DISPATCH
St. Louis, Mo.

SEALAB REACHES HALFWAY POINT OF 45-DAY STINT

LA JOLLA, Calif., Sept. 20 (AP)—The Navy's 45-day Sealab 2 underwater living experiment reached the halfway point yesterday and officials praised its progress.

"We are easily accomplishing or exceeding what we've planned to do," said Navy Capt. George Bond, chief investigator of the experiment. "I hope the remaining half of the experiment goes as well." Navy Capt. Lewis B. Melson, project director, said, "Sealab will be the stepping stone to full comprehension of life in aquaspace."

The second 10-man aquanaut team, except for Comdr. M. Scott Carpenter, completed its seventh of 15 days in 205-feet-deep Sealab Sunday.

Carpenter, the astro-aquanaut, is in his twenty-third day on the ocean bottom. He's scheduled to come up after 30 days.

From
SEP 2[illegible]
STAR
Kansas City, Mo.

High Praise For Sealab 2

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From
INQUIRER
Philadelphia, Pa.

Sealab Nears Half-Way Point

LA JOLLA, Calif., Sept. 19 (UPI).—Sealab 2's aquanauts received a "much needed rest" Sunday morning as the ambitious man-in-the-sea project neared its half-way point.

The afternoon was busy, however. Working 205 feet below the Pacific, the men planned to check their underwater weather station, study marine life and examine the personnel transfer capsule.

The 45-day project, which also demonstrated a trained dolphin's value as messenger and rescuer, comes to its halfway point Monday.

Navy Capt. George Bond set a meeting for Monday to decide when a third team of 10 aquanauts would relieve the second team now residing in the 12-foot-by-57-foot cylinder resting on a ledge in Scripps Canyon.

San Francisco, Calif
EXAMINER
&
NEWS CALL BULLETIN
SEP 20 1965

Sealab's Halfway Point

LA JOLLA (AP) — The Navy's 45-day Sealab 2 underwater living experiment reached the half-way point Sunday and officials praised its progress lavishly.

"We are easily accomplishing or exceeding what we've planned to do," said Capt. George Bond, chief investigator of the experiment.

Capt. Lewis B. Melson, project director, said the research "confirms our belief that the challenge of the deep ocean is utterly fascinating and incredible. Sealab will be the stepping stone to full comprehension of life in aquaspace."

The second 10-man aquanaut team, except for Cmdr. M. Scott Carpenter, completed its seventh of 15 days in the 205-feet-deep Sealab Sunday.

Carpenter, the astro-aquanaut, is in his 23rd day on the ocean bottom today. He's scheduled to come up after 30 days.

POST, Denver, Colo.
SEP 21 1965



AP Wirephoto
ASTRONAUT-AQUANAUT M. SCOTT CARPENTER
"The life at sea down here is very impressive too."

Space Peril Greater, Carpenter Asserts

By BERNARD GAVZER

ABOARD THE SUPPORT VESSEL BERKONE, La Jolla, Calif. —(AP) — Cmdr. M. Scott Carpenter, the first human to live in both inner and outer space, says life on the ocean bottom is "very tough," but "I think there is a potential for far more danger in space."

Carpenter, the astronaut who orbited the earth in May 1962, has lived 205 feet beneath the Pacific Ocean surface since Aug. 29 as part of the 45-day Navy man-in-the-sea program.

He was interviewed late Monday from the control cabin of the Navy's support vessel more than one-half mile off La Jolla.

Recalling his space flight and the current beneath-the-sea experiences which he could compare with it, Carpenter confessed that there were outer space views that were beyond any comparison.

"I've seen greater bliss, greater beauty from space. I think the beauty of a sunset is very hard to match. It's a very impressive thing.

"But to see the lights, the life at sea down here is very impressive too."

There was no opportunity to ask him about the reference to lights. The possibility is that the word was distorted. Because of the high helium content of the gases which the aquanauts breathe, their voices have a high pitch, and the sound is treated electronically to lower it. The result is that Carpenter sounds as though he is holding his nose.

He was asked about the sensation of weightlessness, sea variety and space variety. In space terms, it's called "gravity free flight," and in ocean envirommentt, its "neutral buoyancy."

"They're quite similar," Carpenter said.

"But when it comes to doing work, it is easier to do work down here because you have a little purchase on hand. The viscosity gives you means and the density gives you means.

"You know, you can use the water to swim and to propel yourself.

"Your agility is severely restricted by the water, where it is not in space."

THE SAN DIEGO UNION
Tues., Sept. 21, 1965
SAN DIEGO, CALIFORNIA

Kiwanis, Aquanaut Share Joke In Sea-To-Surface Call

Governor's Ball tonight —Page a-10
Picture — Page a-3

Delegates to the Kiwanis International District Convention heard from the bottom of the sea and saw pictures of Mars yesterday in the opening convention session held in the Civic Theater.

Astronaut-Aquanaut M. Scott Carpenter talked briefly to the group through an electronic telephone connection. Dr. Lee A. DuBridge, president of California Institute of Technology, Pasadena, described exploration plans for the moon and Mars.

WELCOME?

Communications with Carpenter, speaking from SeaLab II, were not entirely satisfactory, but the conversation brought chuckles and applause from the 2,500 delegates who attended the opening session.

When connections were made for Carpenter to speak, he addressed William A. Dunlap, Kiwanis district governor.

Carpenter said, "Mr. Dunlap, are you understanding me, over?"

Dunlap replied, "That's fine. We appreciate your welcome."

Carpenter again, "Hello. I haven't given my welcome yet."

Delegates cheered and chuckled at Carpenter's reply.

The aquanaut's voice sounded like Donald Duck because helium in the underwater chamber changes the tone of a person's voice.

Dunlap then replied, "It is coming in fine, and we are enjoying it."

Carpenter reported he and his fellow aquanauts are "healthy and happy" and have many activities going on under the ocean.

Dr. DuBridge, who was standing with Dunlap during the Carpenter conversation, noted that the astronaut-aquanaut is the only man who has been in space and under the sea.

FILM UTILIZED

In closing the conversation, Carpenter replied, "Thank you, doctor. I wish you good fortune and success."

DuBridge then discussed what man has learned about space, particularly the moon and Mars. He used slides and a movie film to illustrate his speech.

"The space age is as old as man's curiosity," DuBridge said. "And only recently are questions being answered.

"Now, we have views of the moon, Mars and Venus."

DuBridge showed pictures of the moon which were taken from the Ranger 9 vehicle. He also showed pictures of Mars recently made by the Mariner space shot.

"It is quite possible there is some atmospheric haze on Mars," DuBridge said. He said the Mariner pictures revealed that Mars is more like the moon than the earth.

"There are no rivers, no trees on Mars," he said. "But the craters are interesting because we believe there may be frost in some craters. We believe there is just enough water for light frost.

"There is a tremendous amount of scientific work to be done. We will land and explore Mars. This is an exciting time. After thousands of years, we will replace speculation with facts."

He said CIT, working with the National Aeronautics and Space Administration, plans a soft landing on the moon next year and a similar landing on Mars in 1971.

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Interview on the Ocean's Depths

CARPENTER SEES SEA LIFE SAFER THAN SPACE

From SEP 2 - 65
JOURNAL, Atlanta, Ga.

By BERNARD GAVZER

ABOARD SUPPORT VESSEL BERKONE, La Jolla, Calif. (AP) — Commander M. Scott Carpenter, the first human to live in both inner and outer space, says life on the ocean bottom is "very tough," but "I think there is a potential for far more danger in space."

Carpenter, the astronaut who orbited the earth in May 1962, has lived 205 feet beneath the Pacific Ocean surface since Aug. 29 as part of the 45-day Navy man-in-the sea program.

He was interviewed late Monday from the control cabin of the Navy's support vessel more than a half-mile off La Jolla, Calif.

Recalling his space flight and the current beneath-the-sea experiences which he could compare with it, Carpenter confessed that there were outer space views that were beyond any comparison.

"I've seen greater bliss, greater beauty from space. I think the beauty of a sunset is very hard to match. It's a very impressive thing.

"But to see the lights, the life at sea down here is very impressive too.

"I've been impressed in other ways from what I've seen down here as from what I've seen in orbit," he said.



Associated Press Wirephoto

SCOTT CARPENTER

Comparisons

There was no opportunity to ask him about the reference to lights. The possibility is that the word was distorted. Because of the high helium content of the gases which the aquanauts breathe, their voices have a high pitch, and the sound is treated electronically to lower it. The result is that Carpenter sounds as though he is holding his nose.

He was asked about the sensation of weightlessness, sea variety and space variety. In space terms, it's called "gravity-free flight," and in ocean environment it's "neutral buoyancy."

"They're quite similar," Carpenter said.

"But when it comes to doing work, it is easier to do work down here because you have a little purchase on hand. The viscosity gives you means and the density gives you means.

"You know, you can use the water to swim and to propel yourself.

"Your agility is severely restricted by the water, where it is not in space."

The umbilical cord from the support vessel Berkone to Sealab 2 contains a closed-circuit television link and Carpenter could be seen sitting in front of one of the 11 portholes in the 12-by-57-foot undersea chamber from which he and nine other aquanauts are conducting exploration and experiments."

Deep-sea fish attracted by lights of Sealab 2 could be seen swimming past the ports in busy profusion. Once in a while a big fish would gobble up a small fish.

Carpenter wore an electrically heated wet suit which was being tested in hopes that it would permit aquanauts to leave the Sealab for periods as long as three hours. There were some prior difficulties with the suits, but the exact nature of any shortcomings was never revealed.

As I watched Carpenter on the television monitor, Capt. George Bond, who carries the title of principal investigator in the Navy research program, relayed questions. Carpenter would raise his hands to his head at each question, then say, "Well, let's see now," then pause and sort of rephrase the question before trying to answer it.

He was asked which he personally found more hospitable, outer space or the inner space of the sea.

"Inner space is hospitable," he replied.

But later in discussing what oceanographers have described as the "gentle physical environment of the sea," Carpenter commented that "space is a very gentle place. Everything is very gentle.

"I think the sea is very tough. It is a very hard life. It is more hostile in some ways."

Still, in considering what could happen to man in space or beneath the ocean, Carpenter decided that space is possibly the more hostile — presumably because of such hazards as toxic gases and the puncturing of space suits by meteorites.

"I think there is a potential for far more danger in space than there is at sea," he said without elaborating.

Whether man attempts to maintain life in space or in the ocean, he is going to face some basic problems that are much the same, Carpenter indicated.

"I don't think there would be any real differences. You still have to build your house. You have to adapt to both environments. You have to develop proper equipment," he said.

Carpenter appeared quit fit and self-contained.

"He's in good shape," said Capt. Bond.

The astro-aquanaut, who is team leader of the 10 men now beneath the surface, gave the captain a rundown of the activities planned for today, saying he intended to leave the Sealab and descend 266 feet on an excursion. That would be the lowest depth yet achieved in a free swim from the cylinder that has been the base of the operation.

Carpenter is the only one who will have worked below for 30 continuous days. One of the men who spent the first 15 days with the first team will join the third team when it begins its tour Sunday. On that day Carpenter is scheduled to come up.

One of the experts said Carpenter "says he's having a ball, but that's because the days are getting shorter and he's coming to the end of it. He says he has never worked as hard in his entire life and you can believe him. Besides the work there's also one frustration after another with the cold and with new devices, and that takes its toll."

When the interview was completed, thanks were expressed to Carpenter and he had what almost seemed like a moment of levity.

He said, "What was that?" and Capt. Bond repeated the message of thanks and Carpenter then said, "De nada," Spanish for, "It is nothing."

Minneapolis (Minn.) Star
TUESDAY, SEPTEMBER 21, 1965

U.S. Aquanauts to Make Deep Dives Today

LA JOLLA, Calif. — (UPI) — American aquanauts engaged in the Sealab-2 man-in-the-sea project today were scheduled to make a series of quick dives at depths ranging from 200-250 feet.

The aquanauts Monday conducted marine biological studies and underwent physiological tests.

The 10-man team, headed by astronaut-aquanaut M. Scott Carpenter, will be relieved next week by a 10-man group headed by Robert Sheats, 49, a master chief torpedoman from Bremerton, Wash.

The first team — except for Carpenter — surfaced last week after spending 15 days in Sealab-2, a 200-ton, 57-foot-long cylinder resting on a shelf 205 feet beneath the waves in Scripps Canyon.

The purpose of the project is to determine man's ability to live and work under water.

Capt. Melson To Talk On Oceanography

The county Bureau of Home Appliance's fall conference will be staged Sept. 23 at Ocean-House and include a dinner and a talk by Capt. L. R. Melson, director of the SeaLab II underwater living experiment.

More than 500 persons are expected at the event, which will keynote oceanography.

Capt. Melson will describe the objectives of SeaLab II, a documentary film will be shown on San Diego's role in oceanography and several exhibits will be displayed prior to the dinner, which begins at 7 p.m.

A panel discussion on oceanography, moderated by Finn Claudi-Magnussen, chairman of the Chamber of Commerce Oceanographic Development Committee, will be held.

The bureau's new officers and board members will be introduced at the meeting, which is open to the public.

Mpls. (Minn.) Morning Tribune
MONDAY, SEPTEMBER 20, 1965

Sealab 2 Team Says: 'All's Well'

LA JOLLA, Calif. — (AP) — Sealab 2's second team entered its seventh day in the 205-foot-deep under water laboratory Sunday "with no complaints and all well," a spokesman said.

The nation's most ambitious test of man in the ocean involves three 10-man teams living in Sealab 2 for 15 days each.

Navy Cmdr. M. Scott Carpenter leads the first two teams. The astronaut plans to stay below for 30 straight days.

After church services yesterday, the aquanauts were scheduled to conduct sorties to way stations, the underwater weather station and personnel transport capsule. They also were to continue marine biological studies.

From SEP 20 1965
CONSTITUTION Atlanta, Ga.

Underwater Lab Praised

LA JOLLA, CALIF. (AP) — The Navy's 45-day Sealab 2 underwater living experiment reached the half-way point Sunday.

"We are easily accomplishing or exceeding what we've planned to do," said Capt. George Bond, chief investigator of the experiment.

The second 10-man aquanaut team completed its seventh of 15 days in 205-feet-deep Sealab Sunday.

Scott Carpenter, the astro-aquanaut, also was in the first crew, and is in his twenty-third day on the ocean bottom. He's scheduled to come up after 30 days.

SAN DIEGO UN
SEP 21 196

San Francisco, Calif
EXAMINER
Circ. 289,469
SEP 21 1965

More Danger in Outer Space, Says Aquanaut Scott Carpenter

LA JOLIA (AP)—Commander M. Scott Carpenter, first human to live in both inner and outer space, says life on the ocean bottom is "very tough," but "I think there is a potential for far more danger in space."

Carpenter, the astronaut who orbited the earth in May, 1962, has lived 205 feet beneath the Pacific since Aug. 29 as part of the 45-day Navy program.

HE WAS interviewed late Monday from the control cabin of the Navy's support vessel more than one-half mile off La Jolla.

Recalling his space flight and his beneath-the-sea experiences, Carpenter confessed there were outer-space views that were beyond any comparison.

"I've seen greater bliss, greater beauty from space. I think the beauty of a sunset is very hard to match. It's a very impressive thing.

"But to see the lights, the life at sea down here is very impressive too.

"I've been impressed in other ways from what I've seen down here as from what I've seen in orbit," he said.

THERE WAS no opportunity to ask him about the reference to lights.

The possibility is that the word was distorted. Because of the high Helium content of the cases the aquanauts breathe, their voices have a high pitch, and the sound is treated electronically to lower it.

The result is that Carpenter sounds as though he is holding his nose.

He was asked about the sensation of weightlessness—sea variety and space variety. In space terms, it's called "gravity free flight," and in ocean environment, its "neutral buoyancy."

"Therere quite similar," Carpenter said.

SAN DIEGO UN
SEP 19 196

THE SAN DIEGO UNION
Tues., Sept. 21, 1965 ④
SAN DIEGO, CALIFORNIA

Aquanauts' Third Team Chief Named

New Record Set For Underwater Work In 'Hot' Suit

Picture — Page a-14

By BRYANT EVANS
The San Diego Union's Science Writer

The captain of the third team of SeaLab II will be Robert Sheats, 49, a master chief torpedoman, Capt. Lewis B. Melson, director of the SeaLab project, announced yesterday. He also announced the names of the other nine men of the team which will take over the habitat 205 feet deep off La Jolla next Sunday.

A significant development announced yesterday was a new record for a man's working under the cold water at SeaLab depth through the use of a new electrically heated wet suit developed especially for the SeaLab.

Aquanaut Walter Jenkins spent 2 hours and 53 minutes in the water wearing a suit powered with a battery pack that can produce 350 watts of power.

OBJECT OF EXPERIMENT

The principal object of the SeaLab experiment is to determine how much useful work can be done under water. The capability of working longer hours will add to this potential, it was pointed out.

Another record will be broken Sunday when Cmdr. M. Scott Carpenter, captain of both Teams 1 and 2, will be brought to the surface with the rest of the second team. He will have spent a total of 31 days on the bottom.

The second team will be placed in the deck decompression tank until sometime Monday, SeaLab officials said. Carpenter and the others are to discuss their experience at a press briefing next Tuesday.

Sheats and William J. Bunton, 32, an experimental test mechanic and photographer at the Navy Electronics Laboratory here, are to make their descent to SeaLab Saturday to be briefed on the undersea operations by Carpenter. Thus on Saturday night SeaLab II will have 12 inhabitants instead of the usual 10.

3RD TEAM MEMBERS

Other members of the third team are Lt. Robert A. Sonnenburg, 28 of 4367 Adams Ave., first team medical officer who will serve as team doctor on the third team; Charles M. Coggeshall, 35, chief gunner's mate of Fort Wayne, Ind.; Richard Grigg, 28, Scripps Institution of Oceanography graduate student, of 9388 Redwood Dr.; John F. Lyons, 35, engineer first class, of Middletown, N.Y; Lavern R. Meisky, 38, chief shipfitter of Lancaster, Pa.; John Morgan Wells, 25, Scripps Institution research assistant, of Hopewell, Va.; Paul A. Wells, 38, chief mineman of Fort Lauderdale, Fla., and William D. Meeks, 34, boatswain's mate first class of Ponca City, Okla.

Last weekend, five Navy members of the third team practiced salvage work using a newly developed explosive riveting technique in a pool at the Scripps physiology lab. They were able to rivet lifting gear to heavy boilerplate as they might do to fasten a ring to a sunken ship or submarine.

They will repeat the experiment next week when they are living in SeaLab II.

The new electrically heated diving suits are made of a sandwich of rubber skin, sponge rubber and outer rubber with heating resistance wires running through the sandwich. Over this suit a second bright lemon yellow suit is worn to protect the diving suit and to afford maximum sighting potential.

The suits have been tested for pressure and performance at a depth of 640 feet. The eight batteries can supply peak power for three hours. The diver can adjust the heating and can either use it over its whole area or just over the arms and legs.

Eight of the suits were tailor made by the U.S. Rubber company for eight of the aquanauts but nine will use them because two of the aquanauts wear the same size.

French aquanauts under the leadership of Capt. Jacques Yves Cousteau have been delayed in their descent to their Conshelf habitat 325 feet deep in the Mediterranean Sea. Al O'Neal, deputy director of the SeaLab II project learned this yesterday in a telephone conversation with Cousteau. Minor electrical problems were blamed.



NEW AQUANAUTS' SUIT

In the nether world of aquaspace, Bob Barth tries out new kind of wet suit. It's electrically heated and permits aquanauts better to endure cold waters. Barth lets his gloves float above him so he can use bare hands to adjust control on suit.

MEDICAL TRIBUNE - 50
624 Madison Ave. Tri-W
New York, N.Y. 10022
Circ. 161,079
SEP 22 '65



Two Navy physicians, Lt. Cmdr. Robert E. Thompson, above left, and Capt. George F. Bond, right, have won the nation's highest peacetime decoration, the Legion of Merit, for their contribution last year to the deep submergence project called Sealab I. In this experiment, Navy personnel lived for 11 days in a capsule at a depth of 192 feet in the Atlantic Ocean off Bermuda. Dr. Thompson, who was Sealab I team leader, has been assigned to San Diego Naval Hospital. Capt. Bond, who was principal investigator in Sealab I, is in charge of the surface control center in the current Sealab II project in which it is hoped that three teams of 10 aquanauts each will live in Sealab II for periods of 15 days per team.

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Sea Lab Has Sense of Humor

By Gen Fortis

Sea Lab II this week proved a rather unscientific but interesting fact—that 10 men can live 15 days in a confined 57-foot capsule 205 feet underwater and still retain their sense of humor.

When the second team of aquanauts arrived in their new home-under-the-sea for their 15-day visit, they were greeted with the homey inscription, "Welcome to the Tiltin' Hilton," as was appropriate, over the entry to their new quarters.

Reference was made to the six percent rise from one end of the capsule to the other on the ocean floor. The aquanauts climb this rise on entering the special pressurized Sea Lab and live and sleep at the angle.

Sunday, Astronaut - aquanaut Scott Carpenter will be brought to the surface in the personnel transfer capsule. This will be put on the staging vessel "Berkone", and attached to the decompression chamber where it will require 36 hours decompression from the 6½ atmospheric pressure in which he has been residing for 30 days. Carpenter was the only member of the team to stay underwater for that length of time as the first team of 10 aquanauts remained 15 days.

Latest puzzle in the batch of experiments which have been, and are being, run by Sea Lab II is the growing of marigolds and barley. The aquanauts report that barley is growing faster than the marigolds, inside their underwater house, but not being horticulturists, they haven't determined the cause.

The porpoise, Tuffy, was shipped back to his home at Pt. Mugu this week after working with the aquanauts at the Sea Lab II site in several experiments. Commander Carpenter reported Tuffy seemed confused by the wires, cables and noise on the bottom of the sea. At first he seemed not able to hear the underwater buzzer attached to his harness which is his contact with the divers. However, topside personnel stopped boats running and cut down on equipment noise and on his second dive, Tuffy made it to Sea Lab and was sighted twice by Carpenter. His second dive lasted four and one-half minutes. Underwater observers said his dives improved, however, and he did accomplish several missions to the bottom.

Tuesday, the deepest dive yet made by the aquanauts, to 266 feet, was on the schedule. A previous attempt by Carpenter and Aquanaut Robert Barth to dive to 250 feet was aborted at 231 feet because of a shortage of breathing gas. The dive Tuesday was to install a way station, check it and recover from the ocean bottom a way station previously placed down.

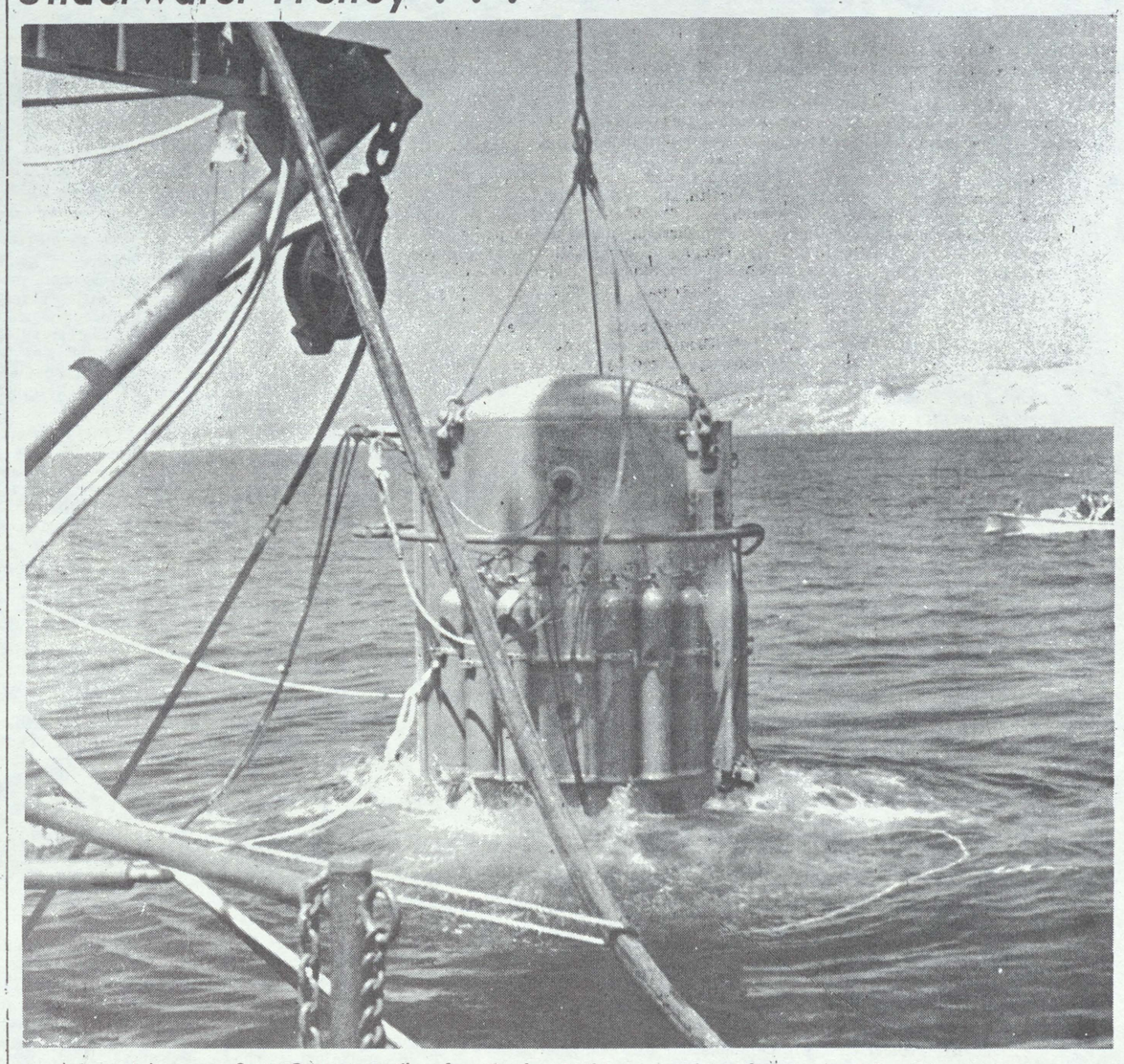
Also under test this week for the first time was a new electrically heated wet suit for an underwater diver. One of the major concerns of the aquanauts is cold water and this suit is designed to both conserve and produce heat. The suit must be able to function in 240 feet of water, keep a man warm in 40 degree water and be operational for at least a three hour period. The suit is a complete thermal protective system and insulates the swimmer with a layer of carbon dioxide. The optional control allows the swimmer to only warm his hands and feet or his whole body either at one-quarter or full power depending on water

(Continued on Next Page)

LA JOLLA LIGHT
and
La Jolla Journal

VOL. LIII, NO. 37 LA JOLLA, CALIFORNIA, THURSDAY, SEPTEMBER 23, 1965 10 CENTS PER COPY

Underwater Trolley . . .



Astronaut-Aquanaut Scott Carpenter will surface Sunday in this personnel transfer capsule of Sea Lab II after 30 days at 205 ft. on the ocean floor off La Jolla. He will be in the decompression chamber on the staging vessel "Berkone" for 36 hours before once again stepping into the earth's atmosphere.

CHICAGO SUN-TIMES, Wed., Sept. 22, 1965

Carpenter Tells Space, Sea Perils

LA JOLLA, Calif. (AP) — Comdr. M. Scott Carpenter, astronaut who has experienced life in outer space and is now testing living conditions underseas, says life on the ocean bottom is "very tough," but added: "I think there is a potential for far more danger in space."

Carpenter, the astronaut who orbited the Earth in May, 1962, has lived 205 feet beneath the Pacific Ocean surface since Aug. 29 as part of the 45-day Navy man-in-the sea program.

He was interviewed from the control cabin of the Navy's support vessel off La Jolla.

Recalling his space flight and the current beneath-the-sea experiences, Carpenter confessed there were outer space views that were beyond any comparison.

Tells Space Beauty

"I've seen greater bliss, greater beauty from space," he said. "I think the beauty of a sunset is very hard to match. It's a very impressive thing...

"But to see the lights, the life at sea down here is very impressive too.

"I've been impressed in other ways from what I've seen down here as from what I've seen in orbit."

Similar Sensations

He was asked about the sensation of weightlessness, sea variety and space variety. In space terms, it's called "gravity free flight," and in ocean environment, it's "neutral buoyancy."

"The're quite similar," Carpenter said. "But when it comes to doing work, it is easier to do work down here."

The umbilical cord from the support vessel Berkone to Sealab 2 contains a closed-circuit television link and Carpenter could be seen sitting in front of one of the 11 portholes in the 12-by-57-foot undersea chamber from which he and nine other aquanauts are conducting exploration and experiments."

Testing Suit

Carpenter still wore an electrically heated wet suit which was being tested in hopes that it would permit aquanauts to leave the sealab for periods as long as three hours.

There were some prior difficulties with the suits, but the nature of any shortcomings was never revealed.

Carpenter could be seen on the TV monitor as Capt. George Bond, principal investigator in the Navy research program, relayed questions.

Asked which he personally found more hospitable, outer space or the inner space of the sea, he replied: "Inner space is more hospitable."

But later, in discussing what oceanographers have described as the "gentle physical environment of the sea," Carpenter commented that "space is a very gentle place. Everything is very gentle.

"I think the sea is very tough. It is a very hard life. It is more hostile in some ways."

Hazards Of Space

Still, in considering what could happen to man in space or beneath the ocean, Carpenter decided that outer space was possibly the most hostile —presumably because of such hazards as toxic gases and the puncturing of space suits by meteorites.

"I think there is a potential for far more danger in space than there is at sea," he said.

Whether man attempts to maintain life in space or in the ocean, he is going to face some basic problems that are much the same as Carpenter indicated.

"I don't think there would be any real differences. You still have to build your house. You have to adapt to both environments. You have to develop proper equipment," he said.

Appears Fit

Carpenter appeared quite fit and self-contained.

"He's in good shape," said Capt. Bond.

The astro-aquanaut, team leader of the 10 men now beneath the surface, is the only one who will have worked below for 30 continuous days.



M. SCOTT CARPENTER

(SEALAB) UPI 9-21-65

AMERICAN AQUANAUTS ENGAGED IN SEALAB TWO'S MAN-IN-THE-SEA PROJECT OFF THE COAST OF LA JOLLA ARE SCHEDULED TO MAKE A SERIES OF QUICK DIVES AT DEPTHS RANGING FROM TWO-HUNDRED TO TWO-HUNDRED AND FIFTY FEET UNDERWATER TODAY. THE AQUANAUTS YESTERDAY CONDUCTED EXTENSIVE MARINE BIOLOGICAL STUDIES AND UNDERWENT PHYSIOLOGICAL TESTS.

-0-

Oceanography Accord Needed

SAN DIEGO VENING TRIBUNE
SEP 24 1965
UBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

Both the Senate and the House now have passed legislation aimed at putting oceanography on a par with America's conquest of space.

But there still remains the problem of getting the two legislative bodies to agree on a single measure.

The House version calls for establishing a 15-member commission to chart long-range oceanographic programs. The commissioners would be appointed by the President from government, industry and the academic community.

The Senate bill would set up a Cabinet-level council, similar to the National Space Council. The House complains that such a council would duplicate functions of existing government agencies — now about 20 in number.

We hope these differences can be ironed out.

There is a need for enlarging and accelerating the oceanographic program and to bring order into the now often overlapping activities in the marine sciences.

Rep. Bob Wilson, R-San Diego, properly told the House that progress in this field is "crucial" from the standpoints of national defense and the search for new supplies of food, minerals and water.

San Diego particularly has a vital stake in the outcome.

SAN DIEGO
VENING TRIBUNE
SEP 23 1965

Sea Lions Discover Sealab As Fine Spot to Stop and Eat

By LEO BOWLER
EVENING TRIBUNE Science Writer

Tuffy the Sealab porpoise may lose his position as the No. 1 pet of the aquanauts.

The men living under the sea off La Jolla have begun to make friends with wild sea lions in the area and a psychologist on the Sealab mother ship Berkone has started to train one of them.

The sea lions, apparently attracted by the multitude of fish swarming around Sealab, have paid numerous visits to the aquanauts in the last two days.

Peeks in Window

They frolic around the undersea residence, rest on top of it, and peer through the windows at the men inside.

"Last night, one of them perched on a light outside, ate fish, and watched the aquanauts who were staring out at him," Capt. George Bond, principal investigator for Sealab, said today.

The men are even discussing the possibility of allowing one of the animals to come into Sealab, Bond said.

Mike Greenwood, a psychologist from New London, Conn., who is stationed aboard the Berkone, has begun training a sea lion to swim to the Berkone on call.

Greenwood is using one of the underwater buzzers that scientists used to train Tuffy. He puts it in the water and rewards the sea lion with a fish if the animal approaches the buzzer when it is turned on.

"One female has come to the buzzer from as far as 200 yards," Bond said.

"We are discussing the possibility of calling the animal down to Sealab like we did with Tuffy, but it may not be necessary. They are diving to the lab of their own accord."

The aquanauts today were busy putting two 5,000-watt lights on the bottom near Sealab in an attempt to improve conditions in the water nearby.

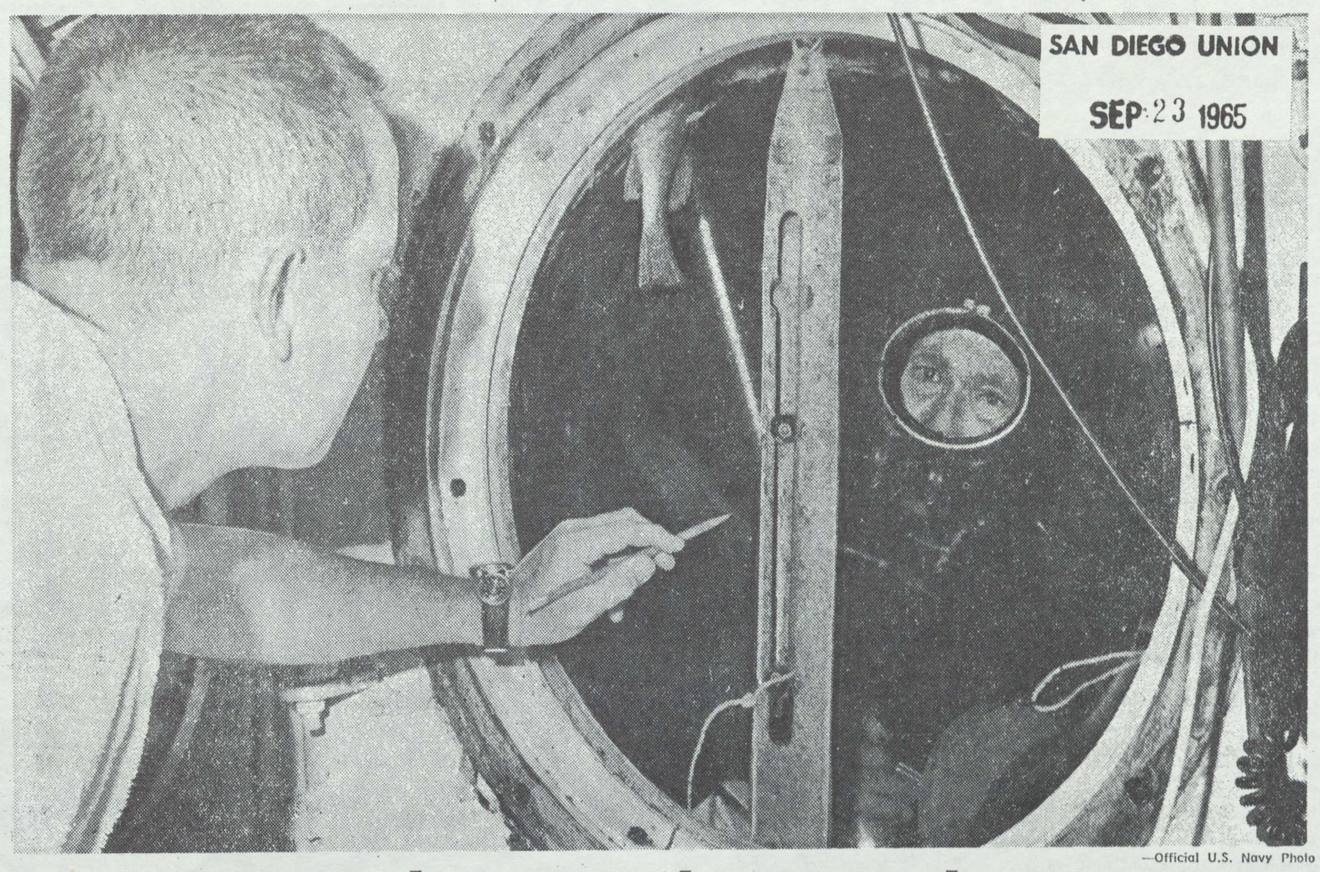
One way station has been put into service near Sealab, and the aquanauts are trying to get another into operation. The way stations furnish places where divers can get partly out of the water and get a new supplies of breathing gas.

Officers Visit

Capt. Lewis B. Melson, project director, said that a planned dive 50 feet down from Sealab into Scripps Canyon had to be delayed again yesterday because a line to a depth gauging instrument became tangled.

Yesterday, however, Bond and Capt. Walter Mazzone, atmosphere control officer for the project, were able to dive down to Sealab and spend several minutes inside talking to the aquanauts. Bond said all are well and in good spirits.

SAN DIEGO UNION
SEP 23 1965



—Official U.S. Navy Photo

SeaLab Inside And Out

George Dowling, inside SeaLab II underwater chamber, checks water temperature on outside thermometer and finds aquanaut Bill Tolbert checking it from outside. Aquanaut is visible through porthole of chamber. (Story on a-20)

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SAN DIEGO UNION
SEP 22 1965

Aquanauts Test Undersea Vision

By BRYANT EVANS
The San Diego Union's Science Writer

Aquanauts of SeaLab II yesterday made some basic contributions to the main purpose of the project — to furnish a basis for predicting what useful things men can do under water.

In particular they were answering the question of "what can men expect to see in clear water 205 feet beneath the surface."

The water was particularly clear yesterday. This was determined by a water clarity meter lowered from the mother ship, the Berkone.

Aquanauts William Tolbert and George Downey made the tests on the bottom. They used four targets in the shape of a square, a triangle, a cross and a hexagon. The targets were white on one side and yellow on the other. The aquanauts' job was to determine the maximum distances from which they could see the targets and the maximum distances from which could make out the shapes. The distances were measured with a tape measure.

Birger Andersen, the psychologist who directed the experiment from the Berkone, said the distances over which they operated were in the neighborhood of 10 or 15 feet. The full report was not available.

Eventually Andersen will have distances under various clarity and light conditions and with this information it will be possible to plan realistically for underwater operations.

In dexterity tests which involve such things as putting nuts and bolts together, Andersen said that the tests showed that the coldness of the water had a lot to do with how well the aquanauts performed.

In real cold water, he said, it is very hard to put little things together and easier to put large ones. In this study the psychologists are correlating water temperature with performance measurements.

A test scheduled for today will deal with the aquanauts' ability to distinguish sounds from various distances and identify the direction from which they come. It will also seek to learn what kind of sounds are easiest for the men to identify.

Three hydrophones will be placed on the ocean bottom. Recorded sounds from a tape recorder will be broadcast on these hydrophones selectively. An aquanaut will signal SeaLab when he hears a sound and, by the use of a code, show which hydrophone he thinks transmitted it.

Andersen said there will be three pure tones used and also a chirp. This chirp is a complex sound similar to sounds made by a porpoise in his echo location efforts. If it turns out that the aquanauts can hear and locate the chirp better than they can the pure tones, it will show that men can learn from porpoises.

SAN DIEGO
EVENING TRIBUNE
SEP 22 1965

Dedication Is Oct. 1 For Research Ship

The newest research vessel acquired by Scripps Institution of Oceanography will be dedicated at 11 a.m. Oct. 1 at B Street Pier.

Following the dedication the public will be permitted to tour the ship.

The vessel is the Ellen B. Scripps, named for the cofounder of the institution.

Dr. John S. Galbraith, chancellor of the University of California at San Diego, of which Scripps is a part, will preside. Participating will be Dr. William A. Nierenberg, director of Scripps.

The vessel will be dedicated by Ellen Clark Revelle, a grandniece of Miss Scripps and wife of Dr. Roger Revelle, former director of Scripps and now director of the Institution of Population Studies at Harvard.

Capt. Frank Miller will take formal command of the vessel. The Naval Training Center band will play.

The blue and gray ship is the first acquired by Scripps built for research. The others in the institution's fleet are conversions.

It is 95 feet long and is designed for trips of up to a month at sea. Scripps officials say they plan to use the ship off Southern California and Baja California and in the Gulf of California.

It was built with a large open deck area to which instrument vans can be bolted. This allows the vessel to be used for many types of expeditions with a minimum of changing time.

The Scripps arrived in San Diego Aug. 13.

San Francisco, Calif.
Examiner
(Cir. D. 289,469 - S. 427,093)

BALT. SUN 21 SEPT. 1965

Up or Down

The second team to serve in Sealab 2 has completed more than half of its 15-day stay in the 205-foot-deep underwater laboratory off La Jolla, Cal. There are "no complaints and all is well," which translated into the parlance of those who prefer earth-orbiting capsules means, "Everything Go." To make the translation is not to hint that blast-off, weightlessness and reentry are the same thing as going down into the cold waters of the Pacific, spending two weeks in an environment nature designed for marine life, including porpoises, and then a snail-pace lift to the surface followed by a 36-hour stay in a decompression chamber to permit safe reentry into man's normal domain. It is to suggest rather that astronauts and aquanauts are of the same general breed, a suggestion to which exception will be taken by those who suffer from acrophobia or claustrophobia but not both. In M. Scott Carpenter we have a melding of the two; a man who is both astronaut and aquanaut. In either area of activity a participant must go beyond the environment nature created for man—so whether it be up or down there is a relation between the all-is-well from the depths and the everything-go from the way-up yonder.

SEP 23 1965

Aquanauts Deep Dive On Again

LA JOLLA (UPI)—Ateam of aquanauts headed by astronaut-aquanaut Scott Carpenter was scheduled today to dive 266 feet beneath the surface of the Pacific Ocean. The dive was canceled twice earlier this week because of trouble with equipment. Apostponement yesterday was due to tangled lines leading to a pneumofathometer, a sophisticated depth gauge.

Plans today called for three aquanauts to hold the lines—to prevent tangling—while others attempt the dive.

Carpenter, Robert Barth and John Reeves were to make the dive into Scripps Canyon, where Sealab 2 rests on a ledge 205 feet underwater.

The object of the deep dive is to recover a way station a small chamber, where the divers can rest and replenish then air.

Navy Sealab II: An Adventure in Undersea Living

LA JOLLA, Calif.—Two-hundred feet below the ocean surface and 1000 yards off the Southern California coast, a group of Navy men is making history in an experiment that's every bit as dramatic and far-reaching as this nation's manned space flights.

It's Sealab II — a Navy project to explore man's capabilities in living long periods on the ocean floor.

The first of three ten-man teams has just finished 15 days of the underwater living. The new crew has gone into the Sealab for its 15-day stint on the ocean floor.

One man — Comdr. M. Scott Carpenter, who has switched from being an astronaut to being an aquanaut, is staying down with the second team and will spend a total of 30 days underwater.

* * *

A SCORPION FISH stung Carpenter as nine of his fellow crewmen were preparing to leave the Sealab.

The departure of the nine was delayed while one of them — Lt. Robert Sonnenburg, a Navy doctor — treated Carpenter to see if he could stay as planned or would have to surface with the team.

After an hour-and-15-minute delay, Dr. Sonnenberg said that Carpenter was responding to treatment and would stay. The sting of the dorsal spines of the inches-long red fish is painful but not lethal. Carpenter was stung on the left index finger at Sealab's exit hatch.

Three members of a fresh crew of nine aquanauts swam down earlier and were with Carpenter, who fell asleep on his bunk, after the other nine crewmen ended their 15-day stay.

The other six new crewmen decended later.

* * *

THE NINE new men in the Sealab crew are:

Robert A. Barth, chief quartermaster; Howard L. Buckner, chief steelworker; Kenneth J. Conda, torpedoman's mate first; George B. Dowling, civilian research physicist; Arthur Flechsig, civilian oceanographer; Glen L. Iley, chief hospital corpsman; Wallace T. Jenkins, civilian equipment specialist; John F. Reaves, photographer first, and William H. Tolbert Jr., civilian oceanographer.

A Navy spokesman said the scorpion fish sting wasn't unexpected because hundreds of the bottom-dwelling fish lurk in the gloomy depths near Sealab II. Carpenter's sting was Sealab's first accident. He was treated with pain-killing drugs and cortisone.

The Navy said the nine men who were brought to the surface today were in good shape—and had proved that man can live and work efficiently in the ocean depths.

The ascent in a pressurized transfer tank took about seven minutes.

On the deck of the staging vessel Berkone, the transfer tank was joined to a decompression chamber. There the nine members of Crew No. 1 waited about 36 hours while the pressure was slowly reduced to that of sea level.

"They're all safe and sound; everything is going beautifully," a Navy spokesman said after the nine returned to the surface.

A third team later will replace the second in the 45-day experiment, the Navy's most ambitious underwater living project.

Since August 28, the first crew has kept busy in and about the deepsea den.

* * *

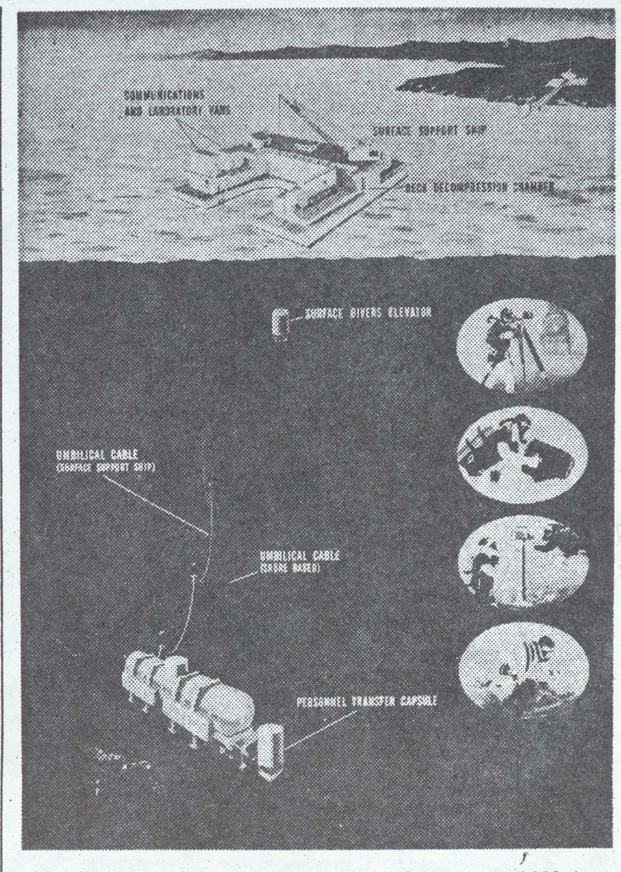
IN WET SUITS the aquanauts have ventured forth to chart movements of ocean currents and sediment. They have set up an ocean-bottom weather station to see if there is a correlation between surface weather and recording below.

Under Pressure, So He Shipped Over

LA JOLLA, Calif. — Billie L. Coffman, torpedoman's mate first, was under a lot of pressure when he re-enlisted recently — 100 pounds per square inch to be exact

Coffman, one of the Sealab crew, was given the re-enlistment oath on the ocean bottom by Capt. George G. Bond, medical director of the underwater project. Bond dove to the Sealab especially to perform the ceremony.

Coffman, of Willimantic, Conn., first enlisted in 1948. He is one of the ten divers which have just finished spending 15 days in the 12-by-58-foot steel cylinder located 1000 yards offshore.



ARTIST'S DRAWING shows scene of Sealab project, 3000 feet off the California coast near La Jolla.

Sealab: A House That's Built Like a Submarine

LA JOLLA, Calif. — The 57-foot-long, 12-foot-diameter Sealab II is described by the Navy as an underwater house that's built like a submarine.

Unlike either a house or a submarine, however, the front door is on the bottom, as shown in the artist's drawing below.

Sealab is moored on the ocean bottom in 210 feet of water (see diagram at top of this page) off Scripps Pier here in La Jolla. Power, water and breathing gas is supplied through umbilical cables from the staging ship above it and from Scripps Institution of Oceanography on shore.

* * *

THE DIVERS are lowered to the bottom in a pressurized capsule by a crane on the support vessel. When they leave Sealab, the divers are taken to the surface in the same capsule.

An aquanaut entering his living quarters swims into the antishark cage. The cage acts as a fenced-in front yard in which a diver can take refuge if need be from sharks or other undersea creatures.

To enter Sealab, he climbs the ladder and pops through a four-foot hatch into an access and shower room.

The moment he comes through the hatch, he emerges into the special atmosphere provided for him to breathe during his underwater stay.

* * *

ALL WINDOWS and the upper access hatch are sealed shut so that the atmosphere remains in the dwelling, like the air remain inside a drinking glass if you turn it upside down and thrust it into a pan of water.

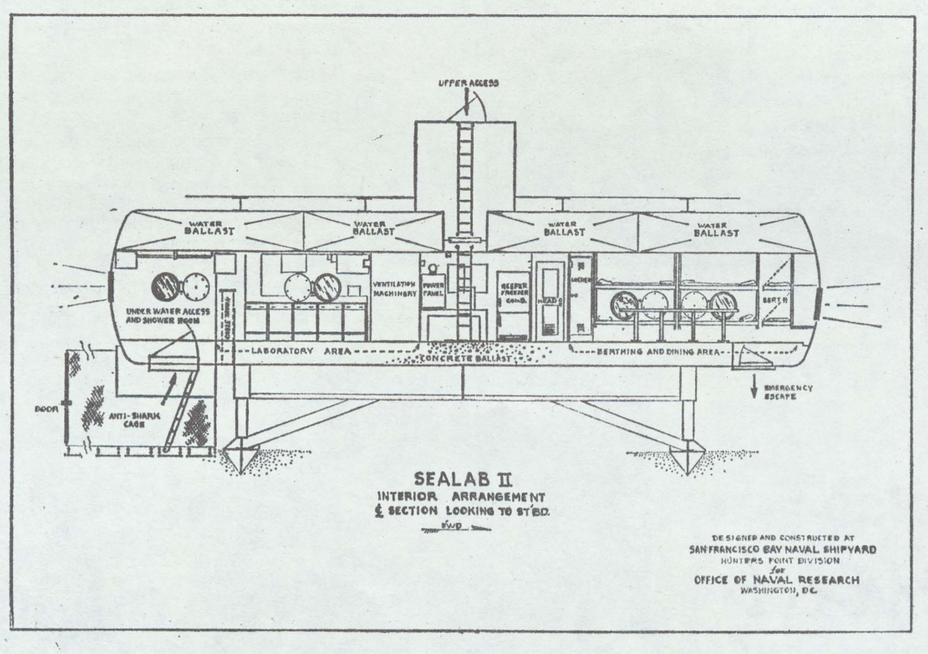
Inside the access room the diver removes his diving equipment, and takes a warm shower or tub bath.

A door separates the access room from the next room in Sealab which houses laboratory equipment and electronic gear.

A curtain separates the lab from the galley. Another curtain hangs between the galley and the sleeping room which has 10 bunks, a folding table and storage space.

In the floor of the sleeping room is an emergency hatch, the back door of Sealab. It is to be used only if some accident should block the regular access hatch.

The upper access hatch is located in the equivalent of a submarine's conning tower, and is used only when Sealab is on the surface.



SEALAB II
INTERIOR ARRANGEMENT
& SECTION LOOKING TO STBD.
KWP

DESIGNED AND CONSTRUCTED AT
SAN FRANCISCO BAY NAVAL SHIPYARD
HUNTERS POINT DIVISION
for
OFFICE OF NAVAL RESEARCH
WASHINGTON, D.C.

5 Sealab Men Are Decorated For '64 Project

SAN DIEGO — Five pioneers in the Navy's Man-in-the-Sea program were honored during a ceremony at the Scripps Institution of Oceanography here.

Four Legions of Merit and a Secretary of the Navy Commendation Medal, were presented to two Naval officers and three enlisted men who took part in Sealab I last year. The presentations were made by Rear Adm. Walter H. Price, Commandant, 11th Naval District.

Receiving the Legion of Merit were Capt. George Bond (MC), his second award; Lt. Comdr. Robert E Thompson (MC), currently stationed at the Naval Hospital, San Diego; Sanders W. Manning, Senior Chief hospital corpsman, who is a diver assigned to Sealab II; and Robert A. Barth, chief quartermaster, also assigned as a diver in Sealab II.

Robert C. Sheats, master chief torpedoman's mate, who trained the divers for Sealab I, received the Secretary of the Navy Commendation Medal.

Capt. Bond, who is the principal investigator in Project Sealab II, received a Gold Star in lieu of his second Legion of Merit Medal.

His citation read:

"Captain Bond's insight into the ability of United States Naval personnel to live for extended conditions that permit them to operate effectively without dependence upon direct surface ship support, has granted the United States Navy for the first time a new dimension of operations and a capability not previously possessed by any person or country . . ."

Probably the most important benefit of the experiment, a Navy spokesman said, would be to show that deep-water salvage and rescue operations are possible after submarine, ship or plane disasters.

"These initial steps, if successful, also would open up the entire continental shelf to future exploration," he added.

Earlier, ear infections struck nine of the ten aquanauts in Sealab.

Capt. George Bond, chief investigator of the 45-day experiment, said the infections caused pain and swelling but did not curtail the aquanauts' activities in and around their underseas home.

Physicians agreed that microorganisms in the ocean were to blame for the first report of an adverse physical condition in Sealab since the divers descended.

Dr. Sonnenburg treated the infections with an antibiotic and swabbing the ears with another medicine.

* * *

THE SEALAB project was started with a brief prayer service, held the day the first team started their 15-day stay.

A special Sealab prayer was used at the Sunday service. It was written by Capt. Bond, who conducted the service from the mothership Berkone.

It went like this:

"Almighty God, who declared through Holy Scripture that mankind would one day acquire dominion over the seas and the creatures therein, grant that this day fulfillment of Thy word is at hand.

"To the brave and dedicated men who have committed themselves to this project, grant Thine unending watch and safeguarding care in all the hours of their life under the sea. Give unusual wisdom to each of us topside who might somehow control their work and safety as they perform their duties below.

"And when their work and Thy will together be done, grant us all a safe and worthy respite from our labors for a time to come. We ask all of this in the name of Jesus Christ our Lord, Amen."

Minneapolis (Minn.) Star
THURSDAY, SEPTEMBER 23, 1965

Aquanauts Postpone Deep Dive Second Time

LA JOLLA, Calif. — (AP) — A fouled line has caused the aquanauts in Sealab-2 to postpone their scheduled deep dive for the second time.

The aquanauts left their capsule at 205 feet beneath the sea Wednesday on an excursion that could have taken them down to their safety limit of 266 feet.

The record to date is 234 feet.

But a kink developed in the air line to their depth gauge and they had to give it up for another day.

Object of the deep dive is to recover a way station, a small chamber where the divers can rest and replenish their supply of breathing gas.

Visibility in the water around the Navy's underwater living project was the best it has been since the program started Aug. 28. The aquanauts said they could see 25 feet.

The men are in good condition, according to two officials who paid them a short visit yesterday.

Dr. George Bond, principal investigator, and Capt. Walter Mazzone, physiological control officer, swam down to the capsule and talked to the men for about 11 minutes.

Burlington (Ia.) Hawk-Eye
THURSDAY, SEPTEMBER 23, 1965

New Sealab Dive Delayed

LA JOLLA, Calif. (AP) — A fouled line has caused the aquanauts in Sealab 2 to postpone their scheduled deep dive for the second time.

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Object of the deep dive is to recover a way station, a small chamber where the divers can rest and replenish their supply of breathing gas.

From SEP 22 1965
PRESS
PITTSBURGH, PA.

Astronaut-Aquanaut M. Scott Carpenter joined two teammates in the man-in-the-sea project in diving 266 feet below the ocean's surface off La Jolla, Calif.

Yesterday's dives by Spaceman Carpenter, Robert Barth and John Reeves were the deepest yet for any of the aquanauts who've been working at a depth of 205 feet in Sealab-2, their 57-foot-long cylindrical home-away-from-home.

Astronaut Carpenter, the second American to orbit the earth, headed the first two 10-man aquanaut teams. He is in his fourth and last week of submersion.

* * *

San Francisco, Calif.
Examiner
Cir. D. 289,469 - S. 427,093)

SEP 22 1965

Aquanauts Set 266-Ft. Dive

LA JOLLA—(AP)—Three Navy aquanauts from the Sealab 2 underwater laboratory hoped to dive to 266 feet below the surface of the Pacific today—their deepest to date.

The dive originally had been scheduled yesterday, but was postponed when the aquanauts were diverted to recover a way station that had tipped over and was lost while it was being lowered.

he way station is a small steel chamber where the aquanauts can rest and replenish their breathing supply while working on the bottom.

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EVENING TRIBUNE SAN DIEGO, CALIFORNIA Friday, Sept. 24, 1965

Veteran Navy Diver, Slated for Sealab, Recalls Weird Hunt

Aquanaut Was Forced to Seek Philippine Treasure for Japanese

By LEO BOWLER
EVENING TRIBUNE Science Writer

The aquanaut who will replace Scott Carpenter as Sealab team leader this weekend was once a reluctant diver in perhaps the weirdest treasure hunt of all time.

The diver is Chief Master Torpedoman Bob Sheats, 47, a veteran of 30 years in the Navy. The treasure consisted of 30 million silver pesos, and the place was Manila Bay.



BOB SHEATS
Carpenter's replacement

Sheats is scheduled to enter Sealab tomorrow. Carpenter and the present Sealab team will come up Sunday. Sheats and nine other aquanauts will then spend 15 days under the sea at 205 feet.

The stint in Sealab is to be Sheats' final big adventure in the Navy. He will retire in March.

His adventure in Manila Bay started one morning in 1942 when a Japanese officer mustered the Americans in the infamous Philippine Island prisoner of war camp at Cabanatuan and called out the names of men known to be proficient in deep sea diving.

Sheats' name was on the Japanese officer's list. The Navy man had been captured in the fall of Corregidor after fighting his way down the Bataan Peninsula and crossing to the island in a small boat with three other men.

Told to Dive or Die

Sheats and the other prisoners were taken to a barge in Manila Bay. They were told to dive or be shot.

In the last days before the fall of the islands, the American authorities had ordered the silver in the Philippine treasury boxed or placed in sacks and dumped into the bay.

The location of the money was known only to a few Americans, but the Japanese were able to ferret out the information.

At first they used native divers in the recovery effort but the men they selected were experienced only in diving to 35 feet and the treasure was under 130 feet of water. When several of the natives died of the bends, the Japanese decided to force the Americans to dive for the money.

Yanks on the Spot

The Americans were on the spot. If they brought up the silver, the Japanese would use it to finance the war against their countrymen. If they refused to dive, the Japanese might carry out their death threat.

Sheats and eight others decided to dive, but to sabotage the effort to the fullest extent possible.

They began bringing up a box of silver on every third dive. They told the Japanese that the work was too difficult for them to accomplish any more.

On the two other dives, the Americans broke open the boxes or slit the sacks and let the coins scatter into the mud on the bay bottom where it could not be recovered.

"Our efforts went well for awhile," Sheats said. "We were able to steal some of the silver and smuggle it to the native population.

"But after awhile, the Japanese found some Moro divers who could operate at the depths where the silver was.

"We sent a delegation to the barge from which the Moros worked and asked them to join our program of sabotage. They agreed to do so, but the agreement lasted only about a week.

"Then the Moros began bringing up four or five boxes on every dive and the jig was up. The Japanese sent the Americans back to Cabanatuan."

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)
SEP 24 1965


—Associated Press Wirephoto

SEALAB LETTER DELIVERED

Mrs. John Reaves of Oxnard displays letter mailed to her from SeaLab II undersea off La Jolla by her husband, member of aquanaut team. Letter, autographed by other aquanauts, was brought to surface by porpoise, Tuffy, during his work with the SeaLab project.

SAN DIEGO
EVENING TRIBUNE
SEP 24 1965



PROBING FUTURE — Henry Mumma, president of the Bureau of Home Appliances, and Finn Claudi-Magnussen, right, chamber official, inspect a model of Lockheed's deep-diving submarine Deep Quest.

SAN DIEGO
EVENING TRIBUNE
SEP 25 1965

Carpenter Up

Sealab: Time for 3rd Team

LA JOLLA, Sept. 25 (UPI)—Three members of a third team of aquanauts descended today to Sealab 2 at a depth of 205 feet in the Pacific to begin the final phase of the Navy's 45-day man-in-the-sea project.

The three will be joined by seven other members of the final team tomorrow for a 15-day stay under water testing survival techniques and collecting data on marine flora and fauna.

M. Scott Carpenter, the former astronaut turned aquanaut, will come to the surface tomorrow after 30 days in the watery environment. He is the only aquanaut to remain under water for that length of time.

The three who joined him and nine members of the second team today were: Robert Sheats, 49, master torpedoman from Bremerton, Wash.; William J. Bunton, 32, experimental test mechanic at the naval electronics laboratory in San Diego; and boatswain's mate 1st class William D. Meeks, 34, of Ponca City, Okla.

They went down 24 hours ahead of the rest of the third team so they could be briefed on procedures and familiarize themselves with the 114 logs the aquanauts have been keeping on underwater conditions.

These logs contain data on such matters as the aquanauts' blood pressure, experiment schedules and results, use of electrical current, and presence of various gases in Sealab 2—their 200-ton, 57-foot long underwater home.

Sheats, Bunton and Meeks descended in a diving bell to the 150-foot level and then swam to Sealab 2. They were equipped with Scuba (self-contained underwater breathing apparatus) gear.

Carpenter and the members of the second team will start to the surface in a transfer chamber at 7 a.m. tomorrow and then will enter a decompression chamber on the deck of the project mother ship, Berkone.

This is necessary to purge their blood streams of helium acquired under the surface. Otherwise they would be susceptible to the bends — a sometimes fatal ailment caused by gas in the blood stream.

The Plain Dealer
Cleveland, O.
A.M.-circ. 339,112
Sun.-circ. 494,645
SEP 24 1965

Teamwork Is Better on 2d Sealab

LA JOLLA, Calif. (AP) — Thanks to better discipline below and better understanding topside, says Navy Capt. George Bond, there has been no recurrence in Sealab 2 of "a certain degree of independence not compatible with safety" observed in last year's Sealab 1 experiment off Bermuda.

Bond, senior medical officer in both tests of divers' ability to function for long periods at extreme depths, says "Safety was drilled into the Sealab 2 men constantly in their predive indoctrination and this time there has been no emotional dissociation from people on the surface."

A NAVY psychologist earlier said the human tendency to adapt completely to a new environment had caused resentment against orders from topside to crop up among the four divers who spent 11 days at a depth of 193 feet in Sealab 1.

He said this was one of the things psychologists were watching for among the three teams of 10 scheduled to spend 15 days each in Sealab 2, resting on the sea floor at a depth of 205 feet 1,000 yards off this coastal resort.

Bond and Capt. Walter Mazzone, physiological control officer, spent 13 minutes in the 12-by-58-foot steel cylinder and reported the Sealab crew had two requests. They wanted to vary their diet of dried and frozen foods with a fresh roast of beef, which was put on the menu yesterday.

"THEY ALSO WANTED to know how the weather was on the surface," Bond smiled. "As you know, the weather below gets pretty monotonous."

Bond said five sea lions have become very curious about the divers' underwater home, staring at them through the portholes that line its sides.

"They'll probably become something of a nuisance before it's over with," he said.

THE CHRISTIAN SCIENCE MONITOR Saturday, September 25, 1965



Associated Press Wirephoto

From the deep on porpoise

Mrs. John Reaves of Oxnard, Calif., whose husband is one of the aquanauts in Sealab 2 off La Jolla, Calif., displays an envelope autographed by the aquanauts. It was mailed to her from the underwater experimental project. It was brought to the surface by Tuffy, a porpoise trained to work with the aquanauts.

Sealab aquanauts keeps busy

By the Associated Press

La Jolla, Calif.

Aquanauts M. Scott Carpenter and Wallace T. Jenkins have descended to 253 feet in the deepest ocean dive yet at the Sealab 2 underwater living project.

Two previous attempts to make deep dives had been postponed and apparent trouble with a depth gauge required the aquanauts to stop short of their goal of 266 feet. Their previous record was 234 feet.

Mr. Carpenter said the depth gauge did not seem to be functioning correctly and he called off the dive. He said it appeared that they were deeper than the gauge recorded.

Water clarity was improved at the Sealab site 205 feet beneath the ocean's surface Thursday, with visibility to 30 feet.

The culinary aspects of undersea living will now occupy some of the aquanauts.

"They'll make pancakes for the first time, using a greaseless griddle," a spokesman said. "They also will attempt to make homemade biscuits."

Cooking is no easy chore at that depth, where the air inside Sealab 2 is only 3.5 percent oxygen, with the rest primarily helium.

"The biscuits will probably end up being flat, but edible," the spokesman said. "It's hard to get them fluffy under seven atmospheres of pressure. They will use a lot more baking powder, too."

From
EVENING NEWS
Newark, N. J.
SEP 23 1965

Kink Delays Sealab Dive

Aquanauts Call Off Deep Plunge Because of Fouled Line

LA JOLLA, Calif. (AP) — A fouled line has caused the aquanauts in Sealab 2 to postpone their scheduled deep dive for the second time.

The aquanauts left their capsule at 205 feet beneath the sea yesterday on an excursion that could have taken them down to their safety limit of 266 feet.

But a kink developed in the air line to their depth gauge and they had to give it up for another day.

Visibility 25 Feet

Visibility in the water around the Navy's underwater living project was the best it has been since the program started Aug. 28. The aquanauts said they could see 25 feet.

Dr. George Bond, principal investigator, and Capt. Walter Mazzone, physiological control officer, swam down to the capsule yesterday and talked to the men for about 11 minutes.

"They look much more healthy in person that they do in those shadowy pictures I see of them on the television," Bond said.

THE SAN DIEGO UNION
Sat., Sept. 25, 1965 ④
SAN DIEGO, CALIFORNIA

Aquanauts Dive Below SeaLab To Sheer Cliff

Find New World At 266 Feet

By BRYANT EVANS
The San Diego Union's Science Writer

An underwater trip that was a pioneering expedition Thursday will become a fascinating nature swim for SeaLab II aquanauts today.

The trip is a dive along the slopes of Scripps submarine canyon to a depth of 266 feet — 61 feet below the level of the SeaLab chamber.

YELLOW PATH

Cmdr. M. Scott Carpenter and Wally Jenkins first made the trip Thursday. They thought that they had not gone the full distance, but found later when the reading on their pneumofathometer was corrected, that they had reached the intended depth.

Then yesterday two other aquanauts, whose names were not given, made the trip. A yellow line was laid down as a path for others to follow.

Today the remaining six aquanauts on the second SeaLab team are scheduled to follow the trail.

CORAL COLLECTED

According to the aquanauts' reports, the trail is one that any park service guide would be glad to recommend. It goes to the edge of a sheer precipice. As the aquanauts went lower under SeaLab, they found that the water became clear — perhaps twice as clear as it was from the lab.

They also found that the wildlife changed as they descended. Fish of species that did not come as high as SeaLab were plentiful near the precipice. They brought back samples of gorgonio coral they had collected.

Today's canyon excursion will mark the last day's activity on the sea bottom for second team members. All 10 are to come to the surface at about 7:30 a.m. tomorrow.

Aquanaut Robert Sheats, captain of team three, will move aboard SeaLab II today. Aquanauts William Meeks and William Bunton will go with him. They will stay overnight to await the remaining seven members of the team tomorrow.

With the second team still aboard, the lab will have to accommodate 13 tonight.

The personnel transport capsule, the pressurized elevator the aquanauts use for going to the surface, was brought up to the mother ship, the Berkone, for inspection and cleaning yesterday.

Also, new ducts were added to the deck decompression chamber on the Berkone to provide better ventilation and dehydration to the room where the aquanauts will have to spend more than 30 hours after they reach the surface.

Sam, the sea lion who has volunteered on the aquanaut team, yesterday continued to undergo training near the Berkone. She answered 30 buzzer signals and each time was rewarded with a fish.

129

San Francisco, Calif.
Examiner
(Cir. D. 289,469 - S. 427,093)

SEP 24 1965

Aquanauts' Deepest Dive Yet--Descend to 253 Feet

LA JOLLA — (AP) — Aquanauts M. Scott Carpenter and Wallace T. Jenkins have descended to 253 feet in the deepest ocean dive yet at the Sealab 2 underwater living project.

Two previous attemtpts to make deep dives were postponed and apparent trouble with a depth gauge required the aquanauts yesterday to st[illegible] short of their goal of 266 fe[illegible]

[illegible]heir previous record was 23[illegible] feet.

CARPENTER said the depth gauge did not seem to be functioning correctly and he called off the dive. He said it appeared they were deeper than the gauge recorded.

Water clarity was improved at the Sealab site 205 feet beneath the ocean's surface ysterday, with visibility to 30 feet.

The culinary aspects of undersea living occupied some of the aquanauts today.



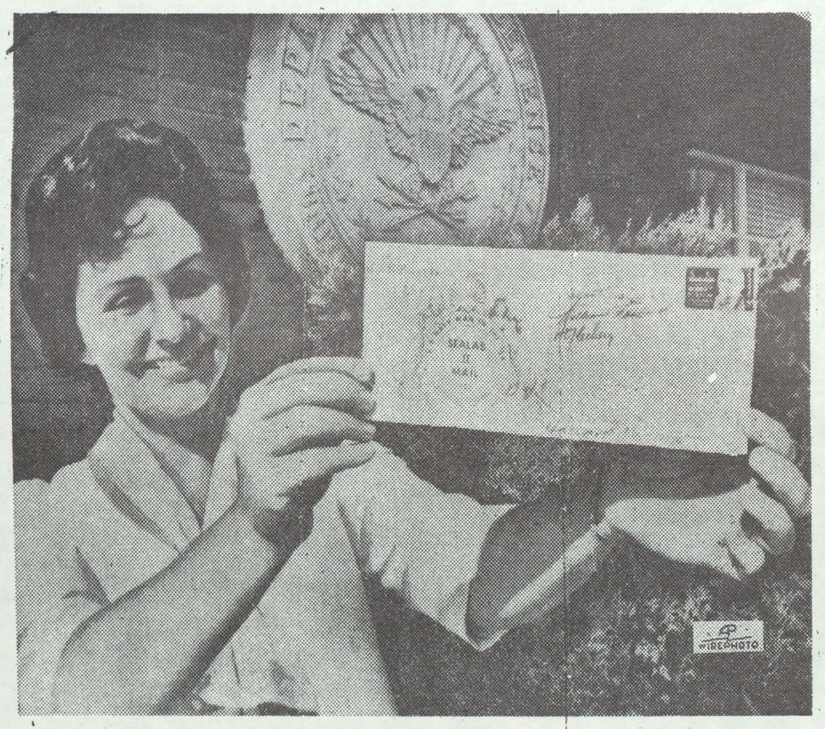
AQUANAUT WIFE MRS. REAVE WITH SEABOTTOM LETTER
It was brought to surface by Tuffy, a porpoise doubling as mailman
A. P. Wirephoto

"THEY'LL make pancakes for the first time, using a greaseless griddle," a spokesman said. "They also will ateempt to make biscuits."

Cooking is no easy chore at that depth, where the air inside Sealab 2 is only 3.5 percent oxygen, with the rest primarily helium.

They can't use grease because it would result in too much toxic gas.

From SEP 24 1965
MORNING SUN
Baltimore, Md.



LETTER FROM SEALAB—Mrs. John Reaves of Oxnard, Cal., whose husband is one of the aquanauts in Sealab 2, shows envelope mailed to her from the underwater project.

ELG. TELEGRAM - WISCONSIN FRIDAY 9/24/65



MAN FROM TWO WORLDS—Navy Commander M. Scott Carpenter is the first human to have lived in both inner and outer space. Astronaut Carpenter orbited the earth in May of 1962. Aquanaut Carpenter has been living 205 feet beneath the Pacific Ocean since August 29 in a 12 by 57 foot undersea chamber as part of the 45-day Navy man-in-the-sea program. Carpenter is the only man in the experiment who will stay in the chamber for 30 days. (AP Wirephoto)

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

SEP 24 1965

Aquanauts On Sealab Show Better Discipline This Year

La Jolla, Cal., Sept. 23 (AP)—There are no naughty-nauts among the aquanauts in Sealab 2.

Thanks to better discipline below and better understanding topside, says Navy Capt. George Bond, there has been no recurrence of "a certain degree of independence not compatible with safety" observed in last year's Sealab 1 experiment off Bermuda.

Bond, senior medical officer in both tests of divers' ability to function for long periods at extreme dephts, says "safety was drilled into the Sealab 2 men constantly in their predive indoctrination and this time there has been no emotional dissociation from people on the surface."

A Navy psychologist earlier said the human tendency to adapt completely to a new environment had caused resentment against orders from topside among the four divers who spent eleven days at a depth of 193 feet in Sealab 1.

He said this was one of the things psychologists were watching for among the three teams of ten scheduled to spend fifteen days each in Sealab 2, resting on the sea floor at a depth of 205 feet 1,000 yards off this coastal resort.

"There was no outright refusal to obey orders in the Sealab 1 test," Captain Bond said today after a quick dive yesterday to check on the health of his men, "but was some dissociation.

"In Sealab 1 we tried to keep in touch constantly with the men below. In Sealab 2, however, we are giving them greater autonomy—we seldom talk to them more than one every seven or eight hours."

Bond and Capt. Walter Mazzone, physiological control officer, spent 13 minutes in the 12 by 58-foot steel cylinder and reported the Sealab crew had two requests. They wanted to vary their diet of dried and frozen foods with a fresh roast of beef, which was put on the menu today.

"They also wanted to know how the weather was on the surface," Bond smiled. "As you know, the weather below gets pretty monotonous."

Bond said five sea lions have become very curious about the divers' underwater home, staring at them through the portholes that line its sides.

May Be Nuisance

"They'll probably become something of a nuisance before it's over with," he said.

"I wouldn't be surprised if the sea lions start trying to come up through the divers' access hatch before long."

He said some of the divers wake up with headaches, probably a sinus condition due to the extreme pressure—more than six times that at the surface—maintained in Sealab 2 to offset the crushing weight of the ocean.

Ocean Exploitation Future Seen Bright

Science, Industry Leaders Conduct Panel At Appliances Bureau Meeting

A bright and prosperous future in the industrial exploitation of the ocean was forecast last night by a panel of science and industry leaders at the annual meeting of the Bureau of Home Appliances in the Hilton Inn.

An announcement that future SeaLab experiments would be conducted at 450 and 650 feet below the ocean surface was made by Henry A. O'Neal, program director for the SeaLab II operation.

In his talk to the nearly 500 members of the audience, O'Neal said SeaLab was using standard household appliances on the bottom of the sea because they were found to be more satisfactory than any other special appliances that could be obtained.

He said that the men in SeaLab II demonstrated none of the personal independence from surface direction that had characterized the aquanauts of SeaLab I off Bermuda last year. He suggested that the more typical ocean environment here as contrasted with the clear tropical waters might have contributed to the more cooperative spirit.

The industrial future of oceanography was dealt with in the six-man panel conducted by Finn Claudi-Magnussen, chairman of the Chamber of Commerce committee on oceanography.

In summarizing the panel discussion, Claudi-Magnussen said that San Diego's advantages in the growing field of marine science included access to variable ocean conditions, the number of companies engaged in the production of modern hardware, and the presence of advanced naval and oceanographic institutions.



From SEP 24 1965
TRIBUNE
Chicago, Ill.

[AP Wirephoto]

Mrs. John Reaves, of Oxnard, Cal., showing letter mailed to her from underwater Sealab II by her aquanaut husband. It bears autographs of the entire aquanaut team submerged in the Pacific, and was carried to the ocean surface by Tuffy, porpoise trained to run errands for aquanauts.

UNDERSEA CREW ATTITUDE CHANGES

Aquanauts Run Tight Ship on Sealab



THE ONLY MAN who is staying in Sealab for 30 days is Navy Commander M. Scott Carpenter who orbited the earth in May, 1962, giving him the honor of being the first human to have lived in both inner and outer space.

LA JOLLA, Calif. —(AP)— There are no naughty-nauts among the aquanauts living 205 feet under water in the Sealab.

Thanks to better discipline below and better understanding topside, says Navy Capt. George Bond, there has been no recurrence of "a certain degree of independence not compatible with safety" observed in last year's Sealab 1 experiment off Bermuda.

Bond has been senior medical officer in both tests of divers' ability to function for long periods at extreme depths.

* * *

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"There was no outright refusal to obey orders in the Sealab 1 test," Capt. Bond said Thursday, "but there was some dissociation.

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"They also wanted to know how the weather was on the surface," Bond smiled, The weather below gets pretty monotonous."

* * *

BOND SAID five sea lions have become very curious about the divers' underwater home, staring at them through the portholes that line its sides.

"I wouldn't be surprised if the sea lions start trying to come up through the divers' access hatch before long," he said.

He said some of the divers wake up with headaches, probably due to extreme pressure —more than six times that at the surface — maintained in Sealab 2 to offset the crushing weight of the ocean.

"They get over it, however, as soon as they get up and stir around," Bond said.

From SEP 24 1965
FREE PRESS
Detroit, Mich.

EVENING NEWS
Newark, N. J.
SEP 24 1965

Depth Gauge Balks Divers

Aquanauts Stopped at 253 Feet as Device Malfunctions

LA JOLLA, Calif. (AP) — Aquanauts M. Scott Carpenter and Wallace T. Jenkins have descended to 253 feet in the deepest ocean dive yet at the Sealab 2 underwater living project.

Two previous attempts to make deep dives had been postponed and apparent trouble with a depth gauge required the aquanauts yesterday to stop short of their goal of 266 feet. Their previous record was 234 feet.

Carpenter said the depth gauge did not seem to be functioning correctly and he called off the dive. He said it appeared that they were deeper than the gauge recorded.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

SEP 24 1965

Fouled Line Delays Test

LA JOLLA, Calif. (AP) — A fouled line has caused the aquanauts in Sealab 2 to postpone their scheduled deep dive for the second time.

The Aquanauts left their capsule at 205 feet beneath the sea Wednesday on an excursion that could have taken them down to their safety limit of 266 feet.

Their record to date is 234 feet.

But a kink developed in the air line to their depth gauge and they had to give it up for another day.

Object of the deep dive is to recover a way station, a small chamber where the divers can rest and replenish their supply of breathing gas.

Visibility in the water around the Navy's underwater living project was the best it has been since the program started Aug. 28. The aquanauts said they could see 25 feet.

The men are in good condition, according to two officials who paid them a short visit.

Dr. George Bond, principal investigator, and Capt. Walter Mazzone, physiological control officer, swam down to the capsule and talked to the men for about 11 minutes.

Los Angeles, Calif.
Times
(Cir. D. 812,147 Sun. 1,149,295)
SEP 24 1965



DOLPHIN MAIL—Mrs. John Reaves of Oxnard displays envelope she received from her husband delivered from SeaLab II, via Tuffy the porpoise, from the bottom of the Pacific Ocean off La Jolla. All 10 aquanauts, including L. Scott Carpenter, signed the envelope, decorated with drawings of King Neptune and a mermaid. Reaves, a photographer on SeaLab team, expects to surface next Monday.

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6-The Evening Telegram
Saturday, Sept. 25, 1965

THE EVENING TELEGRAM COMPANY
SUPERIOR, WISCONSIN
Founded 1890 and Published Until 1932
By J. T. MURPHY
Morgan Murphy
Publisher

Roy H. Westman, General Manager
Clough Gates, Executive Editor
Paul J. Skamser, Business Manager
Wm. L. Gelligoald, Managing Editor

Yet it was kind of you to share my trouble. —Philippians 4:14.

Above and Below the Sea

Two hundred and five feet from land isn't quite as far as 100 miles or more above the earth.

But it still isn't everyday, normal living when it happens to be 205 feet under water. And especially when you're down there for 30 days without even one land break.

That's what astronaut—now aquanaut—Scott Carpenter is doing. And you couldn't blame him if he were to saunter up to astronauts Gordon Cooper and Charles Conrad when he finally surfaces late in September and ask innocently, "Why did you fellows hurry home? Didn't you like it up there?"

The project that has taken Commander Carpenter and nine other members of a Navy research team deep down in the waters of the Pacific off La Jolla in Southern California hasn't caused as much excitement as the spectacular eight-day flight of Gemini 5. But this was to be expected.

For one thing, it's harder to spell and pronounce "oceanology" than "space."

And while it's undeniably unusual for a man to leave a 50-foot cylindrical steel chamber and meander along the sea floor for as long as two hours at a time, it still lacks the popular appeal of a human being stepping out of a whizzing space capsule into what amounts to weightless nothingness.

Nevertheless, the experiment Carpenter and his colleagues are conducting is vitally important to the future of the world and its inhabitants. For, more and more, posterity's chances of assured comfort, if not actual survival, depend on what can be extracted from the sea and its floor.

Thus Carpenter is again making a thrilling, adventurous and important contribution to the future of his country and the world.

We who live today are privileged to be able to see man take such dramatic and gigantic strides toward achieving his oldest dream—dominion over the waters and the air as well as the land.

From SEP 25 1965
MORNING SUN
Baltimore, Md.

PORPOISE, SEALAB AIDE, IS HONORED

Letter Carriers' Group Elects Him For His Delivery Of Mail

La Jolla, Cal., Sept. 24 (AP)—Tuffy, the porpoise who delivered mail to Sealab 2, has been made an honorary member of Branch 343 of the National Association of Letter Carriers.

Officials at the Navy's underwater living experiment received the letter from the St. Louis branch informing Tuffy of his new honor.

The porpoise carried the mail several times to the Sealab capsule 205 feet beneath the ocean's surface in experiments to determine if he could be of help to aquanauts.

Lapel Pin Enclosed

The letter enclosed a lapel pin for Tuffy and noted that the carriers hoped he had been provided with a can of anti-dog spray "for use on any seadogs he might encounter."

The carriers suggested that the Post Office motto be chanted to include the ocean depths as among the things that can't sway a mailman from completion of his rounds.

Aquanaut M. Scott Carpenter said today that his deep dive to 266 feet took him to an 80 degree dropoff at the edge of an even deeper canyon.

Deepest Excursion Made

Carpenter and Aquanaut Wallace Jenkins made the dive yesterday in the deepest excursion yet at Sealab 2.

Carpenter said the visibility at the canyon's edge was better than around the Sealab habitat and they could see 25 to 30 feet.

The bottom at that depth was hard packed and covered with large rocks.

SCHOOLING SWIFT

Sam the Sea Lion Shaped for Sealab

By LEO BOWLER
EVENING TRIBUNE Science Writer

Sam the sea lion went to school again today — even though it's Saturday—at the Sealab II site off La Jolla.

Sam is being pushed through a hurry-up course to prepare him for a possible dive on cue to Sealab.

Mike Greenwood, a psychologist from New London, Conn., has taken over Sam's instruction. Greenwood hopes Sam will earn a scholarship to attend the Point Mugu school which turned out Tuffy the porpoise.

If Sam makes the grade, he will be netted and taken to Point Mugu for his higher education. In the meantime, he sits on a buoy 200 yards from the Sealab mothership Berkone and waits for Greenwood to call him, or frolics with other sea lions which live in the area.

There is a mild controversy aboard the Berkone. Some think Sam is a male, but another faction is sure Sam is a female and should be called Samantha.

Greenwood started training Sam earlier this week, using one of the buzzers left over from Tuffy's visit and some of the mackerel which had been brought to the Berkone to feed Tuffy.

When Sam got the idea that a buzz in the water meant an easy snack, he began responding to the call, even to the point of leaving the sea lion herd and swimming 200 yards to the buzzer.

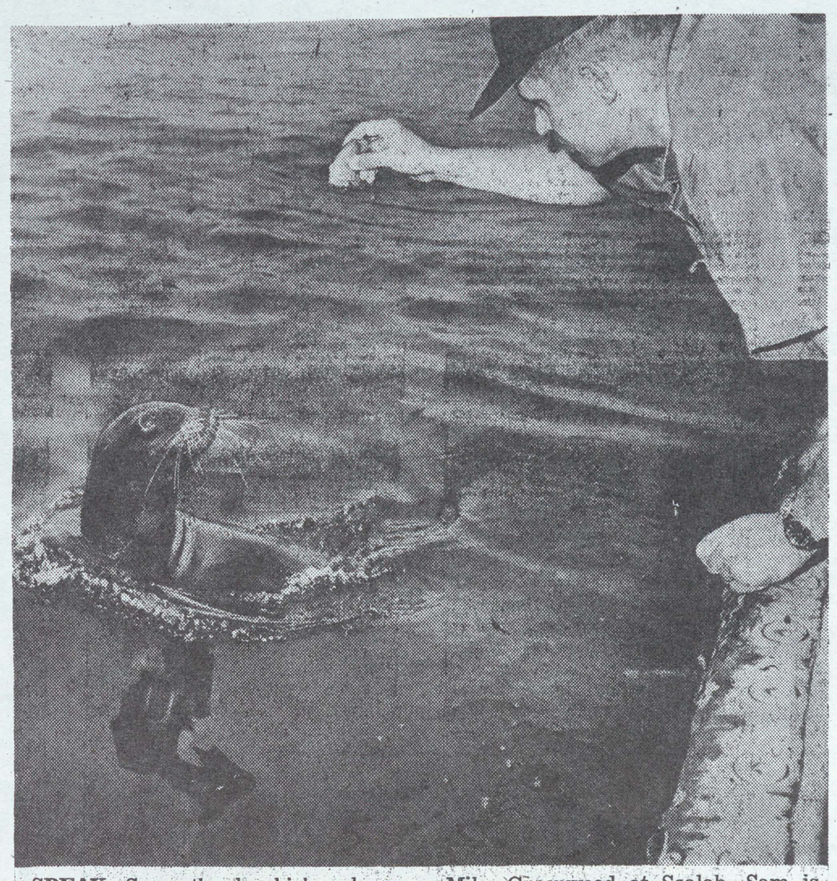
Greenwood, who has had much experience training animals, especially monkeys, said Sam is progressing faster than any animal he has ever seen.

Sam may have already visited Sealab with the other sea lions who dive down to feed on the fish that swarm around the underwater residence, but if he has, no one has recognized him.

Greenwood is trying to figure out a way to mark Sam so that he is easily identifiable. He is considering putting some sticky white paint on the buoy which Sam uses for a perch in the hope that the paint will rub off and serve as a marker.

Greenwood has enlisted the help of Ken Conda, one of the aquanauts now in Sealab. After Conda comes up tomorrow, Greenwood hopes that he will swim with Sam and start training the sea lion to dive.

If the training works out, Greenwood wants to lower the buzzer to Sealab so the aquanauts can call Sam to see if he will dive down to see them. Conda is one of the divers who worked with Tuffy.



SPEAK—Sam, the bewhiskered sea lion, eyes a mouth-watering chunk of mackerel offered by psychologist Mike Greenwood at Sealab. Sam is taking entrance exams for Point Mugu school for divers' aides.

'WEATHER STATION' SET UP NEAR SEALAB

LA JOLLA, Calif., Sept. 1 (AP)—Navy divers and scientists living in Sealab 2 at a depth of 205 feet 1,000 yards off the southern California coast, started setting up a "weather station" today 175 feet from the trailer-sized laboratory.

The station will record water temperatures and currents, which have a bearing on how well men can operate at the ocean's bottom.

With the weight of the ocean on their bodies creating a pressure six times that at the surface, they expect it will take four or five men two days to complete the fairly simple task. The ten aquanauts began their experiments Saturday.

A Navy spokesman said each man had averaged more than 47 minutes of outside work yesterday and this was expected to increase to two or more hours a day.

Inside the laboratory they are busy with research projects, such as cataloging marine life in the area and measuring their own heart beat and brain wave patterns to see if there are any changes due to the stress of living in an underwater world.

Three teams of 10 men will rotate in 15-day tours on the bottom to test the endurance of men in the sea. N.Y. TIMES 9/25/65

From SEP 25 1965
STAR
Kansas City, Mo.

Four Weeks In Sealab Nearing End

La Jolla, Calif. (AP)—M. Scott Carpenter, Navy astronaut-aquanaut, whose home the last four weeks has been on the murky bottom of the Pacific ocean, is about set to start his long voyage to the surface.

Carpenter, a Navy commander, and his team of nine fellow aquanauts are scheduled to begin their 33-hour period of decompression early tomorrow morning. And, while they are surfacing, a fresh team of 10 divers will set-up housekeeping in the Sealab 2 underwater laboratory, 205 feet below the surface.

Today, eight aquanauts were scheduled to dive to depths of 266 feet. Carpenter and Aquanaut Wallace Jenkins made the dive Thursday—the deepest excursion yet at Sealab 2.

If all goes according to schedule, Carpenter will have spent 29½ days in Sealab 2. Counting the 33-hour decompression period, the veteran space-underwater explorer will have completed more than 30 days under pressurized conditions.

THE HOUSTON POST
TUESDAY, SEPTEMBER 28, 1965

Sea Lion Outshines Ole Tuffy

LA JOLLA, Calif — (AP) — Divers chalked up an animal training success and a culinary failure Monday in the Navy's ocean-bottom Sealab 2.

Their success: They have found a super-smart wild sea lion, capable of learning in a few days some of the tricks a tame porpoise took weeks to master.

Their failure: Soggy pancakes.

THE PROGRESS report from the third team of 10 men spending 15 days 205 feet below the surface 1,000 yards off this city came just before the second team emerged after 30 hours in a decompression chamber.

The second team, led by astronaut-aquanaut M. Scott Carpenter, entered the chamber on a support vessel after being hoisted to the surface Sunday.

Plans called for Carpenter and his nine teammates to spend the night aboard the support vessel, then come ashore Tuesday morning.

IT WAS THE second team which discovered the brainy sea lion, at first called Sam and later Samantha.

Divers reported last Thursday that they had trained Samantha to come from as far as 200 yards on signal — a noise made by a buzzer.

The buzzer was the same used in the training of Tuffy, a tame male porpoise coached by Navy scientists at the Point Mugu, Calif, missile center. Tuffy, since flown back to Point Mugu, wore a harness to carry tool and rescue lines to divers swimming outside the Sealab.

SAMANTHA has shown evidence of extreme intelligence. She got confused later but was back on the beam Monday.

The third team also experienced the first major frustration of the Sealab 2 experiment. They learned they couldn't cook pancakes well.

"They were pretty soggy pancakes, burned on the top and bottom and not cooked at all in the center," a spokesman said.

"The extreme pressure prevented us of grease on the griddle. Hot grease gives off hydrocarbon gases which at that pressure would have penetrated the men's tissues deep enough to become toxic."

Most of the divers' food is frozen-dried and is prepared by heating in water.

Des Moines (Ia.) Register
SATURDAY, SEPTEMBER 25, 1965

His Porpoise? Carry Mail

LA JOLLA, CALIF. (AP) —Tuffy, the porpoise who delivered the mail to Sealab 2, has been made an honorary member of Branch 343 of the National Association of Letter Carriers.

Officials at the Navy's underwater living experiment received the letter from the St. Louis, Mo., branch informing Tuffy of his new honor.

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The letter enclosed a lapel pin for Tuffy and noted that the carriers hoped he had been provided with a can of anti-dog spray "for use on any seadogs he might encounter."

£A61LA

AMS BUDGET

NIGHT LEAD SEALAB (320)

BY ROBERT M. BURNETT

ASSOCIATED PRESS WRITER

LA JOLLA, CALIF., SEPT. 25 (AP)-THREE WILL MAKE A CROWD TONIGHT AS THE AQUANAUTS AT SEALAB 2 PREPARE TO CHANGE SHIFTS.

THREE AQUANAUTS FROM THE THIRD TEAM WILL SPEND THE NIGHT IN THE 12X58-FOOT STEEL CAPSULE WITH THE 10 MEMBERS OF TEAM TWO WHO ARE DUE TO SURFACE SUNDAY.

THE HABITAT FOR THE NAVY'S UNDERWATER LIVING EXPERIMENT WAS BUILT TO ACCOMMODATE 10 MEN AND THE 13 AQUANAUTS THAT WILL BE IN THE CAPSULE TONIGHT PLAN TO SLEEP IN SHIFTS.

THEY CALL IT "HOT-BUNKING."

SCHEDULED TO GO DOWN TO THE CAPSULE AT 205 FEET BELOW THE SURFACE TODAY WERE ROBERT SHEATS, CAPTAIN OF TEAM THREE; WILLIAM MEEKS AND WILLIAM BUNTON.

THE SECOND TEAM IS DUE TO COME UP SUNDAY MORNING IN THE PRESSURIZED PERSONNEL TRANSFER CAPSULE AND SHOULD BE INSIDE THE DECOMPRESSION CHAMBER ON THE DECK OF THE SUPPORT SHIP, BERKONE, BY 9 A.M.

THEY WILL DECOMPRESS THERE FOR ABOUT 30 HOURS BEFORE BEING EXPOSED TO ATMOSPHERIC PRESSURE.

£A62LA

FOR CMDR. SCOTT CARPENTER, THE ASTRONAUT TURNED AQUANAUT, THE RETURN TO FRESH AIR AND SUNSHINE WITH THE SECOND TEAM WILL BE PARTICULARLY SIGNIFICANT.

HE HAS BEEN ON THE OCEAN FLOOR SINCE THE BEGINNING OF THE EXPERIMENT ON AUG. 28. THE OTHER DIVERS IN THE FIRST TWO TEAMS SPENT 15 DAYS UNDERWATER.

THE REMAINDER OF THE THIRD TEAM WILL DESCEND TO THE CAPSULE SUNDAY AFTERNOON.

TUFFY, THE PORPOISE, HAS A RIVAL FOR HIS POST AS MASCOT OF THE SEALAB PROJECT.

SAM, THE SEA LION, IS UNDERGOING TRAINING IN HOPES HE CAN BE TAUGHT TO DIVE TO THE CAPSULE LIKE TUFFY DID.

SAM IS ONE OF SEVERAL SEA LIONS THAT HAVE MOVED INTO THE AREA.

MIKE GREENWOOD, A PSYCHOLOGIST WITH EXPERIENCE TRAINING ANIMALS, SAYS SAM IS THE BEST PUPIL HE HAS EVER HAD.

FH1239PPD NME

131

From SEP 26 1965
TRIBUNE
Chicago, Ill.

SEALAB 2 GETS CROWDED AS 3 JOIN 10 OTHERS

La Jolla, Cal., Sept. 25 (AP)—Three will make a crowd tonight as the aquanauts at Sealab 2 prepare to change shifts.

Three aquanauts from the third team will spend the night in the 12-by-37-foot steel capsule with the 10 members of team two who are due to surface Sunday.

The habitat for the navy's underwater living experiment was built to accommodate 10 men, and the 13 aquanauts who will be in the capsule tonight plan to sleep in shifts. They call it "hot-bunking."

205 Feet Below

Scheduled to go down to the capsule 205 feet below the surface today were Robert Sheats, captain of team three; William Meeks and William Bunton.

The second team is due to come up Sunday morning in the pressurized personnel transfer capsule and should be inside the decompression chamber on the deck of the support ship, Berkone, by 9 a. m.

They will decompress there for about 30 hours before being exposed to atmospheric pressure.

Down Since Aug. 28

For Comdr. Scott Carpenter, the astronaut turned aquanaut, the return to fresh air and sunshine with the second team will be particularly significant.

He has been on the ocean floor since the beginning of the experiment on Aug. 28. The other divers in the first two teams spent 15 days under water.

The remainder of the third team will descend to the capsule Sunday afternoon.

Tuffy Has Rival

Tuffy, the porpoise, has a rival for his post as mascot of the Sealab project.

Sam, the sea lion, is undergoing training in hopes he can be taught to dive to the capsule like Tuffy did.

Sam is one of several sea lions that have moved into the area.

Mike Greenwood, a psychologist with experience in training animals, says Sam is the best pupil he has ever had.

57
From
ROCKY MOUNTAIN NEWS
Denver, Colo.
SEP 26 1965

3d Aquanaut Team Begins Sealab Test

LA JOLLA, Calif., Sept. 25 — (UPI)—Three members of a third team of aquanauts Saturday descended to Sealab 2 at a depth of 205 feet in the Pacific to begin the final phase of the Navy's 45-day man-in-the-sea project.

The three will be joined by seven other members of the final team Sunday for a 15-day stay under water testing survival techniques and collecting data on marine flora and fauna.

Carpenter Returning

M. Scott Carpenter, the astronaut-turned-aquanaut, will come to the surface Sunday after 30 days in the watery environment. He is the only aquanaut to remain under water for that length of time.

The three who joined him and nine members of the second team Saturday were Robert Sheats, 49, master chief torpedoman from Bremerton, Wash.; William J. Bunton, 32, experimental test mechanic at the Naval Electronics Laboratory in nearby San Diego; and Boatswain's Mate 1st Class William D. Meeks, 34, of Ponca City, Okla.

They went down 24 hours ahead of the rest of the third team so they could be briefed on procedures and familiarize themselves with the 114 logs the aquanauts have been keeping on underwater conditions.

Contain Data

These logs contain data on such matters as the aquanauts' blood pressure, experiment schedules and results, use of electrical current, and presence of various gases in Sealab 2—their 200-ton, 57-foot-long underwater home.

5
From
HERALD TRIBUNE
New York, N. Y.
SEP 27 1965

Aquanaut breaks underwater record

Off La Jolla, Calif., astronaut-turned-aquanaut Scott Carpenter surfaced from Sealab 2 after spending 29 days 205 feet down (twice as long as anyone else nas lived underwater). Carpenter entered a decompression tank with eight other aquanauts—who'd been down only 15 days—and received President Johnson's phone congratulations while inside.

New York 38, N. Y.
From SEP 26 1965
CONSTITUTION Atlanta, Ga.

Carpenter To Surface After Month

LA JOLA, Calif. (AP) — Navy astronaut-aquanaut M. Scott Carpenter, whose home the past four weeks has been on the murky bottom of the Pacific Ocean, is about set to start his long voyage to the surface.

Carpenter—a Navy commander—and his team of nine fellow-aquanauts are scheduled to begin their 33-hour period of decompression early Sunday morning. While they are surfacing, a fresh team of 10 divers will set up housekeeping in the Sealab 2 underwater laboratory, 205 feet below the surface.

Saturday, eight aquanauts were scheduled to dive to depths of 266 feet. Carpenter and aquanaut Wallace Jenkins made the dive Thursday—the deepest excursion yet at Sealab 2.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)
SEP 26 1965

Mail Carriers Honor Porpoise

LA JOLLA, Calif. (AP) — Tuffy, the watch-porpoise who delivered the mail to Sealab 2, has been made an honorary member of Branch 343 of the National Association of Letter Carriers.

Officials at the Navy's underwater living experiment received the letter from the St. Louis, Mo., branch informing Tuffy of his new honor.

The porpoise carried the mail several times to the Sealab capsule 205 feet beneath the ocean's surface in experiments to determine if he could be of help to the aquanauts.

The letter enclosed a lapel pin for Tuffy and noted that the carriers hoped he had been provided with a can of anti-dog spray "for use on any seadogs he might encounter."

SAN DIEGO UN
SEP 26 1965
PUBLIC INFORMATION OFF
Eleventh Naval District
San Diego, California

Sam Actually Is Samantha, And No Lion

Sam the sea lion is now Samantha, if you please.

Scientists aboard the Berkone, the support vessel for SeaLab II off La Jolla, polled themselves yesterday and decided that the animal who had adopted them was really a female and not the male they at first thought.

Samantha seems to be the smartest of several sea lions attracted to the site either by curiosity or by fish swarming there, according to Michael Greenwood, a psychologist aboard the Berkone.

Greenwood has been using one of the buzzers previously operated to summon Tuffy the porpoise. And Samantha has caught on that when the buzzer sounds, it means she'll get a fish, so she hot-flippers over. The plan now is to train her to descend 205 feet to SeaLab.

Now, as to the SeaLab humans, three aquanauts from the third team took up abode in the undersea home yesterday. They are Robert Sheats, William Meeks and William Bunton. The remaining seven members of the team will join them today after the 10 men of the second team ascend to enter the Berkone's decompression chamber.

Team 3 will stay down for 15 days to wind up SeaLab's 45-day experiment to see how man can function and carry on research underwater.

From SEP 26 1965
SUN-TIMES
Chicago, Ill.

3d Sealab Team Starting 15 Days

LA JOLLA, Calif. (UPI)—Three members of a third team of aquanauts descended Saturday to Sealab 2 at a depth of 205 feet in the Pacific to begin the final phase of the Navy's 45-day man-in-the-sea project.

The three will be joined by seven other members of the final team Sunday for a 15-day stay under water, testing survival techniques and collecting data on marine flora and fauna.

M. Scott Carpenter, the astronaut turned aquanaut, will come to the surface Sunday after 30 days in the watery environment. He is the only aquanaut to remain under water for that length of time.

STAR 9/26/65

10 Sealab Aquanauts To Surface

LA JOLLA, Calif. (AP)—Ten aquanauts from Sealab 2 are due to surface today.

Scheduled to go down to the steel capsule 205 feet below the surface were Robert Sheats, captain of Team 3, William Meeks and William Bunton.

The second team is due to come up this morning in the pressurized personnel transfer capsule and should be inside the decompression chamber on the deck of the support ship, Berkone, by 9 a.m.

They will decompress there for about 30 hours before being exposed to atmospheric pressure.

For Cmdr. Scott Carpenter, the astronaut turned aquanaut, the return to fresh air and sunshine with the second team will be particularly significant.

He has been on the ocean floor since Aug. 28. The other divers in the first two teams spent 15 days underwater.

The remainder of the third team will descend to the capsule this afternoon.

Tuffy, the porpoise, has a rival for his post as mascot of the Sealab project.

Sam, the sea lion, is undergoing training in hopes he can be taught to dive to the capsule like Tuffy did.

Sam is one of several sea lions that have moved into the area.

Mike Greenwood, a psychologist with experience training animals, says Sam is the best pupil he has ever had.

From
STAR
Kansas City, Mo.

NEW TEAM FOR SEALAB

Underwater Lab Has Third Crew of Aquanauts

La Jolla, Calif. (AP)—A new team of divers occupied the Navy's sealab 2 underwater home today while its former occupants, 205 feet above, underwent decompression.

The 10 new aquanauts are the third team to occupy the underwater laboratory since the 12-by-58-foot steel capsule was lowered into the Pacific ocean last month.

Yesterday, President Johnson spoke by telephone to astronaut-aquanaut M. Scott Carpenter shortly after Carpenter was brought to the surface after spending 29 days and 14 hours in the ocean bottom laboratory.

"Scott, you've convinced me and all the nation that whether you're going up or down you have the skill to do a fine job," the President said.

Carpenter, a Navy commander, orbited the earth three times in May, 1963, in a Mercury spacecraft.

From
MORNING SUN
Baltimore, Md.

3 AQUANAUTS TO DROP IN AT SEALAB

Capsule, Built For 10, Will Shelter 13 As Shifts Change

La Jolla, Cal., Sept. 25 (AP)—Three will make a crowd tonight as the aquanauts at Sealab 2 prepare to change shifts.

Three aquanauts from the third team will spend the night in the 12-foot-by-58-foot steel capsule with the 10 members of the second team who are due to surface tomorrow.

The habitat for the Navy's underwater living experiment was built to accommodate ten men, and the thirteen aquanauts who will be in the capsule tonight plan to sleep in shifts.

They call it "hot-bunking."

Capsule 205 Feet Down

Going down to the capsule, 205 feet below the surface, today were Robert Sheats, captain of the third team; William Meeks and William Bunton.

The second team is due to come up tomorrow morning in the pressurized personnel transfer capsule and should be inside the decompression chamber on the deck of the support ship, Berkone, by 9 A.M.

The men will decompress there for about 30 hours before being exposed to atmospheric pressure.

For Cmdr. Scott Carpenter, the astronaut turned aquanaut, the return to fresh air and sunshine with the second team will be particularly significant.

He has been on the ocean floor since the beginning of the experiment August 28. The other divers in the first 2 teams spent 15 days under water.

The rest of the third team will descend to the capsule tomorrow afternoon.

Meanwhile, tuffy, the porpoise, has a rival for his post as mascot of the Sealab project.

Sam, the sea lion, is undergoing training in hopes he can be taught to dive to the capsule like Tuffy.

Sam is one of several sea lions that have moved into the area.

Mike Greenwood, a psychologist with experience training animals, says Sam is the best pupil he has ever had.

50
From
SEP 26 1965

Aquanaut Trio Enter Sealab for Final Phase

LA TIMES 9-26-65

Exclusive to The Times from a Staff Writer

LA JOLLA—Three members of a third team of aquanauts descended to Sealab 2 Saturday night to begin the final 15-day phase of the Navy's undersea living experiment.

Conditions were a bit crowded, for the night, in the 12-by-38-foot capsule, since the 10 men of the second team were still there — and there were only 10 bunks.

But in adaptable Navy style, the 13 slept in shifts — comforted by the knowledge that the men of the second team — including astronaut-aquanaut Scott Carpenter — will return to the surface this morning.

Carpenter's double-length stay of 30 days is the longest any aquanaut has spent in the compact capsule 205 feet beneath the surface.

The remaining seven men of the final group will join their teammates this afternoon.

The three who descended Saturday — Robert Sheats, 49; William J. Bunton, 32, and William D. Meeks, 34 — all Navy enlisted men, went down early so they could be briefed on procedures and familiarize themselves with the logs kept on underwater conditions.

Carpenter and the members of the second team will start to the surface in a transfer chamber at 7 a.m. today, then enter a decompression chamber on the deck of the project mother ship, the Berkone.

The will remain in the chamber for 30 hours before being exposed to atmospheric pressure.

New York 38, N. Y.
From
STAR
Kansas City, Mo.

Sealab Crew Shift Crowd, Limited Area

La Jolla, Calif. (AP)—Three made a crowd last night as the aquanauts at Sealab 2 prepared to change shifts.

Three aquanauts from the third team spent the night in the 12-by-58-foot steel capsule with the 10 members of team two who are due to surface today.

The habitat for the Navy's underwater living experiment was built to accommodate 10 men and the 13 aquanauts that will be in the capsule planned to sleep in shifts. They call it "hot-bunking."

Scheduled to go down to the capsule were Robert Sheats, captain of team three; William Meeks and William Bunton.

The second team should be inside the decompression chamber on the deck of the support ship, Berkone, by 11 o'clock today (Kansas City time).

For Cmdr. Scott Carpenter, the astronaut turned aquanaut, the return to fresh air and sunshine with the second team will be particularly significant. He has been on the ocean floor since the beginning of the experiment August 28.



AP Wirephoto

Mrs. John Reaves of Oxnard, Calif., whose husband is an aquanaut in Sealab 2 off La Jolla, Calif., holds an envelope autographed by the entire aquanaut team and mailed from the underwater experimentation center. Tuffy, a porpoise, carried letter to the surface.

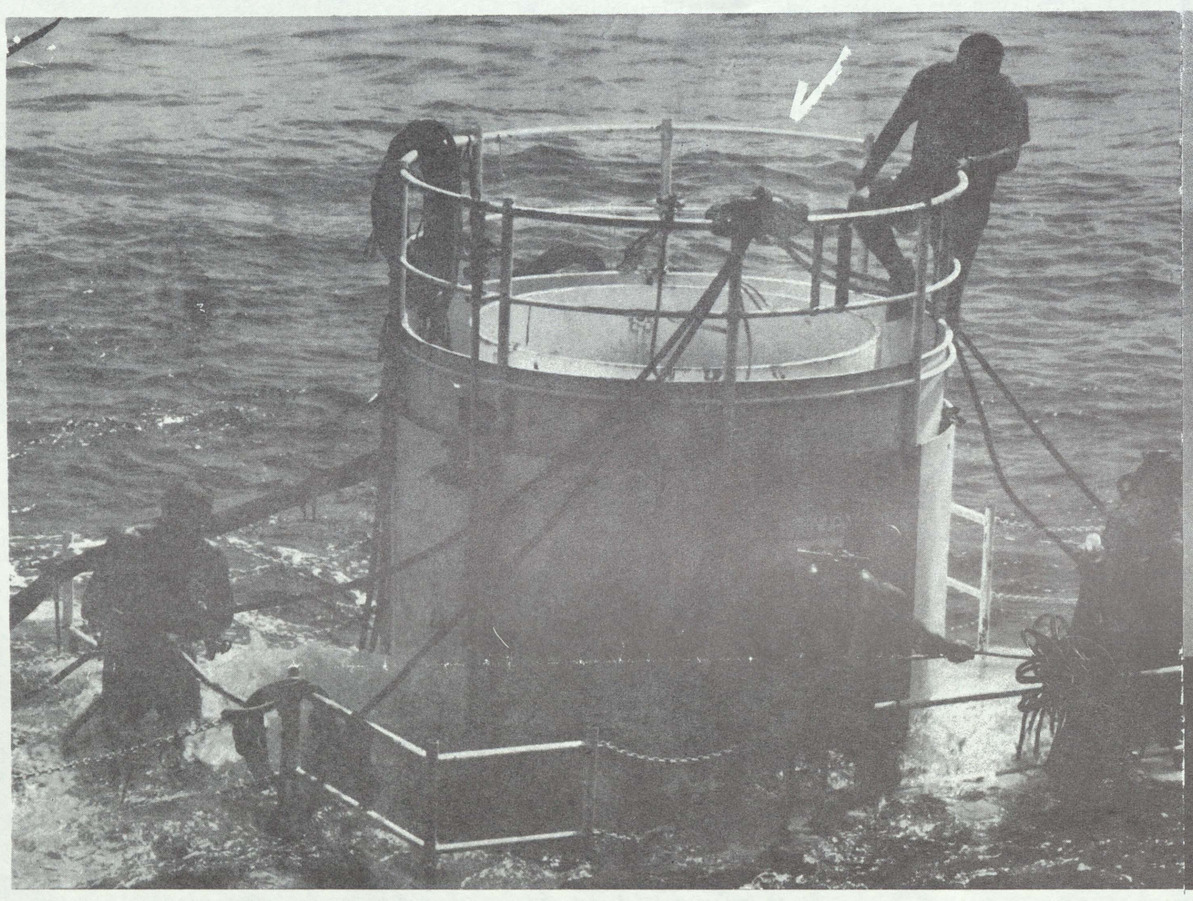
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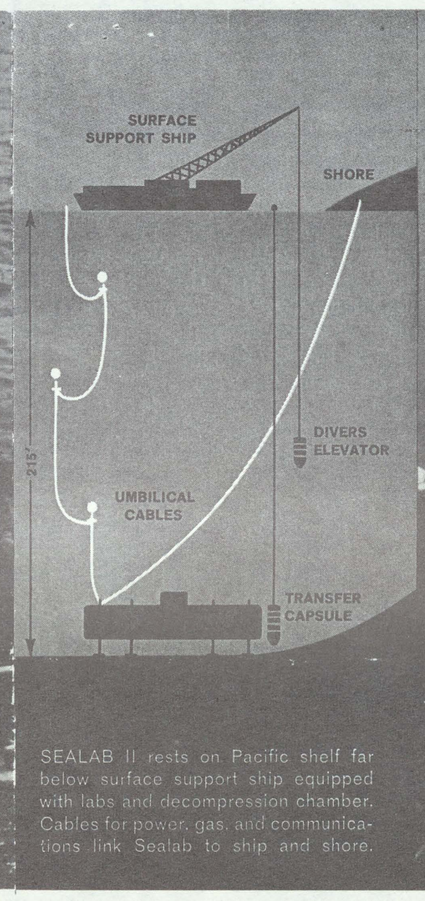
Letter Came By Porpoise

MEDICAL WORLD NEWS - 50
777 Third Ave. Bi-W
New York, N.Y. 10017
Circ. 144,329

SEP 24 '65

MEDICINE COMES TO GRIPS WITH WATERY 'INNER SPACE'







SEALAB II rests on Pacific shelf far below surface support ship equipped with labs and decompression chamber. Cables for power, gas, and communications link Sealab to ship and shore.

Late in August, ten hand-picked Navy skindivers left their mother ship and entered a diving bell to descend 205 feet into the cold Pacific off La Jolla, Calif. Leaving the bell, the aquanauts swam through the opening of an anti-shark cage poised on the continental shelf, and made their way into Sealab II—a 57-foot steel-encased capsule, which was their underwater home until last week. After 15 days, the first team of aquanauts was replaced by a new team, who will remain underwater for a similar period. Astronaut M. Scott Carpenter is expected to stay down for 30 days.

The first nine men brought to the surface after their fortnight's ordeal seemed to be in good shape. "They're all safe and sound," a Navy Spokesman said, "and everything is going beautifully."

Sealab II is part of a massive medical experiment to determine man's capacity for living and working within the marine environment. This second Sealab operation will last 45 days. Its work, according to Capt. George F. Bond, Navy surgeon in charge, is vital because "we must learn about the direct effect of all the gaseous compounds that man breathes, since man probably reflects more of what he breathes than of what he eats and drinks."

Dr. Bond believes that once body tissues are saturated with breathing gases, divers can stay indefinitely at fixed levels underseas with but a single decompression at the surface. Sealab's synthetic atmosphere, designed to test the effects of saturation, contains about 85% helium, 11% nitrogen, and 4% oxygen, a mixture 1.6 times as dense as the air we breathe. Pressure is 125 pounds per square inch, or 8½ times normal air pressure at sea level on the earth's surface.

Most of the testing thus far has involved the physiological as well as the psychological impediments to be found in "inner space." Under the guidance of Commander Carpenter, who is in charge of emergency and topside equipment, every movement of the ten aquanauts is followed on closed-circuit TV; their electrocardiograms and other electric potentials are monitored by biotelemetry.

Four of the aquanauts, for example, have electrode leads attached to their scalps and are the subjects of electroencephalographic studies. Equipment to record their brain waves is located in the pressurized dwelling. Dr. C. W. Sem-Jacobsen of Oslo, Norway, is topside to study the EEG tracings, which up to the present time "show no abnormalities."

As the aquanauts move silently and weightlessly about their various tasks, their ECGs are telemetered by apparatus developed by the Sensory Systems Laboratory of Tucson, Ariz., and the Philadelphia General Hospital. No entangling wires or cables are involved. The body's electric potentials are converted into an acoustical signal, which is transmitted through the water and converted into the usual ECG patterns.

This pioneering device is expected to provide much useful information on cardiovascular responses during extreme exertion. "The findings should give us an indication of stress limits," says Capt. Walter F. Mazzone, senior officer in charge of physiological measurements and controls.

"We are also interested," he says, "in the changes that may occur in processes of the body: blood chemistry, urine, urine chemistry, pulmonary functions." Blood, urine, and saliva samples as well as ear, nose, and throat cultures are checked daily.

Perhaps the biggest problem of prolonged submergence in water averaging 50° F is loss of body heat. Not only does the body's temperature drop to that of the water, but the helium-oxygen mixture has a thermal conductivity about seven times greater than air. The body tries to maintain its core temperature at all costs, Navy doctors explain, even though skin temperatures may drop. Naval authorities say that the "cold barrier" presents the greatest limiting factor to underwater living and working.

Core temperatures are taken with a constantly recording thermometer swallowed by the divers. Skin temperature loss becomes critical only when core temperature falters.

Diving suits equipped with various insulation systems are on trial in the Sealab II experiment. Some suits are heated electrically; others are heated by radioisotopes or by circulating hot water. A combination wet-dry suit containing carbon dioxide, in addition to electric heat, shows most promise.

The aquanauts' work schedule calls for constructing the underwater portion of an offshore oil drilling rig, trying to raise a Navy fighter plane sunk for this purpose, performing other construction tasks with stud guns, and, before the experiment is over, they may do some mining. Some of the aquanauts are scientists, whose assignment is to find parameters for fatigue when working against water. Incipient hypertension, curious changes in blood chemistry, and painful ear infections already have been noted. The swimmer-scientists are also gathering other biological and geological data.

Inside the Sealab, slowed motion of the aquanauts was observed by Dr. Bond. "From the moment the men entered their underwater habitat, they began moving at half speed." Psycho-

continued

133

'INNER SPACE' *continued*

logically, they might be "reacting as animals do to a strange but undefined environmental hazard." Physiologically, "this effect may represent a general slowing of all metabolic functions."

Many of the performance tests being given the aquanauts are unusual. A manipulative test, for example, consists of assembling three lengths of rods into a triangle, fastened at the corners by nuts, bolts, and washers. These and other manual tasks are performed outside the confines of Sealab; only mathematical and other reasoning tests are carried on inside the capsule.

Although the men's activity quotient showed improvement over the Sealab I pilot underwater program a year ago, there is little reason to believe that total output performance underseas can ever match that at sea level. When questioned on this point, Dr. Mazzone was confident that the Navy will be able to establish almost unequivocal parameters for living and working 205 feet under the sea.

Animals in Embolism Tests

At the Naval Medical Research Laboratory in New London, Conn., the Navy is producing experimental air embolisms in dogs and goats—research applicable to the Sealab II program. Through plastic windows exposing the animal's brain, scientists observe the type of embolism formed in diving. It takes but a tenth of a second to develop, they report, and there are but five to seven minutes in which to erase the embolism by placing the animal in a pressure chamber.

Navy medical authorities say that the key to decompression sickness is knowledge of how gas permeates a tissue. A device is being built at the University of Florida to test the effects of various gas combinations, pressures, temperatures, and other variables on different tissue homogenates and fluids. It is hoped that these experiments will help establish a better decompression schedule.

Researchers studying oxygen toxicity are aware of instances of incubator babies blinded as a result of being given too much oxygen. Because of increased tissue absorbtion under pressure, oxygen is only 4% of the aquanauts' air mixture as compared with 20% at sea level. Effects of oxygen on nerve cells, lung tissue, and red blood cells are currently under investigation at the University of Pennsylvania, Albert Einstein College of Medicine, and Ohio State University.

Also under intensive scrutiny is carbon dioxide poisoning. The Office of Naval Research reports the development of a unique carbon dioxide electrode at the University of Lund, Sweden, which records moment-to-moment changes in the carbon dioxide content of the living brain tissue.

The emotional state of the men inside and outside the Sealab II is as private as that of fish in an aquarium. Every sound and movement is being watched by a battery of psychologists over four closed-circuit television channels. About 100 feet from the capsule is an underwater telemetry station. Besides providing television and audio channels, the station has 120 channels providing data which will fill 18,000 punched cards. Designed and built by the Scripps Institution of Oceanography, the station contains special manipulator arms, operated by remote shore control, for making its own repairs.

The men being so closely monitored have their own TV, radio, books, and cards. They cannot smoke. They are also without feminine companionship. Asked about this, Commander Carpenter and Dr. Mazzone smiled. "Totally impossible, at this time," said Dr. Mazzone. And Commander Carpenter suggested: "They can swim."

The actual living compartment for ten men in the 57′ x 12′ cylinder is divided into a laboratory, galley, and bunkroom. Eleven ports in the hull give the occupants a view of a hostile oceanic world. When going outside the capsule, the aquanauts have been harassed by stinging scorpion fish. On the 15th day, one stung Carpenter on the left index finger, but pain-killing drugs and cortisone enabled the commander to continue below.

Can even superlatively conditioned men endure living and working in an alien environment, breathing a synthetic atmosphere, and treading water instead of walking, except for brief periods inside the narrow confines of their capsule? Perhaps more important for the future of underwater exploration, will they find life something more than endurable? For, if they do not, the continental shelf and beyond can never be fully explored and exploited.

The man responsible for determining feasibility of newly emerging facts of science and engineering for the Navy is Capt. Lewis B. Nelson, who is also director of Project Sealab. He foresees, with certain reservations, underwater fish canneries, mining and petroleum industries, even underseas suburbs of crowded coast cities.

Doctors Get Diver Training

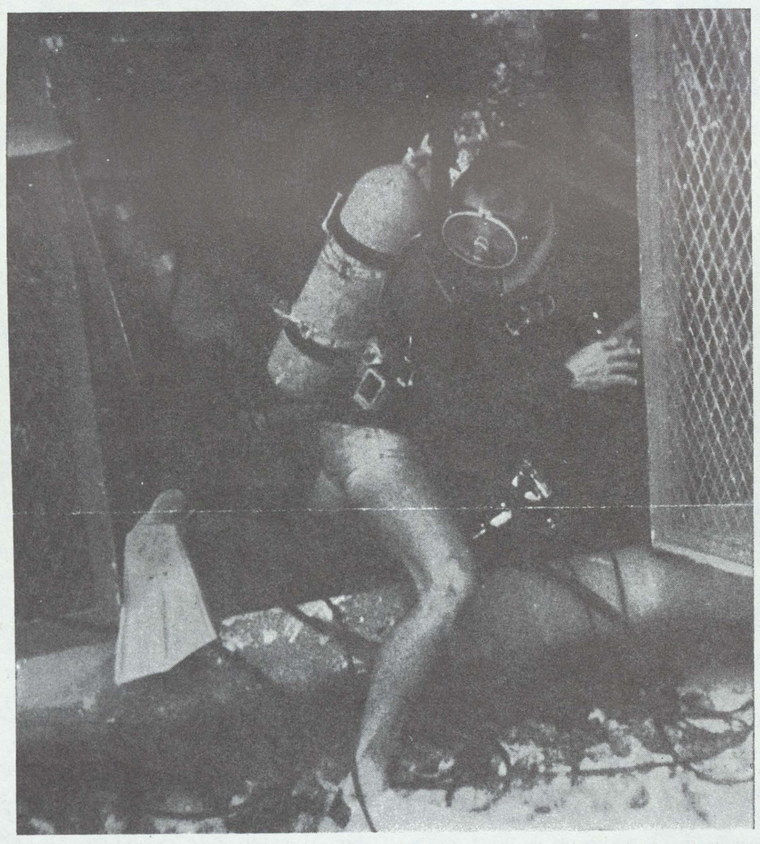
Captain Nelson's prediction of cities under the sea is shared by Dr. Mazzone, who visualizes physicians making house calls in the depths. The Navy's medical program already includes training of physicians in deep-sea diving, one of whom is Robert E. Sonneburg, Sealab's resident doctor.

It is also hoped that extensive exploration at even greater depths will reveal new discoveries of petroleum and minerals, a vast new store of edible foodstuffs and fresh water, and new families of antibiotics.

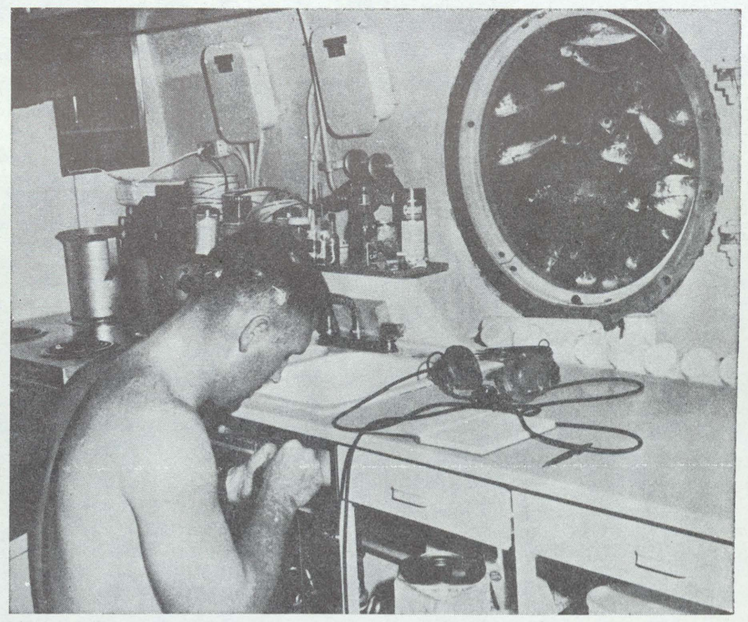
Dr. Bond was asked whether he envisions a time when man will learn to breathe oxygen from the sea.

"I'll answer that by commenting on an experiment being conducted, using a perm-selective membrane for the transfer of oxygen from sea water through the membrane and carbon dioxide from the dry environment of the ocean. In the laboratory this offers some interesting possibilities."

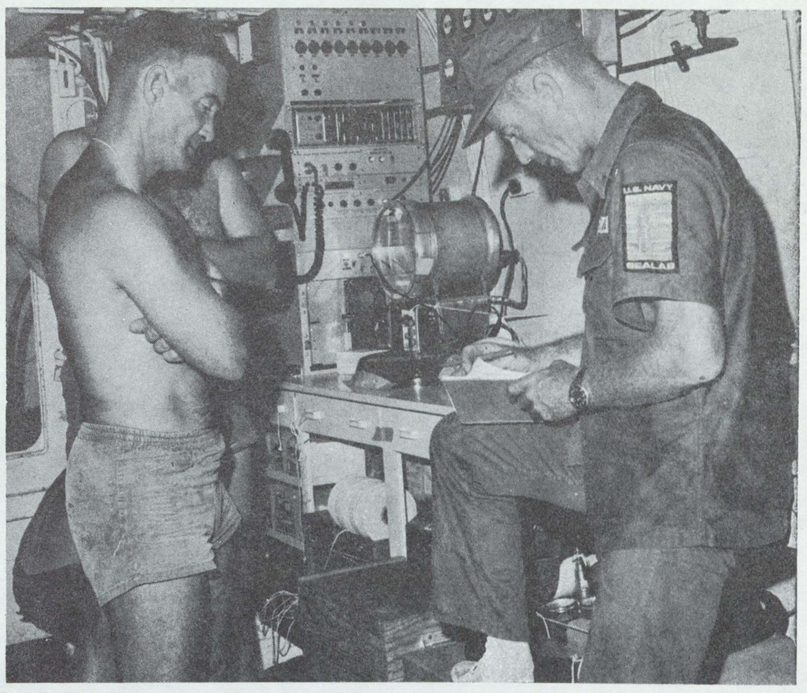
Even Jules Verne, who conceived of a submarine powered by electricity from sea water, is not known to have considered oxygen from the same source. Technologically, it is obvious that we are ready for great exploits, but is man physiologically and psychologically ready? "We won't have any results to announce for a long time," says Dr. Bond. But some answers undoubtedly will emerge from the unique Sealab experiments. ■



***Skindiving gear** is prescribed uniform for Sealab experimenter, who enters underwater home by way of the capsule's "back porch"—a steel-meshed, sharkproof enclosure.*



***Shaved spots** indicate that aquanaut Berry Cannon is subject for electroencephalographic study. Fish swarm at porthole as Cannon repairs headset 205 feet under the Pacific.*



***In laboratory section** of capsule, Commander Carpenter (right), in charge of Sealab personnel, reviews check list of critical underwater experiments with teammate Eaton.*

TOPSIDE MEDIC'S REPORT FROM BELOW

For firsthand experience, Captain Bond dove the 205 feet to Sealab and underwent decompression on the way up. The following is a verbatim report of his findings:

"Captain Mazzone and I put on rubber wet suits, added weights, and strapped on double-bottled open-circuit scuba gear containing a special mixture of 75% helium and 25% oxygen.

"We swam to and entered a descending bell, and lowered away rapidly to 180 feet. We used the bell's compressed air to save our bottle gas.

"Cold water in the bell reached a temperature of 49° F. At this depth, we experienced euphoria, as if we'd had four or five stiff drinks.

"On the bottom (205 feet), when we began breathing our own bottled mixture, the nitrogen narcosis cleared up. The swim to Sealab was only 20 feet, but the darkness made the shark-cage entrance difficult to find. As we entered, we kicked off our swim fins and dropped our bottles. Inside Sealab, the temperature was a comfortable 86° F.

"We remained in Sealab for about 14 minutes, inspecting the installation informally, getting the feel of the place, and visiting with the team.

"Then we swam back to the bell and began decompression. Total decompression time was 73 minutes, and for the last 30-foot stage of ascent we breathed 100% oxygen to rid our bodies quickly of all excess helium.

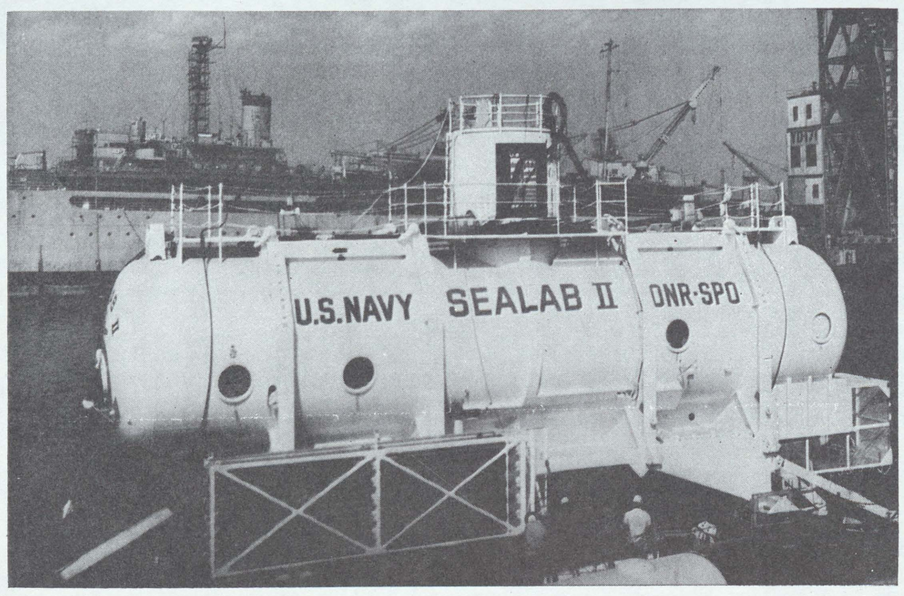
"Upon reaching the surface, we immediately turned over urine specimens to one of our specialists who wanted to perform a gas analysis to find out the total amount of helium that is dissolved in the urine.

"We think that this is a new and very important step in completely determining the efficiency of decompression.

"We have now eaten lunch and can report that we're feeling quite well." ■

JOURNAL OF THE AMERICAN
MEDICAL ASSOCIATION - 50
535 N. Dearborn Street W
Chicago 10, Ill. Circ. 162,536

SEP 27 '65



Sealab II on barge at Long Beach naval shipyard shortly before being put in water for towing to La Jolla, Calif, and stationed more than 200 feet below ocean's surface.

Medical Research Beneath the Sea

Sealab II program, medically oriented and directed by a physician, experiments with men working at pressures seven times that of surface.

Can man live and work beneath the sea?

The answer to that question, which could have major import in the fields of medicine, mining, agriculture, water control, drug production, and national defense, is beginning to take shape off the coast of southern California. The answer is a preliminary "yes".

Almost a mile off shore from the Scripps Institute of Oceanography in La Jolla, ten men last week ended a 15-day period of living and working 205 feet beneath the surface of the Pacific ocean.

Physicians promptly reported that although the men were tired, preliminary physical examinations showed they were in "very good physical condition."

Based on these findings, directors of the project forecast that men will be working at depths of 800 feet or more the year-round—in three-week relays—within the next five years. They also predicted that by that time completely mobile underwater laboratories will be used.

As the first aquanauts returned to the surface, nine other swimmer-scientists replaced them in a 57 × 12 foot cylinder on the ocean floor. One man remained below. He is Cdr M. Scott Carpenter, USN, the astronaut, who is now temporarily commanding the teams of what are called aquanauts.

The project is the Navy's multimillion dollar man-in-the-sea program, one of the most far-ranging experiments ever developed in the field of environmental medicine. Medically oriented since its inception and directed by a physician, the program seeks to test the working efficiency, strength, endurance, limits of vision, and hearing of men working in the cold (50 F) gloom of the ocean at pressures 100 ft/sq in—seven times that at the surface (14.3 ft/sq in).

In addition, physicians are keeping a meticulous watch for physiological and psychological effects of the environment on the aquanauts. As many as 45 blood samples are drawn from the team of aquanauts each day and shipped to the surface for analysis. Urine and saliva samples are collected frequently for metabolic studies, and radioactive iron studies are conducted. Electrocardiograms are taken while the

Continued on next page

Continued from previous page

men are in the capsule and while they are swimming below the surface. Some of these have been telemetered to the surface via amplified sound waves, and satisfactory readings have been obtained. Electroencephalograms also are taken regularly. Pulmonary function studies are planned.

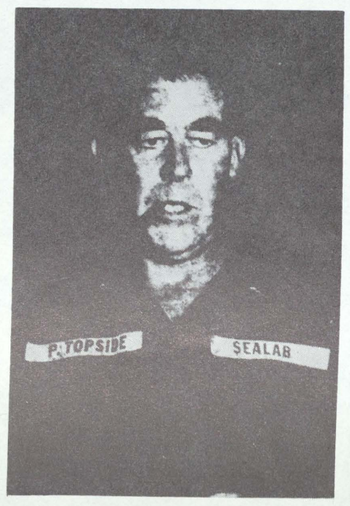
Director of the project is Capt George F. Bond, MC, USN, a former North Carolina general practitioner and a qualified diver. He was officer-in-charge of the Navy's Medical Research Laboratory prior to his current assignment.

Captain Bond emphasized that no final analysis of test results could be made until similar control tests have been repeated now that the men have returned to the surface. But he said that so far—with one exception—"all major tests show no significant deviation from the normal." The exception is a substantial rise in lactic dehydrogenase levels for all subjects during their first three days underwater. These levels subsequently returned to normal and stabilized.

"These men were undergoing a great deal of muscular activity when the rise was noted," Captain Bond said. "But we really don't know what significance such measurements have—after all, nobody has measured LDH levels before under such circumstances."

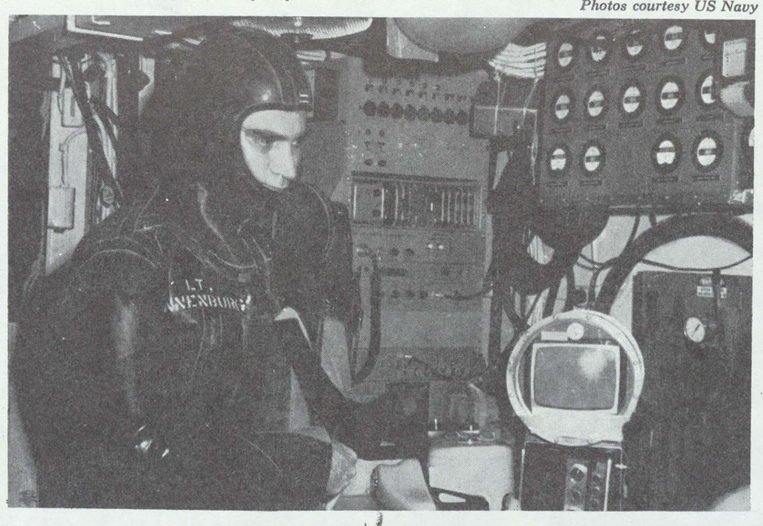
The cylinder in which the men live is called Sealab II. Crammed within it are bunks, a kitchen, bathroom, and laboratories. An umbilical cable from a barge complex floating above feeds the necessary atmosphere to the men below. The

Capt George F. Bond, MC, USN



Lt Robert Sonnenburg, MC, USN, wears battery-operated, electrically-heated wet suit being evaluated by aquanauts in Sealab II.

Photos courtesy US Navy



air they breathe is approximately 75.75% helium, 20% nitrogen, and 4.25% oxygen. At such depths, Captain Bond explained, air such as that breathed at the surface could be fatal. The 4.25% oxygen at 200 feet in depth is roughly equivalent in quantity to the 21% normally available at the surface. The aquanauts have adjusted well to this mixture. Captain Bond said the oxygen content will be lowered to 3.5% for the next three days in an effort to find a more ideal mixture.

However, the helium so affects the vocal cords that the men speak in a Donald Duck-like squawk. An electronic unscrambler permits clear voice communication with the surface. Findings concerning this adjustment to atmosphere may be of importance in clinical medicine, Captain Bond believes.

"In the last 35 years, society has gone from an open to a nearly closed ecology," he said. "In addition, hyperbaric oxygenation is becoming important in medicine. More than $12 million has been invested in such clinical equipment.

"Those in the field of hyperbaric medicine face the same problems and the very same hazards as in Sealab. It is likely that in the future hyperbaric medicine will switch from compressed air to mixed gases. In that case, our findings here will be significant.

"There is also early evidence, at least, that some of the inert gases are not biologically inert. Some early studies by others indicate that fungus growth rates may be altered by exposure to some of these gases. We must examine these in terms of use in gas therapy—not only as possible improved therapy, but also in regard to the possible harm they may cause."

Captain Bond said his investigations also may have a bearing on the problem of trace contaminants such as the hydrocarbons in the atmosphere. Minute measurements of such traces in Sealab II are being conducted. All data, physiological, psychological, marine, and other, are being prepared for analysis by computer.

Serving at the ocean floor, both as a diver and physician, during the first 15 days was Lt Robert E. Sonnenburg, MC, USN. He conducted the physiological observations, was himself a subject, and treated minor complaints among the aquanauts. His one emergency came when Commander Carpenter was stung on the left index finger by a poisonous scorpion fish. Commander Carpenter was in considerable pain and his left hand and arm began to swell. Lieutenant Sonnenburg gave him cortisone and an analgesic and confined him to his bunk. Lieutenant Sonnenburg said Commander Carpenter is now recovered and has resumed his duties.

He said the only significant complaint of the aquanauts was ear infection which occurred in nine aquanauts, and which he was unable to clear up. He said the infections did not respond to systemic antibiotics and that it produced apparently sterile cultures. He doubted the infection was a fungus even though it was apparently furthered by dampness within the cylinder. He said he was able to control it to a degree by using a hairdryer to dry the ears of the men.

Experiments similar to those of Sealab II, to be conducted by various civilian groups, are scheduled for later this year. All have as their ultimate goal the exploitation of the vast continental shelves, a land mass equivalent to the continent of Africa. Marine scientists have estimated that 85% of the edible protein, petroleum, and mineral requirements of future generations could be harvested from these areas.

Medicine at a Glance

Dextran Perfusion Key to Brain Isolation?

Isolated vascular perfusion with low molecular weight dextran at 0 C (32 F) may be the key to successful isolation of the brain without cerebral damage, Tatsuyuki Kudo, MD, Keio University, Tokyo, told the International Congress of Neurosurgery in Copenhagen.

Usually, Dr. Kudo said, the desired cerebral temperature (5 to 6 C [41 to 42.8 F]) is obtained in 20 to 25 minutes, and a bloodless operative field is obtained. The technique has been used with six patients. Three of these died of metastatic carcinoma. The other patients recovered without sign of brain damage.

Erythrocyte Coating Seen as Specific Antibody

Studies with 15 animal species support the theory that erythrocyte coating seen in acquired hemolytic anemia is an autoantibody specific for rhesus groupings of cells.

Both nonprimates (such as the grey whale and the guinea pig) and primates (such as the tree shrew and chimpanzee) were used in University of Oregon Medical School studies, according to Bernard Pirofsky, MD. Eluates of human antibodies were used in the reactivity tests, he told the American Association of Blood Banks meeting at Miami Beach, Fla.

0_2 Tension Related to Collagen Turnover

A clear relationship exists between oxygen concentrations and in vitro synthesis and resorption of collagen, Harvard School of Dental Medicine investigators have found.

At oxygen tensions of 10% to 50%, both processes were increased several fold, especially synthesis. At 50% oxygen, collagen synthesis and degradation were "approximately equal," according to Burt D. Stern, DMD, and associates. The experiments, using the radioactively "tagged" amino acid proline as an index, confirm earlier morphological work by the group.

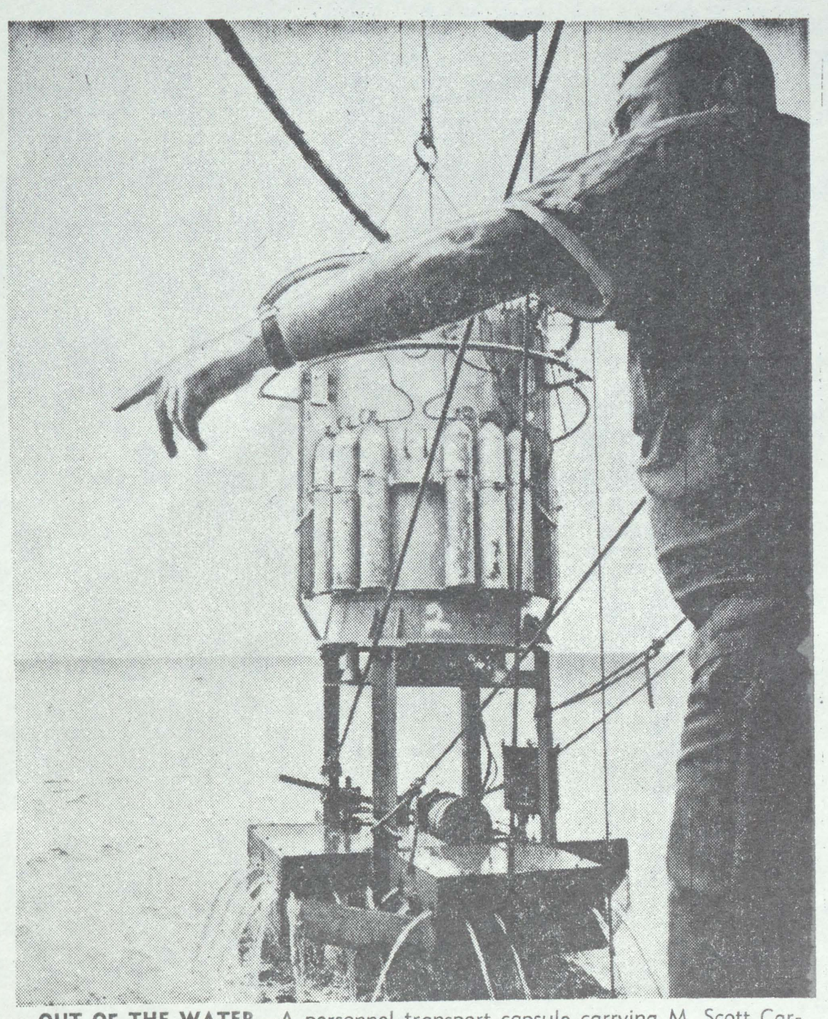
Frozen Blood Called Safe for Infants

Frozen blood preparations have been found "every bit as efficacious and as safe as standard therapy" in comparative exchange transfusion studies of 14 pairs of infants.

The frozen blood, thawed, and reconstituted with saline, used the original plasma as the suspension medium.

The known advantages of frozen blood safely may be extended to transfusions in the premature and full-term neonate, conclude Thiru Vaithianathan, MD, and colleagues at Michael Reese Hospital and Medical Center, Chicago. The study was reported to the American Association of Blood Banks meeting at Miami Beach.

L/A Times, 9-27-65



OUT OF THE WATER—A personnel transport capsule carrying M. Scott Carpenter and nine other aquanauts breaks the surface after trip up from Sealab 2. (AP Wirephoto)

SEALAB HERO

Presidential Call Received by Carpenter

Exclusive to The Times from a Staff Writer

LA JOLLA—M. Scott Carpenter emerged Sunday from the depths of the Pacific to complete man's longest underwater stay and then, in a voice that "sounded like Donald Duck," accepted congratulations from President Johnson.

The 40-year-old astronaut-aquanaut completed 29 days and 14 hours aboard Sealab 2, 205 feet below the surface in the Navy's 45-day experiment in underwater living.

Carpenter's stay was more than twice as long as the time spent under water by any other person, the Navy said.

Carpenter and nine other aquanauts made the trip from the 12-foot-by-58-foot steel cylinder in 18 minutes to Sealab's mother ship, USS Berkone, without incident, the Navy said.

Texas Phone Call

Four hours later, sitting in a decompression chamber aboard the Berkone, Carpenter got a telephone call from Mr. Johnson from the LBJ Ranch near Johnson City, Tex.

A Presidential aide gave this partial account of the conversation:

The President: You have convinced me and all the nation that whether going up or down, you have the skill to do a fine job . . . The nation is very proud of you . . .

Carpenter: Thank you very much, sir, on behalf of all the crew and all those who participated in Sealab. It's an honor to be part of the program . . .

He then apologized for the sound of his voice. "It's the absolute best I can do in a helium atmosphere," he told the President.

Carpenter and the other nine men in the decompression chamber breathe a lighter-than-air mixture of oxygen, helium and nitrogen which causes their voices to "sound like Donald Duck," a spokesman said.

Carpenter and the other men slipped through an escape hatch in Sealab, wearing swim trunks, protective helmets and breathing apparatus, and swam a few feet to the orange-colored personnel transfer capsule, an underwater elevator that was hoisted aboard the Berkone.

The helmets were worn to protect the aquanauts' heads from bumping the sides of the capsule if the trip got rough. But they weren't needed.

During the ascent Carpenter radioed the Berkone: "Are we moving?" He was assured that they were.

The capsule broke the surface at 8:05 a.m. After removal of a set of spindly legs used to support it on the ocean bottom, the capsule was connected to a ship's hatch above a decompression chamber.

The men slipped through the air-tight hatch for another 30 hours of confinement in steel to acclimatize their bodies to sea-level pressure—one-sixth less than on the ocean bottom.

Capt. George Bond, chief investigator for Sealab, said all the men appeared in excellent shape.

The aquanauts left behind three members of the final 10-man team to spend the remaining 15 days aboard Sealab in the final phase of the 45-day experiment.

They joined Carpenter's team Friday. The remaining seven members of the final team, headed by Chief Torpedoman Robert Sheatz, who at 49 is the oldest of the underwater pioneers, descended to Sealab Sunday afternoon.

Among the seven was Lt. Robert Sonnenburg, 28, Navy physician, who had spent 15 days under water with Team No. 1, then returned topside for 15 days.

The previous underwater endurance record was held by a six-man French team headed by famed undersea explorer Jacques Cousteau. The French remained 60 feet under water for 14 days in a chamber in the Mediterranean a year and a half ago.

Last year Sealab 1's team stayed for 11 days at a depth of 192 feet off Bermuda.

A spokesman said Carpenter and the others of Team No. 2 were reluctant to leave Sealab. He said the men wanted to explore a passageway through the undersea Scripps Canyon that had been discovered at a depth of 266 feet—only five feet less than the maximum diving depth allowed by the project.

"I have never worked harder in my life than in Sealab. Harder physical labor is required than in space.

"Nothing is easier than being weightless in space—it's the most completely relaxing thing you can experience.

Carpenter expressed amazement at the ability of the human body to adapt to stresses. He said, "Man has an incredible faculty to adapt to hostile environments."

"We did a lot of oceanographic and scientific work, learned a lot about marine biology, marine geology — paved the way for future explorations of the sea.

"We learned a great deal more than we have ever known about human reaction to prolonged exposure to high pressure.

"You can't appreciate what we've gained, what we've learned, what we've accomplished until you've been there to see the problems involved.

He said: "When we first went down, we would swim 25 or 30 minutes, then shiver so badly it was unbelievable. It hurt pretty bad lots of times.

"Water temperatures are cold — 50 degrees doesn't mean much to people who are not divers. You have to swim in it to realize just how cold."

Carpenter said it took two weeks for the aquanauts to become acclimated to the cold water.

He told of waking up at night, "feeling cold but perspiring, not knowing whether we were hot or cold."

Carpenter said he sees no difference in the length of time man can stay at great depths beneath the sea, or in isolated areas such as DEW line sites. "If a person can stay in isolation anywhere else, he can stand it at the bottom of the ocean," he said.

"I'm convinced that with proper heated suits man will be able to spend eight hours a day working deep in the sea. The only limitations will be hunger and fatigue, that will necessitate return to the habitat."

Carpenter said it was thought by many before the program was launched that divers would not be able to get along together — that "ten men in that small space would have a lot of personal problems.

"This turned out not to be true at all. There wasn't a cross word during the 30 days I was down. All the men were highly motivated. It reaffirmed my faith in human nature.

"For all of us, it was the best time we've ever had, made us feel we weren't working hard enough. Shouldn't be this much fun."

Carpenter described the bite on his left index finger by a sculpin Sept. 12 as "painful, like a cobra bite. It's a potent little animal. Poison from this fish is still not too well known."

He and the other aquanauts agreed that too much time is spent below in housekeeping and bringing supplies aboard and not enough time gathering meaningful scientific data.

SAN DIEGO EVENING TRIBUNE

SEP 27 1965

TEAM CONGRATULATED FOR WORK

Here's Text of LBJ-Aquanaut Talk

Here is the text of the conversation between President Johnson and Cdr. Scott Carpenter.

President—"Scott, you read me all right?"

Carpenter—"Yes, sir, Mr. President. I read you loud and clear. How about me?"

President — "Scott, you've convinced me and all the nation that whether you are going up or down we have the skills to do a fine job."

Carpenter—"Thank you very much. It's a great crew out here and we are all very honored and pleased that you saw fit to call us and let us know that you are interested in what we are doing."

President — "I know that being 205 feet under for 30 days and making the excursion dive that you did has been very valuable to us, and has advanced our knowledge of how humans can perform under these conditions and I want you to know that the nation is very proud of you.

"You are very brave and skillful, and I am grateful that you have successfully completed this experiment."

Carpenter—"Well, thank you very much, sir, on behalf of all the crew and of all those who participated in Sealab. It's an honor to be a part of the program, and again we are pleased to know that you are this interested in what we've been doing.

"I must apologize for the sound of my voice. It's the absolute best I can do in a helium atmosphere."

President—"How are you feeling?"

Carpenter—"We are all feeling very well. We entered the decompression chamber about four hours ago and everyone is happy and we are running on schedule."

President—"I've had a note from Mrs. Carpenter and your wife is very proud of you, as we all are. I just wanted to say hello to you and all the fellows associated with you and good luck. We're mighty proud of you."

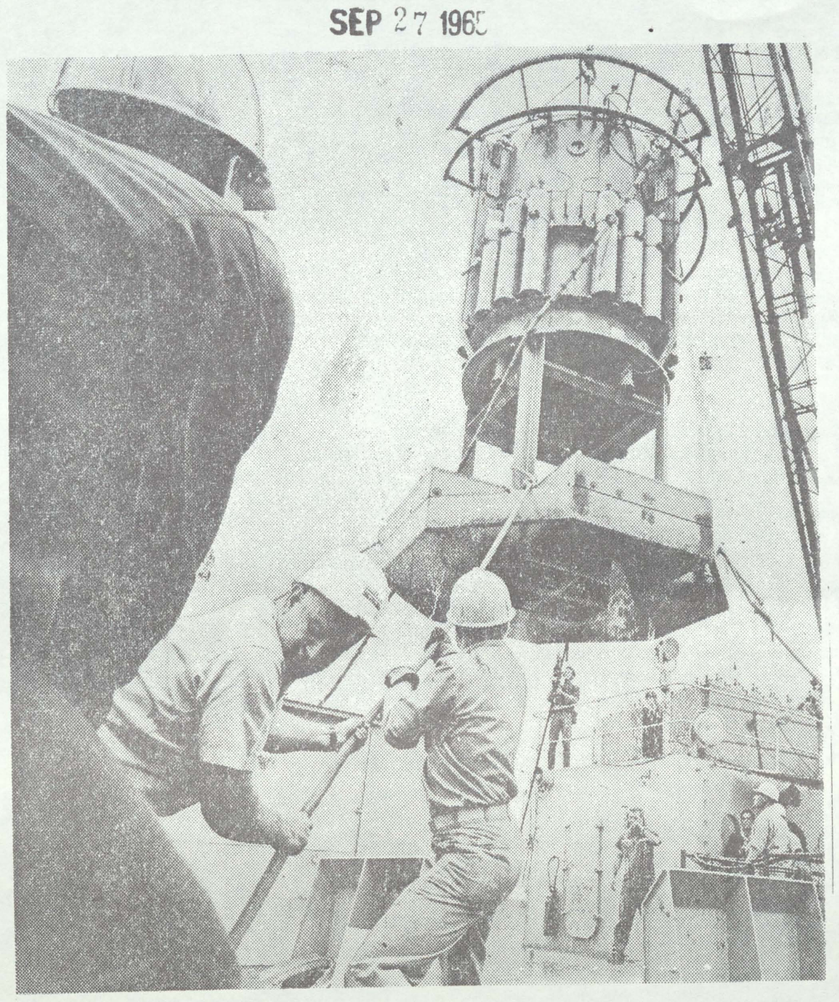
Carpenter — "Thank you very much, sir, for calling."

President — "Thank you, Scott. Good luck and I'll see you later."

Carpenter—"Thank you, sir. Goodby."

SAN DIEGO UN

SEP 27 1965



JOURNEY FROM BOTTOM OF SEA

Personnel transport capsule bearing second team of 10 SeaLab aquanauts is lowered onto Berkone. Men spent 15 days beneath sea. (Story, Page a-17)

From SEP 27 1965 PITTSBURGH, PA.

President Lauds Scott Carpenter

Astronaut-Aquanaut Underwater 30 Days

LA JOLLA, Calif., Sept. 27 (UPI)—Whether he's hurtling through space or swimming the ocean's depths, M. Scott Carpenter has "the skill to do a fine job," according to President Johnson.

The President and the astronaut-aquanaut chatted by telephone yesterday as Commander Carpenter completed a 30-day experiment under the Pacific Ocean in Sealab 2 as part of the man-in-the-sea project.

Commander Carpenter received the presidential call while in a decompression chamber aboard the mother ship Berkone. Commander Carpenter, who orbited the earth three times in his 1962 space flight, was the only man in the scheduled 45-day project to remain submerged 30 consecutive days. He was to emerge from the chamber today.

"You have convinced me and all the nation that whether you are going up or down, you have the skill to do a fine job," the President told the commander.

"Well, thank you very much," he replied. "There were a lot of other people who demonstrated the same kind of courage. It's a great crew out here and we are all very honored and pleased that you saw fit to call us and let us know that you were interested in what we are doing."

From SEP 27 1965 MORNING SUN Baltimore, Md.

SEALAB CREW BROUGHT UP

Carpenter Ends 29 Days In Underwater Lab

La Jolla, Cal., Sept. 26 (AP)—Astronaut M. Scott Carpenter and nine fellow aquanauts rose 205 feet from Sealab 2 today — so smoothly that part way through the ascent Carpenter asked whether it had started.

Carpenter had completed 29 days and 14 hours in the ocean-bottom laboratory.

His associates in team No. 2 had been below 15 days, like team No. 1 before them.

A third team of 10 men will complete the Navy's 45-day experiment in underwater living and working.

Hoisted In Capsule

Three members of team No. 3 entered the 12-by-58-foot steel capsule yesterday. The others were to follow later today.

Carpenter and his team-mates were hoisted in a personnel-transfer capsule to the deck of the staging vessel Berkone 1,000 yards off the picturesque Southern California coast.

On deck the transfer capsule was mated to a decompression chamber in which the aquanauts will remain until approximately 3.45 P.M. tomorrow. Pressure inside the chamber will be gradually reduced to that of sea level.

A crane on the vessel had hoisted the transfer capsule 31 feet from the ocean floor when Carpenter asked by telephone whether the ascent had started. Capt. George Bond, in charge of the project's investigations, assured him it had. Carpenter said he couldn't feel any movement.

Breaks Surface At 8.05 A.M.

The orange-painted transfer capsule broke the surface of the ocean at 8.05 A.M.

Sealab 2's third team includes Navy Lt. Robert Sonnenburg, a medical corpsman who was a member of the first team.

In 15 days, a spokesman said, the Navy thus will have comparative physiological data on two men who have lived and worked in the ocean's depths for 30 days —one of them with a 15-day interval on the surface.

Six Frenchmen remained 15 days at a depth of 60 feet in a chamber in the Mediterranean about 18 months ago. Sealab 1's team stayed at 192 feet off Bermuda for 11 days last year. These, the Navy spokesman said, were the longest previous experiments in underwater living.

Monday, Sept 27

Dear Russ & Ron,

Here are some more clippings -- also in a separating mailing I am sending that unedited tape of the sounds and short interviews with Carpenter, Bond, etc, that Cdr. Chapman said he might possibly use some of for sound effects in his SeaLab documentary he is filming. Please give it to him or forward to him if he's gone. And thanks.

Lotsa luck!

Will send more clippings from time to time...

best regards,

Hoover

136

Captivating Tuffy

The accomplishments of Tuffy, a trained dolphin, have added a new dimension and interest to the important SeaLab research that has captured the hearts and attention of the nation.

Engaging and obedient, Tuffy has delivered mail to the bottom of the sea, "saved" lost aquanauts in simulated experiments and performed other nearly-human services with a smile.

He is probably content with the rewards of kindness and extra fish. We think, however, he has also earned a medal. What could be more appropriate than a pin on his harness in the form of an aquanaut? With space for kelp clusters for future deeds, of course.

SAN DIEGO UN

SEP 27 1965

SAN DIEGO UNION 9/27/65

Short Causes Emergency For SeaLab

By JAMIE BRYSON

A short in an electrical cable near SeaLab II 205 feet beneath the ocean off La Jolla caused a switch to an emergency power supply and some concern for the safety of 10 aquanauts aboard the laboratory, project spokesmen disclosed yesterday.

The emergency occurred Saturday shortly after noon. At that time, aquanauts working outside SeaLab spotted bubbling and arcing in the water near the vessel and reported it to shore.

Ashore, it was feared the trouble might involve the main power source cable which extends from a point near the Scripps Institution of Oceanography pier 3,000 feet along the ocean bottom. This supply was shut down temporarily and emergency electricity sent into SeaLab via an auxiliary cable from the mother ship, Berkone, located directly above.

Henry O'Neal, program director, said the short circuit was traced to a 110-volt cable strung earlier to facilitate a floodlight which was discovered to be inoperable and never used. The cable — one of about 15 on the bottom in the SeaLab experiment area — had been disconnected but inadvertently charged again, O'Neal said.

He said aquanauts stayed clear of the arcing, which was within three feet of the SeaLab II hull, and there were no injuries or damage.

SeaLab is dependent on the shore primarily and the Berkone secondarily for its source of electricity. It carries no auxiliary power aboard.

If both sources of power were to fail, O'Neal explained, the aquanauts would be without lights—other than hand torches — and communication with the shore and the mother ship would be cut off. The breathing mixtures is supplied through tubes from shore, also, but SeaLab carries adequate emergency supplies aboard.

O'Neal said the electric cable incident was considered not serious but enabled testing of alternate systems under emergency conditions "with satisfactory results."

NAVY'S AQUANAUTS

'World Without Sun'

In a recent movie called "World Without Sun," the French explorer Jacques Yves Costeau introduced the American public to amazing developments in oceanography. Now the U. S. Navy has 3 teams of aquanauts engaged in a "Sealab" underwater exploration project off the coast of California. It could have as much meaning for humanity as any outer space program.

The depletion of land resources because of rapid population growth is leading man into exploration of the vast food reserves and mineral wealth in the sea and ocean beds that cover seven-tenths of the earth's surface. The Navy's "Man-in-the-Sea" program is designed to find out how people can live and work in great ocean depths.

This experiment began last summer off the coast of Bermuda with Sealab 1, a capsule in which men lived for a few days at a shallow depth. Now the aquanauts are living and working in Sealab 2 at a depth of 210 feet for around 45 days. The 3 teams began working in 15-day shifts on August 28, with the last slated to end October 15.

Only the leader is to remain below for 45 days. He is Navy Commander M. Scott Carpenter, who has already won fame as an astronaut in the outer space program.

Sealab 2, the aquanauts' home, is a steel cylinder with an artificial atmosphere consisting mostly of helium. The men work outside the Sealab in a sharkproof chamber. When they emerge from their 15-day shift, they enter a decompression chamber for 2 days and are studied for physical effects.

In their work the aquanauts are using a trained dolphin named Tuffy, much the same way as animals are used on land. Dolphins can see much farther in water than humans, so Tuffy is used as a guide.

AMERICAN OBSERVER - 94A
1733 K Street, N.W. W
Washington, D.C. 20006

LBJ HAILS CARPENTER FOR SEALAB EXPLOIT

LA Herald 9-27-65

LA JOLLA, Sept. 27 (UPI)—Whether he's hurtling through space or swimming the ocean's depths, M. Scott Carpenter has "the skill to do a fine job," according to President Johnson.

The President and the astronaut-aquanaut chatted by telephone yesterday as Carpenter completed a 30-day experiment under the Pacific Ocean in Sealab 2 as part of the man-in-the-sea project.

UNDER SEA 30 DAYS

Carpenter received the presidential call while in a decompression chamber aboard the mother ship Berkone. Carpenter, who orbited the earth three times in his 1962 space-flight, was the only man in the scheduled 45-day sea project to remain submerged 30 consecutive days. He was to emerge from the chamber today.

"You have convinced me and all the nation that whether you are going up or down, you have the skill to do a fine job," the President told Carpenter.

THIRD TEAM DOWN

"I know that being 205 feet underwater for 30 days and making the dive that you did has been very valuable to us and has advanced our knowledge of how humans can perform to these conditions, and I want you to know that the nation is very proud of you. You are very brave and skillful, and I am grateful that you have successfully completed this experiment," the President said.

Actually, the project won't end until ct. 11. Carpenter headed the first 10-man team of aquanauts that descended into Scripps Canyon Aug. 28. He remained in Sealab 2 when the first nine aquanauts were relieved by the second team.

The second team, including Carpenter, was relieved during the weekend by a third 10-man team. The project was aimed at discovering how well men could live and work during prolonged periods under water.

Lyndon Phones Hero of Space and Ocean

BY PHILIP DODD

[Chicago Tribune Press Service]

Austin, Tex., Sept. 26—President Johnson interrupted a leisurely week-end at his ranch near here today to telephone congratulations to Astronaut Scott Carpenter, who emerged from the ocean depths this morning after 30 days beneath the waves.

Carpenter, who is a navy commander, and nine other technicians and scientists had been participating in the navy's experimental program in the Pacific off La Jolla, Cal.

They descended to 205 feet in "Sealab II," a cylindrical chamber, to make observations. At times, they left the tank to explore the bottom. On one such foray, Carpenter went down to 266 feet.

When Johnson telephoned, Carpenter and his companions were in a decompression chamber, filled with helium on the deck of a staging vessel off La Jolla. They must remain there until tomorrow afternoon.

"Scott," the President told the man who has made history in space and beneath the sea, "you have convinced me and all the nation that whether you are going up or down you have the skill to do a fine job."

"Well, thank you very much," said Carpenter, his voice muffled because of the helium atmosphere. "There were a lot of other people who demonstrated the same kind of courage."

Carpenter said he and the others in the chamber were happy because the demonstration was on schedule.

Rain kept the President indoors today, except for church. He signed the 1.7 billion dollar military construction appropriations bill.

TRIBUNE Chicago, ILL.

SEP 27 1965

Carpenter Concludes Stay Under the Pacific

LA JOLLA, Calif. (UPI)—Astronaut-aquanaut M. Scott Carpenter finished a month's stay under the Pacific Ocean Sunday for the Sealab 2 project and was congratulated via telephone by President Johnson.

While in a decompression chamber aboard a surface vessel, Carpenter thanked the President and apologized for the squeaky, high-pitched sound of his voice.

"It's the best I can do in a helium atmosphere," said Carpenter, who will emerge from the chamber Monday.

MR. JOHNSON told Carpenter, "You have convinced me and all the nation that whether you are going up or down you have the skill to do a fine job."

A third and final team of aquanauts Sunday took over occupancy of the steel cylinder resting on a ledge 205 feet below the ocean surface. The 45-day scientific experiment ends Oct. 11.

Carpenter, 39, was the only aquanaut who remained underwater for 30 days.

THE ASCENT OF Carpenter and nine other second-team aquanauts in a transfer capsule was so smooth they did not realize they were on their way up until well past the halfway point.

"When are you going to start the ascent?" Carpenter asked when the transfer capsule had been pulled up 130 feet from the ocean bottom.

After the deliberately slow transfer from ocean bottom to the surface staging vessel, the Berkone, Carpenter and the nine other aquanauts were placed into a decompression chamber. They are scheduled to step out into the open air at 3:45 p.m. Monday.

NEW TEAM GOES DOWN

Carpenter, 9 Others End Stay in Sealab 2

By Associated Press

LA JOLLA, CAL.—Astronaut M. Scott Carpenter and nine fellow aquanauts rose 205 feet from Sealab 2 Sunday—so smoothly that part way through the ascent Astronaut Carpenter asked whether it had started.

Astronaut Carpenter had completed 29 days and 14 hours in the ocean-bottom laboratory —approximately twice as long, a Navy spokesman said, as anyone else has lived under water.

His associates in Team No. 2 had been below 15 days, like Team No. 1 before them.

THIRD TEAM

A third team of 10 men will complete the Navy's 45-day experiment in underwater living and working.

Three members of Team No. 3 entered the 12-by-58-foot steel capsule Saturday. The others were to follow later Sunday.

Astronaut Carpenter and his teammates were hoisted in a personnel-transfer capsule to the deck of the staging vessel Berkone 1000 yards off the picturesque Southern California coast.

On deck, the transfer capsule was mated to a decompression chamber in which the aquanauts will remain until 3:45 p.m. Monday. Pressure inside the chamber will be gradually reduced to that of sea level.

A crane on the vessel had hoisted the transfer capsule 31 feet from the ocean floor when Astronaut Carpenter asked by telephone whether the ascent had started. Capt. George Bond, in charge of the project's investigations, assured him it had. Astronaut Carpenter said he couldn't feel any movement.

BROKE SURFACE

The orange-painted transfer capsule broke the surface of the ocean at 8:05 a.m.

Sealab 2's third team includes Navy Lt. Robert Sonnenburg, a medical corpsman who was a member of the first team.

In 15 days, a spokesman said, the Navy will have comparative physiological data on two men who have lived and worked in the ocean's depths for 30 days—one of them with a 15-day interval on the surface.

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GLOBE DEMOCRAT
St. Louis, Mo.

WEEKLY NEWS REVIEW - 94A
1733 K Street, N.W. W
Washington, D.C. 20006

SEP 27 '65

Navy Teams Explore Mysteries of Sea

Deep beneath the ocean off the California coast, 3 teams of U. S. Navy aquanauts are engaged in a project of underwater exploration that may eventually yield results as exciting and significant as those achieved by any outer space program.

It's part of the Navy's "Man-in-the-Sea" program, designed to find out whether people can live and work in great ocean depths. If ways are found, perhaps man can develop the vast food reserves and mineral wealth in the oceans.

The Navy project started last summer off the Bermuda coast with Sealab 1, a capsule in which men lived for a few days in shallow water. Now the aquanauts are living and working in Sealab 2 at a depth of 210 feet for about 45 days.

In their work the aquanauts are using a trained dolphin named Tuffy, much the same way as animals are used on land.

Their leader is Navy Commander M. Scott Carpenter, already famous as an astronaut.

Sealab's Team Up; Johnson Telephones

By LEO BOWLER
EVENING TRIBUNE Science Writer

Cdr. Scott Carpenter and nine fellow aquanauts were brought back to a normal world today as they decompressed in a chamber aboard the Sealab mothership off La Jolla.

Carpenter and his teammates entered the chamber yesterday during a day marked by a smooth ascent from Sealab and a call from President Johnson.

The President and Carpenter spoke for several minutes over a phone hook-up between the decompression chamber and the LBJ Ranch in Texas.

Carpenter's voice was sent through the helium unscrambler aboard the Berkone because he still was in a helium atmosphere in the chamber and it distorted his side of the conversation.

Johnson commented on the courage and skill which the aquanauts displayed in the experiment.

"I know that being 205 feet under water for 30 days and making the excursion dive that you did has been very valuable to us and has advanced our knowledge of how humans can perform under these conditions," the President told Carpenter.

The aquanaut told Johnson all the men inside the chamber were feeling well.

Raised to Surface

Four hours earlier Carpenter had led his team swimming from Sealab to the personnel-transfer capsule on the bottom nearby. The 10 entered the capsule, sealed it and were raised to the surface under the same pressure they experienced on the bottom.

The capsule was attached to the decompression chamber with a pressure tight seal and the 10 entered the chamber to begin 30 hours inside.

During the time inside, the pressure inside the chamber has been gradually reduced and the atmosphere changed from the helim-nitrogen-oxygen gases used in Sealab to normal air.

The time in the decompression chamber is needed to keep the men from getting the bends.

Go Ashore Tomorrow

Tonight the 10 will sleep aboard the Berkone. They will go ashore tomorrow for a press conference at Sumner Hall on the Scripps Institution of Oceanography campus.

Carpenter entered Sealab Aug. 28. The nine men who went with him came up Sept. 12 and were replaced by a fresh crew but Carpenter stayed below until yesterday.

Ten new crewmen, led by Robert Sheats, a master chief diver, now are in Sealab. Sheats and two others entered Saturday and the remaining seven swam down to the lab yesterday.

Short Circuit Formed

The Sealab was switched to emergency electrical power for a time Saturday afternoon when a short-circuited electrical cable was discovered near the lab.

Officials said it was feared the trouble might involve the main power cable which extends from near the Scripps pier 3,000 feet along the ocean bottom.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

SAN DIEGO
EVENING TRIBUNE

SEP 27 1965

SEP 27 1965

Astronaut, Aquanauts Quit Submerged Sealab

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Carpenter and his teammates were hoisted in a personnel - transfer capsule to the deck of the staging vessel Berkone 1,000 yards off the Southern California coast.

On deck the transfer capsule was mated to a decompression chamber in which the aquanauts will remain until approximately 3:45 p.m. Monday. Pressure inside the chamber will be gradually reduced to that of sea level.

A crane on the vessel had hoisted the transfer capsule 31 feet from the ocean floor when Carpenter asked by telephone whether the ascent had started. Capt. George Bond, in charge of the project's investigations, assured him it had. Carpenter said he couldn't feel any movement.

Sealab 2's third team includes Navy Lt. Robert Sonnenburg, a medical corpsman who was a member of the first team.

Data Expected

In 15 days, a spokesman said, the Navy thus will have comparative physiological data on two men who have lived and worked in the ocean's depths for 30 days — one of them with a 15-day interval on the surface.

Six Frenchmen remained 15 days at a depth of 60 feet in a chamber in the Mediterranean about 18 months ago. Sealab 1's team stayed at 192 feet off Bermuda for 11 days last year. These, the Navy spokesman said, were the longest previous experiments in underwater living.

From SEP 27 1965
INQUIRER
Philadelphia, Pa.

Greeted by President

Carpenter Ends Sealab Test

Special to The Inquirer And N. Y. Herald Tribune

AUSTIN, Sept. 26.—President Johnson chatted by telephone Sunday with Cmdr. Scott Carpenter shortly after the Mercury astronaut emerged from the Pacific at the end of a 30-day stay in an underwater naval laboratory.

Carpenter and nine other Navy and civilian scientists had left "Sealab 2," and were in a helium-filled decompression chamber aboard a staging vessel off La Jolla, Calif., when Mr. Johnson's call came from the LBJ Ranch.

"Scott, you have convinced me and all the Nation that whether you are going up or down, you have the skill to do a fine job," the President told him.

The commander replied that "there were a lot of other people who demonstrated the same kind of courage, and that the entire 10-man team was "very honored and pleased that you saw fit to call us."

The crew came up Sunday after their month-long experiment in underwater living, but will remain inside the staging vessel's decompression chamber until 3:45 P.M. Monday. The project they participated is in part of the Navy's "Man in the Sea Program."

Their underwater lab was anchored at a depth of 205 feet, with Carpenter remaining below the entire month. Under his command were two crews which stayed down 15 days each.

"How are you feeling?" Mr. Johnson asked.

"We are feeling very well . . . everyone is happy and we're running on schedule," the commander replied. However, he added," I must apologize for the sound of my voice. It's the absolute best I can do in a helium atmosphere."

Persons who speak while breathing helium, do so in a sort of "Donald Duck" voice.

Mr. Johnson, who is spending a long weekend at his LBJ Ranch, told the commander that "I had a note from Mrs. Carpenter, and your wife is very proud of you, as we all are, and I just wanted to say hello to you and all the fellows associated with you. And good luck, and we're mighty proud of you."

He said that the experiment "has advanced our knowledge of how humans can perform in these conditions, and I want you to know that the Nation is very proud of you."

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President Hails Work Of Carpenter, SeaLab

THE SAN DIEGO UNION
Mon., Sept. 27, 1965 ⑧* A19
SAN DIEGO, CALIFORNIA

By S. A. DESICK

From a well-known ranch house in Texas, a familiar voice yesterday boomed into a decompression chamber off La Jolla.

The President of the United States was making a friendly telephone call.

He asked to talk to Scott Carpenter.

Cmdr. Carpenter, 40, the astronaut-turned-aquanaut, and nine of his fellow aquanauts were lying in their bunks when the call came in.

LEAVE SEALAB

Four hours earlier, they had been brought up from SeaLab II, the steel underwater home for the ambitious Navy project to determine whether man can live and work in the depths of the sea.

They had been brought up in a pressurized capsule, then transferred into the decompression chamber, where they will spend the next 30 hours to rid their tissues of the gas bubbles that cause the bends.

The chamber is riveted to the deck of the Berkone, the support vessel for SeaLab. Carpenter—who in May, 1962, made a three-orbital space flight—at first spent some time looking out of the decompression chamber's porthole.

DAYLIGHT STRANGE

He was seeing daylight for the first time in 29 days and 14 hours—since his descent 205 feet Aug. 28 with nine other members of SeaLab's first team.

Those nine men had ascended 15 days later, but Carpenter had stayed down for 15 more days with the second team.

Carpenter was jolted out of whatever reverie he was in when President Johnson's call came through. Here is a transcript of their conversation as recorded by Copley New Service at the President's ranch house near Johnson City, Tex.:

President: Scott, do you read me all right?

Carpenter: Yes, sir, Mr. President. I read you loud and clear. How me?

President: Scott, you have convinced me and all the nation that whether you are going up or down you have the skill to do a fine job.

Carpenter: Well, thank you very much. There were a lot of other people who demonstrated the same kind of courage. It's a great crew out here and we are all very honored and pleased that you saw fit to call us and let us know that you were interested in what we are doing.

President: I know that being 205 feet under water for 30 days and making the excursion dive that you did has been very valuable to us and has advanced our knowledge of how humans can perform in these conditions, and I want you to know that the nation is very proud of you. You are very brave and skillful, and I am grateful that you have successfully completed this experiment.

Carpenter: Well, thank you very much, sir, on behalf of all the crew and all those who participated in Sealab. It's an honor to be a part of the program, and again, we are pleased to know you are this interested in what we have been doing. I must apologize for the sound of my voice. It's the absolute best I can do in a helium atmosphere.

President: How are you feeling?

Carpenter: We are feeling very well. We entered the decompression chambers about four hours ago and everyone is happy and we're running on schedule.

President: I had a note from Mrs. Carpenter and your wife is very proud of you, as we all are; and I just wanted to say hello to you and all the fellows associated with you; and good luck, and we're mighty proud of you.

Carpenter: Thank you very much, sir, for calling me.

President: Thank you, Scott. Good luck and I'll see you later.

Carpenter: Thank you, sir, bye, bye.

When the President alluded to an excursion dive, he was referring to the fact that Carpenter and the aquanauts of the second team had descended in wet suits to a depth of 266 feet in an undersea canyon.

Members of the second team also had the distinction of working with Tuffy the porpoise. Tuffy, trained at the Navy's base at Point Mugu, was flown here, and proved adept at carrying messages to SeaLab and rescuing "lost" aquanauts.

Tuffy has gone back to Point Mugu after being made an honorary aquanaut, and the current pet of the scientists aboard the Berkone is a sea lion named Samantha, who showed up a few days ago.

There was too much excitement around the Berkone yesterday to pay too much attention to Samantha (it's hoped she won't feel rejected and develop a neurosis).

Not only was the second team brought up, but seven members of the third, and final, team descended to SeaLab. The first three members of this team had descended Saturday.

One of the aquanauts who went down yesterday was Lt. Robert E. Sonnenburg, a Navy doctor who was also on the first team.

The third team will stay down 15 days to wind up the 45-day project. It will carry out biological and other research projects, but its mission will be concentrated on salvage experiments.

SEALAB CREW BROUGHT UP

BALT. SUN 9/27/65

Carpenter Ends 29 Days In Underwater Lab

La Jolla, Cal., Sept. 26 (AP)—Astronaut M. Scott Carpenter and nine fellow aquanauts rose 205 feet from Sealab 2 today — so smoothly that part way through the ascent Carpenter asked whether it had started.

Carpenter had completed 29 days and 14 hours in the ocean-bottom laboratory.

His associates in team No. 2 had been below 15 days, like team No. 1 before them.

A third team of 10 men will complete the Navy's 45-day experiment in underwater living and working.

Hoisted In Capsule

Three members of team No. 3 entered the 12-by-58-foot steel capsule yesterday. The others were to follow later today.

Carpenter and his team-mates were hoisted in a personnel-transfer capsule to the deck of the staging vessel Berkone 1,000 yards off the picturesque Southern California coast.

On deck the transfer capsule was mated to a decompression chamber in which the aquanauts will remain until approximately 3.45 P.M. tomorrow. Pressure inside the chamber will be gradually reduced to that of sea level.

A crane on the vessel had hoisted the transfer capsule 31 feet from the ocean floor when Carpenter asked by telephone whether the ascent had started. Capt. George Bond, in charge of the project's investigations, assured him it had. Carpenter said he couldn't feel any movement.

Breaks Surface At 8.05 A.M.

The orange-painted transfer capsule broke the surface of the ocean at 8.05 A.M.

Sealab 2's third team includes Navy Lt. Robert Sonnenburg, a medical corpsman who was a member of the first team.

In 15 days, a spokesman said, the Navy thus will have comparative physiological data on two men who have lived and worked in the ocean's depths for 30 days —one of them with a 15-day interval on the surface.

Six Frenchmen remained 15 days at a depth of 60 feet in a chamber in the Mediterranean about 18 months ago. Sealab 1's team stayed at 192 feet off Bermuda for 11 days last year. These, the Navy spokesman said, were the longest previous experiments in underwater living.

LBJ Lauds Carpenter's Sealab Stay

AUSTIN, Sept. 26 — Cmdr. Scott Carpenter got a presidential pat on the back today for performing as well under the sea as he used to do in space.

President Johnson phoned congratulations to Carpenter, who was in a shipboard decompression chamber after emerging from 30 days beneath the sea off the La Jolla, Calif., coast.

"Scott, you have convinced me and all the nation that whether you are going up or down you have the skill to do a fine job," the President said.

Carpenter, the astronaut who made a 3-orbit flight in a Mercury spacecraft in 1962, is now on loan to the Navy's "Man in the Sea" program.

Carpenter, with nine other men coming in relays, spent a month in an undersea laboratory, Sealab 2, positioned 205 feet below the surface. At one point, Carpenter emerged from the lab and descended to a level of 266 feet.

Carpenter thanked Mr. Johnson for the call and apologized for the sound of his voice from inside the decompression chamber.

"It's the absolute best I can do in a helium atmosphere," he said. WASH. POST 9/27/65

Mpls. (Minn.) Morning Tribune
MONDAY, SEPTEMBER 27, 1965

Aquanauts Return to the Surface From Sealab 2

LA JOLLA, Calif. — (AP) — M. Scott Carpenter, the astronaut turned aquanaut, and nine companions rose 205 feet from Sealab 2 Sunday—so smoothly that part way through the ascent Carpenter asked whether it had started.

Carpenter had completed 29 days and 14 hours in the ocean-bottom laboratory — approximately twice as long as anyone else has lived under water, a Navy spokesman said.

His associates in team No. 2 had been below 15 days, like team No. 1 before them.

A third team of 10 men will complete the Navy's 45-day experiment in underwater living and working.

Carpenter and his teammates were hoisted in a personnel-transfer capsule to the deck of the staging vessel Berkone, 1,000 yards off the coast of Southern California.

On deck the transfer capsule was mated to a decompression chamber in which the aquanauts will remain until this afternoon. Pressure inside the chamber will be gradually reduced to that of sea level.

Scott Carpenter Ends 29 Days On Ocean Floor

LA JOLLA, Calif. (AP) — Astronaut M. Scott Carpenter and nine fellow aquanauts rose 205 feet from Sealab 2 Sunday—so smoothly that part way through the ascent Carpenter asked whether it had started.

Carpenter had completed 29 days and 14 hours in the ocean-bottom laboratory—approximately twice as long, a Navy spokesman said, as anyone else has lived under water.

His associates in team No. 2 had been below 15 days, like team No. 1 before them.

A third team of 10 men will complete the Navy's 45-day experiment in underwater living and working.

Three members of team No. 3 entered the 12-by-58-foot steel capsule Saturday. The others were to follow later Sunday.

Carpenter and his teammates were hoisted in a personnel-transfer capsule to the deck of the staging vessel Berkone, 1,000 yards off the picturesque Southern California coast.

On deck, the transfer capsule was mated to a decompression chamber in which the aquanauts will remain until Monday when the chamber gradually will be reduced to that of sea level.

Six Frenchmen remained at a depth of 60 feet in a chamber in the Mediterranean about 18 months ago. A previous Sealab team had stayed at 192 feet off Bermuda for 11 days last year. These, the Navy spokesman said, were the longest previous experiments in underwater living.

SUN-TIMES Chicago, Ill.

BY THE ASSOCIATED PRESS

LA JOLLA, CALIF., SEPT. 26 (AP)-ASTRONAUT M.SCOTT CARPENTER AND NINE FELLOW AQUANAUTS ROSE 205 FEET FROM SEALAB 2 TODAY--SO SMOOTHLY THAT PART WAY THROUGH THE ASCENT CARPENTER ASKED WHETHER IT HAD STARTED.

CARPENTER HAD COMPLETED 29 DAYS AND 14 HOURS IN THE OCEAN-BOTTOM LABORATORY--APPROXIMATELY TWICE AS LONG, A NAVY SPOKESMAN SAID, AS ANYONE ELSE HAS LIVED UNDER WATER.

HIS ASSOCIATES IN TEAM NO. 2 HAD BEEN BELOW 15 DAYS, LIKE TEAM NO. 1 BEFORE THEM.

A THIRD TEAM OF 10 MEN WILL COMPLETE THE NAVY'S 45-DAY EXPERIMENT IN UNDERWATER LIVING AND WORKING.

THREEMEMBERS OF TEAM NO. 3 ENTERED THE 12-BY-58-FOOT STEEL CAPSULE YESTERDAY. THE OTHERS WERE TO FOLLOW LATER TODAY.

CARPENTER AND HIS TEAMMATES WERE HOISTED IN A PERSONNEL-TRANSFER CAPSULE TO THE DECK OF THE STAGING VESSEL BERKONE 1,000 YARDS OFF THE PICTURESQUE SOUTHERN CALIFORNIA COAST.

ON DECK THE TRANSFER CAPSULE WAS MATED TO A DECOMPRESSION CHAMBER IN WHICH THE AQUANAUTS WILL REMAIN UNTIL APPROXIMATELY 3:45 P.M. TOMORROW. PRESSURE INSIDE THE CHAMBER WILL BE GRADUALLY REDUCED TO THAT OF SEA LEVEL.

A CRANE ON THE VESSEL HAD HOISTED THE TRANSFER CAPSULE 31 FEET FROM THE OCEAN FLOOR WHEN CARPENTER ASKED BY TELEPHONE WHETHER THE ASCENT HAD STARTED. CAPT. GEORGE BOND, IN CHARGE OF THE PROJECT'S INVESTIGATIONS, ASSURED HIM IT HAD. CARPENTER SAID HE COULDN'T FEEL ANY MOVEMENT.

THE ORANGE-PAINTED TRANSFER CAPSULE BROKE THE SURFACE OF THE OCEAN AT 8:05 A.M.

SEALAB 2'S THIRD TEAM INCLUDES NAVY LT. ROBERT SONNENBURG, A MEDICAL CORPSMAN WHO WAS A MEMBER OF THE FIRST TEAM.

IN 15 DAYS, A SPOKESMAN SAID, THE NAVY THUS WILL HAVE COMPARATIVE PHYSIOLOGICAL DATA ON TWO MEN WHO HAVE LIVED AND WORKED IN THE OCEAN'S DEPTHS FOR 30 DAYS--ONE OF THEM WITH A 15-DAY INTERVAL ON THE SURFACE.

SIX FRENCHMEN REMAINED AT A DEPTH OF 60 FEET IN A CHAMBER IN THE MEDITERRANEAN ABOUT 18 MONTHS AGO. SEALAB 1'S TEAM STAYED AT 192 FEET OFF BERMUDA FOR 11 DAYS LAST YEAR. THESE, THE NAVY SPOKESMAN SAID, WERE THE LONGEST PREVIOUS EXPERIMENTS IN UNDERWATER LIVING.

WD1255PPD

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Carpenter Ascends From Sealab Test

LA JOLLA, Calif., Sept. 26—(AP)—Astronaut M. Scott Carpenter and nine fellow aquanauts rose 205 feet from Sealab 2 Sunday—so smoothly that part way through the ascent Carpenter asked whether it had started.

Carpenter had completed 29 days and 14 hours in the ocean-bottom laboratory—approximately twice as long, a Navy spokesman said, as anyone else has lived under water.

His associates in team No. 2 had been below 15 days, like team No. 1 before them.

A third team of 10 men will complete the Navy's 45-day experiment in underwater living and working.

Three members of team No. 3 entered the 12-by-58-foot steel capsule Saturday. The others were due to follow on Sunday.

Carpenter and his teammates were hoisted in a personnel-transfer capsule to the deck of the staging vessel Berkone 1000 yards off the Southern California coast.

On deck the transfer capsule was mated to a decompression chamber in which the aquanauts will remain until approximately 3:45 p.m. Monday. Pressure inside the chamber will be gradually reduced to that of sea level.

A crane on the vessel had hoisted the transfer capsule 31 feet from the ocean floor when Carpenter asked by telephone whether the ascent had started. Capt. George Bond, in charge of the project's investigations, assured him it had. Carpenter said he couldn't feel any movement.

commander "you have convinced me and all the nation that whether you are going up or down you have the skill to do a fine job."

Johnson Praises Aquanaut's Test

JOHNSON CITY, Tex., Sept. 26 —(UPI)— President Johnson put in a congratulatory telephone call Sunday to astro-aquanaut Scott Carpenter who was in a decompression chamber aboard a vessel off La Jolla, Calif. after spending 30 days under the sea.

Mr. Johnson told the Navy

New Team Goes Down To Sealab

LA JOLLA, Calif. — (AP) — A new team of divers occupied the Navy's Sealab 2 underwater home Monday while its former occupants—205-feet above—underwent the critical decompression phase.

The 10 new aquanauts are the third team to occupy the underwater laboratory since the 12-by-58-foot steel capsule was lowered into the Pacific Ocean last month.

Sunday, President Johnson spoke by telephone to astronaut-aquanaut Malcolm Scott Carpenter shortly after Carpenter was brought to the surface after spending 29 days and 14 hours in the ocean bottom laboratory.

'CONVINCED ME'

"Scott, you've convinced me and all the nation that whether you're going up or down you have the skill to do a fine job," the President said.

Carpenter, a Navy commander, orbited the earth three times in May 1963 in a mercury spacecraft.

His underwater stint was hailed as a record by the Navy, who said Carpenter spent approximately twice as long underwater as anyone else.

SEP 27 1965

29-Day Aquanaut Surfaces

FREE PRESS
Detroit, Mich.

LA JOLLA, Calif. — (AP) — M. Scott Carpenter, the astronaut, and nine fellow aquanauts rose 205 feet from Sealab 2 Sunday—so smoothly that part way through the ascent he asked whether it had started.

Carpenter had completed 29 days and 14 hours on the ocean bottom in the laboratory. A Navy spokesman said that was approximately twice as long as anyone else had stayed under water.

The others in Team No. 2, had been below 15 days, as Team No. 1 had been before them.

A third team of 10 men will complete the Navy's 45-day experiment in living and working under water.

Three members of Team No. 3 entered the 12-by-58-foot steel capsule Saturday. The others were to follow Sunday.

Carpenter and the others were raised in a capsule to the deck of the staging vessel Berkone, lying 1,000 yards off the Southern California coast.

La Jolla, Calif.

Ten aquanauts were in the midst of an above-surface 36-hour decompression schedule Monday after having participated in Sealab 2's underwater laboratory experiment. M. Scott Carpenter spent 29 days and 14 hours in Sealab 2—approximately twice as long as any one else has lived under water.

CHRISTIAN SCIENCE MONITOR
Boston, Mass.

1965

SEALAB DIVERS FIND FLAPJACK DOESN'T FLIP

Wild Sea Lion Learns Buzzer's Call

La Jolla, Cal., Sept. 27 (AP)—Divers chalked up an animal training success and a culinary failure today in the navy's ocean-bottom Sealab 2.

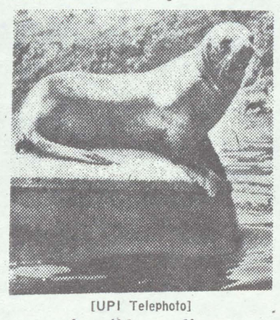
Their success: They have found a wild sea lion capable of learning in a few days some of the tricks a tame porpoise took weeks to master.

Their failure: Soggy pancakes.

Third Team in Sealab

The progress report from the third team of 10 men spending 15 days 205 feet below the surface 1,000 yards off this coastal resort came just before the second team emerged after 30 hours in a decompression chamber.

The second team, led by Astro-Aquanaut M. Scott Carpenter, entered the chamber on a support vessel after being hoisted to the surface yesterday. The long decompression was ordered to adjust the divers gradually to normal atmospheric pressure. In the 12x58-foot Sealab 2 they were subjected to 100 pounds per square inch—seven times surface pressure — necessary to withstand the crushing weight of the ocean.



[UPI Telephoto]
A wild sea lion

Brief Meeting with Wife

Carpenter had a brief reunion with his wife, Rene, for the first time in a month when he and nine other Sealab 2 divers emerged from the decompression chamber. Carpenter and the others were then told to remain on the mother ship for 12 hours or more in case of any unexpected reactions. Carpenter was the only man to be under water in the project for 30 consecutive days.

It was Carpenter's team which discovered the brainy sea lion, at first called Sam and later Samantha.

Divers reported that they had trained Samantha to come from as far as 200 yards on signal—a noise made by a buzzer.

The buzzer was the same used in the training of Tuffy, a tame male porpoise coached by navy scientists at the Point Mugu, Cal., missile center.

Not Cooked in Center

The third team experienced the first major frustration of the Sealab 2 experiment to test man's ability to live and work at great depths when they learned they couldn't cook pancakes on the griddle in the galley.

"It's the first real failure of the project. The extreme pressure prevented use of grease on the griddle. Hot grease gives off hydrocarbon gases which at that pressure would have penetrated the men's tissues deep enough to become toxic."

TRIBUNE Chicago, ILL.

SEP 28 1965

From SEP 24 1965
INQUIRER
Philadelphia, Pa.

All Is Serene With Sealab, Topside Crews

LA JOLLA, Calif., Sept. 23 (AP).—There are no disobedient aquanauts in Sealab 2.

Thanks to better discipline below and better understanding topside, says Navy Capt. George Bond, there has been no recurrence of "a certain degree of independence not compatible with safety" observed in last year's Sealab 1 experiment off Bermuda.

Bond, senior medical officer in both tests of divers' ability to function for long periods at extreme depths, says "safety was drilled into the Sealab 2 men constantly in their pre-dive indoctrination and this time there has been no emotional dissociation from people on the surface."

RESENTED ORDERS

A Navy psychologist earlier said the human tendency to adapt completely to a new environment ha dcaused resentment against orders from topside to crop up among the four divers who spent 11 days at a depth of 193 feet in Sealab 1.

He said this was one of the things psychologists were watching for among the three teams of 10 scheduled to spend 15 days each in Sealab 2, resting on the sea floor at a depth of 205 feet 1000 yards off this coastal resort.

"There was no outright refusal to obey orders in the Sealab 1 tests," Capt. Bond said after a quick dive Wednesday to check on the health of his men, "but there was some dissociation.

GREATER AUTONOMY

"In Sealab 1 we tried to keep in touch constantly with the men below. In Sealab 2, however, we are giving them greater autonomy—we seldom talk to them more than once every seven or eight hours."

Bond and Capt. Walter Mazzone, physiological control officer, spent 13 minutes in the 12 x 58-foot steel cylinder and reported the Sealab crew had two requests. They wanted to vary their diet of dried and frozen foods with a fresh roast of beef, which was put on the menu Thursday.

"They also wanted to know how the weather was on the surface," Bond smiled. "As you know, the weather below gets pretty monotonous."

CURIOUS SEA LIONS

Bond said five sea lions have become very curious about the divers' underwater home, staring at them through the portholes that line its sides.

"They'll probably become something of a nuisance before it's over with," he said.

"I wouldn't be surprised if the sea lions start trying to come up through the divers' access hatch before long."

He said some of the divers wake up with headaches, probably a sinus condition due to the extreme pressure—more than six times that at the surface—maintained in Sealab 2 to offset the crushing weight of the ocean.

"They get over it, however, as soon as they get up and stir around," Bond said.

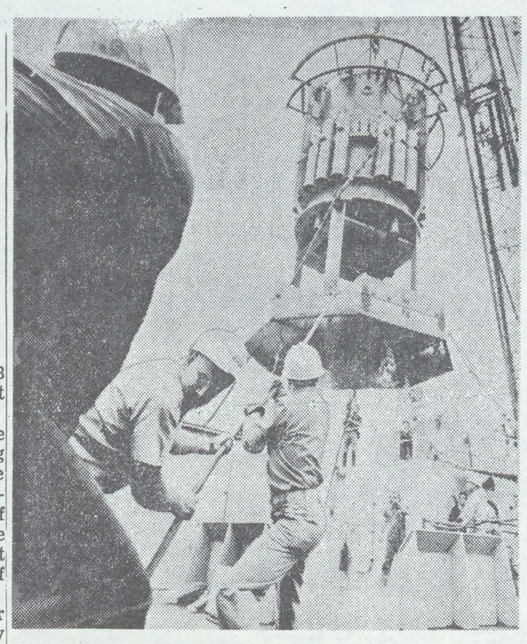
From SEP 26 1965
INQUIRER
Philadelphia, Pa.

Carpenter Greets Wife

LA JOLLA, Calif., Sept. 27 (UPI). — Aquanaut-Astronaut M. Scott Carpenter was reunited with his wife, Rene, Monday, for the first time in a month after he and nine other Sealab 2 divers merged from a decompression chamber.

But the reunion was brief. Carpenter and the others were instructed to remain on the mother ship Berkone for 12 hours or more to guard against possible unexpected reactions.

Carpenter faced intensive examination and debriefing since he was the only man to be under water in the project for 30 consecutive days.



TEN AQUANAUTS are inside this personnel transport capsule as it swings across the deck of Sealab 2 staging vessel at La Jolla, Calif., Sunday. Capsule brought divers from ocean floor where Astronaut M. Scott Carpenter completed 29 days and 14 hours, twice as long as anyone else has lived underwater. (Associated Press Photo)

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

SEP 28 1965

Flapjacks Just Won't Flap In Sealab Without Grease

LA JOLLA, Calif., Sept. 28 (AP)—The 10 occupants of the Sealab 2 underwater laboratory tried without success yesterday to cook pancakes on a griddle in the galley.

"It's the first real failure of the project," a spokesman said. "They were pretty soggy, burned on the top and bottom and not cooked at all in the center."

The spokesman said that the divers could not use grease on the griddle because hot grease gives off gases which, because of extreme pressures, would be harmful to the aquanauts. So they are back to the regular diet of frozen-dried food.

While members of the third team of divers were burning pancakes, their predecessors in the sealab completed the final stages of decompression.

The second team, including astronaut-aquanaut M. Scott Carpenter, then spent the night in seclusion.

It was the second team that discovered Samantha, the female sea lion.

Divers said that Samantha would come from as far as 200 yards when she heard a buzzer sound. Then she became confused and started following divers testing a hand-held propulsion scooter.

Scientists said that the propeller on the scooter apparently sounded similar to the buzzer.

The divers hope they can correct Samantha's habits by extra training and by rewarding her with fish when she responds to the right sound.

Scientists hope that such animals can be taught to carry rescue lines to divers in trouble.

From SEP

POST-DISPATCH
St. Louis, Mo.



United Press International Photo

AQUANAUT-ASTRONAUT—La Jolla, Calif., Sept. 28—Astronaut-aquanaut Scott Carpenter leaves a decompression chamber aboard the mothership Berkon eafter 31 days under pressure. Carpenter had lived underwater with a team of Navy men. The experiment, still being continued with another team, is named SeaLab.

Two SeaLab Divers Reach 253 Feet

Instrument Failure Forces Men Into Swift Return

By BRYANT EVANS
The San Diego Union's Science Writer

Two SeaLab II aquanauts made a dive into Scripps Submarine Canyon to a depth of 253 feet—48 feet below SeaLab—early yesterday afternoon.

Cmdr. M. Scott Carpenter and Wally Jenkins stopped short of their 266-foot goal when they found that their pneumofathometer was malfunctioning. Trouble with this depth registering instrument caused postponement of the dive on two prior attempts.

The aquanauts came back promptly to the level of SeaLab because without accurate knowledge of the depth of their dive they had no way of estimating their need for decompression, it was explained.

The SeaLab operation apparently has a new deep diving volunteer. A female sealion nicknamed Sam for an unexplained reason, has made some close visits to the lab. On the surface, she has responded to the same "ping" signals used to call Tuffy the porpoise and has accepted her reward of fish from Michael Greenwood, a project psychologist on the mother ship, the Berkone.

TRAINING PLANNED

Greenwood said he plans to try to train Sam to respond to commands by rewarding her in the sea and without taking her into captivity.

Meanwhile, Tuffy has been made a member of the National Association of Letter Carriers for his yeoman service in carrying mail down to SeaLab last week.

His acceptance into the organization was announced in a letter from Gene C. Hacker, secretary of Branch 343, St. Louis, of the organization. Hacker enclosed a lapel pin for Tuffy and commented that perhaps the phrase "nor ocean depths" should be added to the hazards that do not prevent letter carriers from making "the swift completion of their rounds."

The letter and lapel pin were forwarded to Tuffy's trainer, Rollie Ross, at the Pt. Mugu Naval Missile Center where Tuffy returned after successful performance of his SeaLab mission.

NEW TV RIGGING

Down on the bottom, the aquanauts yesterday were working toward supplying better out-in-the-water television pictures. They rigged a new tripod for a television camera and put up new lights. The lights included three 1,000-watt diving lamps originally constructed in 1937 for an attempt to salvage the British liner Lusitania, sunk early in World War I. The lamps never were used.

The aquanauts shot two hours of documentary movies yesterday as the clarity of the water reached a new high for the operation. Visibility was estimated at 30 feet. The film is to be used for technical analysis of the operation after its completion.

Telephone communication between the Berkone and the beach has been lost, although both the staging vessel and the shore installation can still communicate by telephone with the SeaLab. The Berkone does have a radio link with the shore.

San Diego, Calif
Union
(Cir. D. 111,303 Sun. 213,743)

SEP 24 1965

139



PRINCIPAL AND INTEREST — Rene Carpenter listens intently as her husband, Scott, a central figure in the Sealab experiment, describes what it was like on the bottom of the ocean. Carpenter spent 30 days in the capsule. At his left during news conference is aquanaut George Dowling.

'High Adventure' Low Down Tops Among Sealab II Thrills

"Arturo, this is high adventure."

That is the way the only aquanaut from San Dieo in the second Sealab team describes his feelings about his stay on the bottom of the sea.

Arthur O. Flechsig, 40, a Scripps Institution of Ocenography specialist, described for newsmen the highlight of his 15 days in Sealab.

He said he experienced his biggest thrill while first swimming toward Sealab through a school of fish which almost blocked his view of the huge steel tank that was to be his home for the next 15 days.

"When I could just barely make it out through the hundreds of fish, I said to myself: 'Arturo, this is high adventure.' And it was."

Flechsig's statement came yesterday after each aquanaut was asked to tell newsmen about their biggest moment or some of the phase of their participation in the Sealab experiment. Here are answers from the others:

John F. Reaves, a Navy photographer — "The unnatural environment in which I had to take pictures and still stay alive was my biggest challenge. Working with Tuffy, the porpoise was the most interesting thing I did."

Wally Jenkins, an oceanographer — "The whole thing was a thrill, the whole 325 hours I spent down there. The dive to 266 feet with Cdr. (Scott) Carpenter was the biggest thrill. When we got to the edge of Scripps Canyon I wanted to shake hands. I guess he thought I was kind of corny. I had to catch him to do it."

Bob Barth, a Navy quartermaster and the only aquanaut from Sealab I to participate in Sealab II — "It was quite different than Sealab I. It was bigger, more complex, with a lot more people and a lot more chores. I hope to participate in Sealab III."

George Dowling, and oceanographer — "It was like practicing oceanography upside down. Generally you work from the surface toward the bottom, but under this new concept, we worked from the bottom up."

Ken Conda, a Navy torpedoman's mate — "Working with Tuffy was the highlight of the stay at the bottom. He seemed almost human. He trained us in the way he wanted us to work. The first time he came down, he brought a letter from by wife. The second time, I saw somthing strapped to his harness. It was a Coke, a joke betwee Wally Ross, his trainer and myself."

Howard Buckner, a Navy chief steelworker — " I thought the biggest problem would be kicking the cigar habit, but I was so busy down there I only wanted one once. The whole thing was a thrill."

William Tolbert, an oceanographer — "I had an accident when I was in school and I was handicapped for five or six years. I didn't make the local football or basketball teams. The biggest thrill for me was making the Sealab team. I wouldn't let myself believe it until I was down there and Capt. (George) Bond couldn't change his mind."

Scott Carpenter — "I enjoyed watching the sea lions which visited us most of all. They are the most graceful things in the water I've ever seen.

EVENING TRIBUNE SAN DIEGO, CALIFORNIA Wed., Sept. 29, 1965

SEALAB LIFE DIFFERENT

Carpenter Lauds Team's Behavior

By LEO BOWLER
EVENING TRIBUNE Science Writer

Scott Carpenter came back from his 30-day Sealab II experiment amazed at the ability of humans to adapt to seabottom life.

He told newsmen he believed the most important finding of the experiment was knowledge about human performance under the sea.

Carpenter said the average time outside Sealab spent by each of the first team members every day was 39 minutes which, he said, doesn't seem like much when compared to the cost of the experiment.

But, he said, the team brought back knowledge which should lengthen this stay many times.

"It is well within the state of the art now for designers to come up with a wet suit in which a man could spend eight hours a day in the water," Carpenter said. "He would have to come in only when hunger or fatigue forced him to do so."

When the aquanauts went down, Carpenter said, it was felt that the limiting factor on diving would be the coldness of the water.

"This is not so," he said. "Man has a tremendous ability to adapt. When we first went down, we could spend 25 to 30 minutes outside before the cold forced us back. This changed a lot during the two weeks it took to get acclimated."

Carpenter and the other aquanauts came back with many ideas which he said would improve future Sealabs.

The electrical wetsuits now being tested in Sealab made extended dives possible, but Carpenter called for a redesign of the suits in the light of findings by the aquanauts.

He also said that temperature and humidity control inside Sealab needs improvement.

Thermostats Confused

"The helium atmosphere confuses the body's thermostats," Carpenter said. "We would wake up in the night cold but perspiring, not knowing whether we were really too cold or too hot.

"You had to get out of bed every couple of hours to rest."

Carpenter also said that new procedures should be worked out to make the organization of future Sealabs more efficient.

He said the group on the bottom should be autonomous and that the project should be administered from the bottom instead of from the surface.

The aquanauts should have more facilities to care for their own equipment so they wouldn't have to spend so much time sending equipment, like breathing gear, to the surface.

Never a Cross Word

"A lot of people felt the pressure would have effects on personality that would make the aquanauts too independent," Carpenter said. "They were afraid the divers would shuck off their responsibilities to the men on the surface and that they couldn't get along with each other."

"This was not so," Carpenter said. "There was not a cross word all the time I was down there. It reaffirmed my faith in humans."

Carpenter said the aquanauts had to endure plenty of hardships in addition to cramped quarters and isolation.

DAILY VARIETY - 2
6404 Sunset Blvd. D
Hollywood 28, Calif.
Circ. 8,294
SEP 29 '65

DAILY VARIETY DAILY

JUST FOR VARIETY

By ARMY ARCHERD

GOOD MORNING: "Namu," nationally-publicized killer whale captured, and on view in Seattle, was inked for pix by — who else? — Ivan Tors. "It's the first time my attorneys ever had business with a killer whale," said Tors, "but they're used to dealing with killer sharks — in Hollywood" . . . Add honors to Tors' films: Scripps Institute of Oceanography sent him a letter of thanks for whale footage in "Around The World Under The Sea" which shows, for the first time, how whales dive to ocean depths a la submarines, or vice versa . . . Tors is the only civvie invited aboard the Sea Lab where our Aquanauts have been experimenting. "Tuffy," the porpoise used as a messenger by the Aqualads, already starred in a "Flipper" seg to be aired soon . . . And here's a switch, Tors is so busy in tv, via "Flipper" and the upcoming "Daktari" series bought by CBS, he has decided to curtail feature films following the Soupy Sales' "Birds Do It" (for Columbia) . . . Marc Daniels discovered a plethora of material in the six-part "Kildare," lensed enough footage for a seventh — which Metro ok'd. (And paid him for same) . . . Add another casualty to the "Duel At Diablo" company at Kanab: Bobby Crawford, who toiled a week despite high fever and sore throat, was forced to quit when medics diagnosed mononucleosis. A final, big scene, showing Crawford as a bugler-survivor, blowing taps over deceased buddies was axed, instead he was "killed off" to permit his medical "discharge" from the pic . . . Meanwhile, brother Johnny Crawford's competing in the Bakersfield rodeo before "Eldorado," with John Wayne and Bob Mitchum. The latter Crawford is limited to steer and calf-roping, no more bull or bronc riding — on orders from his papa . . . Arthur Jacobs is talking to Gower Champion about directing the musicalized "Goodbye Mr. Chips" at Metro. Meanwhile, Jacobs and Dick Fleischer took off for the Isles to search "Dr. Dolittle" locations for 20th. They're testing Linda Bennett for the Rex Harrison starrer . . . Steve Allen gets a taste of the campaign trail tonight — talks about Conservatism to the Toluca Lake Young Republicans at Sportsmen's Lodge . . . Bob Hope, starting his 16th season (in black-and-white) tonight for NBC notes, "CBS is finally recognizing color — and about time. They fought it longer than Gov. Wallace."

Astro-Aquanaut Turns Scoffing Into Plaudits

La Jolla, Calif. (AP)—A civilian scientist-diver admits he scoffed when he first learned an astronaut, Scott Carpenter, was going to head a team of divers in the Navy's Sealab 2 experiment. But he returned to the surface believing:

"That man is the best thing that ever happened to underwater research."

George B. Dowling, 38, a physicist who spent 15 days with Carpenter and eight others in the 12-by-58-foot steel cylinder on the floor of the Pacific 1,000 yards offshore, said:

"I was frankly skeptical. I thought, 'They're going to let him go down because he's what he is—an astronaut.'

"But that was before I met him.

"After two weeks in Sealab 2, I am convinced they couldn't have picked a better man. I've never known anyone as considerate, as painstaking, as well equipped for this kind of work.

"For instance, our breathing tanks were the latest and best that could be obtained, very advanced models. But while we were still in training, Carpenter found 25 changes that had to be made and all of them were worthwhile.

"That probably was from his training as a test pilot. But there were many other things that made us respect and like him. There was no task too menial for him to do. Whenever he saw something that needed doing, he didn't tell someone; he did it himself.

"I don't know when he got any sleep."

"Many of the experiments we conducted obviously had military applications," Dowling said.

"We measured current and temperature, for instance, because you can correlate changes in those factors with changes in sonar signals and thus get a better idea of whatever target your sonar is hitting."

STAR
Kansas City, Mo.

Test Described

Underwater Stay Called Possible

LA JOLLA, Calif. (AP) — Astronaut M. Scott Carpenter, after a record 30 days on the Pacific's floor, is convinced "Men can live forever—any length of time they wish — beneath the surface of the ocean."

Carpenter surfaced Sunday with nine other aquanauts from the Navy's 205-foot deep Sealab 2. He told a news conference Tuesday of the beauty, pain and hard manual labor and added:

"The ocean is a much more hostile environment than space. I worked much harder in Sealab 2 than in the Mercury capsule. More energy is required just to move around, because of the extreme pressure, and just to stay warm, because of the 50-degree cold.

"But the real key is the isolation. I think men can live as long in underwater habitats as they can in Dewline stations or any place else where they are isolated. I am convinced that men can live and work forever — any length of time they wish — beneath the surface of the ocean."

The 40-year-old Navy commander, who orbited the earth in May of 1962, said men are essentially weightless both in space and in the ocean, but the density of deep water — 800 times that of air at the surface — makes every movement an effort.

Of the scorpion fish sting on his bare hand Sept. 12 which kept him in bed for more than a day, Carpenter said:

"It was my fault — groping around down there without the aid of a light. I know better now. Such things are no threat if you look where you're putting your hand."

He said one of the great delights of his stay in the 12x58 foot steel cylinder on the ocean floor 1,000 yards off this coastal resort was watching sea lions which came down at night to feed on fish attracted by lights from the Sealab 2 portholes.

"They are about the most beautiful, graceful things I've ever seen," he said.

The divers who came up with Carpenter were the second team to spend 15 days in Sealab 2 as part of a Navy experiment to determine how long men can function at great depths.

Carpenter went down with nine men Aug. 28 and stayed for two more weeks after the first team was replaced by another group of nine Sept. 12. A third team, the last in the 45-day test, replaced the second Sunday.

Carpenter and the nine others at the news conference spent 30 hours in the decompression chamber and emerged for their first breath of fresh air late Monday.

Capt. George Bond, project medical officer, termed the experiment highly successful so far and Carpenter's 30-day stay a record "for anything like that depth."

NEWS
Dallas, Texas

From SEP 20 1965
JOURNAL, Atlanta, Ga.

Sealab 2 Experiment Half Over

LA JOLLA, Calif. (AP) — The Navy's 45-day Sealab 2 underwater living experiment reached the half-way point Sunday and officials praised its progress lavishly.

"We are easily accomplishing or exceeding what we've planned to do," said Capt. George Bond, chief investigator of the experiment. "I hope the remaining half of the experiment goes as well."

Capt. Lewis B. Melson, project director, said, "Sealab will be the stepping stone to full comprehension of life in aquaspace."

The second 10-man aquanaut team, except for Cmdr. M. Scott Carpenter, completed its seventh of 15 days in 205-feet-deep Sealab Sunday.

Carpenter, the astro-aquanaut, is in his 23rd day on the ocean bottom. He is scheduled to come up after 30 days.

Man Can Live Forever In Undersea Work, Carpenter Believes

By RALPH DIGHTON

LA JOLLA, Calif., Sept. 28 (AP).—Astronaut M. Scott Carpenter, after a record 30 days on the Pacific's floor, is convinced "men can live forever—any length of time they wish—beneath the surface of the ocean."

Carpenter surfaced Sunday with nine other aquanauts from the Navy's 205-foot deep Sealab 2. He told a news conference Tuesday of the beauty, pain and hard manual labor and added:

"The ocean is a much more hostile environment than space. I worked much harder in Sealab 2 than in the Mercury capsule. More energy is required just to move around, because of the extreme pressure, and just to stay warm, because of the 50-degree cold.

'ISOLATION IS KEY'

"But the real key is the isolation. I think men can live as long in underwater habitats as they can in DEW line stations or any place else where they are isolated. I am convinced that nine men Aug. 28 and stayed for two more weeks after the first team was replaced by another group of nine Sept. 12. A third team, the last in the 45-day test, replaced the second team Sunday.

Carpenter and the nine others at the news conference spent 30 hours in the decompression chamber and emerged for their first breath of fresh air late Monday.

Capt. George Bond, project medical officer, said the two teams have accomplished more than 200 man hours of work outside the Sealab despite the cold and murky water. He termed the experiment highly successful so far, and Carpenter's 30-day stay a record "for anything like that depth."

Capt. Walter Mazzone, project physiological officer, said the experience of divers in Sealab 2 shows a need for redesign of future underwater huts—especially enlargement of areas where divers stow and repair their gear.

"But this was only our second manned underwater habitat and there were never enough funds," he said. "Sometimes we had to use dollars from our own pockets."



AP Wirephoto

Astronaut Scott Carpenter leaves decompression chamber at La Jolla, Calif., after spending 30 days at bottom of ocean in a Navy Sealab experiment.

EVENING SUN
Baltimore, Md.



Of Darien Firm

Two Participate In Sea Project

Two members of the staff of Dunlap and Associates, Inc. of Darien are participants in the U. S. Navy's "Man-in-the-Sea" project now using SEALAB-II for underwater experiments.

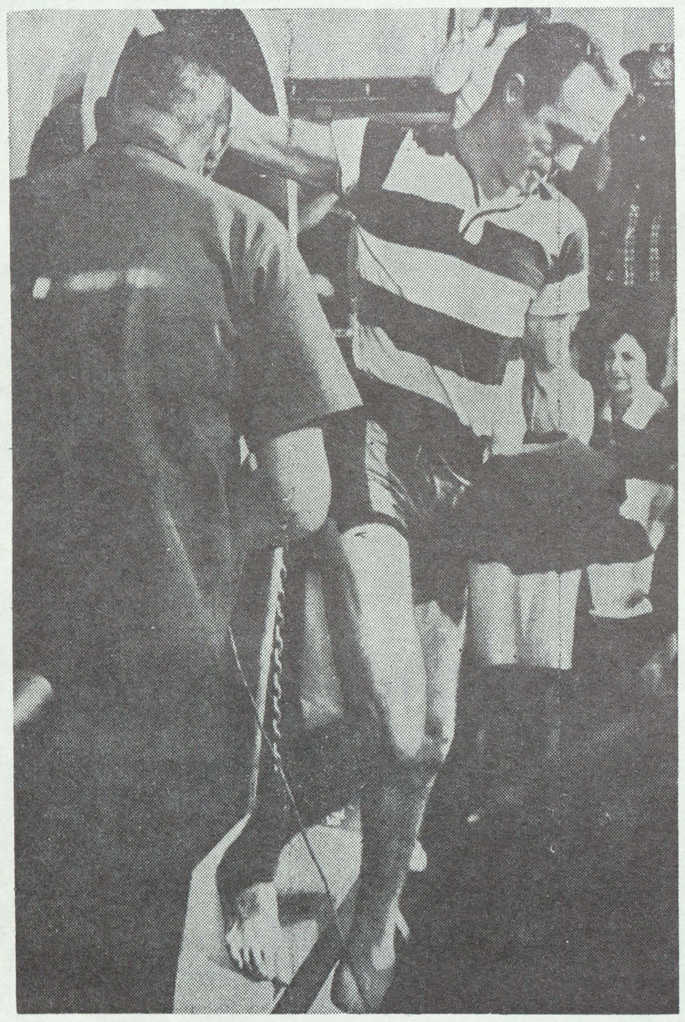
SEALAB-II is the non-propelled, sea-going craft built to provide a home on the ocean floor for 10 aquanauts. It was submerged off the coast of La Jolla, Calif., Aug. 28 and is dut to be brought to the surface Oct. 2.

The area scientists, Dr. Hugh M. Bowen and Birger M. Andersen, are cooperating with Navy doctors and psychologists in studying how man can live, work, and adjust to an undersea environment. They have developed a series of tests which will help to determine man's capabilities under water, particularly with regard to the proper design of tools and task procedures for underwater work.

Dr. Bowen, managing scientist and laboratory director at Dunlap, lives in Rowayton with his wife Jane and their two children Marshall and Gillian. He received his Ph.D. from Cambridge University, England.

Mr. Andersen, associate engineering psychologist, received his master's degree from the University of Bridgeport. He lives in Weston with his wife Sue and their two children. Jon and Krist. At Dunlap his professional work has been concerned with ocean surveillance satellites, space vehicles and weapon and weather systems.

STAMFORD ADVOCATE,
WEDNESDAY, SEPTEMBER 22, 1965





SEP 29 1965
SUN-TIMES
Chicago, Ill.

SEP 29 1965
INQUIRER
Philadelphia, Pa.

ASTRONAUT ENDS DEEP-SEA TEST

LEFT: Astronaut M. Scott Carpenter emerges from the decompression chamber aboard the mothership Berkone after 31 days of tests under high pressure. Back to camera is Capt. Walter Mazzone who was in charge of the decompression chamber. ABOVE: Having proved he is equally at ease out-of-this world or under it, Carpenter is welcomed back from the ocean floor by his wife who flew to La Jolla, Calif., from Houston. Carpenter and nine others participated in the deep-sea tests. (UPI)

Again a Hero

A couple of years ago Astronaut-Aquanaut M. Scott Carpenter told a Boulder (Col.) high school graduating class to reach for the moon. "Your horizons," he said, "are limited only by your own vision."

That is advice which Commander Carpenter is in a particularly appropriate position to renew. In May, 1962, he became America's second space traveler, having orbited the earth three times. At that time he received President Kennedy's congratulations at the White House. Now he has set a new record, emerged from the Navy's undersea laboratory, Sealab 2, after 30 days spent 205 feet beneath the Pacific Ocean's surface at La Jolla, Cal. From a shipboard decompression chamber, Mr. Carpenter heard President Johnson say by telephone: "Scott, you have convinced me and all the nation that whether you are going up or down you have the skill to do a fine job." And a fellow scientist-diver who at first was skeptical of the astronaut's role in the undersea project returned to the surface saying: "That man is the best thing that ever happened to underwater research."

Commander Carpenter has indeed proved by his achievements that lack of vision has never limited his horizons. In both space and under the sea he has earned the admiration and gratitude of his fellow Americans.

The Atlanta Journal Wednesday, Sept. 29, 1965

Carpenter Earns Respect in Sealab 2

LA JOLLA, Calif. (AP) — A civilian scientist-diver admits he scoffed when he first learned astronaut M. Scott Carpenter was going to head a team of divers in the Navy's Sealab 2 experiment.

He returned to the surface believing that Carpenter "is the best thing that ever happened to underwater research."

Physicist George B. Dowling, 38, who spent 15 days with Carpenter and eight others in the 12-by-58-foot steel cylinder on the floor of the Pacific 1,000 yards offshore, said in an interview:

"I was frankly skeptical. I thought, 'They're going to let him go down because he's what he is—an astronaut.'

"But that was before I met him.

"After two weeks in Sealab 2 I am convinced they couldn't have picked a better man for the job. I've never known anyone as considerate, as painstaking, as well-equipped for this kind of work.

"Just for instance, our breathing tanks were the latest and best that could be obtained, very advanced models. But while we were still in training, Carpenter found 25 changes that had to be made and all of them were worthwhile.

"That probably was from his training as a test pilot. But there were many other things that made us respect and like him. There was no task too menial for him to do. Whenever he saw something that needed doing, he didn't tell someone; he did it himself.

"I don't know when he got any sleep."

Dowling, a civil service oceanographer at the Navy Mine Defense Laboratory at Panama City, Fla., has degrees in chemistry and physics and is close to winning his doctorate in physical oceanography.

A member of the second team to spend two weeks 205 feet below the surface in Sealab 2, Dowling returned with his teammates Sunday and, after 30 hours in a decompression chamber, appeared with them at a news conference Tuesday.

Interviewed later, Dowling gave an unusual, unofficial picture of the Sealab 2 experiment to test man's ability to function underwater for long periods—an experiment which will end when the third team comes up Oct. 10.

"The laboratory for which I work is interested in countermeasures against underwater weaponry," Dowling said. "Many of the experiments we conducted obviously had military applications.

"We measured current and temperatures, for instance, because you can correlate changes in those factors with changes in sonar signals and thus get a better idea of whatever target your sonar is hitting.

"Some of us swam along marked lines to measure how far away objects can be recognized as a way of helping divers locate mines on the bottom.

"But much of our planned research work suffered because of the unexpected difficulty of doing simple tasks at that depth. Things we figured would take 10 minutes required 40 or 50.

"Just cutting the steel bands from a parcel of stakes we used to tether cables took 10 minutes or more. On the surface you could do it in seconds," he said.

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9/29/65 NAVY TIMES

Tuffy Delivers Goods, Times

LA JOLLA, Calif. Tuffy the porpoise made seven successful dives, then waved farewell to the aquanauts in Sealab 2.

Officials said Tuffy had completed his work with the underwater living project and would be taken back to his Point Mugu Naval Station training pool by helicopter.

The aquanauts crowded about portholes of their 12 by 58 foot steel capsule home to wave goodbye to their watery friend.

After a wary start, Tuffy busied himself delivering mail, including copies of Navy Times, test objects and lifelines to the aquanauts, working 205 feet below the surface.

In recognition of his service, Tuffy was made an honorary member of Team No. 2. The porpoise did not participate in the project's first two-week phase.

The Navy said results of physical tests made of the first team were favorable. A spokesman said members of Team No. 1, which surfaced over a week ago, had no appreciable loss of hearing and developed increased tolerance to cold water.



Astro-aquanaut M. Scott Carpenter is greeted by his wife, Rene, as he emerges from the decompression chamber of the Berkone, mothership for Sealab 2. He was under pressure 31 days.
—UPI Telephoto.

Aquanaut Describes Hostility of Ocean

LA JOLLA, Calif., Sept. 28—(AP)—Astronaut M. Scott Carpenter, after a record 30 days on the Pacific's floor, is convinced "men can live forever—any length of time they wish—beneath the surface of the ocean."

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"The ocean is a much more hostile environment than space. I worked much harder in Sealab 2 than in the Mercury capsule. More energy is required just to move around, because of the extreme pressure, and just to stay warm, because of the 50-degree cold.

"But the real key is the isolation. I think men can live as long in underwater habitats as they can in DEW line stations or any place else where they are isolated. I am convinced that men can live and work forever—any length of time they wish—beneath the surface of the ocean."

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"It was my fault — groping around down there without the aid of a light. I know better now. Such things are no threat if you look where you're putting your hand."

He said one of the great delights of his stay was watching sea lions which came down at night to feed on fish attracted by lights from the Sealab 2 portholes.

"They are about the most beautiful, graceful things I've ever seen," he said.

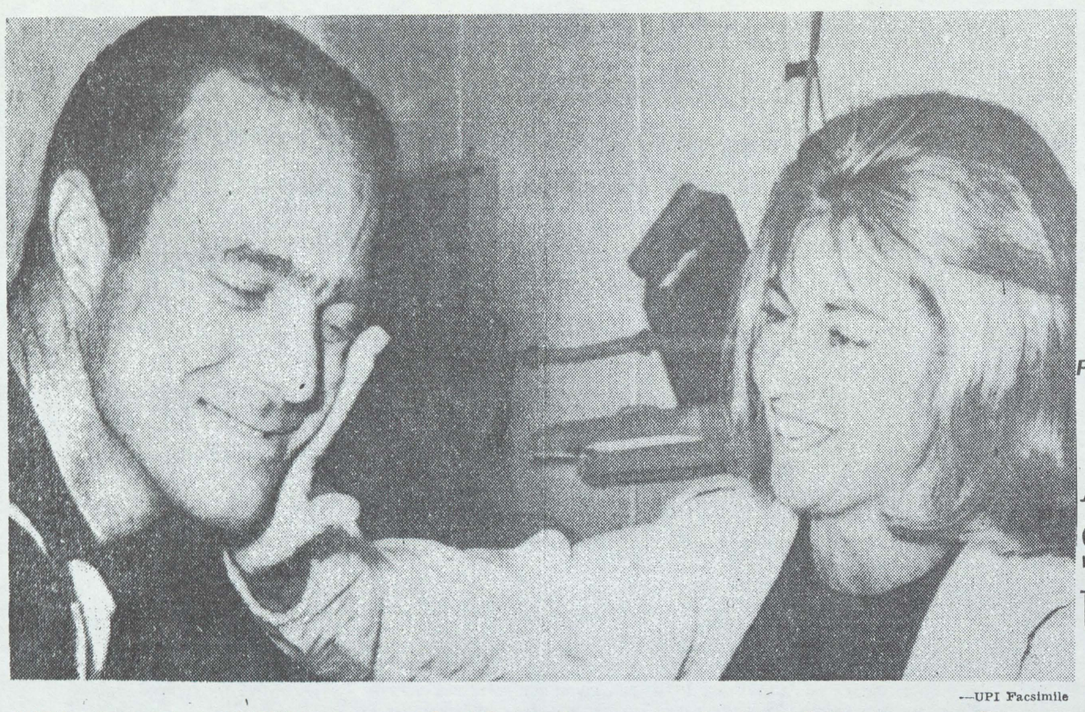
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QUIZ ON CURRENT EVENTS

EDITOR'S NOTE: These are questions on recent news events. Answers will be published in Friday's Atlanta Journal.

4. Nine aquanauts lived under water:
(a) 15 days. (b) 16 days. (c) 19 days. (d) 8 days.

9. Working as watchdog and errand boy for aquanauts in Sealab 2 on the ocean bottom was:
(a) Shark. (b) Tuffy. (c) Porpoise. (d) Baracuda.



—UPI Facsimile

"HEY, YOU NEED A SHAVE!"—Astronaut Scott Carpenter is greeted by his wife, Rene, who strokes the stubble on his cheek after he emerges from the decompression chamber on the deck of the mothership Berkone near La Jolla, Calif. Astronaut Carpenter spent a month under water in Sealab 2 of the U. S. "man-in-the-sea" project. Nine men who came up with him stayed 15 days in the steel cylinder.

Says Carpenter Was Best Thing That Ever Happened to World Underwater Research

By Ralph Dighton

LA JOLLA, Calif. (AP) —A civilian scientist-diver admits he scoffed when he first learned astronaut M. Scott Carpenter was going to head a team of divers in the navy's Sealab 2 experiment. But he returned to the surface believing:

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—Associated Press Wirephoto LA HEREX 9/29

REUNION AFTER 31 DAYS ON OCEAN BOTTOM

Astro-Aquanaut M. Scott Carpenter is reunited with his wife, Rene, after he and nine Sealab II teammates emerged from decompression chamber. Carpenter spent 31 days on ocean bottom.

From [illegible] 1965
FREE PRESS
Detroit, Mich.

Astronaut Sold on Life Under Sea

LA JOLLA, Calif.— (AP) — Astronaut Scott Carpenter, after spending a record 30 days submerged in the Pacific, is convinced "Men can live forever — any length of time they wish—beneath the surface of the ocean."

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* * *

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"They are about the most beautiful, graceful things I've ever seen," he said.

* * *

THE DIVERS who came up with Carpenter were the second team to spend 15 days in Sealab 2 as part of a Navy experiement to determine how long men can function at great depths.

Capt. George Bond, project medical officer, termed the experiement highly successful so far and Carpenter's 30-day stay a record "for anything like that depth."

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AFTER 31 DAYS UNDER PRESSURE, almost all of it 205 feet below the surface of the Pacific ocean, Scott Carpenter, the nation's top astronaut-aquanaut, emerged from the decompression chamber today aboard the Sealab II mothership Berkone. With his back to the camera was Capt. Walter Mazzone, who was in charge of the decompression procedure—(Wirephoto).

Pasadena Star-News
Tuesday, Sept. 28, 1965 —3

Griddle Fails on Sealab

LA JOLLA, Calif. (AP) — Soggy pancakes and a gadabout lady have given aquanauts at Sealab 2 a pair of unexpected problems.

The second problem they believe can be corrected by time, training and a few fish.

But the pancakes are another matter.

The 10 occupants of the 12x58-foot underwater laboratory tried without success Monday to cook pancakes on a griddle in the galley.

"It's the first real failure of the project," a spokesman said. "They were pretty soggy, burned on the top and bottom and not cooked at all in the center."

The spokesman said the divers can't use grease on the griddle because hot grease gives off gases which, because of extreme pressures, would be harmful to the aquanauts.

So it's back to the regular diet of frozen-dried food, the same as that eaten by the two previous teams of aquanauts, the spokesman said.

It was the second team that discovered Samantha, the lady sea lion.

Divers said Samantha would come from as far as 200 yards when she heard a buzzer sound. But then she became confused and started following divers testing a hand-held propulsion scooter.

Scientists said the propeller on the scooter apparently sounded similar to the buzzer.

But the divers hope they can break Samantha's wanderlust by extra training and by rewarding her with fish when she responds to the right sound.

STAR
Kansas City, Mo.

EA105LA

(280)

LA JOLLA, CALIF., SEPT. 28 (AP)-SOGGY PANCAKES AND A GAD-ABOUT LADY HAVE GIVEN AQUANAUTS AT SEALAB 2 A PAIR OF UNEXPECTED PROBLEMS.

THE SECOND PROBLEM THEY BELIEVE CAN BE CORRECTED BY TIME, TRAINING AND A FEW FISH.

BUT THE PANCAKES ARE ANOTHER MATTER.

THE 10 OCCUPANTS OF THE 12X58-FOOT UNDERWATER LABORATORY TRIED WITHOUT SUCCESS YESTERDAY TO COOK PANCAKES ON A GRIDDLE IN THE GALLEY.

"IT'S THE FIRST REAL FAILURE OF THE PROJECT," A SPOKESMAN SAID. "THEY WERE PRETTY SOGGY, BURNED ON THE TOP AND BOTTOM AND NOT COOKED AT ALL IN THE CENTER."

THE SPOKESMAN SAID THE DIVERS CAN'T USE GREASE ON THE GRIDDLE BECAUSE HOT GREASE GIVES OFF GASES WHICH, BECAUSE OF EXTREME PRESSURES, WOULD BE HARMFUL TO THE AQUANAUTS.

SO IT'S BACK TO THE REGULAR DIET OF FROZEN-DRIED FOOD, THE SAME AS THAT EATEN BY THE TWO PREVIOUS TEAMS OF AQUANAUTS, THE SPOKESMAN SAID.

WHILE THE THIRD TEAM OF DIVERS WERE BURNING PANCAKES, THEIR PREDECESSORS IN THE 205-FEET-BELOW-SEA-LEVEL LAB WERE COMPLETING THE FINAL STAGES OF DECOMPRESSION.

THE SECOND TEAM, INCLUDING ASTRONAUT-AQUANAUT M. SCOTT CARPENTER, THEN SPENT THE NIGHT IN SECLUSION. A NEWS CONFERENCE WAS SCHEDULED TODAY ON BOARD THE SUPPORT VESSEL BERKONE.

IT WAS THE SECOND THAT DISCOVERED SAMANTHA, THE LADY SEA LION.

DIVERS SAID SAMANTHA WOULD COME FROM AS FAR AS 200 YARDS WHEN SHE HEARD A BUZZER SOUND. BUT THEN SHE BECAME CONFUSED AND STARTED FOLLOWING DIVERS TESTING A HAND-HELD PROPULSION SCOOTER.

SCIENTISTS SAID THE PROPELLOR ON THE SCOOTER APPARENTLY SOUNDED SIMILAR TO THE BUZZER.

BUT THE DIVERS HOPE THEY CAN BREAK SAMANTHA'S WANDERLUST BY EXTRA TRAINING AND BY REWARDING HER WITH FISH WHEN SHE RESPONDS TO THE RIGHT SOUND.

SCIENTISTS HOPE SUCH ANIMALS CAN BE TAUGHT TO CARRY RESCUE LINES TO DIVERS IN TROUBLE.

EE428APD NM TIL 440APD

2nd SeaLab Unit Aboard Mother Ship

Men's Health, Spirit Good; Interview, Tests Scheduled

By BRYANT EVANS
The San Diego Union's Science Writer

The 10 aquanauts of SeaLab II's second team emerged from the decompression chamber on the deck of the mother ship, Berkone, at 5:43 yesterday afternoon — 32 hours and 13 minutes after leaving their underwater habitat.

All were in good health and high spirits, according to Capt. George Bond, chief scientific investigator for the program. They were to remain aboard the Berkone overnight for medical observation, inasmuch as it would still be possible for bends to develop.

The decompression period was extended a half-hour when two aquanauts, Cmdr. Scott Carpenter and Howard Buckner, complained of pains. This was described as not an unusual symptom during decompression. Another delay of an hour was caused by time taken to repair an oxygen leak.

This second team, headed by Carpenter, is to appear for a press interview at 9:30 this morning on the Scripps Institution of Oceanography campus. Carpenter is expected to tell what it is like to remain at depths of 205 feet for more than 29 days.

The aquanauts then will go to Naval Hospital for examination and debriefing.

The temperature in the decompression chamber was reported at 78 degrees and relative humidity at 80 per cent.

As the second team was getting accustomed to a normal atmosphere, the third team, led by Chief Robert Sheats, was starting to work on a program to determine whether aquanauts could perform useful salvage tasks.

In fact, they did perform a real salvage operation yesterday when they attached a line to a way station which had been lost in Scripps' submarine canyon, during the early days of the operation.

The way station which is designed to offer a resting place and gas supply to an aquanaut, later was hoisted to the deck of the Berkone.

The aquanauts also relocated another way station, which had been in use for a couple of weeks.

The team of three aquanauts established a new and shorter route to the rim of Scripps canyon. The new route extends 160 feet from SeaLab to a point on the rim at a depth of 260 feet. The route established by team two, was 250 feet long to a point 266 feet deep. An area for salvage experiments was established 150 feet east-northeast of SeaLab at a 10 degree slope.

"I could have no better team under any circumstances," Sheats said in a telephone conversation last night.

"They've been working like Trojans. Two of them have just gone out at 8:45 tonight to take pictures on the 266-foot level in Scripps' canyon."

The two men were William Bunton and Morgan Wells.

Aquanauts also outlined an area with buoys where the fuselage of an old F-85 Cougar plane is to be lowered into the ocean today. The aquanauts are to use a foam that hardens immediately to fill the fuselage and give it positive buoyancy.

SAN DIEGO UN.

SEP 28 1965

THE HOUSTON POST
WEDNESDAY, SEPTEMBER 29, 1965

Can Live in Sea Forever, Scott Says

LA JOLLA, Calif — (AP) — Astronaut M. Scott Carpenter, after a record 30 days on the Pacific's floor, is convinced "men can live and work forever — any length of time they wish — beneath the surface of the ocean."

Carpenter surfaced Sunday with nine other aquanauts of the project's second team from the Navy's 205-foot deep Sealab 2. He told Tuesday of the beauty and hard manual labor and added:

"THE OCEAN is a much more hostile environment than space. I worked much harder in Sealab 2 than in the Mercury capsule. More energy is required just to move around, because of the extreme pressure, and just to stay warm, because of the 50-degree cold.

"But the real key is the isolation. I think men can live as long in underwater habitats as they can in DEWline stations or any place else where they are isolated."

The 40-year-old Navy commander said men are essetially weightless both in space and in the ocean but the density of deep water — 800 times that of air at the surface — makes every movement an effort.

HE SAID ONE great delight of his stay in the 12x58 foot steel cylinder on the ocean floor was watching sea lions which came down at night to feed on fish attracted by lights from the Sealab 2 portholes.

Carpenter and the nine others at a news conference spent 30 hours in the decompression chamber and emerged for their first breath of fresh air late Monday.

White House May Send Bid To Carpenter

Copley News Service

JOHNSON CITY, Tex. — President Johnson may invite Scott Carpenter, the astronaut who turned aquanaut, to the White House for a visit.

A White House appearance for Carpenter would follow up the personal congratulations received from Mr. Johnson Sunday in a telephone conversation.

Joseph Laitin, associate White House press secretary, said yesterday he knew nothing about a prospective invitation for Carpenter to come to Washington with his wife and officials of the SeaLab project.

But it was learned unofficially that the White House was considering the idea.

The object would be two-fold: Recognition of the importance of oceanography and recognition of Carpenter's unique contribution to the U.S. scientific program—achievements both in space and in ocean experimentation.

Carpenter, on loan to SeaLab from the National Aeronautics and Space Administration, is ineligible for one of NASA's medals for his feat in remaining below the ocean surface for 30 days.

SAN DIEGO UN.

SEP 28 1965



UPI Telephoto

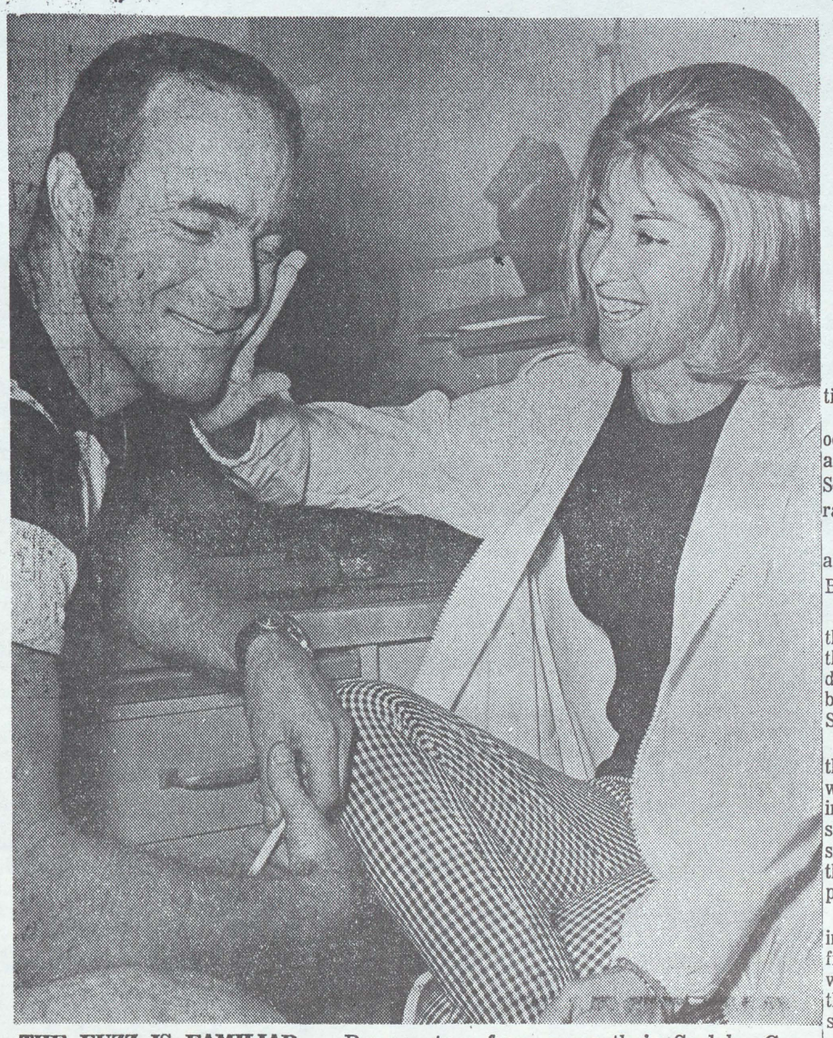
Aquanaut Up After 31 Days

Aquanaut M. Scott Carpenter leaves the decompression chamber aboard the mothership Berkone off La Jolla, Calif., Monday, ending 31 days under the sea in Sealab 2. Carpenter returned with the second team of divers and was kept in seclusion until a press conference scheduled Tuesday. A third team of divers is already aboard Sealab 2, 205 feet below the surface of Pacific Ocean.

POST, Tex.
SEP 28 1965

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Carpenter Steps Ashore After 30 Days Below



THE FUZZ IS FAMILIAR — Rene Carpenter checks stubble on the cheek of husband Scott upon his return from a month in Sealab. Carpenter's stay was the longest of any aquanaut. —Photo by George Smith

Sealab Aquanauts Appear Fresh, Alert

Wives Greet 2nd Team Members After Decompression Period

By LEO BOWLER
EVENING TRIBUNE Science Writer

Aquanaut Scott Carpenter stepped ashore today for the first time since August 28, ending his 30-day adventure under sea.

Carpenter and the nine men from the second team of divers to occupy Sealab came in from the Berkone in small skiffs, landed at Scripps Pier, and walked to Sumner Auditorium on the Scripps Institution of Oceanography campus.

They looked rested and fit after a night's sleep aboard the Berkone.

The aquanauts came out of the decompression chamber on the Berkone at 5:37 p.m. yesterday. They had been in the 23-by-10 foot chamber since early Sunday.

They were still in the clothes they had worn in Sealab. Most wore shorts, but one stepped out in a bathrobe. Most had not shaved while in the decompression chamber and they showed the rigors of the decompression period.

Their appearance today was in marked contrast. They wore freshly pressed uniforms and walked to a press conference in the auditorium with jaunty steps.

Work Was Hard

Carpenter told newsmen he had "never worked so hard in his life as he did in his 30 days in Sealab."

He said that Sealab experiment was much more difficult than orbiting the earth. Carpenter made three orbits as an astronaut in 1962.

He said experiencing weightlessness in space was easy compared with the kind of weightlessness an aquanaut experiences. The difference, Carpenter said, is in the energy the aquanaut must expend moving through the water, the many hard physical chores which face him and the cold, which he must burn up energy in order to combat.

Isolation Problem

Despite the problems encountered under the sea, Carpenter said he thought the time man could spend working there was limited only by his ability to endure the isolation involved.

One of the major objectives of the Sealab II experiment is to determine how efficiently a man can work on the bottom of the ocean and how long he can stay there.

Carpenter said many changes need to be made in the way the project was organized and in the equipment supplied to the aquanauts. He said he thought that groups working on the bottom should be autonomous instead of being controlled by surface officials.

Wives Greet Them

Wives of three of the aquanauts were on hand yesterday aboard the Berkone to greet their husbands. Mrs. John F. Reaves and Mrs. Howard L. Buckner were near the door of the chamber when it was opened by Capt. Walter Mazzone, who was in charge of the chamber.

Reaves' son, Gregory, also was on hand to greet his dad.

Mrs. Scott Carpenter had come aboard the Berkone minutes before the chamber was opened. She avoided newsmen and was taken to an office to await her husband.

Carpenter ducked through a hatch and made for the office where his wife waited for a reunion.

The couple beamed and Mrs. Carpenter commented on the aquanauts beard and congratulated him on the successful completion of his stay under the sea.

Close to Chamber

The aquanauts were kept aboard the Berkone last night for a debriefing and so that they would be close to a decompression chamber in case an emergency should arise.

During the decompression period, several complained of cramps and muscle stiffness. The first team to come up said that the decompression was the worst time of the experiment.

The chamber had been equipped in the meantime with mattresses and with improved ducts to circulate the air and control the high humidity. The second team appeared to be more comfortable in the chamber than the first.

Several Interruptions

The decompression was interrupted several times, once by an oxygen leak inside the chamber which had to be repaired. The other interruptions came when food and other items were passed inside through an air lock.

SAN DIEGO EVENING TRIBUNE
SEP 28 1965

Mpls. (Minn.) Morning Tribune
WEDNESDAY, SEPT. 29, 1965



Associated Press

M. SCOTT CARPENTER, astronaut and aquanaut, saw his wife, **RENE,** after spending 29 days on the ocean floor in Sealab 2 near La Jolla, Calif. Carpenter said his stay underwater had convinced him "man can stay under water indefinitely." He said the ocean is a more hostile environment than space, however.

SAN DIEGO UN
SEP 29 1965

Rough Seas Delay Test By SeaLab

Rough water on the ocean surface yesterday prevented the salvage vessel from lowering the fuselage of an old Cougar plane into the ocean so that SeaLab II aquanauts could try out a foam salvage system.

The test of pumping foam into the fuselage probably will be made today. The foam sets quickly and gives the fuselage enough buoyancy to rise to the surface.

Without this planned task, Team 3 aquanauts used their time to make biological investigations and to replace a defective instrument in the underwater weather station. They also laid out a new route to the rim of Scripps Submarine Canyon.

A new high pressure gas line was lowered from the mother ship, the Berkone, to SeaLab to provide a supply of breathing gas to recharge bottles for the Mark 6 underwater breathing apparatus.

The bottles previously have been sent to the surface for recharging. The new line should simplify the supply problem which Cmdr. M. Scott Carpenter yesterday described as one of the greatest time consumers in the operation.

Aquanaut P. A. Wells, a member of the third team in SeaLab II, was reported suffering from a mild case of gastric enteritis, probably of viral origin. He was not considered to be seriously ill.

A sudden decline in the white croaker population around SeaLab was blamed yesterday on Samatha and her girl friend Suzy, two sea lions that have been constant visitors lately at the SeaLab site.

From SF NEWS
Dallas, Texas

Kremlin Sounds Warning to Norway

MOSCOW (AP)—The Soviet Union warned neighboring Norway Wednesday against tying itself closer to NATO.

The immediate issue was plans for a new communications center in Nuvik, in northern Norway, near the Soviet border.

Tass called the center a NATO military installation and said it would be linked to American submarines carrying Polaris nuclear rockets.

The official Soviet news agency said:

"By allowing (this) construction . . . Norway increasingly ties itself to the military plans of the Pentagon . . ."

FISHERMEN'S NEWS - 48
Fishermen's Terminal Bi-W
Seattle 99, Wash. Circ. 5,723

SEP '65

SEA LAB II

Congressman Keith of Massachusetts praises the foresight and imagination of the people working on the Sea Lab II project. This project will go on beneath the waters of the Pacific Ocean. A team of skindivers is preparing to work and sleep in a 12' X 58' cylinder up to 45 days at a depth of 210 feet. The lead diver is Astronaut Commander M. Scott Carpenter.

THE NORWALK HOUR, NORWALK, CONN.—
WEDNESDAY, SEPTEMBER 22, 1965

LOCAL SCIENTISTS ASSIST IN NAVY SEALAB EXPERIMENT

Two members of the staff of Dunlap and Associates, Inc., are participants in the U.S. Navy's "Man-in-the-Sea" project now using SEALAB-II for underwater experiments. SEALAB-II is the non-propelled, sea-going craft built to provide a home on the ocean floor for 10 aquanauts. It was submerged off the coast of La Jolla, Calif. on Aug. 28 and is due to be brought to the surface on Oct. 12.

The area scientists, Dr. Hugh M. Bowen and Birger M. Andersen, are cooperating with Navy doctors and psychologists in studying how man can live, work, and adjust to an undersea environment. They serve as alternates in observing the proceedings and gathering data at the site. Their work is supported by a contract to Dunlap from the Office of Naval Research and the Special Projects Office under the supervision of Drs. James W. Miller and George W. Bond. They have developed a series of tests which will help to determine man's capabilities under water, particularly with regard to the proper design of tools and task procedures for underwater work.

In addition to these tests, careful records will be made of the divers' performance as they carry out a variety of tasks and activities. An example of such tasks is the salvage of an aircraft fuselage by means of injecting buoyant foam. The data from these tests and activities will be related to such factors as water temperature, visibility, and various medical and physiing the limitations and capabilities of divers. Such information is essential in planning future SEALAB projects.

Rowayton Resident

Dr. Bowen, managing scientist and laboratory director at Dunlap, resides in Rowayton with his wife Jane and their two children Marshall and Gillian. He received his Ph.D. from Cambridge University, England. His work at Dunlap has been concerned with such studies as the Navy's manned orbiting laboratory, lot proficiency evaluation, mail sorting for semi-automated systems; and remote controls for atomic power plants. Prior to joining the Darien research-consulting firm in 1957, he engaged in radar research with the Medical Research Council in England and served as consultant to the Royal Air Force.

Mr. Birger G.. Andersen, associate engineering psychologist, received his master's degree from the University of Bridgeport. He lives in Weston with his wife Sue and their two children Jon and Kristi. At Dunlap his professional work has been concerned with ocean surveillance satellites, space vehicles, and weapon and weather systems. Before he joined Dunlap in 1958 he served with the U.S. Navy and was trained in SCUBA diving procedures as a member of the Underwater Demolition Team. His fluency in foreign languages extends to Danish, Norwegian and Swedish.

THE DARIEN REVIEW,
DARIEN, CONN. —
Thursday, September 30, 1965

Dunlap Scientists Aid Ocean Plumb With Navy Sealab

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Dr. Bowen, managing scientist and laboratory director at Dunlap, resides in Rowayton with his wife Jane and their two children

AFTER SEALAB EXPERIMENT

Prolonged Underwater Life Possible, Carpenter Says

By Associated Press

LA JOLLA, CAL. — Astronaut M. Scott Carpenter, after a record 3 days on the Pacific's floor, is convinced "men can live forever—any length of time they wish—beneath the surface of the ocean."

Mr. Carpenter surfaced Sunday with nine other aquanauts from the Navy's 205-foot deep Sealab 2. He told a news conference Tuesday of the beauty, pain and hard manual labor and added:

"The ocean is a much more hostile environment than space. I worked much harder in Sealab 2 than in the Mercury capsule. More energy is required just to move around, because of the extreme pressure, and just to stay warm, because of the 50-degree cold.

REAL KEY

"But the real key is the isolation. I think men can live as long in underwater habitats as they can in DEWline stations or any place else where they are isolated. I am convinced that men can live and work forever—any length of time they wish—beneath the surface of the ocean."

The 40-year-old Navy commander, who orbited the earth in May of 1962, said men are essentially weightless both in space and in the ocean but the density of deep water—800 times that of air at the surface—makes every movement an effort.

Of the scorpion fish sting on his bare hand Sept. 12 which kept him in bed for more than a day, Cmdr. Carpenter said:

"It was my fault — groping around down there without the aid of a light. I know better now. Such things are no threat if you look where you're putting your hand."



AFTER 29 DAYS ON THE OCEAN FLOOR, astro-aquanaut Scott Carpenter is reunited with his wife, Rene, as he emerges from a decompression chamber at La Jolla, Cal.

SEA LIONS

He said one of the great delights of his stay in the 12 by 58 foot steel cylinder on the ocean floor 1000 yards off this coastal resort was watching sea lions which came down at night to feed on fish attracted by lights from the Sealab 2 portholes.

"They are about the most beautiful, graceful things I've ever seen," he said.

The divers who came up with Cmdr. Carpenter were the second team to spend 15 days in Sealab 2 as part of a Navy experiment to determine how long men can function at great depths.

Cmdr. Carpenter went down with nine men Aug. 28 and stayed for two more weeks after the first team was replaced by another group of nine Sept. 12. A third team, the last in the 45-day test, replaced the second Sunday.

Cmdr. Carpenter and the nine others at the news conference spent 30 hours in the decompression chamber and emerged for their first breath of fresh air late Monday.

From SEP 29 1965
INQUIRER
Philadelphia, Pa.

UNDERSEA RESEARCH

To the Editor of The Inquirer:

I agree with Arnel Geils who wrote a letter calling upon the Navy to speed up its program of undersea research and development. Another Sealab project should be undertaken as quickly as the equipment can be made ready. The aim of this experiment should be to live and work at a depth of 380 feet which is now the maximum operations limit for Navy divers.

CHIPPY SANDERS

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Sealab's Carpenter Tells of Stay

Undersea Time Seen Unlimited

By RALPH DIGHTON
Associated Press Science Writer

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"The ocean is a much more hostile enviroment than space. I worked much harder in Sealab 2 than in the Mercury capsule. More energy is required just to move around, because of the extreme pressure, and just to stay warm, because of the 50-degree cold.

Isolation Real Key

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He said one of the great delights of his stay in the 12x58 foot steel cylinder on the ocean floor 1,000 yards off this coastal resort was watching sea lions which came down at night to feed on fish attracted by lights from the Sealab 2 portholes.

The divers who came up with Carpenter were the second team to spend 15 days in Sealab 2 as part of a Navy experiment to determine how long men can function at great depths.

Went Down Aug. 28

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Carpenter and the nine others at the news conference spent 30 hours in the decompression chamber and emerged for their first breath of fresh air late yesterday.

Doesn't Sleep Well

"I did not sleep well. It seemed I had to get up every two hours and rest. The Sealab was moored at a tilt on the underwater shelf. In the future there should be hydraulic jacks so the habitat can be leveled on a sloping surface.

"The real bottleneck turned out to be lack of sufficient space for exiting from and re-entering Sealab. A delicious feeling, tho, was coming in from the cold water to a hot shower.

"Logistics were a bad problem. We had to spend too much time just existing and supply-ourselves and adjusting our equipment rather than gathering scientific data. Future Sealab experiments should have breathing apparatus we can service ourselves rather than be dependent on the surface vessel. The group on the bottom should be autonomous, not administered to from the surface.

Need Heated Suits

"Each man averaged about 39 minutes in the water daily. We need heated suits to increase that time, possibly up to eight hours in the water, with only fatigue and hunger, not cold, forcing a man back into the housing. We had trouble with equipment being flooded and corroded and becoming inoperative. Some of the equipment was seasick; none of the men were."

Carpenter was bitten on his left index finger by a sea scorpion Sept. 12.

"That was quite painful," he recalled. "Sedatives were given me and kept me in bed a day. The poison, somewhat similar to what one might get from a cobra bite, brought on numbness all thru my hand and arm."

Capt. Walter F. Bond of the navy medical corps, principal investigator for the surface team, said the scorpion venom does incapacitate for a while but is not as malignant as that from a cobra and the possibility of death is negligible.

"It was my fault this happened," Carpenter added. "I was groping without a light and without a glove on. After two days, however, I was ready to go back to my tasks."

Carpenter told of diving to 266 feet — 61 feet below Sealab — with another aquanaut, Wallace Jenkins, 30, an equipment specialist of Panama City, Fla.

"When we came to the edge of the precipitous drop into sea canyon," Carpenter said, "I noticed that Jenkins, instead of going head first as he had been since leaving the capsule, stepped gingerly, as a mountain climber might. There is a feeling you may fall down."

Carpenter remarked on the grace of the sea lions he saw.

"They were beautiful to watch," he said. "The sea lion has some secret of swimming we do not yet understand."

Chuckles Over Remark

Carpenter chuckled over a comment of William Tolbert, 39, an oceanographer member of the team who also lives in Panama City.

"One time he was standing shivering, shaking with cold, at the bottom of the ladder," Carpenter said. "He could not come back into the housing because he still had a job to do. He exclaimed: 'God, I wonder what makes a man volunteer for something like this.' I thought that too, once, but this was big adventure and we would not give up a moment of it."

Carpenter's wife, Rene Louise, was in the audience during the press conference.

She was asked whether she was more worried about her husband being under water than when he was up in space.

She's a Navy Wife

"As a navy wife," she replied, "I have been disciplined to everything."

"That," remarked Capt. Bond, "is the most cogent thing said here today."

Those on the aquanaut team surfacing at this time in addition to Carpenter, Jenkins, and Tolbert were five navy enlisted men, John Reaves, 36, Oxnard, Cal.; Robert Barth, 35; Panama City; Glen Iley, 36, Groton, Conn.; Howard Buckner, 36, Forrestville, Md.; and Kenneth Conda, 32, Ledyard, Conn.; and George Dowling, 38, of Panama City, a research physicist, and Arthur Flechsig, 40, of Encinitas, Cal., of the Scripps Institution of Oceanography of the University of California at San Diego.

Iley, a hospital corpsman, was the one who treated Carpenter's scorpion bite.

Sends Breath for Analysis

"I also had a lot of work to do on pulmonary functioning," Iley said. "Every ten minutes for the first 12 hours I would have to breath in a bag and send the bag to the surface for analysis.

"At least four of our team had headaches every morning. I experimented in treating with anti-hystamines and they seemed to work the best. My own worst experience was after one dive. I coughed for 10 hours."

Reeves, a navy photographer, was enthusiastic about Tuffy the porpoise, who after becoming accustomed to the Sealab site and equipment, delivered mail and tools to the aquanauts.

"Tuffy had a personality all his own," added Conda. "He turned us around the way he wanted. Once he brought me down a bottle of coke, and waited around as if he expected me to drink it right there or give him some."

Third Team Now at Work

The first team of ten aquanauts, led by Carpenter, descended Aug. 28. Nine of these came up on Sept. 12, Carpenter remaining below to be joined by nine others for his second team. A third team of ten went down last Sunday for the final 15 days of the project.

"A total of more than 200 actual man-hours of work have been accomplished on the ocean bottom despite cold and opaque water conditions," reported Capt. Bond. "A planned program of deep excursion dives has been successfully inaugurated for the first time in diving history, and certainly the largest cumulative body of data relative to man's free ranging existence on the ocean floor has been collected already during the excercise.

"Our program deals basically with man and his individual or collective underseas capabilities."

TRIBUNE Chicago, ILL.

SEP 29 1965

From
MORNING SUN
Baltimore, Md.

NO LIMITATION SEEN IN LIVING UNDER OCEAN

Aquanaut - Astronaut Carpenter Tells Of Beauty And Work

La Jolla, Cal., Sept. 28 (AP)—Astronaut M. Scott Carpenter, after a record 30 days on the Pacific's floor, is convinced "men can live forever—any length of time they wish—beneath the surface of the ocean."

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Impressed By Sea Lions

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San Francisco, Calif.
Examiner
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SEP 29 1965

Astronaut Stars in Role Under Sea

LA JOLLA—(AP)— A civilian scientist-diver admits he scoffed when he first learned astronaut M. Scott Carpenter was going to head divers in the Navy's Sealab 2 experiment.

But he returned to the surface believing:

"That man is the best thing that ever happened to underwater research."

Physicist George B. Dowling, 38, who spent 15 days with Carpenter and eight others in the steel cylinder on the floor of the Pacific 1,000 yards offshore, said:

"I was fankly skeptical. I thought, 'They're going to let him go down because he's what he is—an astronaut.'

"But that was before I met him.

"After two weeks in Sealab 2 I am convinced they couldn't have picked a better man for the job. I've never known anyone as considerate, as painstaking, as well equipped for this kind of work.

"Just for instance, our breathing tanks were the latest and best that could be obtained, very advanced models. But while we were still in training, Carpenter found 25 changes that had to be made and all of them were worthwhile.

"That probably was from his training as a test pilot.

"But there were many other things that made us respect and like him. There was no task too menial for him to do. Whenever he saw something that needed doing, he didn't tell someone; he did it himself.

"I don't know when he got any sleep."

Sea a Tougher Foe, Says Hero of Space



Astronaut Scott Carpenter got an affectionate pat from his wife, Rene, aboard ship off La Jolla, Cal., yesterday after he emerged from decompression chamber. [UPI Telephoto]

BY SEYMOUR KORMAN
[Chicago Tribune Press Service]

La Jolla, Cal., Sept. 28—Navy Comdr. M. Scott Carpenter, the only man who has orbited the earth three times and also has spent 30 days on the ocean bottom, today saluted the sea as a much tougher adversary than space.

"In space the enemy is distance and space itself," Carpenter said. "Water is a more hostile and arduous environment because of the excessive pressures.

"We know how to combat weightlessness and lack of pressure in space. We do not yet fully know how to protect against pressures increasing the peril the deeper one goes in the water.

Man Adjusts to Stress

"But man has a good built-in adjustment to water stresses as well as to space."

Carpenter, 40, gave this summation at a press conference after two days of decompression since he and nine other aquanauts surfaced from Sealab 2, a 57-foot-long stee' cylinder moored 205 feet below the Pacific surface, 3,000 yards off shore from La Jolla. He also related graphic details of his stay-under-water which began Aug. 28.

Carpenter was one of the original 7 Astronauts and made his triple orbit of the earth May 24, 1962. His 30 days below in the ocean is the longest on record for a man at that depth, and brought him a congratulatory call from President Johnson Sunday.

Finds Tasks Fatiguing

"Essentially one is weightless in water as in space," Carpenter said, "but one is so much more restricted in water because of the high pressure. There are long hours of hard physical labor required in experiments under seas. That is very fatiguing. One must employ energy not only to move, but to stay warm in the water.

"Nothing is easier and more complete relaxation than being weightless in space. But working in the denseness of water is a real problem.

"Traveling thru the interface [passing from one medium to another] between air and water is something not encountered in space travel.

205 Feet a Long Trip

"The 205 feet thru water from the Sealab to Berkone, our surface barge, is the longest distance I know.

"Sealab 1, a project off Bermuda in July, 1964, and Sealab 2 have given us much information how man can exist and work under the sea. As we perfect equipment, habitats, and adjustments to pressure, man will be able to stay under water indefinitely if he can stand the isolation."

Carpenter said it had been believed before Sealab 2 that the limiting factor to working on the ocean floor would be the water temperature of 50 degrees Farenheit. "We found this not so," he went on. "To a man the aquanauts demonstrated incredible ability to adapt to the cold. Time was required to adjust to the helium breathing atmosphere in our capsule home.

Hears No Cross Word

"There was also a question of how a group of men would act in confined quarters for a period of 15 or 30 days. Would we quarrel? Would we tend to pass the buck on responsibilities to the mother vessel on the surface?

"These were highly motivated men and I did not hear a cross word in the 30 days I was down there. It reaffirmed my faith in human nature that we could get along so well. We worked hard but we all agreed it was the best time we ever had. It was fun.

"There were hardships, of course. The human thermostat is easily confused. We will need better humidity control in the underwater housing in the future. One would wake at night, not knowing if he was too hot or too cold.

Use of Tuffy The Porpoise By Sealab 2

By Charles F. Ransom
(Of Register's Editorial Page Staff)

"You may not have lived much under the sea ——" said the Mock Turtle. "I haven't," said Alice.

THE U. S. Navy's Sealab 2 experiment has been going on 215 feet under the sea since Aug. 29 with Astronaut-Aquanaut Scott Carpenter in command.



CARPENTER

Carpenter is a Navy commander, loaned to the National Aeronautics and Space Administration for his work in outer space, and loaned back to the Navy for this study of man's capabilities in another hostile environment, the terrific pressures and the murky blackness of an ocean canyon. Carpenter stayed down for 30 days.

Follow-Up
Sealab 1

Sealab 2 is a follow-up to Sealab 1 a smaller undersea craft in which four aquanauts spent 13 days last year 160 feet down near Bermuda. The Navy hopes to learn how to explore depths to 800 feet, which would take in most of the world's continental shelves.

A curious feature of the Sealab 2 experiment was the use of Tuffy the porpoise as messenger and errand boy. Porpoises have brains as large as man's. They can be taught all sorts of tricks, seem to enjoy them, and can mimic human speech, though in a rapid, high-pitched voice that is not ordinarily intelligible until slowed down mechanically. They do not understand it, but they seem to have a "language" of their own.

Did Take
Training

They are not much like the fictional porpoise Flipper of the television series, still less like the superbrains of Leo Szilard's science fiction, who solved the armament problem. Sealab 2's Tuffy did not live up quite to the advanced billing put out about him.

But Tuffy did take training at the Navy's Point Mugu Naval Station. He was flown to Sealab's launching ship by helicopter Sept. 13, given some additional training and went to work Sept. 16.

His trainer, Navy Torpedoman Kenneth J. Conda, was one of the aquanauts on duty at that time. Tuffy swam down to Sealab 2 on signal, and then balked. Conda thinks he was frightened by the maze of cables and equipment attached to Sealab, for which his training had not prepared him. More training followed.

Missions
Completed

On Sept. 17 and 18, he completed a number of missions correctly on signal, carrying mail and messages up and down between the ship and Sealab, and to aquanauts at work on the sea bottom. Tuffy also carried a line from one aquanaut to another in a "rescue" rehearsal.

A porpoise can swim much faster and find his way much better under the sea than a human diver can, even though the human has motors and instruments to help. He can stand the pressures and the dark at 200 feet.

But Tuffy was sent back by helicopter to Point Mugu Sept. 18, after completing seven dives that day. The official explanation was that his "mission" was "completed". But his trainer had been slated to spend another week in Sealab 2. He had predicted Tuffy would swim up to 20 mail and message missions per day and would perform actual rescues whenever a diver got lost or in trouble in the dark deeps. "Tuffy can make the 205-foot trip [from the surface] in 45 seconds," Aquanaut Conda had said.

Friends
Of Man

Perhaps Tuffy turned out to be more of a care and less useful than had been hoped and got sent home. But this may not be the end of porpoises as friends of man in the ocean depths. They may never attain the heights of Szilard's fiction, but they may yet become the dogs and horses of the deep, something like Flipper.

And as the Mock Turtle told Alice, "No wise fish would go anywhere without a porpoise."

"Don't you mean 'purpose'?" Alice asked.

"I mean what I say," the Mock Turtle replied.

Des Moines (Ia.) Register
WEDNESDAY, SEPT. 29, 1965

'Sea More Hostile Than Space

From Associated Press

Astronaut Scott M. Carpenter, after a record 30 days on the Pacific's floor, is convinced men can live any length of time they wish beneath the surface of the ocean.

He surfaced Sunday with nine other aquanots from the Navy's Sealab 2. He told newsmen yesterday:

"The ocean is a much more hostile environment than space. I worked much harder in Sealab 2 than in the Mercury capsule. More energy is required just to move around, because of the extreme pressure, and just to stay warm, because of the 50-degree cold."

Carpenter, 40, who orbited the earth in May of 1962, said men are essentially weightless in space and deep in the ocean (the Sealab was 205 feet down).

He said one of the great delights of his Sealab stay was watching sea lions which came down at night to feed on the fish attracted by the capsule's lights.

The Plain Dealer
Cleveland, O.
A.M.-circ. 339,112
Sun.-circ. 494,645

SEP 29 1965

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'Men Can Live Forever' Beneath Ocean Surface

LA JOLLA (AP) — Astronaut M. Scott Carpenter, after a record 30 days on the Pacific floor, is convinced "men can live forever — any length of time they wish — beneath the surface of the ocean."

Carpenter surfaced Sunday with nine other aquanauts from the Navy's 205-foot deep Sealab 2. He told a news conference Tuesday of the beauty, pain and hard manual labor.

Ocean Hostile

"The ocean is a much more hostile environment than space," the astronaut said. "I worked much harder in Sealab 2 than in the Mercury capsule. More energy is required just to move around, because of the extreme pressure, and just to stay warm, because of the 50-degree cold.

"But the real key is the isolation. I think men can live as long in underwater habitats as any place else where they are isolated."

The 40-year-old Navy commander, who orbited the earth in May of 1962, said men are essentially weightless both in space and in the ocean but the density of deep water — 800 times that of air at the surface — makes every movement there an effort.

Enjoyed Sea Lions

He said one of the delights of his stay in the 12x58-foot steel cylinder on the ocean floor 1,000 yards off La Jolla was watching sea lions which came down at night to feed on fish attracted by lights from the Sealab 2 portholes. "They are about the most beautiful, graceful things I've ever seen," he said.

The divers who came up with Carpenter were the second team to spend 15 days in Sealab 2 as part of a Navy experiment to determine how long men can function at great depths.

Carpenter went down with nine men Aug. 28 and stayed for two more weeks after the first team was replaced by another group Sept. 12. A third team, last in the 45-day test, replaced the second Sunday.

Pasadena Star-News
Wednesday, Sept. 29, 1965

Carpenter Tells Of 30-Day SeaLab Stay And Potential



—San Diego Union Staff Photo

Second team of aquanauts holds press conference at Scripps Institution of Oceanography after emerging from SeaLab II off La Jolla. Here, Scott Carpenter, fifth from left, answers questions. Aquanauts, from left: John Reaves, Wallace Jenkins, Robert Barth, George Dowling, Carpenter, Glen Iley, William Tolbert and Howard Buckner. (Story on Page a-1)

Carpenter Reports On Life For 30 Days Under The Sea

Rough sea delays test with plane—Page a-21

By BRYANT EVANS
The San Diego Union's Science Writer

Man can live and work at the bottom of the sea as long as he can in any isolated environment such as Antarctica, says Cmdr. M. Scott Carpenter, the astronaut who lived for 30 days as an aquanaut in SeaLab II.

He qualified his statement as only reflecting his own feeling after experience since there is as yet no reliable clinical information on the ultimate effect of long-term exposure to high pressure on the human body.

Carpenter and the nine other aquanauts of the second SeaLab team discussed their experiences and impressions during a two-hour press conference yesterday in Sumner Auditorium on the campus of the Scripps Institution of Oceanography.

In general, the 10 men agreed that life on the sea floor is rugged and often uncomfortable, that there are many changes that should be made in the arrangements, that it was a great and thrilling and sometimes beautiful experience and that they would all like to do it again.

All but Carpenter had spent 15 days in the habitat 205 feet under the water 100 yards off the end of the Scripps pier.

"It was only 200 feet," Carpenter said. "That doesn't seem very far when you compare it to a 100-yard dash that a man can run in about 9 seconds. But it is the largest 200 feet anywhere. You realize that when you find out how hard it is to get there."

He said that before he went down to the SeaLab he had thought that the low temperature, around 50 degrees Fahrenheit, would be the limiting factor in working on the sea floor, but that he became amazed at the incredible facility of men to become acclimated to the cold.

At first, he said, men who were in the water for from 25 to 30 minutes were so cold that they could not work. But this changed as the days went on. It took the full two weeks for them to be acclimated so that they could spent long periods in the water. With electrically heated suits, he said, he saw no reason that men could not work on the ocean bottom for 8 hours at a time.

Living in a helium atmosphere, Carpenter said, does something to man's built-in thermostat. This has something to do with the greater rate of heat transfer of helium as compared with air. Carpenter said that he would wake up at night feeling cold and then would notice that he was perspiring.

He said that he was greatly impressed with the ability of the men to adjust to the unusual environment.

"A lot of people thought that the effect of pressure on people's personalities would make them shuck off responsibility to authority on the surface and interfere with their ability to get along with each other.

"This was just not so. Not a cross word was spoken in 30 days."

IMPRESSIVE SITUATIONS

One by one, each of the aquanauts commented on the things that impressed them most under the sea. Some of their comments are as follows:

John Reaves, photographer 1st class, of Oxnard, who had trained with Tuffy, the porpoise:

"Aside from the exterior bad lighting conditions in the water, the things that the underwater photographer has to look for most is the constant concern with your own life and safety and breathing while at the same time you are trying to do the job. It is really a challenge."

Wallace Jenkins, equipment specialist, Mine Defense Laboratory, Panama City, Fla.:

"The whole thing has been a thrill. The 325 hours, give or take one or two, I didn't spend one minute that I was bored or wished I was anywhere but right there. This included the mornings I woke up with a CO-2 headache or whatever they were. Right now I wish I was back."

WEATHER STATION

Robert A. Barth, chief quartermaster, Panama City, Fla.:

"I was helping maintain the weather station that Scripps had put on the bottom about 165 feet away from the habitat. We made a couple of trips to it changing rotors and equipment. All in all, I enjoyed it very much. We had a fine bunch of people and a good boss who kept us busy all the time. I hope to be a participant in SeaLab III."

George B. Dowling, research physiscist at Mine Defense Laboratory, Panama City, Fla.:

"We did some oceanography upside down. We did some of the normal things we do from ships except we let things go from the bottom up instead of from the surface down. We found out that we can tell a little more than a little bit about what the topside weather is from observations at the bottom."

THE SAN DIEGO UNION
Wed., Sept. 29, 1965 ④ A5
SAN DIEGO, CALIFORNIA



AP Wirephoto

Astronaut-Aquanaut Describes Life in Sea

M. Scott Carpenter, third from right, the astronaut who spent 31 days under water in Sealab 2, describes life in space and in the sea at a press conference with other aquanauts. Carpenter said he is convinced "man can stay under water indefinitely." Comparing underwater environment to space he said he regards "the ocean as a more hostile environment" but that man can survive in both. "If he can stand isolation anywhere else, he can stand it under water." A third team of aquanauts is now in Sealab, 205 feet below surface off La Jolla, Calif.

POST
SEP 29 1965

Sealab Makes Plastic-Foam Salvage Tests

LA JOLLA, Calif., Sept. 30. — (AP) — A jet plane strained against its moorings 20 feet off the ocean floor today, buoyed up by an injection of plastic foam.

The old jet hulk is being used in a salvage experiment conducted by the aquanauts in Sealab 2. It was scheduled to hover in the water for 48 hours before being released to float to the surface.

The aquanauts pumped the plane full of foam yesterday after it was lowered to the bottom near the Sealab capsule used as a habitat in the Navy's underwater-living experiment.

Robert Sheats, leader of the ten-man team of aquanauts, said other salvage tests yesterday were completed successfully.

Two 55-gallon drums were filled with foam on the ocean floor and allowed to float to the surface.

Eight other drums will be filled, tied down and allowed to float up at intervals during the final phase of the project. The delay is to study the effect of water and time on the foam cells.

Seattle, Wash.
Times
(Circ. D. 226,737
Sat. 214,851 - Sun. 267,958)

SEP 30 1965

Tougher Than Space

WASH POST 9/29

LA JOLLA, Calif.—Astronaut M. Scott Carpenter, who spent 30 days underwater in Sealab II, told newsmen that "the ocean is a much more hostile environment than space." He said he worked much harder in the Sealab than in the Mercury capsule, but still said he is convinced that men can live "forever—any length of time they wish—beneath the surface of the

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GLOBE DEMOCRAT
St. Louis, Mo.



REUNION—Astro-aquanaut Scott Carpenter is reunited with his wife, Rene, after he and Sealab teammates emerged from decompression chamber. He spent more than 29 days on ocean bottom.

Civilian Diver First Scoffed, Now Thinks Carpenter Best

La Jolla, Cal., Sept. 29 (AP)—A civilian scientist-diver admits he scoffed when he first learned astronaut M. Scott Carpenter was going to head a team of divers in the Navy's Sealab 2 experiment. But he returned to the surface believing:

"That man is the best thing that ever happened to underwater research."

Physicist George B. Dowling, 38, who spent fifteen days with Carpenter and eight others in the 12-by-58-foot steel cylinder on the floor of the Pacific 1,000 yards offshore, said: "I was frankly skeptical. I thought, 'they're going to let him go down because he's what he is—an astronaut.'

"But that was before I met him.

"Well Equipped"

"After two weeks in Sealab 2 I am convinced they couldn't have picked a better man for the job. I've never known anyone as considerate, as painstaking, as well equipped for this kind of work.

"Just for instance, our breathing tanks were the latest and best that could be obtained, very advanced models. But while we were still in training, Carpenter found 25 changes that had to be made and all of them were worthwhile.

"That probably was from his training as a test pilot. But there were many other things that made us respect and like him. There was no task too menial for him to do. Whenever he saw something that needed doing, he didn't tell someone; he did it himself.

"I don't know when he got any sleep."

Close To Ph.D.

Dowling, a civil service oceanographer at the Navy Mine Defense Laboratory at Panama City, Fla., has degrees in chemistry and physics and is close to winning his Ph.D. in physical oceanography.

A member of the second team to spend two weeks 205 feet below the surface in Sealab 2, Dowling returned with his teammates Sunday and, after 30 hours in a decompression chamber, appeared with them at a news conference yesterday.

Interviewed later, Dowling gave an unusual, unofficial picture of the Sealab 2 experiment to test man's ability to function underwater for long periods—an experiment which will end when the third team comes up October 10.

Military Applications

"The laboratory for which I work is interested in countermeasures against underwater weaponry," Dowling said. "Many of the experiments we conducted obviously had military applications.

"We measured current and temperatures, for instance, because you can correlate changes in those factors with changes in sonar signals and thus get a better idea of whatever target your sonar is hitting.

"Some of us swam along marked lines to measure how far away objects can be recognized as a way of helping divers locate mines on the bottom.

"But much of our planned research work suffered because of the unexpected difficulty of doing simple tasks at that depth. Things we figured would take ten minutes required 40 or 50 minutes.

"Just cutting the steel bands from a parcel of stakes we used to tether cables took ten minutes or more. On the surface you could do it in seconds."

Dowling said future underwater habitats "will have to be easier to get in and out of. Every man there will agree to this."

"Sealab 2 was tilted about 6 degrees because it was on a slope. The next one will have to have jacks to level it. The floor around our access hatch was always slippery and because of the slant you had to have a hand hold before you could take a step. All this wastes time," he said.

"And if there is one thing we learned, there has to be more room in the staging area around the hatch. You have to put on and take off your breathing tanks in an area the size of a closet. And that closet has a 4-foot-diameter hole—the hatch—in the middle

Dubuque (Ia.) Telegraph-Herald
WEDNESDAY, SEPT. 29, 1965

Skeptical Diver Admits Astronaut Best Man to Be Picked for Sealab

LA JOLLA, Calif. (AP) — A civilian scientist-diver admits he scoffed when he first learned astronaut M. Scott Carpenter was going to head a team of dives in the Navy's Sealab 2 experiment.

He returned to the surface believing that Carpenter "is the best thing that ever happened to underwater research."

Physicist George B. Dowling, 38, who spent 15 days with Carpenter and eight others in the 12-by-58-foot steel cylinder on the floor of the Pacific 1,000 yards offshore, said in an interview:

"I was frankly skeptical. I thought, 'They're going to let him go down because he's what he is — an astronaut.'

"But that was before I met him.

"After two weeks in Sealab 2 I am convinced they couldn't have picked a better man for the job. I've never known anyone as considerate, as painstaking, as well-equipped for this kind of work.

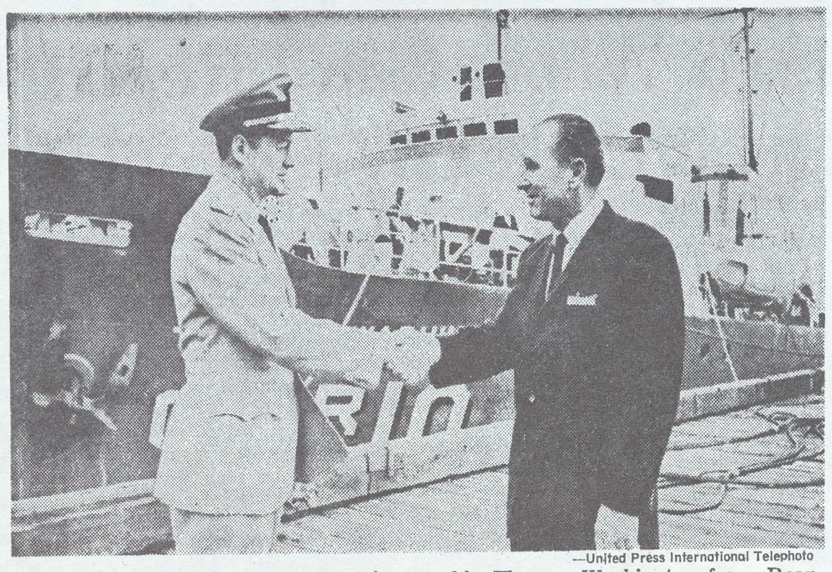
"Just for instance, our breathing tanks were the latest and best that could be obtained, very advanced models. But while we were still in training, Carpenter found 25 changes that had to be made and all of them were worthwhile.

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—United Press International Telephoto

Peter G. Trapani, right, marine superintendent for Scripps Institution of Oceanography, accepts research ship Thomas Washington from Rear Adm. Frank Jones in Boston ceremony. It's due here in February.

Scripps Acquires Long-Range Ship

The oceanographic research vessel Thomas Washington, which can rove 10,000 miles and stay at sea for seven weeks, was turned over to Scripps Institution of Oceanography yesterday in Boston.

The ceremony was conducted at the Boston Naval Shipyard. Rear Adm. Frank C. Jones, yard commandant, signed the lease papers from the Navy and Peter G. Trapani, marine superintendent at Scripps Institution, accepted the $2.5 million vessel.

The Thomas Washington will undergo minor changes for additional stowage before leaving Boston Oct. 12 for San Diego. It is expected here about February.

The vessel will carry a scientific party of 17 in addition to the crew of 24.

The Thomas Washington is 208 feet long, cruises at 12 knots and has a range of 10,000 miles. It will be outfitted with scientific gear and the staff briefed for several weeks at Woods Hole, Mass.

Capt. Terry Hansen will skipper the new vessel. Hansen and chief engineer James Pollock are both employes of Scripps.

The Thomas Washington is one of several ships leased by the Office of Naval Research for underwater studies.

A full suite of electronic depth records and radar is installed and the ship's furnishings include three built-in laboratories.

Dr. T. H. Van Andel, Scripps' research biologist, has organized the circuitous cruise that will take the new vessel between 12,000 and 15,000 miles along the East Coast, in the Bahamas and Caribbean and the north coast of South America before passing through the Panama Canal.

Minneapolis (Minn.) Star
THURSDAY, SEPTEMBER 30, 1965

Aquanauts to Salvage Sunken F85

LA JOLLA, Calif. — (AP) — An F85 jet plane strains against its moorings 20 feet off the ocean floor today, buoyed up by an injection of plastic foam.

The old jet hulk is being used in a salvage experiment conducted by the aquanauts in Sealab-2 and is scheduled to hover in the water 48 hours before being released to float to the surface.

The aquanauts pumped the plane full of foam Wednesday after it was lowered to the bottom near the Sealab capsule used as a habitat in the Navy's underwater living experiment.

Robert Sheats, leader of the 10-man team of aquanauts, said other salvage tests yesterday were completely successfully.

The 55-gallon drums were filled with foam on the ocean floor and allowed to float to the surface.

Eight other drums will be filled, tied down and allowed to float up at intervals during the final phase of the project. The purpose of the delay is to study the effect of water and time on the foam cells.

The foam is pumped to the bottom through a hose from a surface ship and it is hoped that the experiment will provide information that could lead to the development of new salvage techniques.

Another chemical — hopcalite — was introduced into the Sealab atmosphere cleaning system yesterday to relieve frequent headaches reported by some of the aquanauts.

SAN DIEGO
EVENING TRIBUNE
SEP 30 1965

GUARDIAN Wednesday September 2

US Sealab tests successful

By ANTHONY TUCKER, our Science Correspondent

"I feel fine," Commander Scott Carpenter said yesterday, emerging from 33½ hours in a decompression chamber after spending a month 205ft. down on the seabed off La Jolla, California.

Leader of the first two teams to work in the American Sealab II underwater experiment, and now the world record holder for endurance at the pressure encountered at this depth, Commander Scott Carpenter, spoke by telephone to a press conference in London.

He said he had encountered no problems that were not anticipated. The oxygen - helium atmosphere of Sealab was not narcotic, and although there were problems with speech and with the body's natural thermostat, the teams adjusted within a few days.

The other team members spent 15 days in the Sealab chamber, a large tank open to the sea at the bottom and with internal atmosphere at the same pressure as the water outside. In effect, the team members—aquanauts in US naval parlance—live in a bubble and have free access to the sea at that level.

During the experiments, which Scott Carpenter declared to be completely successful, the aquanauts, underwent physiological and other performance tests, trying out new salvage techniques and undertaking marine biological research.

The Sealab experiments are establishing scientifically that it is possible for men to stay indefinitely on the seabed. The depth of operation so far is of value only for off-shore working, but later experiments will be taken down in stages to greater depths.

More projects

If 600ft. proves to be within the bounds of human tolerance, then the greater portion of the Earth's continental shelves will become accessible for prolonged salvage, research, exploration and exploitation.

"We still have many projects to carry out," Scott Carpenter said. "We already have plans for Sealab III, which will be the same vehicle modified and will work deeper."

During his month he had taken one free dive down to 265ft., and returned to the chamber without trouble.

Before he was an aquanaut, Scott Carpenter was an astronaut. Asked whether he preferred space to the seabed, he said: "Both intrigue me because there are so many unknowns. I'm curious and I like to explore both."

No one could have sounded more relaxed about the extremes of human endeavour, both of which test human tolerance to the limit.

EVENING NEWS
Newark, N. J

Beneath the Sea

PERHAPS less exciting than space exploration, manned oceanic research is proceeding beyond the so-called "depth barrier." The findings could be at least equally important as landing on the moon.

Relatively little is known about the ocean floors, which comprise seven-tenths of the earth's surface. The drawbacks, now being overcome, have been lack of the necessary life-support equipment and a serious question as to whether man could endure the great pressures while also subjected to the mental strains of isolation.

After spending a record 30 days in Sealab 2, Astronaut-turned-Aquanaut M. Scott Carpenter said he is convinced "men can live . . . any length of time they wish beneath the surface of the ocean."

While many question the possible material gains to be found in space, ocean floors represent a vast source of untapped wealth in minerals and oil. The seas also could yield vast quantities of food, but scientists believe these will become available only after knowledge of life in the ocean has been greatly expanded.

The Navy is not stepping up its oceanic research program merely in the interest of science. The problems of submarine detection still are great and one suggested solution has been to deploy manned surveillance stations on the ocean floor at great depths.

Whether for defense against an enemy or survival under the threat of overpopulation, oceanic exploration holds the promise of a better life in the three-tenths of the earth man inhabits.

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Navy Man Tells Lions

Houston Post 9/30

Sea's Resources Not Fully Utilized

By LYN BILLINGSLEY
Post Science Editor

While nearly half of the world's population suffers from protein malnutrition, no nation has made efforts to pluck protein-loaded fish from the earth's oceans for these people, says Lcdr Don Walsh of the United States Navy.

Lcdr Walsh also says that the U.S. is importing most of the manganese ore needed for its steel industry while nodules of the ore remain on the ocean floor ready to be "harvested."

USE OF THE SEA'S resources is being held back by the few number of students interested in oceanography, he said. The 20 doctoral candidates produced annually by American schools are hardly enough to adequately study oceans, which cover 71 per cent of the earth, Lcdr Walsh says.

Lcdr Walsh, who is earning his Master's degree in ocean sciences at Texas A&M University, is a former pilot of the Trieste bathyscaphe that searched for the lost atomic submarine, Thresher, in 1963.

Speaking to the Houston Central Lion's Club and the Navy League this week at the Rice Hotel, Lcdr Walsh said that only 4 per cent of the ocean floor had been charted.

IF NOT FOR pure scientific knowledge, the ocean floor should become a familar map for the reason of national security, he said. More charting of the sea floor might bring more anti-submarine devices into development, he explained. He noted that the Soviet Union's submarine fleet was twice as large as the American fleet.

Submarine warfare directed against commercial shipping would be a severe blow to world trade and American economy since 99 per cent of that trade is conducted by shipping, Lcdr Walsh said.

He was pilot of the Trieste from 1959 to 1962. In 1960, he took the bathyscaphe on a nine-hour dive to 35,000 feet below the ocean's surface.

EVENING TRIBUNE
SAN DIEGO, CALIFORNIA
Thurs., Sept. 30, 1965

Sealab Divers Hold Successful Tests to Float Sunken Objects

Initial experiments with a buoyant foam designed to float heavy objects from the ocean floor to the surface were termed a success yesterday by Chief Robert Sheats, Sealab II Team 3 leader.

In other developments, Sealab II aquanauts discovered the amount of carbon monoxide in the lab's atmosphere was slightly higher than the amount found in air normally breathed and noted this may be one of the factors causing frequent headaches suffered by lab personnel.

Chemical Added

Support ship personnel have added Hopcalite to the lab's air cleaning system in an effort to reduce the carbon monoxide level. Hopcalite is a chemical mixture designed to remove carbon monoxide gases by oxidation.

The hulk of an F85 jet fighter was successfully lowered to the ocean floor yesterday for the beginning of the salvage experiments. Efforts to lower the hulk Tuesday were thwarted by offshore winds and choppy seas.

The plane has been stripped of its engine, electronic equipment and landing gear and its wings have been removed. Aquanauts worked from 4:30 to 6:30 p.m. yesterday filling the hulk with foam and reported it is now positively buoyant and is tethered about 20 feet from the ocean floor.

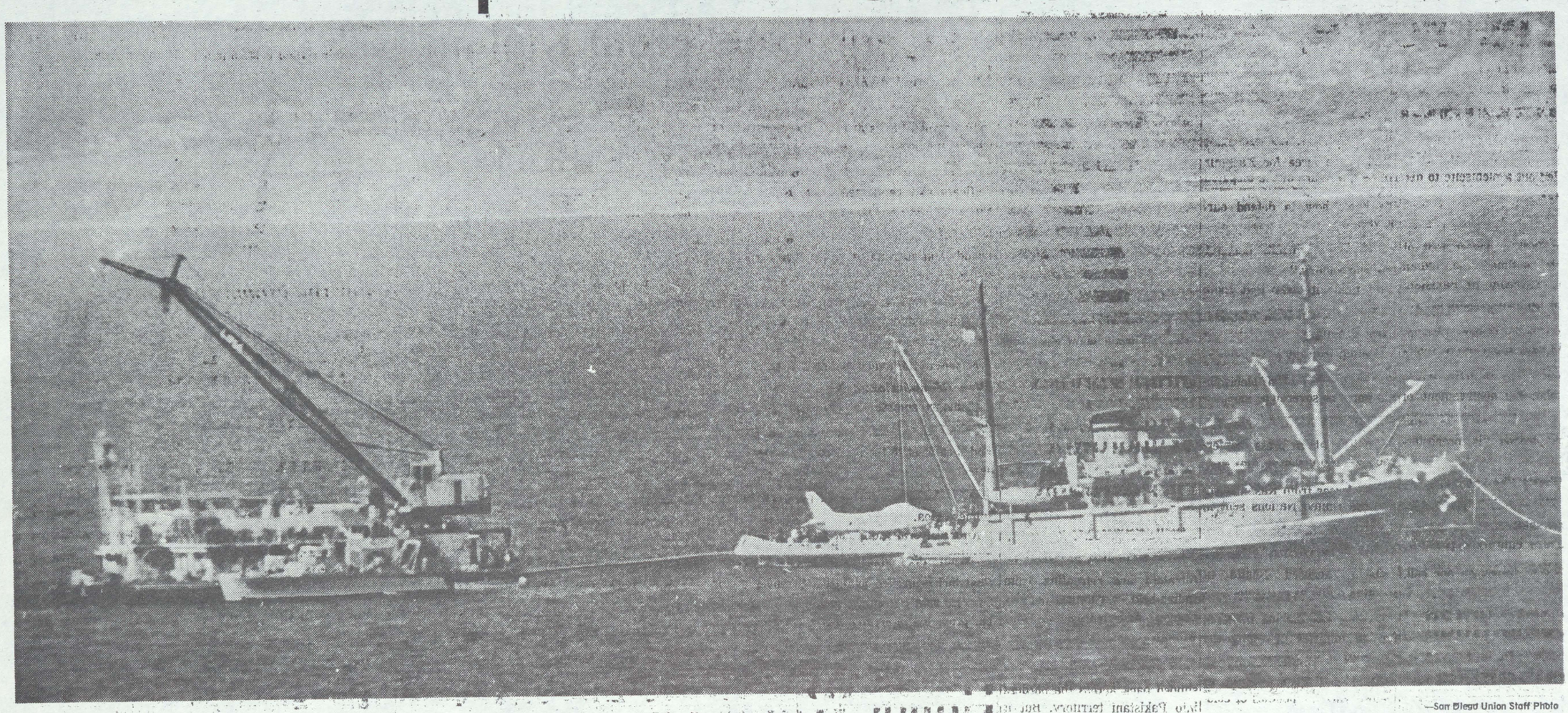
Supplied From Surface

The hulk is to remain in this position 48 hours and then will be allowed to rise to the surface. Purpose of the experiment is to determine the reaction of the foam in the hulk.

WITH THE AQUANAUTS: Navy Lt. Robert Sonnenburg, the doctor member of Sealab II's first and third crews, is the son of Sigmund E. Sonnenburg, who was lost in 1941 on the sub USS09 when it went down in Portsmouth, N.H. Sonnenburg, who has wanted to be on a sub from the time he was a youngster, is easily rated as the strongest of the aquanauts, having built up his muscles by exercise during his days in medical school. A special torque wrench, used for testing the aquanauts' strength down under, had to be installed for his use.

THE SAN DIEGO UNION Thurs., Sept. 30, 1965 ④
SAN DIEGO, CALIFORNIA

Another Experiment Starts For SeaLab



Navy vessel, right, moves old Cougar plane near staging ship Berkone for SeaLab test off La Jolla. Fuselage was lowered to bottom and pumped full of foam. Aquanauts will study foam while plane is anchored to bottom. Navy divers photographed descent of fuselage for documentary film on the salvage tests which also involve use of 55-gallon test drums. (Story on Page a-1.)

—San Diego Union Staff Photo

A115LA

(230)

LA JOLLA, CALIF., SEPT. 30 (AP)-AN F85 JET PLANE STRAINS AGAINST ITS MOORINGS 20 FEET OFF THE OCEAN FLOOR TODAY, BUOYED UP BY AN INJECTION OF PLASTIC FOAM.

THE OLD JET HULK IS BEING USED IN A SALVAGE EXPERIMENT CONDUCTED BY THE AQUANAUTS IN SEALAB 2 AND IS SCHEDULED TO HOVER IN THE WATER FOR 48 HOURS BEFORE BEING RELEASED TO FLOAT TO THE SURFACE.

THE AQUANAUTS PUMPED THE PLANE FULL OF FOAM YESTERDAY AFTER IT WAS LOWERED TO THE BOTTOM NEAR THE SEALAB CAPSULE USED AS A HABITAT IN THE NAVY'S UNDERWATER LIVING EXPERIMENT.

ROBERT SHEATS, LEADER OF THE 10-MAN TEAM OF AQUANAUTS, SAID OTHER SALVAGE TESTS YESTERDAY WERE COMPLETED SUCCESSFULLY.

TWO 55-GALLON DRUMS WERE FILLED WITH FOAM ON THE OCEAN FLOOR AND ALLOWED TO FLOAT TO THE SURFACE.

EIGHT OTHER DRUMS WILL BE FILLED, TIED DOWN AND ALLOWED TO FLOAT UP AT INTERVALS DURING THE FINAL PHASE OF THE PROJECT. PURPOSE OF THE DELAY IS TO STUDY THE EFFECT OF WATER AND TIME ON THE FOAM CELLS.

THE FOAM IS PUMPED TO THE BOTTOM THROUGH A HOSE FROM A SURFACE SHIP AND IT IS HOPED THAT THE EXPERIMENT WILL PROVIDE INFORMATION THAT COULD LEAD TO THE DEVELOPMENT OF NEW SALVAGE TECHNIQUES.

ANOTHER CHEMICAL -- HOPCALITE -- WAS INTRODUCED INTO THE SEALAB ATMOSPHERE CLEANING SYSTEM YESTERDAY TO RELIEVE FREQUENT HEADACHES REPORTED BY SOME OF THE AQUANAUTS.

OFFICIALS SAID A SLIGHTLY GREATER THAN NORMAL AMOUNT OF CARBON MONOXIDE WAS DISCOVERED IN THE ATMOSPHERE AND THOUGH IT WAS NOT DANGEROUS, THE HOPCALITE, A MIXTURE OF MAGANESE DIOXIDE AND OTHER DIOXIDES, SHOULD REMOVE IT.

EE454APD

SUN SEP 29 1965

Aqua[illegible]

[illegible]

a porpoise

[illegible]

Messenger

By RONALD [illegible]FORD
Science Editor

PORPOISES can be trained to carry out life-saving rescue missions for aquanauts who run into trouble as they explore the depths of the ocean.

United States spaceman Commander Scott Carpenter, who has now become an aquanaut, revealed last [illegible] how vital a role porpoises will play in future deep sea exploration.

Mess

In [illegible] made thr[illegible] of the earth. On Sun[illegible] he was brought to the surf[illegible] after spending 29 days 14 hours in a £300,000 deep sea "space ship" called Sealab II.

It is anchored 205 feet below the Pacific waves off the California [illegible]

Du[illegible] with other aquanauts who spent 15 days at a time on the sea bed, a 19-stone male porpoise called Tuffy was used as a delivery boy, taking messages from the surface ship to Sealab II.

Last night, after spending the last hours in a decompression [illegible] taken [illegible] him used [illegible] sea level, [illegible] after held a [illegible] with reporte[illegible] the Transa[illegible]

[illegible]

Tuffy performed so well, he said, [illegible] he and other porpoise[illegible] trained for rescue [illegible] future deep sea [illegible]

Tuffy [illegible] be [illegible] carry messages, [illegible] repairs, or to take [illegible] to a diver who is [illegible] lost, [illegible] Carpenter.

He [illegible] more efficient [illegible] than a human diver [illegible]

The [illegible] Tuffy, Sealab [illegible] a special under[illegible] which [illegible]

Commander left the conference for a reunion his wife and family.

But [illegible] is ready [illegible] into action—either [illegible] in the deep, he said.

Sealab II [illegible] to be [illegible] before it [illegible] can greater depth[illegible] — aquanauts are [illegible] beat Carpenter's deep[illegible] stay.

SAN DIEGO EVENING TRIBUNE SEP 30 1965

Sealab Tests On Buoyancy Prove Success

Foam Designed To Float Objects From Sea Floor

Initial experiments with a buoyant foam designed to float heavy objects from the ocean floor to the surface were termed a success yesterday by Chief Robert Sheats, Sealab II Team 3 leader.

In other developments, Sealab II aquanauts discovered the amount of carbon monoxide in the lab's atmosphere was slightly higher than the amount found in air normally breathed and noted this may be one of the factors causing frequent headaches suffered by lab personnel.

Chemical Added

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The plane has been stripped of its engine, electronic equipment and landing gear and its wings have been removed. Aquanauts worked from 4:30 to 6:30 p.m. yesterday filling the hulk with foam and reported it is now positively buoyant and is tethered about 20 feet from the ocean floor.

Supplied From Surface

The hulk is to remain in this position 48 hours and then will be allowed to rise to the surface. Purpose of the experiment is to determine the reaction of the foam in the hulk.

Sealab II officials said cellular loss, shrinkage and other factors will be noted to improve methods in the use of the foam.

Foam used for the experiments is supplied from the surface through the use of hoses and foam guns.

Bottles Recharged

The support vessel began supplying Sealab II with breathing gas today through a 325-foot high pressure hose which will enable aquanauts to recharge Mark VI breathing appartus bottles.

Aquanauts have been having the bottles recharged by sending them to the surface.

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SAN DIEGO UN

SEP 30 1965

PUBLIC INFORMATION OFF
Eleventh Naval District
San D[illegible]go, California

Jet Fighter Sunk In Test For SeaLab

Picture — Page a-3

By JUDITH MORGAN

The fuselage of a Navy jet fighter plane was lowered to the ocean floor near SeaLab II yesterday and aquanauts began filling it with foam as part of a salvage experiment.

The aircraft will remain anchored to the bottom for at least 48 hours so aquanauts can study the action of sea water on the foam, which makes the plane buoyant.

By last night, Team 3 aquanauts had used foam guns to shoot foam into the plane, then picked the craft up and moved it 100 feet east of SeaLab for observation.

The Navy plans to let the plane float six to 10 feet above the ocean floor and see if sea water will cause the foam to disintegrate.

Eight 55-gallon test drums also were ballasted and lowered from the Navy ship Gear yesterday as part of the salvage experiments. Two drums were brought to the surface last night and cut open for inspection. SeaLab officials said the foam had formed and expanded satisfactorally.

In an effort to find relief for the severe headaches which have plagued SeaLab II aquanauts, project officials are investigating carbon monoxide.

San Diego Aquanaut William J. Bunton, now in SeaLab as a member of the third team of men, has complained of the worst headaches.

SAN DIEGO EVENING TRIBUNE SEP 29 1965

PUBLIC INFORMATION OFFICE
Eleventh Naval District
San Diego, California

Plane Salvage Plan Delayed By Rough Sea

Attempts to place the hulk of an F85 fighter plane under water for salvage experiments by Sealab II divers were to be renewed today after winds and a choppy sea canceled the operation yesterday.

Observers said the support ship with the hulk was rocking so much there was no chance to get the plane overboard.

Despite cancellation of the salvage experiments, Team No. 3 aquanauts kept busy with expanded biological investigations.

Do Repair Work

The aquanauts also replaced some defective instruments on the weather station and five burned-out mercury vapor lights.

They also marked a new trail to the rim of Scripps Canyon.

Today the support vessel was to begin supplying oxygen through an umbilical cord controlled by a Krassberg sensor. This will be a test of a previously planned ultimate gas supply system.

Would End Tough Task

A high-pressure gas line has been installed from the staging vessel to Sealab II and it will be used to charge Mark VI breathing apparatus bottles under water.

This will relieve the aquanauts from the difficult task of transferring these breathing units to the surface for service.

SKIN DIVER OCT '65

installed on the surface vessel. They will be transferred to the DDC through the mating hatch under pressure and then begin their period of decompression, which is expected to take about 35 hours. This experimental technique of personnel transfer is expected to contribute to the ongoing Deep Submergence program of developing salvage and submarine rescue facilities.

DEDICATION AT LONG BEACH NAVAL SHIPYARD

PAUL H. NITZE, SECRETARY OF NAVY

"I am pleased and honored to participate today in the dedication of SEALAB II, the Navy's second experiment in living beneath the sea. This experiment represents an important stage in the transition from pioneering explanatory research to the achievement of a significant operational capability of national importance. It is not always true that the fruits of research and development mature in timely phase with a national need, nor does the transition from exploratory research to the development of a true capability always proceed in a process of smooth, timely and harmonious change. I believe that in the case of SEALAB II both of these fortuitous conditions obtain.

"With the ratification of the Treaty on the Continental Shelf in June of 1964, the United States acquired sovereign rights to the undersea lands of the continental shelf out to a 'depth of 200 meters, or to a depth which admits of practical exploitation.' By the lesser of these definitions, the United States acquired rights in an as yet unexplored area of over 1,000,000 square miles. Not since the days of the Louisiana Purchase has there been an acquisition so rich with promise and yet so completely unknown. As in that time, the national interest calls for an exploration of these virgin lands. But as was also true in the early nineteenth century, man's logistic and technological capability to explore and assay the vast and newly acquired area is elemental and unsophisticated.

"Today our limited knowledge of the continental shelf is based largely upon data and observations made from surface ships. Yet it is already apparent from our still meager explorations by deep submersibles and free swimmers that this knowledge can and will be rapidly enlarged. As in the days of the Louisiana acquisition, the potential resources of the continental shelf are over-estimated by some and under-estimated by many. Obviously, the mere existence of deposits of manganese, tin and silver, or of mineral sands, or the plentiful protein resources useful as food or fertilizer, does not make them, per se, economically attractive. Until an undersea engineering capability is developed which is competitive with terrestial engineering in cost and use of human resources, the potential of the shelf, no matter how rich, will not be realized. It is therefore of first priority that, before the continental shelf can be adequately surveyed and utilized, we must develop a capability to operate machines, vehicles and men with ease and efficiency over these submarine lands.

"Eleven months ago I spoke at Groton, Connecticut, of the Navy's intention to pursue a program leading to such an ocean engineering capability. I can report that substantial progress has been made in the intervening months. Let me mention just a few examples of that progress.

"The oceanographic deep submersible ALVIN has successfully completed unmanned tethered tests to a depth of 7,500 feet in the tongue of the ocean south of Cape Kennedy and she may even now be conducting manned dives to her operational limit in excess of 4,000 feet. At nearby San Clemente Island the Naval Ordnance Test Station has successfully completed manned trials to a depth of 200 feet in the two man, high speed submersible MORAY. This craft literally flies in the water in order to maintain depth. At the same location, the experimental vehicle, DEEP JEEP, has completed a successful series of manned dives and work demonstrations at its operational depth of 2,000 feet. At present, the bathyscaphe, TRIESTE II, which carried the burden of the THRESHER search, is undergoing continuous modification in its employment as a training and test vehicle for the deep submergence systems project. A deep submergence group for training and logistics support under the command of Submarine Squadron Three has been established at Ballast Point, San Diego, and a floatation dock is now being converted here at the Long Beach Naval Shipyard for support of the TRIESTE II and several smaller deep submersibles. And at the Mare Island Naval Shipyard, work has commenced on a new bathyscaphe, the TRIESTE III, which is designed for use by Navy Electronics Laboratory scientists in deep ocean studies.

"The concept design of a rescue vehicle capable of submarine to submarine transfer of personnel has been finished, and structural test models of the hull and scale models for hydrodynamic, propulsion and stability tests have also been completed. And, finally, at the David Taylor Model Basin and the Marine Engineering Laboratory, various phases of design, test and fabrication of two large pressure test facilities are in process. They will be able to accommodate the pressure hulls of a large class of deep submersibles.

"The burden for development of that portion of our undersea program which involves the free swimmer, the man-in-the-sea, falls directly upon the men who participate in and bear the responsibility for the SEALAB II Project. It is a source of pride to me that the organizational structure of the Navy has provided the full spectrum of capabilities to insure the success of this enterprise.

"Ideally, the initiation of radically new capabilities within the Navy begins with the exploratory researches of the Office of Naval Research, the naval laboratories, and the nation's great universities. In this environment, which is dedicated to advancement of the fundamentals of the physical and biological sciences on all fronts, the seeds of innovation germinate. The early recognition of a major capability in embryonic form requires a transition from such exploratory research to the advanced developmental work which is conducted by the Naval Material Support Establishment through our material bureaus, our project managers, and the Navy laboratories, with the participation of private industry. The final phase in this cycle is the development of operational systems and hardware for the fleet which enhance the Navy's ability to preserve and protect freedom of the seas and the legitimate interests of the United States and her allies. A review of the history and projected future of the man-in-the-sea portion of our Deep Submergence Systems Program indicates that it may prove to be an excellent example of the way in which this idealized research and development pattern should operate.

"SEALAB I, the exploratory predecessor to this more comprehensive experiment, was born in the Naval Medical Research Laboratory, New London, out of the researches of Captains George F. Bond, Robert Workman and Walter Mazzone. It was fostered in the broad and permissive environs of the Office of Naval Research and nourished by the Mine Defense Laboratory at Panama City and units of the forces afloat. That first experiment, conducted at Argus Island last fall, was successful beyond the expectation of those whose surmise was based on a review of its modest budget. In SEALAB I, four Navy men lived for nine days at a depth of 193 feet, and conclusively established man's psysiological and psychological ability to exist in an ocean environment. To date, no long-term physiological effects of such exposure have been discovered.

"SEALAB *II*, while similar to SEALAB I in principle, will be a more lengthy and comprehensive experiment. Here two diving crews of ten men each will occupy the laboratory alternately during a 30-day period. Two of the men are scheduled to stay down for the entire period.

"Like its predecessor, SEALAB II is in essence an inverted container in which an appropriate mixture of helium, oxygen and nitrogen is entrapped at the pressure of depth to provide a dry habitation for its occupants. The swimmers in the laboratory will have reached a physiological balance between this environment, their circulatory systems and gas-absorbing tissue. Upon completion of their sojourn, they will return to the atmosphere through a personnel transfer capsule and surface decompression chamber and by a long and carefully controlled transition from the helium environment to the fresh air which sustains ordinary mortals.

"The present SEALAB, which will be located at a depth of 210 feet, will operate in water which is significantly colder than that which surrounded SEALAB I. Carefully controlled experiments to measure work function and ability will be interlaced with a regimen of psychological and psysiological tests and projects involving biological acquisition, oceanographic measurements, undersea construction and salvage. Experiments in transportation and navigation will be conducted with battery-powered swimmer propulsion devices, and a number of insulated swimmer suits will be evaluated for protection against the low temperature and high heat transfer of the water.

"Preparation for SEALAB II, our second experiment in undersea habitation, were begun contemportaneously with the initiation of the Deep Submergence Systems Project. The success of SEALAB I was such that the present program bypasses the advanced development stage and points to a specific operational capability in the late sixties. This remarkable progress has been achieved under the joint direction of the Navy Special Projects Office and the Office of Naval Research. Utilization of this joint approach has permitted the coordination and application of a broad spectrum of Navy resources to the program. Without the varied contributions of many of our bureaus, laboratories and test and development facilities, the experiment which we dedicate today would never have been possible.

"Throughout the history of the United States Navy, a small but significant corps of men has engaged in underwater diving and swimming in quest of military advantages whose potential is self-evident, but whose attainment has been just beyond reach. The use of a shallow submersible in the Revolutionary War is textbook history. Similar attempts in the Civil War were accompanied by efforts to employ swimmers to tow mines or attach limpets to enemy hulls. Since that time a growing, dedicated and herioc segment of the Navy has slowly developed an important military capability. The work of our Navy divers has been sporadically marked by peacetime disasters. The heroism which they have displayed

(Continued on Page 62)

SEA LAB II

(Continued from Page 19)

in these circumstances has been such that six of the seven Congressional Medals of Honor awarded in peacetime have been earned by this fraternity. The salvage, rescue and search operations on the submarines F-4, and S-51, the SQUALUS and the THRESHER have, in their turn, emphasized the significance of their work. Yet efforts independent of disaster have made the real progress.

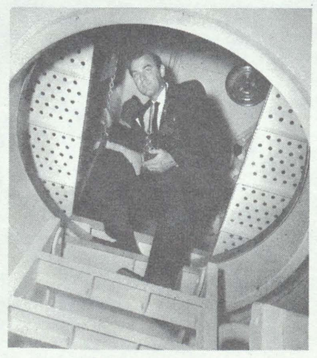
"It was in 1879 that Admiral Luce established a corps of divers whose work was to mature in 1914 with the publication of a manual of deep sea diving by Gunner Stillson. Much of it is valid today. The Navy's Experimental Diving Unit was established in 1927, and its development of helium oxygen equipment and decompression schedules was employed in the salvage of SQUALUS in 1939. The development by Cousteau and Gagnon of the demand-breathing scuba device is well known. Less well-publicized is the development by Lambertsen of the University of Pennsylvania of the rebreathing apparatus which conserves vital gas at depth and which is the direct ancestor of the units which will be employed in this SEALAB.

"Today the Navy's capability for man as a free swimmer is manifested in a number of ways — not only in diving teams for rescue and salvage, but in our Underwater Demolition Teams, our Explosive Ordnance Disposal Units, and in the SEAL Teams of the amphibious forces. Units such as these surveyed and cleared the Normandy beaches in World War II and cleansed Wonson Harbor in Korea of a dense minefield in less than two days. All told, about 2,000 officers and men of the Navy are engaged in some form of underwater activity as free swimmers or divers. Yet each of these men is limited at depths of 200 feet to but a few minutes of productive effort each day. The provision of a saturation diving capability for these men would multiply the uses to which their talents could be applied and, consequently, the total number of such men who could be usefully employed by the Navy would greatly increase.

"SEALAB II is thus at the threshold of an expanded military capability, useful on every continental shelf or reef where a U.S. military presence is required. Coincidentally, a capability will be created to foster the non-military interests involved in such matters as tending pipelines, cables and underwater installations; extraction of oil and minerals; culture of fish and marine life; extension of geophysical exploration; and the general advancement of the earth sciences.

"In a period of a little over fifty years, man's first flight into the air has been translated into a commonplace experience for millions of Americans. Many of us could not have attended this ceremony had it not been for the ready availability of high speed jet air transportation. It has been just a year since the completion of SEALAB I. Today, at the dedication of SEALAB II, we express the hopes and the trepidations which accompany this difficult and even precarious extension into the sea. Yet it may not be too soon to anticipate that this dedication presages the day when an excursion to an advanced sea habitation, 600 to 1,000 feet below the sea, will be an experience as commonplace as jet air travel is today. To the realization of this goal, this Sea Laboratory is dedicated; to the men who will man her, good luck and Godspeed."











Long shot of Aircraft Carrier "Hornet" and SEALAB II *show comparative size in top left photo. Editor Jim Auxier queries Grigg during tour of* SEALAB II *top right. SD staffer Art Smith descends through hatchway Aquanauts will use above left. Dave Podewitz discusses underwater photography with Bill Bunten above center. Aquanauts are avid underwater photo bugs. Renewing old acquaintances are Connie Johnson, SD Managing Editor and Captain Bond above right. At left Scott Carpenter, who will head the first team of* SEALAB II *answers reporters questions while*

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PMSKBUDGET

AQUANAUTS' PANCAKES (250)

BY ROBERT M. BURNETT

ASSOCIATED PRESS WRITER

LA JOLLA, CALIF., OCT. 1 (AP)-THE HOUSEWIVES OF THE UNITED STATES ARE TRYING TO HELP THE AQUANAUTS OF THE NAVY'S SEALAB 2 OVERCOME THEIR WORST CATASTROPHE TO DATE: THEIR PANCAKES.

IN THE UNDERWATER LABORATORY, WHERE THE AIR IS MOSTLY HELIUM AND ATMOSPHERIC PRESSURE IS SEVEN TIMES THAT AT THE SURFACE, THE AQUANAUTS' FLAPJACKS TURNED INTO DISASTER: SCORCHED ON THE OUTSIDE, GUMMY ON THE INSIDE.

AFTER THE AQUANAUTS REPORTED LAST WEEK THAT THEIR PANCAKES FAILED, WOMEN BEGAN TO VOLUNTEER CULINARY ADVICE.

"WE HAVE BEEN FLOODED WITH LETTERS FROM HOUSEWIVES FROM COAST TO COAST," A SEALAB SPOKESMAN REPORTED. "THEY HAVE ALL RECOMMENDED PANCAKE COOKING PROCEDURES GUARANTEED TO HELP THE DIVERS."

AMONG THE SUGGESTIONS:

USE A GREASELESS COOKING PAN. CHANGE THE INGREDIENTS -- A PINCH MORE OF THIS, A BIT LESS OF THAT. LOWER THE HEAT. RAISE THE HEAT. TRY FROZEN BATTER.

THE NAVY HAS BEEN CONSIDERING THE SUGGESTIONS -- ALTHOUGH, SAID A SPOKESMAN, HOUSEWIVES DON'T REALLY REALIZE WHAT AQUANAUT FRYCOOKS ARE UP AGAINST:

BECAUSE OF THE ADDED PRESSURE, THINGS COOK FASTER. HEAT TRANSFERS QUICKLY FROM THE GRIDDLE TO THE PANCAKE. WHEN THE OUTSIDE LOOKS PERFECT THE INSIDE IS JUST AN OOZY GOO.

NAVY SCIENTISTS HAD ALREADY TRIED GREASELESS PANS -- PERFECTED FOR USE BY PERSONS WHO CAN'T HAVE GREASE IN THEIR DIETS -- BECAUSE GREASE WOULD HAVE SMOKED UP THE SEALAB ATMOSPHERE.

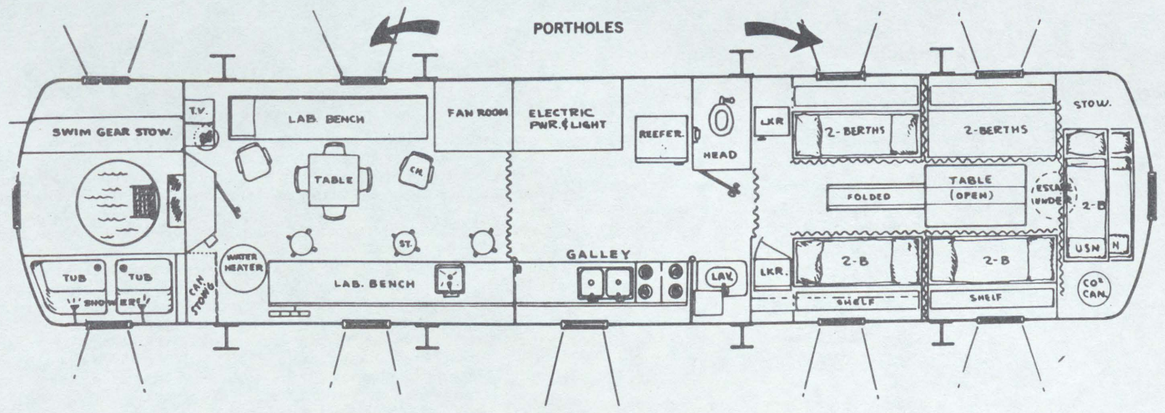
THE ATMOSPHERE WAS FINE, BUT THE PANCAKES WERE INCREDIBLE. AND INEDIBLE.

NOW NAVY SCIENTISTS WILL GIVE THE FROZEN PANCAKE BATTER A WHIRL.

THEY'LL TRY IT FIRST IN A TOPSIDE LABORATORY DUPLICATING SEALAB'S CONDITIONS. IF IT WORKS, THEY'LL SEND IT DOWN TO THE BOTTOM OF THE SEA -- AND THE AQUANAUTS WILL TRY AGAIN TO HAVE PANCAKES FOR BREAKFAST.

EE203APD

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SEALAB II
INTERIOR ARRANGEMENT
TOP REMOVED—LOOKING DOWN



Captain George F. Bond, MC, USN (right), and Commander M. Scott Carpenter, USN, the Astronaut turned aquanaut, in a press conference.

SEALAB II Aquanauts show that man can live and work there for long periods

By JEROME M. KIRSCHENBAUM
Lieutenant (JG), USNR

AT THIS moment the United States Navy is fighting the Second Battle of Inner Space. Its major weapon is a small, white room that rests 210 feet beneath the Pacific Ocean. It is called SEALAB II.

The first battle was fought off Bermuda last summer in SEALAB I. There, on a smaller level, it was proved that men can exist under the sea for long periods of time. This year, off La Jolla on the southern coast of California, three 10-man teams under the leadership of Aqua/Astronaut M. Scott Carpenter are spending 45 days beneath the sea. They are trying to prove that men can not only live there for prolonged periods, but can accomplish meaningful work as well.

The SEALAB capsule itself is a long, cylindrical dwelling that looks like a very well laid out house trailer inside. Laboratory facilities, hot showers, a 10-man bunk room and even entertainment television are provided. The capsule is self-sufficient, but for safety reasons has an emergency umbilical line to a surface support ship.

Man No Longer an Intruder

SEALAB II rests on a level spot in the huge undersea canyon located just off the Scripp's Institution of Oceanography complex at La Jolla. The undersea house seems quite small and insignificant in this mountainous terrain, but when it completes its mission, the Navy will have the greatest body of knowledge concerning the undersea world ever accumulated at one time.

Prior to the work of men like Captain George F. Bond of the Navy Medical Corps, France's Jacques Cousteau, inventor of the Aqua-Lung, and Edward Link, man was an intruder in the depths. He could only spend a few minutes in the "silent world" and then was forced to return to the surface. Even then he entered this alien and forbidding environment at the risk of his life and only when protected by expensive and complicated equipment. The greater the depth to which he descended, the less time he could spend there. Long periods of "decompression deadtime" had to be passed while nitrogen, forced into the bloodstream by the crushing pressure, had time to come out of solution. If the diver rose to the surface without this decompression, bubbles would form in his veins and he would fall victim to the painful, crippling, and sometimes fatal, "bends."

ABOUT THE AUTHOR

Lieutenant Kirschenbaum is a graduate of Columbia University. Prior to his naval service he participated in diving salvage operations off Cape Hatteras and is an amateur SCUBA diver. His current duty station is with the Office of Information, Washington, D. C. Previously, he was on board USS PETREL ASR-14, a Submarine Rescue Vessel which was the support ship for SEALAB I. Lieutenant Kirschenbaum recently returned from La Jolla where he covered preparations for SEALAB II.

Life-Giving Mixture

Captain Bond pioneered in the development of a system with which, by breathing a special mixture of gases, a man could spend long periods of time on the bottom without serious after-effects. This innovation makes SEALAB II possible.

Inside the steel cylinder that will be their home for more than a month, Commander Carpenter and his men breathe a predominantly helium atmosphere. Less than four per cent of that atmosphere is oxygen. They cannot smoke. There is not enough oxygen to support combustion.

The atmospheric pressure in SEALAB II will be six times that of the ocean outside. In fact, the entrance hatch in the floor of the lab is kept open to the sea throughout the project. Rather than fight their environment, the men of SEALAB II live *in* it.

Foam and Christmas Trees

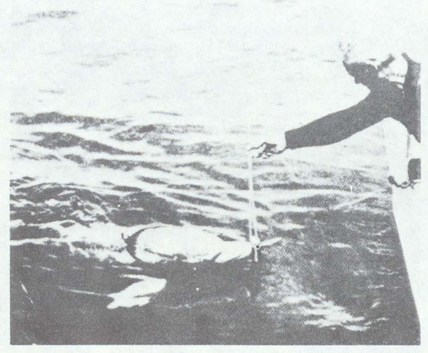
Because of the exotic atmosphere they breathe, and the fact that they have a home away from their surface home, the Aquanauts can roam at will for days beneath the sea, only having to decompress when they finally return to the surface ship. This practice was proved during SEALAB I. Now, the Aquanauts are spending an extremely long time "down-under" and will accomplish a huge body of scientific work. Man has ceased to be an intruder in the depths; he has become an inhabitant.

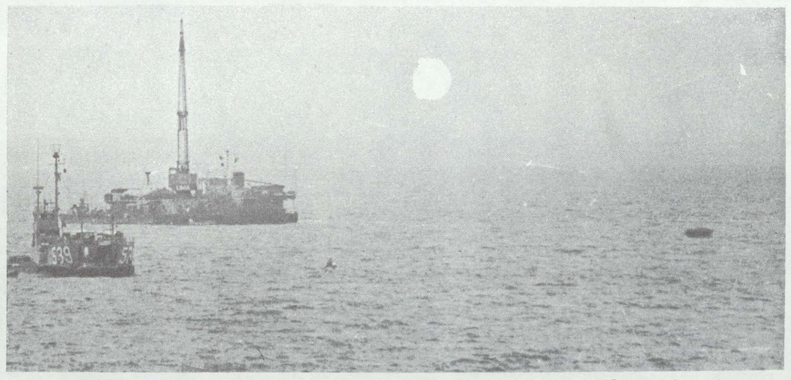
Many new techniques and systems are being tested during the project. They will, along with succeeding deep-diving vehicles and habitats, be the tools that will firmly place men at home under the oceans of the world.

One of these methods is a novel way of raising crashed aircraft or small sunken ships from the bottom. The Aquanauts inject a special foam solution into the fuselage of an old Navy fighter plane specifically sunk for this test. When sufficient foam is in place, the aircraft will rise to the surface by its own buoyancy. This will do away with the hours of diving, rigging and hoisting previously required. Also, to prove that men can do heavy construction work at great depths, the Aquanaut teams are building a portion of an off-shore oil rig called a "Christmas Tree." To do so, they will employ new techniques and newly designed underwater power-tools.

The SEALAB habitat is a busy center for scientific research and data collection. Physiology tests, the results of which immediately pass to the shore control point through a highly sophisticated communications and telemetry system, are a major portion of the program. Research in marine biology, light visibility tests, fish census and bounce dives into deeper parts of the La Jolla canyon are all going on as part of an extensive schedule of scientific exploration.

Tuffy, a porpoise, trains with Wally Ross to respond to the signaling device which the Aquanauts will wear when they are outside SEALAB II. When Tuffy hears the device, he immediately goes to the distressed swimmer and carries him to safety with the aid of the harness.





SEALAB II, hardly visible at right, prepares to submerge. The Surface Support Ship, center, will serve as the surface headquarters for the "Man-in-the-Sea" experiment.

One of the newest innovations being used during the project is a small, bee-hived shaped, submerged communications station. It is called the "Benthic Lab." This unmanned laboratory was designed by Scripp's scientists to take hundreds of signals coming from SEALAB II, fuse them into one "master" signal and transmit this to shore. There, the "master" is broken down into individual electronic pieces of information. This saves tremendous amounts of manhours that would previously have been spent laying miles of individual cables for each signal. Telemetered heartbeats, TV pictures, radio signals, voice transmissions —all flow through the "Benthic."

Almost as remarkable as its function is the design of the communications station. It repairs itself. An arm, equipped with a TV camera to enable a shore-based operator to view the interior of the station, can move up and down through the submerged capsule, pulling out used or damaged circuit cards, discarding them and replacing them with new circuits. It can repair more than 93 per cent of its own parts.

A St. Bernard Named 'Tuffy'

As the Aquanauts enter this, the beginnings of a new world, they are taking a non-human ally with them. It will be in the form of a light-grey bottlenose porpoise who goes by the name of Tuffy.

Tuffy is no average porpoise—he is a marine St. Bernard. Instead of a warming flask of brandy strapped around his neck, he carries a special harness trailing a life line. The men of SEALAB II are trying to evaluate the porpoise as a life-saving device.

Porpoises have directional hearing. This, coupled with their unusual sonar and agility in the water enable them, with training, to easily find a disabled or lost diver. They can dive deeper, swim faster, surface more quickly and attain greater depths rapidly—all much more proficiently than any human diver could hope to do. Combine this with their high intelligence and apparent friendly nature, and the porpoise is a natural ally for the undersea sailor.

Here is how Tuffy does his job:

Each diver in the project has an acoustic signalling device strapped on his arm when he ventures out of the habitat. Tuffy has been trained to find this signal. He can do it at great distances and substantial depths. If a diver finds himself lost or in difficulty, he need only turn on his signal, and Tuffy, a life-line attached to his special harness, will come rocketing to him.

Candid Camera

Captain Bond and the other medical investigators on the project will be able constantly to watch their charges 210 feet below them. Two TV cameras monitor the interior of the lab and several others are set up outside the dwelling so that topside observers can share in the experiences of their undersea shipmates.

All this adds up to one thing—The Navy is under the sea to stay. There will be more SEALAB's and more Aquanauts. The exploration of the unknown depths of the ocean is as great a challenge as any walk in space. The dangers are the same, the unknowns as vast and complex, but this inner space must be conquered if the Navy is to command the seas totally.

SEALAB II is a tiny white cell of warmth and intelligence in the dark cold valley of the La Jolla Canyon. Its men are fragile creatures who defy crushing pressure and silent darkness. A thin steel wall and an even thinner helium atmosphere are their only defense. In the evenings they sit at their small galley tables and talk as if they were in their own homes—and perhaps they are.



The first team of Aquanauts to spend more than a week in SEALAB II included, left to right: Robert A. Barth, QMC, Cyril J. Tuckfield, EMC, J. D. Skidmore, PHC, Frederick J. Johler, EMC, Thomas A. Clarke, and Lieutenant Robert E. Sonnenberg, MC, USN.

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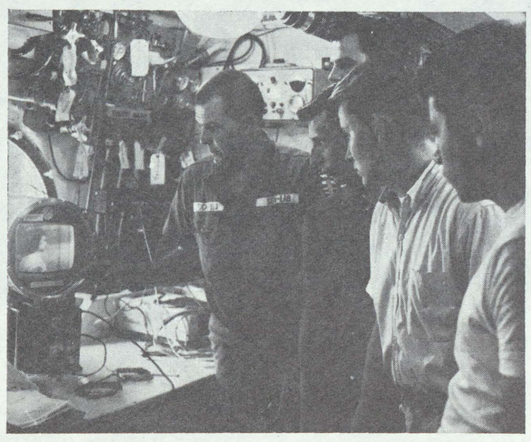
OCTOBER 1965

UNDERSEA TECHNOLOGY®

THE MAGAZINE OF OCEANOGRAPHY, MARINE SCIENCES, AND UNDERWATER DEFENSE

Carpenter Stays Down 30 Days

■ LARRY L. BOODA



Chief Engineerman Cyril Tuckfield, member of SeaLab II crew, explains television system to crew responsible for preparing acquanauts wetsuits.

La Jolla, Cal., Sept. 27. Astronaut-Aquanaut Cdr. Scott Carpenter emerged from the SeaLab II decompression chamber here today after spending an unprecedented 30 days at a pressure depth of 205 ft. Carpenter came up with the nine members of the project's team number two. Carpenter, a regular reader of UST, admitted that 30 days under pressure was a lot tougher than the three circuits in orbit he spent in a Gemini capsule.

Members of all three teams busily engaged in the dozens of physical, biological and physiological experiments during their shifts below. (UST Aug. p. 17, Sept. p. 9) The topside crew, led by Capt. George Bond, diving surgeon and Capt. Walter F. Mazzone, physiological control officer, showed effects of the effort, at this point two-thirds through its 45 day course.

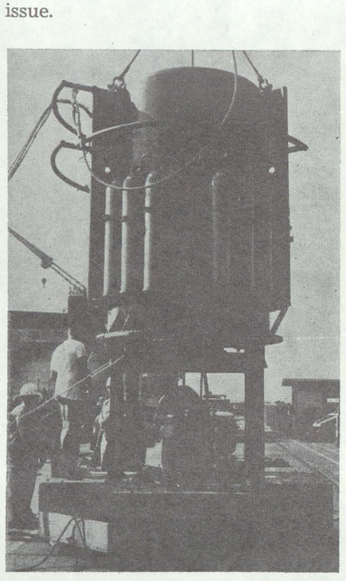
The only mishap occurred Sept. 12 as nine members of the first team were preparing to enter the Personnel Transfer Capsule to be taken to the surface decompression chamber. A scorpion fish stung Carpenter, causing an arm and hand to swell painfully. Lt. R. E. Sonnenburg, the medical officer of the team, delayed the departure long enough to give Carpenter pain killing drugs. It wasn't enough to prevent Carpenter from going into his second 15 day period, however.

Featured in the second shift activities were the operations with Tuffy, a porpoise who had been trained at the Naval Missile Center, Point Mugu, Cal. Tuffy is a male Atlantic bottlenose porpoise, seven feet long and weighing 270 pounds. His estimated age is 10 years. Captured in 1962, he bears scars of many encounters with sharks.

Originally possessing an unpleasant disposition, Tuffy now is cooperative and intelligent. His first trainer was Deborah Duffield, a student at Stanford University, who worked at Point Mugu the Spring and Summer of 1964. Wallace C. Ross took over his training in November 1964.

Working in the open ocean Tuffy learned to wear a harness, retrieve objects and home on an audio signal which he can hear 75 to 100 ft. compared with human ability of three feet. Tuffy located "lost" divers and carried messages.

As UST went to press the third team had successfully salvaged an aircraft fuselage and a ship steel plate. A complete report of the project will be carried in the December issue.



SeaLab II personnel checkout the personnel transfer capsule which brings acquanauts to deck chamber for 33 hours decompression after stay below.

The San Diego Union

FRIDAY MORNING, OCTOBER 1, 1965

SeaLab Team May Talk With French Divers

Contact Possible Today

By JUDITH MORGAN

SeaLab II aquanauts today may talk by telephone to their French underwater fraternity brothers, the six oceanauts living 330 feet under the Mediterranean Sea in the latest experiment by Jacques Cousteau.

The French divers, one of whom is Cousteau's son, entered their 20-foot wide diving bell Sept. 17 in the Monte Carlo harbor for the two-week experiment, latest in the Conshelf series directed by Cousteau. Cousteau is the underwater explorer whose two-man diving saucer was in La Jolla last year.

The spherical bathyscaph was towed to a site east of Ville Franche where the men are working inside the bell and, as in SeaLab II, making expeditions outside along the ocean floor.

TIME RUNNING OUT

The possibility of a telephone call between the two underwater experiments has existed since the first team of SeaLab aquanauts entered its undersea habitat Aug. 28. Time is running short on the French end of the line since Cousteau's experiment will end this weekend.

The phone call, if placed from SeaLab, would be made in the morning because it is eight hours later at the Conshelf site, a SeaLab official said. Both SeaLab and the topside ship Berkone will be able to communicate with the French diving bell if successful contact is made through the Benthic Communications Laboratory.

Rick Grigg, a member of team 3 and a student at Scripps Institution of Oceanography, is a likely candidate for the bulk of the conversation.

FLUENT IN FRENCH

Rick speaks French fluently. His wife, Sandra, said yesterday in La Jolla that Rick studied French at Stanford University, then perfected it during a three-month stay in Tahiti.

Meanwhile, the aquanauts continued salvage experiments yesterday working with foam to make 55-gallon drums and a Navy jet fighter plane buoyant.

A simulated submarine hull was lowered yesterday from the Navy ship Gear for use today in an underwater patching experiment. A steel plate will be lowered and a stud gun used to rivet the plate to the sunken hull.

Core samples were taken from the ocean bottom yesterday for geological tests by aquanaut-scientists and Navy scientists on the surface.

SeaLab officials at Scripps Institution have been receiving mail from housewives all over the country with cooking hints for successful pancakes.

A newspaper story saying that the aquanauts' pancakes were burned on the bottom and top and still cold in the middle brought letters from as far away as Virginia.

Iowa City (Ia.) Press Citizen
FRIDAY, OCTOBER 1, 1965

Sealab Flapjacks Flopped, Housewives Offer Aid

LA JOLLA, Calif. (AP)—The housewives of the United State are trying to help the aquanauts of the Navy's Sealab 2 overcome their worst catastrophe to date: their pancakes.

In the underwater laboratory, where the air is mostly helium and atmospheric pressure is seven times that at the surface, the aquanauts' flapjacks turned into disaster: scorched on the outside, gummy on the inside.

After the aquanauts reported last week that their pancakes failed, women began to volunteer culinary advice.

"We have been flooded with letters from housewives from coast to coast," a Sealab spokesman reported. "They have all recommended pancake cooking procedures guaranteed to help the divers."

Among the suggestions:

Use a greaseless cooking pan. Change the ingredients—a pinch more of this, a bit less of that. Lower the heat. Raise the heat. Try frozen batter.

The Navy has ben considering the suggestions—although, said a spokesman, housewives don't really realize what aquanaut frycooks are up against.

Because of the added pressure, things cook faster. Heat transfers quickly from the griddle to the pancake. When the outside looks perfect the inside is just an oozy goo.

Navy scientists had already tried greaseless pans—perfected for use by persons who can't have grease in their diets—because grease would have smoked up the Sealab atmosphere.

The atmosphere was fine, but the pancakes were incredible and inedible.

Now Navy scientists will give the frozen pancake batter a whirl.

They'll try it first in a topside laboratory duplicating Sealab's conditions. If it works, they'll send it down to the bottom of the sea—and the aquanauts will try again to have pancakes for breakfast.

EDITORIAL PAGE

Record American

FRIDAY, OCTOBER 1, 1965

Life in the Deep

EVOLUTIONISTS who maintain that man's pristine ancestors occupied the sea may find an I-told-you-so assist in Scott Carpenter's venture that, in properly developed housing and equipment, human beings could live and work "forever" far below the ocean's surface.

Carpenter is the world's only astro-aquanaut. He has completed a 30-day Navy assignment in Sealab 2 at a 205-foot depth off La Jolla, Cal. Other members of the group engaged in this scientific experiment have taken 15-day tours in the cylinder in and around which they have lived among startled piscatorial neighbors.

Carpenter acknowledges the pressures and strains of dwelling in Neptune's rooming house. But he is confident that man can manage effectively in that once hazardous domain. "Forever," of course, is a long, long time.

HOUSEWIVES RUSH TO RESCUE

Flapjacks Flop in Sealab

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From OCT 1 1965 Atlanta, Ga.

SAN DIEGO
EVENING TRIBUNE
OCT 1 1965

Phone Links Yanks, French 'Oceanauts'

Sealab II aquanauts talked today by phone with their French counterparts 330 feet under the surface of the Mediterranean Sea.

It was the first time that men in one undersea residence had talked to men in another, and the first time that men breathing one artificial (atmosphere have talked with others breathing a different artificial atmosphere.

Swap Congratulations

The aquanauts and the French, who call themselves oceanauts, exchanged congratulations and talked about their experiences at the bottom of the sea.

High on the list of information they wanted to exchange was data on visibility in the water, invariably the first thing a man working under the sea mentions.

Rick Grigg, a Scripps Institution of Oceanography student living 205 feet below the surface in Sealab II, conducted the conversation for the Americans. Grigg speaks French.

The call was placed by Capt. Jacques Cousteau, leader of the French experiment which is called Conshelf III. The six French oceanauts are in the 10th day of a 15-day experiment in undersea living. Unlike the Americans, they were in their steel spherical residence when it was lowered to the bottom.

The Americans are breathing a mixture of helium, nitrogen and oxygen. The French are using a similar atmosphere, but they switched to a mixture of neon and oxygen for the conversation because neon does not distort spech as badly as does helium.

Cousteau, on the surface, talked first to Capt. George Bond, principal investigator of Sealab II. Bond was on the Scripps campus for the call.

Bond switched the phone to Cdr. Scott Carpenter who spoke with Cousteau and oceanaut Andre Leban in the French undersea station.

Then Carpenter turned the communication line over to Grigg in Sealab. Grigg, talked to Leban and later to Phillipe Cousteau, who also is an oceanaut.

English Tougher

Sealab officials said that French is easier to understand than English spoken in an artificial atmospheres.

Bond spoke in French, but Carpenter used English. Then when Grigg took over, his counterpart responded in English.

"I can't understand you, are you speaking English or French," Grigg responsed.

After some confusion, both men decided to use French for the balance of their talk.

More on Sealab, A-17

Ogden Standard-Examiner

6A OGDEN, UTAH, FRIDAY EVENING, OCTOBER 1, 1965

EDITORIALS

Aquanauts' 30 Days Under the Sea

One of the most interesting U.S. scientific experiments of the year has been the "voyage" of Sealab 2.

This is the device that was placed 205 feet deep under the surface of the Pacific Ocean, just off La Jolla, Calif., to become the home of Astronaut-Aquanaut M. Scott Carpenter and his colleagues.

Carpenter lived in Sealab 2 for a record 30 days. Twenty-seven other men joined him for varying periods.

When the main part of the experiment was concluded, the divers had to spend many hours in compression chambers that adjusted their bodies to normal, surface atmospheric pressures.

At a news conference, Carpenter described the ocean as a "much more hostile environment than space." He should know—he was one of the most successful of the Mercury Project space pilots.

The depths of the ocean have long intrigued curious men. Modern submarines enable seamen to live below the surface for weeks on end. But they do not dare leave the strong hulls of their craft.

Divers—those using heavy suits or the hardy ones who go down with only breathing apparatus—are limited as to both depth and duration.

That's where devices of the Sealab pattern can lead to a revolution in underwater activity.

The performance by the keenly-trained Scott Carpenter and the others who ate, slept and worked in the deep sea laboratory shows that properly-equipped divers can survive long periods submerged.

Through this experiment they have learned more efficient ways of combatting the pressures, the extreme cold and the isolation of a fish-like life.

They even trained a porpoise and a lady sea lion to help them out in running errands.

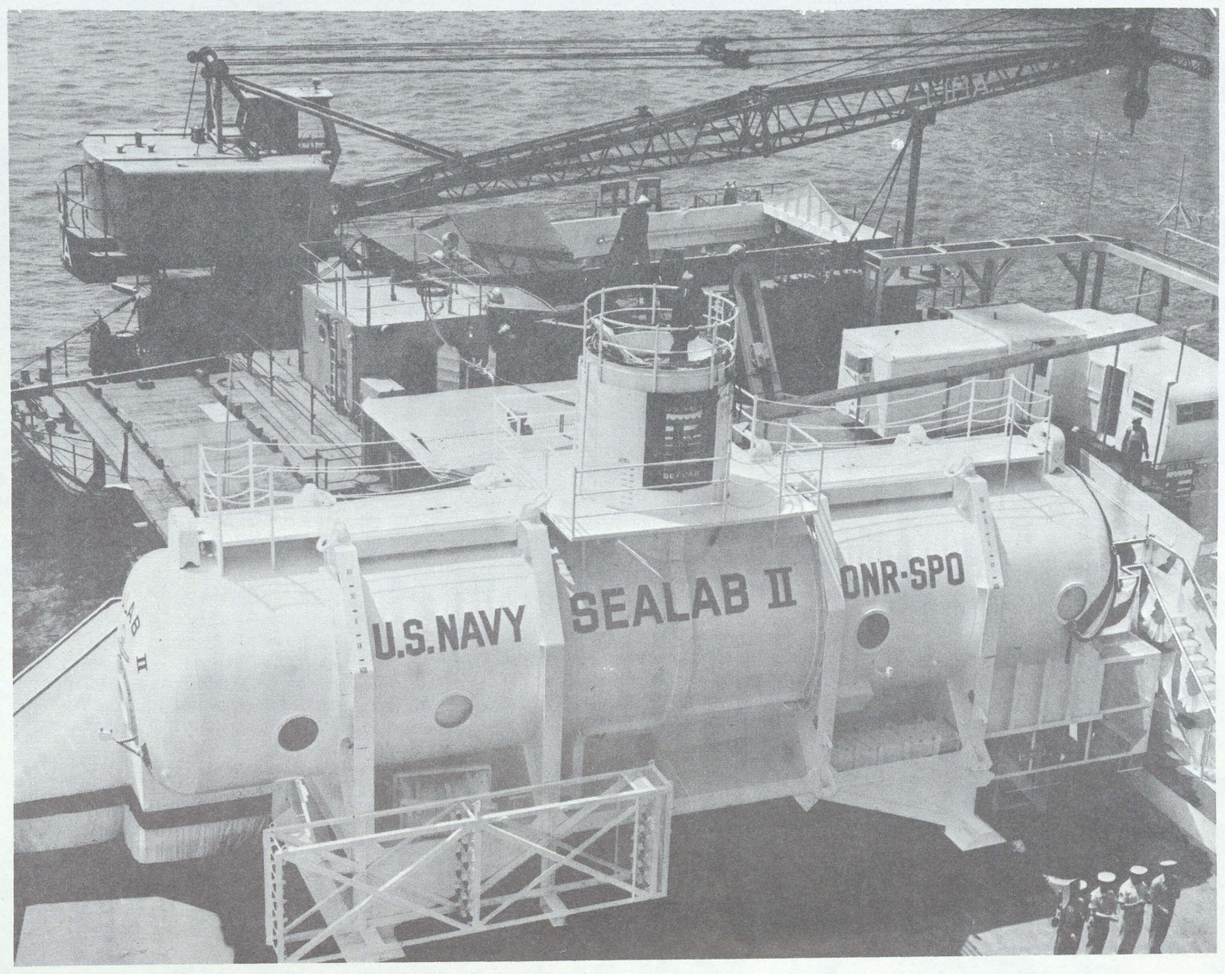
It's well known that the floor of the ocean covers a rich reserve of minerals—in addition to the petroleum already being pumped out in many areas.

Sealab 2 and its crew have hastened the arrival of the day when this reservoir of natural riches can be tapped.

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SEA LAB II

AT PRESS TIME AQUANATS DESCEND FOR MONTH'S STAY AT 210 FEET OFF LA JOLLA



SEALAB II, the second phase of the Navy's "Man-in-the-Sea" began in the middle of August. Working in the area around their undersea quarters, situated on the ocean bottom at a depth of 210 feet, one-half mile off La Jolla, California, the aquanauts will carry out experimental salvage techniques, engage in oceanographic and marine biological research, and undergo a series of physiological and human performance tests.

The undersea experiment is being conducted by the Office of Naval Research (ONR) in collaboration with the Navy's Special Projects Office as part of the Deep Submergence Systems Program. SEALAB-I was conducted last year by ONR 30 miles off Bermuda when four Navy divers lived and worked comfortably and safely at a depth of 193 feet for a period of 11 days.

An experimental salvage procedure will be used in the recovery of a Navy fighter aircraft to be sunk for this purpose. The aquanauts will use a new plastic foaming technique to attempt to float the aircraft to the surface. The procedure has been successful in the laboratory and in limited sea tests but has not yet undergone full-scale application testing at sea. Other salvage work which may be undertaken includes an attempt to use standard stud guns to attach lifting pad eyes to a piece of steel hull simulating a submarine and also to patch holes in the hull. The divers will attach experimental rubberized floatation bags to serve as pontoons to raise the hull. Other tasks under consideration are ore mining and construction of the underwater portion of an offshore oil drilling rig.

Marine biologists will work with marine life in a ten-foot square fish cage that will be placed on the ocean floor to provide an at-depth undersea "aquarium." A census of marine life in the area will be made and large fish will be given special physiological tests, including the taking of internal gas samples. Bioluminescence and biofluorescence of marine life will be studied, and plankton sampled.

Geologists will study the composition of the ocean bottom, especially the sediment. The scouring effect of sediment on mine cases will be observed and dyed sand will be used to trace the transport of sediment along the ocean bottom.

Two new systems for taking electrocardiograms of men swimming and working underwater will be tested. Using acoustic biotelemetry, the data will be transmitted to physiologists in the surface control station. Brief experimental (bounce) dives are planned to a depth of about 350 feet.

A special feature of the SEALAB II operation will be a newly designed undersea telemetry station contained in a concrete beehive structure about six feet in diameter and located about 100 feet from the habitat. Known as a Benthic Laboratory, it will serve as the "central switchboard" for communications and data sampling channels. It will provide four television channels which will make possible constant monitoring on shore of the aquanauts' activities both inside and outside their under house, 20 channels for audio communications and 120 data channels. The aquanauts will connect the Benthic Laboratory to the SEALAB habitat and perform initial check-out tests.

The Benthic Laboratory, designed and built by the Scripps

SEA LAB II *(Continued from Preceding Page)*

Institution of Oceanography, contains special manipulator arms for making its own repairs. If a component should become defective, the arms, operated by remote control from shore, will remove the component and replace it with a stowed spare part.

The aquanauts will also operate an undersea "weather station" to collect such data as the velocity of currents at the bottom, near the station and 30 feet from the bottom, temperature fluctuations in a 30-foot vertical line from the bottom, and variations in pressure caused by undersea waves and swells. The Benthic Laboratory and the weather station will remain in operation after completion of the SEALAB II program.

One of the major problems of the aquanauts while working in water with an average temperature of 50 degrees F. will be keeping warm. Although a few experimental thermally heated suits will be tested, the divers will generally wear the standard diving wet suits. It is planned to install near the working area a small emergency way station equipped with an isotope-radiation heating unit provided by the Atomic Energy Commission. The station, which will contain emergency breathing gas as well as the heater, will be large enough for one man.

The cold water as well as the increased pressure and saturated diving conditions limit the effectiveness with which men can perform various jobs in the undersea environment. Special human engineering tests have been devised for the aquanauts to test their capabilities under such conditions. Among the motor skills to be tested are strength capabilities, manipulative abilities, two-hand coordination and tactile sensitivity. Arithmetic performance and speech intelligibility tests will be conducted along with hearing and vision studies. Visibility in the area is expected to vary from zero to 60 feet.

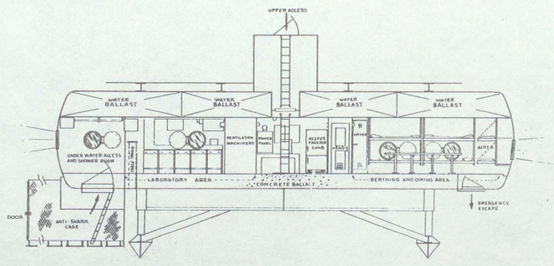
The SEALAB II undersea unit is essentially a non-propelled sea-going craft designed as a pressure vessel. It has positive surface and subsurface stability. Water ballast tanks are used to control positive and negative buoyancy.

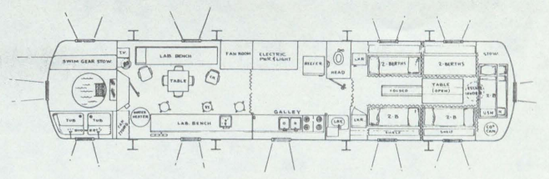
The living compartment, a 57-foot long cylinder 12 feet in diameter, is divided into a laboratory, galley and bunkroom. Eleven viewing ports are provided in the hull. Imbedded in the surface of the solid concrete deck is radiant heating cable which will maintain the interior temperature at 80-90 degrees F. Air conditioning equipment will maintain the humidity at 60 per cent. The 80 per cent helium atmosphere of SEALAB is a high conductor of heat with consequent high body heat loss. Four percent oxygen and sixteen percent nitrogen are the other gas components making up the atmosphere and gas mixture to be breathed by the aquanauts. Hot, fresh water showers and special heaters will be available to enable divers returning from the ocean to regain normal body temperatures.

The undersea habitat will be self-contained with respect to food and breathing gas for at least six weeks. Electric power and water will be provided by lines from shore. An emergency breathing gas supply and emergency electric power will be provided by an umbilical cable from the special catamaran surface support vessel. The cable will also contain a sampling hose to permit analysis of the habitat gas to be accomplished on the surface vessel. The catamaran will have administrative, laboratory, control and berthing space for project personnel and will be the staging vessel for the surface support diving team.

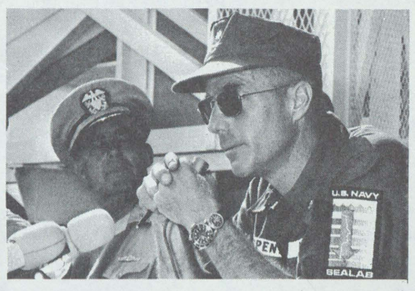
A special system for transporting the aquanauts between the surface and the SEALAB habitat has been devised. A personnel transport capsule (PTC), designed and built by the Dixie Manufacturing Co., Baltimore, Maryland, and also a standard diving bell will be used by the aquanauts to descend to the bottom. They will then swim about ten yards to the SEALAB and enter the habitat through an anti-shark cage and the access hatch on the bottom of SEALAB.

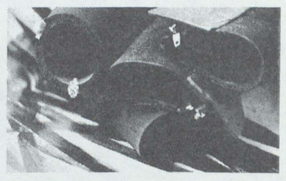
The aquanauts will return to the surface in the PTC under pressure. The PTC has special fittings so it can be mated to a large double-lock deck decompression chamber (DDC)

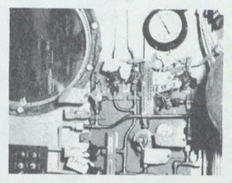








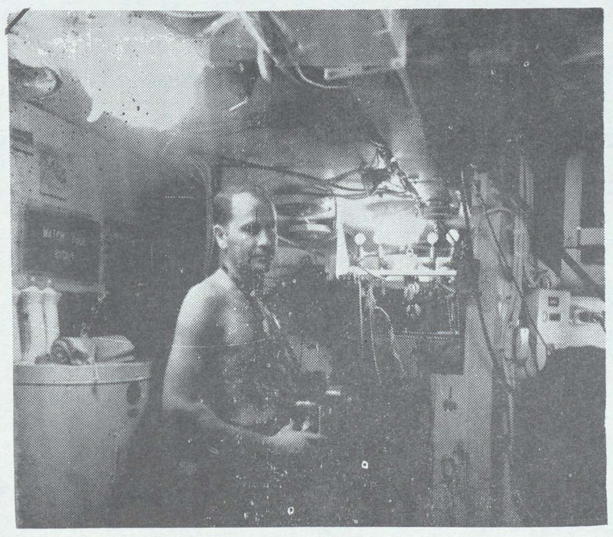




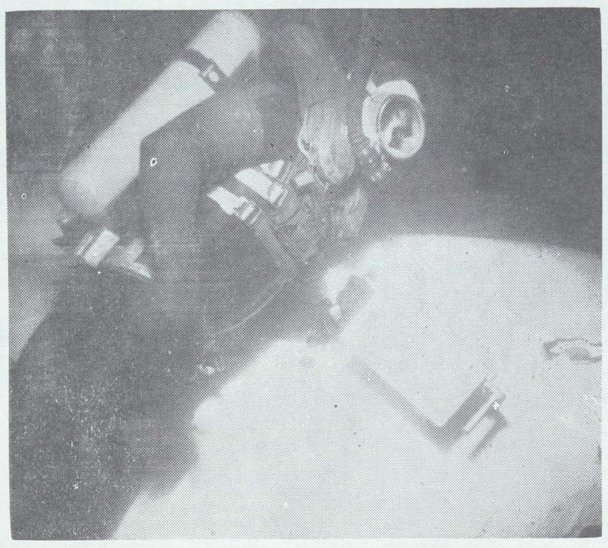
Sealab's first team of Aquanauts pose above. Super-thick wet suits team will use are shown with ¼" wet suit. Self-explanatory drawings at right show Sealab II's interior. Imposing array of instruments needed for vessel above right.

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NAVY NEWS - 52
3738-40 El Cojon Blvd. M
San Diego 5, Calif.
Circ. 10,000 OCT '65



Bill Bunton, shown here inside the Sealab II habitat, told of his experiences to Pat Polakowski, Editor NEL CALENDAR.



This photo by Bunton shows Chief Paul Wells, USN, 'foaming' the nose of an F85 aircraft. This process involves pumping liquid chemicals through a hose (held by Wells) from the Sealab II staging vessel. The chemicals foam and harden into a rigid buoyant material. The aircraft was sunk for this specific test. After foaming the craft, it was raised, under controlled conditions, to the surface.

"I'd Volunteer Again" Says Bill Bunton

by Pat Polakowski

I wanted to know what it was like to live and work under the sea.

So I picked up the telephone and dialed Bill Bunton at his underwater address, Sealab II.

And the result was an enthusiastic report from Bunton, a diver with NEL's Deep Submergence Program and a member of the last team of aquanauts involved with Sealab II's historic "Man-in-the-Sea" Program.

Bunton descended to the Sealab habitat, positioned 210 feet below the Pacific Ocean off the La Jolla coast, September 25 to conduct gorgonian sea fan (coral) studies for Dr. Eric Barham, Marine Environment Division. The NEL employee was handling all photography inside and outside the cylindrical house, which is designed to make undersea living possible. Bunton was the only civilian photographer assigned to Sealab II.

"I'm fine, but a bit tired," Bunton replied to an opening question. "We're working awfully hard — 16 hours a day. This isn't exactly an ideal place to live, but we're getting a lot accomplished," he continued.

"I've found gorgonian coral and have collected several samples at a depth of 270 feet on the canyon wall. I've sent samples topside," he reported.

The Sealab II habitat was emplaced 200 feet from the wall of the La Jolla Canyon, half a mile off the coast, and Bunton was permitted, because of his diving ability, to go out to that point and down the wall to a depth of 300 feet. Time permitted for sorties was 50 minutes. Bunton said he was outside his current home once — maybe twice a day.

"My pictures were sent topside with good results. The camera is functioning well," Bunton reported.

The camera to which he refered is a one-of-a-kind instrument, built at the Oceanographic Engineering Corporation of Del Mar. It has been designed to fulfill a number of photography requirements desired by NEL employees associated with underwater study.

"It's very cold down here in the water," Bunton reported. "And our habitat is hot — probably 90 degrees. The humidity is also high.

Bunton envisions a definite future for undersea habitats.



Aquanaut Bill Meeks pauses near gorgonian coral in the depths of La Jolla Canyon. This underwater photo was taken by NEL's Bill Bunton.

NAVY TIMES (Weekend) Oct 1965

Sealab II Aquanauts Happy With New Heated Wet Suits

SAN DIEGO—A Navy aquanaut prepares to leave his undersea home—Sealab II—205 feet below the surface of the Pacfic. His lemon-yellow wet suit glistens in the tungsten light of the undersea laboratory. He slips out of the always open hatch, and slides into the dark, cold water of the sea around him.

One of his major concerns is the cold water he must swim and work in. But this aquanaut is wearing a newly-developed wet suit that should solve this problem.

The U.S. Rubber Co. has developed for the Navy, the first electrically heated wet suit for an underwater diver. The suit, designed to both conserve and produce heat, is being evaluated by aquanauts in the Navy's Sealab II project, taking place on a ledge of Scripps Canyon off La Jolla, Calif.

* * *

SEALAB II is the Navy's project to prove that man can live and perform useful work under hazardous conditions, high pressure, and living in an artificial atmosphere. They chose this year's site for three reasons: Cold water, poor visibility and a good surface for the underwater habitat to be placed at 200-plus feet.

The new wet suit was to meet three requirements. The suit must be able to function in 240 feet of water; must be able to keep a man warm in 40-degree water, and be operational for at least a three-hour period.

Medical Corps Capt. Ed. Beckman and his associates at the Naval Medical Research Institute used diving experience, physiological requirements of divers and laboratory measurements performed at NMRI to determine the insulation and heating necessary to meet the requirements.

* * *

IN MAY 1965 a contract was let by the Navy to the U.S. Rubber Co. Research Center in Wayne, N.J. for research, prototype design and fabrication, and field engineering of the suits at Sealab II site.

The contract called for delivery Aug. 31, 1965. This was condensing normal development time of one year into four months, yet the first suits were delivered on August 6, in time to accompany the first team of aquanauts to their undersea home.

The suit is a complete thermal protective system, and in addition to the heat produced by resistance wires powered by battery pack or AC umbilical cable, insulates the swimmer with a layer of carbon dioxide and has options in the control box so that the swimmer may elect to only warm his hands and feet or his whole body, either at one-quarter or full power, depending on water conditions and the work to be done.

* * *

AQUANAUTS IN the Sealab project are happy with the performance of the suit. Fred Johler, senior chief engineman, who tested a suit with the first team, told Hank Frey, project leader-diver for U.S. Rubber, "The suit kept me very warm. It is the only suit I used that I could stay out in a long time and feel comfortable. I like that suit very much. In the other suits you get cold after a certain period, but in this suit I felt very comfortable."



NEW WET SUIT gets a workout in a training tank on aquanaut Bill Tolbert. The battery pack which provides the heat is worn around the waist. Tolbert carries his mitts and can slip his hands into them whenever necessary.

Bill Tolbert, oceanographer from the Mine Defense Laboratory, Panama City, Fla., and two members of the second team of aquanauts, had this comment: "This is really something. It's the only suit I'm going to wear down here, because I've got a lot of work to do, and it'll let me do that. The battery pack is great for mobility."

Design of the electrical systems and hardware for the suit was done at the U.S. Rubber research center in Wayne, N.J. Fabrication of the prototype suits, tailor-made for the eight aquanauts picked for testing, was performed at the U.S. Rubber clothing plant in Washington, Ind.

Each suit consists of a hooded parka, pants, mitts and boots. The innermost layer of the suit is made of stretch nylon for ease of putting on and taking off. Velcro fasteners are used on the basic suit for smooth joining and ease of movement. A sandwich of rubber skin, sponge rubber and outer rubber has wires embedded in it to provide warmth. Gas and electrical fittings are quick-disconnect and make for ease in use.

* * *

SILVER ZINC batteries, carried in a portable pack of eight units, provide 350 watts for three hours, and have been designed and tested for pressure and performance to depths of 640 feet. The batteries were specially developed for this project. The suit can also use a 120-foot electric cable as a power source. Aquanauts in Sealab II use this method when swimming with the hookah umbilical re-breather close to their undersea habitat.

An outer suit is worn with the heated wet suit. Bright yellow in color for good visibility, it also protects the inner suit from snags, abrasions, cuts and punctures.

Five of the ten aquanauts are testing the new suit. They are oceanographers Bill Tolbert and George Dowling; equipment specialist Wally Jenkins; Comdr. Scott Carpenter, team leader, and Bob Barth, chief quartermaster. Ken Conda, torpedoman's mate first, can also wear Tolbert's suit, so one is getting at least double usage.

SAN DIEGO, CALIFORNIA
Fri., Oct. 1, 1965

Experimental Salvage Test Under Way

Sealab II aquanauts began underwater salvage experiments yesterday which may open the way for the recovery of sunken ships.

A simulated submarine hull, a four-by-six-foot curved section of heavy steel, was lowered yesterday.

Today aquanauts were to attempt to determine if such a hull can be patched underwater. A steel plate and stud guns were to be lowered for the patching attempt. In addition, aquanauts were to attempt to affix lifting hooks to the patches.

If the patching is successful and the hooks prove efficient, sunken ships may be recovered through the use of the liquid-plastic foam with which the aquanauts are also experimenting.

Experiments with the foam continued yesterday with the filling of six 55-gallon drums. Sealab II officials explained the foam immediately hardens and forces out water, providing positive buoyancy. The drums were tethered to the ocean floor and will be released over the next few days.

In other developments, Sealab officials laid plans to test a newly developed method of clearing the water around Sealab so the aquanauts will have a better view.

Dr. Harry Hockman, Dr. Ray Smith and Jack Williams, of the Navy Civil Engineering Laboratory at Pt. Hueneme, brought to the mother ship Berkone a chemical which has been laboratory tested, but not under actual sea conditions.

The chemical, a flocculent, is to be mixed into the water around Sealab. It is supposed to combine with the silt that gets stirred up and form into a solid which looks like snowflakes, then sink to the bottom, carrying the silt with it.

Seattle, Wash.
Times
OCT 1 1965

Aquanauts, Oceanauts Converse

LA JOLLA, Calif., Oct. 1 (UPI)—Two groups of men submerged underwater 8,000 miles apart held a historic 16-minute telephone conversation today.

The conversation was between aquanauts on the Sealab 2, 205 feet beneath the surface of the Pacific Ocean off La Joll and the "oceanauts" in Jacques Cousteau's diving bathyscaph who have been living under water in Monte Carlo Harbor since September 17 at a depth of 330 feet.

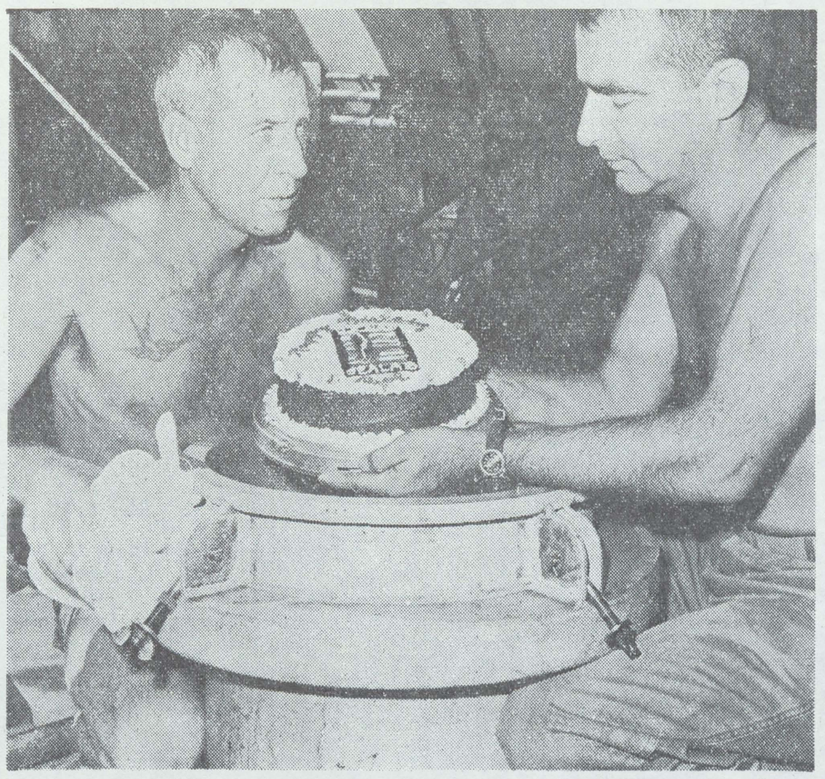
It was the first telephone conversation in history between men in two underwater habitats.

The aquanauts nd oceanauts had some difficulty understanding one another because the helium atmosphere in which they live made their voices sound like "Ronald Duck", according to one observer. At such depths the mn breathe helium because oxygen would become toxic.

Also participating in the three-way-conversation were Capt George Bond, a Sealab official, and M. Scott Carpenter, astronaut - aquanaut, who were on the surface here. Carpenter emerged last week-end from 30 consecutive days in the Sealab.

Most of the talking was done by Rick Gregg, aquanaut, who speaks French, Dr. Bond, Carpenter, Phillipe Costeau, son of Jacques, and Andre Leban, team leader of the oceanauts, who speaks English.

SAN DIEGO
EVENING TRIBUNE
OCT 1 1965



FITTING DESSERT—This chocolate cake was served for dessert in Sealab II yesterday after Team 3 aquanauts finished a raw fish dinner. The cake, a birthday present for Bob Sheats, team leader, was baked by Mrs. Jay D. Skidmore, wife of one of the aquanauts in Sealab during the first 15 days. Sheats was 50 yesterday. Preparing the cake for shipment to the ocean floor are Earl Murray, left, and Skidmore.

AQUANAUT TURNS 50

Raw Fish, Cake Mark a Birthday

Aquanaut team leader Bob Sheats celebrated his 50th birthday yesterday 205 feet under the sea with a raw fish dinner topped off with chocolate cake.

The fish came from the waters around Sealab where foraging aquanauts have been getting a good portion of their food for the last few days and the cake came from Mrs. Jay D. Skidmore, wife of one of the aquanauts in Sealab the first 15 days.

Sheats, who entered the Navy in 1935 and has been a diver for 27 years, entered Sealab Saturday to take over as team leader when Cdr. Scott Carpenter came to the surface.

The birthday was the second in Sealab. Lt. Bob Sonnenburg, a San Diego Navy doctor, celebrated his while the first team was in Sealab. Sonnenburg is also a member of the current team.

The cake was sent down to Sealab yesterday morning by Skidmore and Earl Murray. Murray, a diver from Scripps Institution of Oceanography, was also a member of the first team.

Sheats and his crew on the bottom are engaged in tests of salvage operations which Navy divers in an operational Sealab might be asked to perform.

His men also decided to see how much food they can procure for themselves from their underwater environment. They have been spearing fish for food, and collecting crabs and other underwater delicacies.

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3d Team of Aquanauts Takes Over in Sealab

NAVY TIMES 10/6/65

LA JOLLA, Calif.—Astronaut M. Scott Carpenter and nine fellow aquanauts came up 205 feet from Sealab 2 so smoothly that part way through the ascent Carpenter asked whether is had started.

Carpenter had completed 29 days and 14 hours in the ocean-bottom laboratory.

His associates in team No. 2 had been below 15 days, like team No. 1 before them.

A third team of 10 men is completing the Navy's 45-day experiment in underwater living and working.

Three members of team No. 3 entered the 12-by-58 foot steel capsule a day earlier. The others followed on schedule.

Carpenter and his teammates were hoisted in a personnel-transfer capsule to the deck of the staging vessel Berkone 1000 yards off the coast.

A crane on the vessel had hoisted the transfer capsule 31 feet from the ocean floor when Carpenter asked by telephone whether the ascent had started. Capt. George Bond, in charge of the project's investigations, assured him it had. Carpenter said he couldn't feel any movement.

Sealab 2's third team includes Lt. Robert Sonnenburg, a medical corpsman who was a member of the first team.

In 15 days, a spokesman said, the Navy thus will have comparative physiological data on two men who have lived and worked in the ocean depths for 30 days—one of them with a 15-day interval on the surface.

Six Frenchmen remained 15 days at a depth of 60 feet in a chamber in the Mediterranean about 18 months ago. Sealab 1's team stayed at 192 feet off Bermuda for 11 days last year. These, the Navy spokesman said, were the longest previous experiments in underwater living.

From
HERALD TRIBUNE
New York, N. Y.
OCT 2 1965

Housewives Offer Aquanauts Help On Pancakes

LA JOLLA, Calif. (AP).

The housewives of the United States are trying to help the aquanauts of the Navy's Sealab 2 overcome their worst catastrophe to date: their pancakes.

In the underwater laboratory, where the air is mostly helium and atmospheric pressure is seven times that at the surface, the aquanauts' flapjacks turned into disaster: scorched on the outside, gummy on the inside.

After the aquanauts reported last week that their pancakes failed, women began to volunteer culinary advice.

"We have been flooded with letters from housewives from coast to coast," a Sealab spokesman reported. "They have all recommended pancake cooking procedures guaranteed to help the divers."

Among the suggestions:

Use a greaseless cooking pan. Change the ingredients—a pinch more of this, a bit less of that. Lower the heat. Raise the heat. Try frozen batter.

Divers Hold 8,000-Mile Phone Talk

LA JOLLA, Calif. —(UPI)— Two groups of divers submerged 8,000 miles apart held a historic 16-minute telephone conversation Friday.

The conversation was between Sealab-2 aquanauts 205 feet beneath the surface of the Pacific Ocean off the California caost and the "oceanauts" in Jacques Cousteau's bathyscaph who have been living underwater in Monte Carlo harbor since Sept. 17 at a depth of 330 feet.

It was the first telephone conversation in history between two underwater habitats.

* * *

THE AQUANAUTS and oceanauts had some difficulty understanding each other because the helium atmosphere in which they live made their voices squeaky.

Also participating in the three-way conversation were Sealab official Capt. George Bond and astronaut-aquanaut M. Scott Carpenter, who were on the surface here. Carpenter emerged last weekend from 30 days aboard the Sealab.

Most of the talking was done by aquanaut Rick Gregg, who speaks French, Dr. Bond, Carpenter, Phillipe Cousteau, son of Jacques, and Andre Leban, team leader of the oceanauts, who speaks English.

At one point Carpenter asked, "Are you speaking French or English?"

An observer said much of the conversation sounded like it came from an elementary French class.

The aquanauts and oceanauts congratulated each other and wished each other good luck.

From OCT 2 1965
FREE PRESS
Detroit, Mich.

From OCT 2 1965

Los Angeles, Calif.
Times
(Cir. D. 812,147 Sun. 1,149,295)

OCT 2 1965

U.S., French Aquanauts Hold Talks

First Underwater Call Between Crews 8,000 Miles Apart

LA JOLLA—French and American aquanauts—submerged and more than 8,000 miles apart—held a historic 15-minute telephone conversation Friday.

It was the first telephone conversation in history between men in two underwater habitats.

Jacques Cousteau, the famed French underseas explorer, placed the call from Conshelf III, a bathyscaph 330 feet under water off the coast of Cape Ferrat on the Mediterranean.

Answering the call were Navy Capt. George Bond and astro-aquanaut Scott Carpenter in a communications center at the Scripps Institution of Oceanography.

The Americans on this end of the conversation then connected the Frenchmen to Rick Grigg, a Scripps student oceanographer who is 205 feet under water in Sealab II with nine other U.S. aquanauts who are spending 15 days near the ocean floor off La Jolla.

Conversations were carried on in both English and French.

The aquanauts, observers said, did not exchange scientific observations but merely chatted and congratulated each other.

From
TRIBUNE Chicago, ILL.
OCT 2 - 1965

Phones Link Sealab Crews of 2 Nations

La Jolla, Cal., Oct. 1 (UPI) — Two groups of men submerged underwater 8,000 miles apart today held a 16-minute telephone conversation.

The conversation was between aquanauts in the Sealab which is 2,205 feet beneath the surface of the Pacific ocean off the coast here, and the oceanauts in Jacques Cousteau's bathyscaph, who have been living underwater in Monte Carlo harbor since Sept. 17 at a depth of 330 feet.

It was the first telephone conversation in history between men in two underwater habitats.

Difficult to Understand

The aquanauts and oceanauts had some difficulty understanding one another because the concentration of helium in the atmosphere they breathe made their voices sound like Donald Duck, according to one observer.

Also participating in the three-way conversation were two Sealab officials, Capt. George Bond and Astronaut-Aquanaut M. Scott Carpenter, who were on the surface here. Carpenter emerged last weekend after 30 consecutive days aboard the Sealab.

Most of the talking was done by Aquanaut Rick Gregg, who speaks French, Dr. Bond, Carpenter, Philippe Coustreau, son of Jacques, and Andre Leban, team leader of the oceanauts, who speaks English.

Little Shop Talk

At one point Carpenter asked, "Are you speaking French or English?"

An observer said much of the conversation sounded like an elementary French class.

The aquanauts and oceanauts congratulated each other and wished each other good luck.

Officials said the underwater teams did not exchange scientific information but were just making conversation.

Carroll (Ia.) Daily Times Herald
SATURDAY, OCTOBER 2, 1965

Hostile Sea

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M. Scott Carpenter, the combination astronaut and aquanaut, returned from his 29-day sojourn on the ocean floor in Sealab 2 with the view that the sea is a more hostile enviroment than space. Hostile, that is, to man, who can survive at great depths only in a capsule filled with atmosphere and girded against pressure.

And yet Carpenter also said his stay down there, for a period more than twice as long as any other man has experienced, had persuaded him that "man can stay under water indefinitely." This does not contradict his views on the hostility of the ocean as a human environment; it merely suggests that man, as is his wont, can also adapt himself even to such unfavorable conditions.

This is of more than academic importance. Increasingly, man is turning to the sea as a future of food and mineral wealth. To get at it, he must learn to survive and work in an environment for which nature did not fit him. That is the long-range import of the Sealab 2 experiments and of others in the offing.

Scientists 8,000 Miles Apart --Under Water--Talk It Up

LA JOLLA, Calif. (UPI)—Two groups of men submerged underwater 8,000 miles apart held a historic 16-minute telephone conversation Friday.

The conversation was between aquanauts in the Sealab 2,205 feet beneath the surface of the Pacific Ocean off the coast here, and the "oceanauts" in Jacques Cousteau's diving bathyscaph who have been living underwater in Monte Carlo Harbor since Sept. 17 at a depth of 330 feet.

The aquanauts and oceanauts had some difficulty understanding one another because the helium atmosphere in which they live made their voices sound like "Donald Duck" according to one observer.

Also participating in the three-way conversation were Sealab official Capt. George Bond and astronaut-aquanaut M. Scott Carpenter, who were on the surface here. Carpenter emerged last weekend from 30 consecutive days aboard the Sealab.

The aquanauts and oceanauts congratulated each other and wished each other good luck. Officials said the two underwater teams did not exchange scientific information but were just making conversation.

SAN DIEGO
EVENING TRIBUNE
OCT 1 1965

Pain in Mornings Puzzles Doctors

Carbon Monoxide Detected In Atmosphere of Sealab

By LEO BOWLER
EVENING TRIBUNE Science Writer

Headaches which strike aquanauts as they awaken in the morning and a small amount of carbon monoxide in the Sealab atmosphere have developed into something of a medical mystery.

Dr. George Bond, principal investigator for the Sealab project, ordered remedial measures for the carbon monoxide, but he says he doesn't think that it is the cause of the headaches.

Carbon monoxide is a deadly gas when present in sufficient quantities, but the amount found in Sealab is well below the danger level, Bond says.

Nevertheless, Sealab officials are puzzled by its presence, because no activity which would produce the gas is allowed in the closed atmosphere of the undersea residence.

Bond said in an interview that there are several possible sources

Smoking Suspected

One is the aquanauts themselves, or at least the portion of them who smoked before going into Sealab. Bond explained that smokers carry carbon monoxide in their bodies and the gas would be released as the men lived in Sealab.

Then it would accumulate as new smoker-divers went down to Sealab to replace teams coming out.

Another source is burned toast, and there is evidence, Bond said, that some was burned during the experiment.

A third is carbon monoxide which was in the air originally in Sealab and that pumped in on several occasions to resupply some of the gases in the helium-nitrogen-oxygen mixture the aquanauts breathe.

The carbon monoxide from these sources would tend to concentrate as other impurities are removed, Bond said.

Gas in Blood

Nearly continuous monitoring of the aquanauts' blood has shown no dangerous increase in the gas in their bodies.

"The level of the gas in their blood is less than what you find in smokers on the surface," Bond said. "So I don't think it is causing the headaches."

The headaches occur only in the morning when the aquanauts arise and they go away as soon as the men are up and around. They do not strike the same men all the time, and not all aquanauts have them each morning.

Incidence of ear infections have dropped markedly in the second and third teams, Bond said.

Nine of the 10 men in the first team suffered from ear infections, but only two men in the second team reported them and only one man in Team 3 has had trouble with his ears so far.

From
STAR
Kansas City, Mo.

French and U. S. Aquanauts Communicate

La Jolla, Calif. (AP)—Two oceans, a long, long telephone cable and a language barrier separate teams of American and French aquanauts exploring ocean bottoms.

In their first communication with each other by telephone yesterday, the language barrier proved irksome.

"Well, it was something," said Rick Grigg, spokesman for the American team. "At first I couldn't understand because he was speaking English and I was talking French. But after we both spoke French, then it was much better."

The French team is in Conshelf 3, an undersea capsule resting on the floor of the Mediterranean sea at a depth of 330 feet, near Cape Ferrat, France.

The U. S. Navy's aquanauts are in Sealab 2 at a depth of 205 feet off La Jolla.

American officials said some of the confusion in the conversation was caused by the language problem, the rest was caused by the artificial atmosphere the teams live in, which distorts voices.

Information exchanged between the two teams included observations on underwater visibility, undersea life observed and mutual congratulations on the success of the two ventures.

The French team was in the 10th day of a 14-day experiment. The Sealab 2 experiment began August 28 and ends October 10.

Grigg talked to Phillipe Cousteau and Andre Laban of the French crew.

BACK STAGE - 2
155 West 46th Street
New York 36, N.Y. Circ. 6,903

OCT 1 '65

NAVY "SEALAB 2" CHOSE NEW SeAQUArtz FOR ITS PHOTOGRAPHY

Sealab 2, the Navy's most recent and spectacular undersea project, depended exclusively on the Birns & Sawyer SeAQUArtz Mark III Underwater Light to furnish illumination for all underwater photography done outside the submerged laboratory. The units also were used by the aquanauts for their reconnaisance forays around the area.

The 45-day experiment, 205 feet beneath the ocean surface offshore from LaJolla, California, took six SeAQUArtz lights aboard, although only half of them could be used at one time since the staging vessel above was equipped with only three power lines for this purpose.

Developed and manufactured by Birns & Sawyer, Hollywood, as a result of continued research into the needs and problems of undersea illumination, SeAQUArtz Mark III is described as a superb all-purpose light for work or photography, and has been safety-tested to depths of 3,000 feet.

Available for either 120-volt or 220/440-volt AC/DC operation, the SeAQUArtz also may be obtained in 30-volt mode for battery power. Full details and specifications are furnished upon request by the manufacturer, Birns & Sawyer Cine Equipment Co., 6424 Santa Monica Blvd., Hollywood, Calif. 90038.

San Francisco, Calif.
Examiner
(Cir. D. 289,469 - S. 427,093)

OCT 2 1965

US, French Aquanauts Have Chat

LA JOLLA—(AP)—Despite two oceans between them and a language barrier, French and American teams of aquanauts talked to each other on the phone from the bottom of the sea.

In their first communication with each other yesterday, the language barrier proved irksome.

"Well, it was something," said Rick Grigg, spokesman for the American team. "At first I couldn't understand because he was speaking English, and I was talking French.

"But after we both spoke French, then it was much better."

The French team is in Conshelf 3, an undersea capsule resting on the floor of the Mediterranean at a depth of 330 feet, near Cape Ferrat, France.

The U.S. Navy's aquanauts are in Sealab 2 at a depth of 205 feet off La Jolla.

Aircraft Brought To Surface

By JUDITH MORGAN

The fuselage of a Navy jet fighter plane was brought to the surface above SeaLab II in five minutes last night after 48 hours underwater in a salvage experiment by Team 3 aquanauts.

SeaLab officials said some loss of buoyancy occurred in the foam-filled aircraft during the two days it was tethered 20 feet above the ocean floor.

One purpose of the experiment was to see what effect the action of sea water would have on the foam which adds buoyancy to sunken objects.

Two 55-gallon drums, part of a salvage experiment, will be surfaced today and tomorrow in a controlled ascent of 50 feet per minute. The drums also have been made buoyant by foam.

TALK TO FRENCHMEN

The aquanauts yesterday talked to French oceanauts taking part in Jacques Cousteau's underwater experiment Conshelf III 330 feet below the Mediterreanean Sea near Villefranche.

Capt. Cousteau, whose son, Phillipe, is one of the six French oceanauts whose experiment will end Wednesday, placed the telephone call at 9 a.m. San Diego time to captain George Bond, SeaLab's principal investigator.

Bond took the call in benthic control on the campus of Scripps Institution of Oceanography. The French oceanauts switched to a neon-oxygen atmosphere during the phone conversation but the SeaLab divers were breathing a helium-oxygen mixture.

CARPENTER SPEAKS

Cmdr. Scott Carpenter spoke to Phillipe Cousteau, a friend of his, and Rick Grigg, a member of Team 3 and a student at Scripps, spoke to various oceanauts in French.

New York 38, N. Y.
From OCT 2 1965
INQUIRER
Philadelphia, Pa.

Underwater Call Covers 8000 Miles

LA JOLLA, Calif., Oct. 1 (UPI).—Two groups of men submerged underwater 8000 miles apart held a historic 16-minute telephone conversation Friday.

The conversation was between aquanauts on the Sealab 2 which is 205 feet beneath the surface of the Pacific Ocean off the coast here, and the "oceanauts" in Jacques Cousteau's diving bathyscaph who have been living underwater in Monte Carlo Harbor since Sept. 17 at a depth of 330 feet.

It was the first telephone conversation in history between men in two underwater habitats.

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EVENING TRIBUNE SAN DIEGO, CALIFORNIA Monday, Oct. 4, 1965 Y A-7

ONE HIT, ONE MISS

'Trained' Sea Lion Eludes Paint Gun; 2nd Enters Sealab

By LEO BOWLER
EVENING TRIBUNE Science Writer

Scientists chalked up one apparent success and one failure in their weekend dealings with sea lions at the Sealab II site off La Jolla.

They failed yesterday in an attempt to paint one seal so they could tell it from its neighbors, but they scored a success of sorts when a sea lion entered Sealab, breathed the atmosphere inside, and apparently survived.

Mike Greenwood, a Sealab psychologist, and some crewmen from the Sealab mother ship Berkone, embarked on the painting project in a small outboard-powered boat.

Identification Is Aim

Greenwood was armed with a spray can of paint. He hoped to get close enough to Sam, the female he had trained earlier to answer the call of an underwater buzzer, then squirt her with the paint.

The purpose was to mark her before an attempt to call her to Sealab was made so that aquanauts could distinguish her from other sea lions which visit the undersea residence.

Sam eluded all attempts to spray her and Greenwood gave up, at least for the time being.

The question of whether a sea lion could survive the Sealab atmosphere may have been answered by an animal which surfaced inside Sealab, took a breath, and left.

Embolism a Problem

The atmosphere has no harmful gases but it is at 200 pounds per square inch pressure. If the animal swam to the surface with the full breath in its lungs, the gas would expand as it neared the surface and tear the lung tissue — a condition divers call embolism.

Submariners trained in escaping from subs on the bottom are told to exhale all the way to the surface to avoid embolism. Whether an animal would do this has been questioned.

Sealab officials have alerted all hands to keep an eye out for a disabled sea lion which might be suffering from embolism, but so far none has been found.

A new supply of buzzers has been found to replace one lost last week, so Greenwood still hopes to call Sam down to Sealab and get her to enter and breathe the atmosphere. If the sea lion makes the trip, Greenwood hopes to call her to the surface again to see if there are any ill effects from breathing the Sealab atmosphere.

Aquanaut Stung

Aquanaut Rick Grigg, a student from Scripps Institution of Oceanography, has recovered from scorpion fish stings he received yesterday while swimming outside Sealab.

From OCT 3 - 1965
INQUIRER
Philadelphia, Pa.

Sniffs Harmful Helium

Sea Lion Visits Sealab

LA JOLLA, Calif., Oct. 2 (AP). SEALAB 2—aquanauts had a visitor Saturday: A sea lion popped in on them. It might have been a fatal mistake, scientists said.

Curious sea lions have been peering in the windows of the underwater laboratory for weeks. One, dubbed Samantha, has been a constant visitor.

Aquanauts think it was Samantha which Saturday raised its head above the surface of the water in the Sealab entry hatch, took a breath of the air inside and then swam away.

No door is needed on the hatch because the atmosphere inside—mostly helium gas—is maintained at seven times the pressure of the surface, enough to keep the water from coming in. Due to pressure factor, scientists are interested in seeing what happens to Samantha.

* * *

THE animal descended to the Sealab, at 205 feet below the surface, with its lungs full of air at sea-level pressure.

As a result of breathing the high-pressure atmosphere in the capsule, the sea lion would have had to expel air from its lungs instinctively as it ascended to the surface.

If it did not, the lungs could have overexpanded and the animal would have died of an embolism, or air in the blood vessels, the Navy said.

Divers are taught to release high-pressure air during emergency ascent but it is not known if an animal will do it.

If animals are capable of mastering the technique, then use of them as helpers in underwater living projects can be expanded greatly.

EVENING TRIBUNE SAN DIEGO, CALIFORNIA Monday, Oct. 4, 1965 Y A-7

ONE HIT, ONE MISS

'Trained' Sea Lion Eludes Paint Gun; 2nd Enters Sealab

By LEO BOWLER
EVENING TRIBUNE Science Writer

Scientists chalked up one apparent success and one failure in their weekend dealings with sea lions at the Sealab II site off La Jolla.

They failed yesterday in an attempt to paint one seal so they could tell it from its neighbors, but they scored a success of sorts when a sea lion entered Sealab, breathed the atmosphere inside, and apparently survived.

Mike Greenwood, a Sealab psychologist, and some crewmen from the Sealab mother ship Berkone, embarked on the painting project in a small outboard-powered boat.

Identification Is Aim

Greenwood was armed with a spray can of paint. He hoped to get close enough to Sam, the female he had trained earlier to answer the call of an underwater buzzer, then squirt her with the paint.

The purpose was to mark her before an attempt to call her to Sealab was made so that aquanauts could distinguish her from other sea lions which visit the undersea residence.

Sam eluded all attempts to spray her and Greenwood gave up, at least for the time being.

The question of whether a sea lion could survive the Sealab atmosphere may have been answered by an animal which surfaced inside Sealab, took a breath, and left.

Embolism a Problem

The atmosphere has no harmful gases but it is at 200 pounds per square inch pressure. If the animal swam to the surface with the full breath in its lungs, the gas would expand as it neared the surface and tear the lung tissue — a condition divers call embolism.

Submariners trained in escaping from subs on the bottom are told to exhale all the way to the surface to avoid embolism. Whether an animal would do this has been questioned.

Sealab officials have alerted all hands to keep an eye out for a disabled sea lion which might be suffering from embolism, but so far none has been found.

A new supply of buzzers has been found to replace one lost last week, so Greenwood still hopes to call Sam down to Sealab and get her to enter and breathe the atmosphere. If the sea lion makes the trip, Greenwood hopes to call her to the surface again to see if there are any ill effects from breathing the Sealab atmosphere.

Aquanaut Stung

Aquanaut Rick Grigg, a student from Scripps Institution of Oceanography, has recovered from scorpion fish stings he received yesterday while swimming outside Sealab.

Second Aquanaut Stung at La Jolla by Scorpion Fish

LA JOLLA (AP)—A scorpion fish struck again Sunday at Sealab 2, stinging aquanaut Rick Grigg three times on the hand and once on the foot.

Although they were the worst stings received by an aquanaut since the underwater experiment began Aug. 28, Grigg, 28, of La Jolla, was reported in good condition.

Astronaut - aquanaut M. Scott Carpenter, was stung earlier by one of the poisonous fish. The sting causes pain and swelling.

Think Sea Lion Visitor Survived Whiff of Helium

LA JOLLA, Calif. (AP) — A curious sea lion apparently has survived her brief whiff of the high-pressure, helium-charged atmosphere in Sealab 2, a navy spokesman said Monday.

The visitor appeared Saturday. Aquanauts were routed from their bunks by a strange barking.

The sea lion, dubbed Samantha, had poked its head through the capsule's entry hatch. Aquanauts grabbed their cameras but the flashbulbs startled her and she withdrew.

The capsule hatch is left open to the sea because the atmosphere inside — 80 percent helium, 16 percent nitrogen and 4 percent oxygen — is maintained at seven times the pressure of the surface, sufficient to keep the water from rushing into the capsule.

Hunt Her

Navy scientists feared that as the sea lion later ascended the 205 feet to the surface, its lungs would expand and the mammal would die of embolism — air in the blood vessels.

A deathwatch was established by surfers and lifeguards from Coronado to Huntington Beach—70 miles north of the project.

But no sea lions washed ashore, the spokesman said—indicating Samantha instinctively exhaled the fumes in her ascent.

Aquanauts plan to buzz for Samantha, who has responded to earlier buzzer calls.

Sunday, navy scientists spray-painted several of the six sea lions that play near the project's surface vessel—anchored about 4,000 feet offshore.

To Keep Them Out

But Capt. George Bond, project supervisor, has ordered that future visiting sea lions be discouraged from entering the capsule.

Bond said aquanaut Rich Grigg, 28, of La Jolla has been returned to full duty after being stung four times Sunday by a scorpion fish while he was working near the capsule without gloves or boots.

He was given a pain-killing drug and anti-histamines by a fellow aquanaut and five hours later was walking about the underwater laboratory.

He and the nine other members of the third team are due to surface Sunday—at the end of the last 15-day phase of the 45-day experiment.

Cedar Rapids (Ia.) Gazette
MONDAY, OCTOBER 4, 1965

Mailmen Fete Sleek Porpoise

ST. LOUIS, Mo. (AP)— A seagoing mail carrier — a porpoise named Tuffy — has been named an honorary member of the St. Louis Letter Carriers Union.

Gene C. Hacker, secretary of Branch 343 of the National Association of Letter Carriers, says he has sent Tuffy a dues card and lapel pin with instructions to "wear it with pride, for you are now a member of one of the greatest organizations in the world."

Tuffy's duties include delivering mail to aquanauts in the U.S. Navy's underwater living project Sealab near La Jolla, Calif.

ELECTRONIC NEWS - 72
7 East 12th Street W
New York, N.Y. 10003
Circ. 47,747

OCT 4 '65

Most Sea Lab II Equipment Was Developed for 1st Test

By ANNE MITCHELL

PANAMA CITY, Fla.—Much of the electronic equipment aboard the underwater experimental laboratory, Sea Lab II, was tested and evaluated by the U. S. Navy Mine Defense Laboratory here, and some of it, including an underwater intercom, developed by MDL.

The first experiment in underwater living in which MDL actively participated was Sea Lab I. It was designed and constructed here by the lab out of existing materials and with a limited budget in a crash program in spring, 1964.

In this experiment, 4 men stayed in the vessel off the coast of Bermuda at a depth of 193 feet for 11 days. Much of the equipment and many of the techniques developed for Sea Lab I are being used on the new experiment.

The original vessel itself is currently here being modified for use as a test lab for Sea Lab II, Capt. Richards T. Miller, commanding officer of MDL, told Electronic News.

Sea Lab II was constructed at San Francisco Naval Shipyard according to specifications supplied by MDL.

The AN/PSQ-IB handheld sonar, produced by Dalmo-Victor, was repackaged by the Navy Lab to reduce the size and weight. Two transducers, 1x½-inch, replace the original transducer which was 1x8 inches. By this and other repackaging techniques, the size of the sonar has been reduced from 15x15 inches to 9 x 3½ inches and the weight from 22 pounds to 3 pounds.

Submitted for Bids.

It is understood from officials here that on completion of tests, the unit which can return an echo from 120 yards underwater will be submitted to industry for bids for its manufacture.

MDL is responsible for the in-house development of a "buddy-swimmer" intercom using bone conduction microphones connected by 24 feet of wire. The bone conduction microphone is used as both a microphone and as an earphone, Dr. Norman H. Jasper, technical director, MDL, said.

Primary power is supplied the vessel through a cable laid underwater from Scripps Institute of Oceanography. Secondary power comes through an unbilical cord connected to the support vessel Berkone directly overhead.

Modes of communication and instrumentation contained in the underwater lab, Dr. Jasper said, include an electrowriter; television (both closed circuit and entertainment); an intercom; open microphone; underwater loud speakers, and a helium speech unscrambler.

Voices Unintelligible.

The helium atmosphere makes the men's voices unintelligible to listeners on the support ship. Without this unscrambler which translates the high frequencies caused by the helium to more normal frequencies, they could not be understood, Dr. Jasper said.

A special feature of the experiment is a newly designed telemetry station located about 100 feet from the underwater vessel. This station makes possible constant monitoring on shore of the aquanauts activities both inside and outside their underwater home-away-from-home.

The 57-foot Sea Lab II is designed to be self-supporting with respect to food, water and breathing gas mixture, Dr. Jasper said.

The present test is primarily to determine the ability of divers to live under pressure (about 125 psi — although the lab was hydrostatically tested to 188 psi, Dr. Jasper said) for long periods and to perform useful Naval and oceanographic tasks interrelated with the ocean environment.

SAN DIEGO UN
OCT 4 1965

Aquanaut Stung By Poison Fish

Aquanaut Rick Gregg was stung three times on the hand and once on the foot by a sculpin yesterday while diving to the wall of Scripps Canyon for biological sampling and photographs.

Since he was not wearing gloves or boots, the stings of the sculpin, a poisonous scorpion fish, were considered severe.

The treatment administered to Grigg was the same as that administered to aquanaut Scott Carpenter after he was stung once. Grigg, 28, was ambulatory last night with no apparent after-effects.

Aquanauts of SeaLab II took 600 feet of color film during the excursions to the canyon wall.

Other than the excursions to the canyon, the aquanauts observed a holiday routine yesterday.

Pancakes were made and served to all hands in the sea-bottom home. This time the pancakes were successfully prepared in the helium atmosphere by using an extra-thin batter.

Capt. R. A. Spencer, USN, arrived last night at SeaLab II to serve as alternate on-site commander.

MODERN GROCER - 36
370 Lexington Avenue
New York 17, N.Y. Circ. 13,201

OCT 4 '65

Sealab II Test Nears End

Astronaut M. Scott Carpenter emerged from Sealab II on Sept. 27 after 30 days in the sea.

The exercise was part of a 45-day man-in-the-sea program being conducted by the Navy off the coast at La Jolla, Calif. Two teams of 10 men each are spending 15 days in the sea chamber.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

OCT 6 - 1965

From OCT 4 1965
PRESS
PITTSBURGH, PA.

Aquanauts Mix Excursions, Work

LA JOLLA, Calif., Oct. 4 (UPI)—America's third team of aquanauts mixed technical work with marine life excursions as the 45-day man-in-the-sea project neared its last week.

The team completed the major portion of an underwater salvaging yesterday, including the lifting and inspection of two 55-gallon steel drums filled with foam to make it rise through the water.

From
HERALD TRIBUNE
New York, N. Y.

OCT 4 1965

Aquanauts Dive Off California

For the second time, Sealab 2 aquanauts went to the edge of Scripps Canyon—266 feet underwater off La Hoya, Calif.—to collect specimens of marine biology. The collecting went on all week end. The aquanauts are experimenting to see how well man can live deep underwater. The project ends next Monday.

SEALAB (180)

LA JOLLA, CALIF., OCT. 6 (AP)-TWO SWIMMERS IN THE NAVY'S SEALAB 2 PROJECT DOVE TO A DEPTH OF 300 FEET IN AN OFFSHORE CANYON, SETTING A NEW DEPTH RECORD FOR THE AQUANAUTS.

AQUANAUTS ROBERT SHEATS AND BILL BUNTON MADE THE AUTHORIZED DESCENT INTO SCRIPPS CANYON YESTERDAY, SPENDING SEVEN MINUTES DESCENDING, FIVE MINUTES AT THE 300-FOOT DEPTH AND SEVEN MINUTES COMING BACK UP TO THE SEALAB.

SEALAB DIVERS HAD GONE TO A DEPTH OF 270 FEET BEFORE, AND THE SEALAB CAPSULE RESTS AT A DEPTH OF 205 FEET.

SHEATS AND BUNTON REPORTED THAT THE AREA OF THEIR DIVE DID NOT CONTAIN MUCH MARINE LIFE, AND THAT THEY FOUND THE CANYON WAS CHIEFLY ROCK OUTCROPPINGS AND SHELVES.

IN ANOTHER EXPERIMENT YESTERDAY, THE AQUANAUTS DINED FOR THE FIRST TIME ON PLANKTON -- TINY SEA CREATURES AND PLANTS. THEY SAID THE PLANKTON HAS A SWEET, NUTTY FLAVOR.

THEY PLANNED FURTHER EXPERIMENTS WITH PLANKTON, AND MOST OF THE AQUANAUTS SAID THEY'D LIKE TO TRY IT COOKED. SAID BUNTON:

"IT'S BETTER THAN STARVING TO DEATH."

ANOTHER SPOKESMAN SAID THE AQUANAUTS SCOOP THE PLANKTON UP WITH A NET, ADDING:

"THEY WERE QUITE TASTY. THEY FOUND THE PLANKTON TO BE EXCELLENT EATING AND PLAN TO MAKE A SOUP, OR EVEN STEW IT. THEY HAVE TO EAT THEM WITH SPOONS, BECAUSE THEY ARE SO SMALL."

EE302APD NM

155

From OCT 3 - 1965
TRIBUNE
Chicago, Ill.

SEALAB 2 GETS NOSY VISITOR

Sea Lion Sticks Head Thru Hatch

La Jolla, Cal., Oct. 2 (AP)—Sealab 2 Aquanauts had a visitor today; a sea lion popped in on them. It may have been a fatal mistake, scientists say.

Curious sea lions have been peering in the windows of the underwater laboratory for weeks. One, dubbed Samantha, has been a constant visitor.

Aquanauts think it was Samantha who today raised her head above the surface of the water in the Sealab entry hatch, took a breath of the air inside, and then swam away.

Wait and See

No door is needed on the hatch because the atmosphere inside—mostly helium gas—is maintained at seven times the pressure of the surface, enough to keep the water from coming in. It's because of the pressure that scientists are vitally interested in seeing what happens to Samantha.

The animal descended to the Sealab, at 205 feet below the surface, with its lungs full of air at sea-level pressure.

As a result of breathing the high-pressure atmosphere in the capsule, the sea lion would have had to expel air from its lungs instinctively as it ascended to the surface.

Animal Could Die

If it did not, the lungs could have overexpanded and the animal would have died of an embolism, or air in the blood vessels, the navy said.

Divers are taught to release high pressure air during emergency ascent, but it is not known if an animal will do it.

If animals are capable of mastering the technique, then use of them as helpers in underwater living projects can be expanded greatly.

San Francisco, Calif.
Examiner
(Cir. D. 289,469 - S. 427,093)
OCT 2 1965

Life in the Deep

EVOLUTIONISTS who maintain that man's pristine ancestors occupied the sea may find an I-told-you-so assist in Scott Carpenter's venture that, in properly developed housing and equipment, human beings could live and work "forever" far below the ocean's surface.

Carpenter is the world's only astro-aquanaut. He has completed a 30-day Navy assignment in Sealab 2 at a 205-foot depth off La Jolla. Other members of the group engaged in this scientific experiment have taken 15-day tours in the cylinder, in and around which they have lived among startled piscatorial neighbors.

Carpenter acknowledges the pressures and strains of dwelling in Neptune's rooming house. But he is confident that man can manage effectively in that once hazardous domain. "Forever," of course, is a long, long time.

But the successful experiences of this expedition further dramatize the possible scope of man's adventures, and achievements, in the future as he lifts his foot from its accustomed terrestrial security and plants it in space and on the ocean bottom.

EVENING NEWS
Newark, N. J.
OCT 5 1965

Try to Lure Sealab Pet

LA JOLLA, Calif. (AP)—Samantha's good health confirmed, Navy astronauts in Sealab 2 want to find out today if their friendly mascot can be coaxed down again.

The sea lion took a whiff of the capsule's helium-charged air Saturday, ascended the 205-feet to the surface and swam off.

Yesterday she returned to the project's surface vessel to play and accept bits of fish and steak.

Civilian Psychologist Mike Greenwood, 35, and Navy Aquanaut Ken Conda, 33, tried taking a swim with Samantha. That frightened her—but they expected her return to the area in the early morning darkness. Aquanauts attempt to lure the sea lions to the capsule, using a buzzer and feeding any who respond. Their routine calls for continued mapping of rock canyons near the capsule. The team—last of the three-phase, 45-day experiment—is due to surface Sunday.

Sun Star 10/2/65

Sealab Visit By Sea Lion May Be Fatal

La Jolla, Calif. (AP) — Sealab 2 aquanauts had a visitor Saturday: a sea lion popped in on them. It may have been a fatal mistake, scientists say.

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No Hatch Poor

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If it did not, the lungs could have overexpanded and the animal would have died of an embolism, or air in the blood vessels, the navy said.

Divers are taught to release high-pressure air during emergency ascent but it is not known if an animal will do it.

If animals are capable of mastering the technique, then use of them as helpers in underwater living projects can be expanded greatly.

SAN DIEGO
EVENING TRIBUNE
OCT 1 1965

Class Ends For Eager Sea Lion

Sam the sea lion has had its education interrupted.

The animal's teacher, Mike Greenwood, a psychologist stationed aboard the Sealab mothership, Berkone, dropped the buzzer he was using to train Sam, and it sank to the bottom.

Greenwood, who says Sam is really a girl and should be called Samantha, had trained the sea lion to come to the buzzer. Each time the animal responded, it received a fish for a reward.

Much Higher Pitch

Since the school Greenwood is running doesn't have an audio-visual training aid department with spare buzzers, Greenwood had to resort to the use of a pinger, a different type of underwater sound signaling device which puts out a signal much higher in pitch than the buzzer to which Sam had become accustomed.

The trouble is that pingers are present in quantity around Sealab. They are used to mark locations on the bottom, and are attached to various pieces of equipment which, like Greenwood's buzzer, might become lost. A sonar unit can be used to locate the pinger and thus the equipment to which it is tied.

Pinger to Pinger

Sam apparently went from pinger to pinger looking for a usual reward. When it didn't get a fish each time it located one, it got tired of the game and quit playing.

Yesterday afternoon, Sam even was absent from the buoy on which the animal usually rests between swims.

Greenwood has one ray of hope, though. Like a good oceanographer, he hooked a pinger to the buzzer before he lost it. He hopes an aquanaut will come across it on the bottom and send it back.

From OCT 6
JOURNAL, Atlanta, Ga.

Aquanauts Try to Lure Sea Lion

LA JOLLA, Calif. (AP)—Samantha's good health confirmed, Navy aquanauts in Sealab 2 want to find out today if their friendly mascot can be coaxed down again.

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Later she returned to the project's surface vessel to play and accept bits of fish and steak.

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Aquanauts attempt to lure the sea lions to the capsule, using a buzzer and feeding any who respond.

Their routine calls for continued mapping of rock canyons near the capsule. They are also testing an all-purpose hand tool that drills, fastens bolts and etches hard surfaces—without recoil or twist.

The team of 10 aquanauts—last of the three-phase, 45-day experiment — is due to surface Sunday.

Nosy Sea Lion Calls On Sealab

LA JOLLA, Calif. (AP)— A curious sea lion apparently has survived her brief whiff of the high-pressure, helium-charged atmosphere in Sealab 2, a Navy spokesman said Monday.

The visitor appeared Saturday. Aquanauts were routed from their bunks by a strange barking.

The sea lion, dubbed Samantha, had poked its head through the capsule's entry hatch. Aquanauts grabbed their cameras but the flashbulbs startled her and she withdrew.

The capsule hatch is left open to the sea because the atmosphere inside — 80 per cent helium, 16 per cent nitrogen and 4 per cent oxygen — is maintained at seven times the pressure of the surface, sufficient to keep the water from rushing into the capsule.

Navy scientists feared that as the sea lion later ascended the 205 feet to the surface, its lungs would expand and the mammal would die of embolism — air in the blood vessels.

A deathwatch was established by surfers and lifeguards from Coronado to Huntington beach — 70 miles north of the project.

But no sea lions washed ashore, the spokesman said — indicating Samantha instinctively exhaled the fumes in her ascent.

Monday aquanauts planned to buzz for Samantha, who has responded to earlier buzzer calls.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)
OCT 5 - 1965

Poisonous Fish Injures Aquanaut

Sealab 2's aquanaut Rick Grigg was hunting marine organisms off La Jolla, Calif., when he got one right in the hand—the poisonous spine of a sculpin fish. He was jabbed three times and laid low for five hours before drugs brought him around. Aquanauts figured an inquisitive sea lion which stuck its head through the open hatch of their 205-foot-deep capsule yesterday would die as soon as the helium it whiffed expanded in its lungs and reached the bloodstream. But a deathwatch along 70 miles of coastline failed to disclose any sea lion carcasses. The aquanauts breathe a mixture of gases, including helium, to counter prolonged deep-water pressure. High pressure inside their capsule keeps water from pouring into the opened hatch.

From
HERALD TRIBUNE
New York, N. Y.
OCT 5 1965

From OCT 6
STAR
Kansas City, Mo.

FEAST ON PLANKTON

Soup From Sea Creature Planned for Sealab 2

La Jolla, Calif. (AP)—Plankton soup is on the menu for the aquanauts living in Sealab 2.

The 10 divers living in the capsule at 205 feet beneath the ocean's surface whetted their appetities yesterday by eating the tiny sea animals and plants raw.

"They were quite tasty," a spokesman said. They scoop the plankton with a seine or a net.

Breath of Sealab 2 Helium May Kill Sea Lion

THE HOUSTON POST
SUNDAY, OCTOBER 3, 1965
SECTION 1, PAGE 9

LA JOLLA, Calif — (AP) — Sealab 2 aquanauts had a visitor today: A sea lion popped in on them. It may have been a fatal mistake, scientists say.

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If it did not, the lungs could have overexpanded and the animal would have died of an embolism, or air in the blood vessels, the Navy said.

Divers are taught to release high-pressure air during emergency ascent but it is not known if an animal will do it.

IF ANIMALS are capable of mastering the technique, then use of them as helpers in underwater living projects can be expanded greatly.

Fate of the sea lion probably will not be known for several days.

Sealab personnel will be watching for dead animals and also will be counting the herd in the area to determine if one is missing.

Minneapolis (Minn) Sunday Tribune
SUNDAY, OCTOBER 3, 1965

Sealab 2 Dispels Bogeymen, But Discovers Some New Problems

By JACK WILSON
Minneapolis Tribune
Staff Correspondent

WASHINGTON, D.C. — As is usual at this stage of exploring a new environment, the Sealab 2 experiment in underwater living erased some expected problems, and produced some unexpected ones.

It's still too early to give a complete report on the effects of spending several weeks in a tank under 205 feet of seawater, Navy authorities here said last week. But at least a few of the expected hobgoblins failed to show up.

And the experiment bolstered the Navy's confidence in its new system of underwater operations, called saturation diving. Briefly, the theory is that since a deep-sea diver has to spend a long time in a decompression chamber getting adjusted to normal air pressure after each dive, he might as well stay down long enough to get his job done in one dive.

UNDER normal Navy procedure, the longest and deepest dive that can now be made is 380 feet for 30 minutes. And when the diver comes up he must spend several hours going through decompression, to avoid the diver's disease, the "bends," or other manifestations that can include nausea, paralysis, or death.

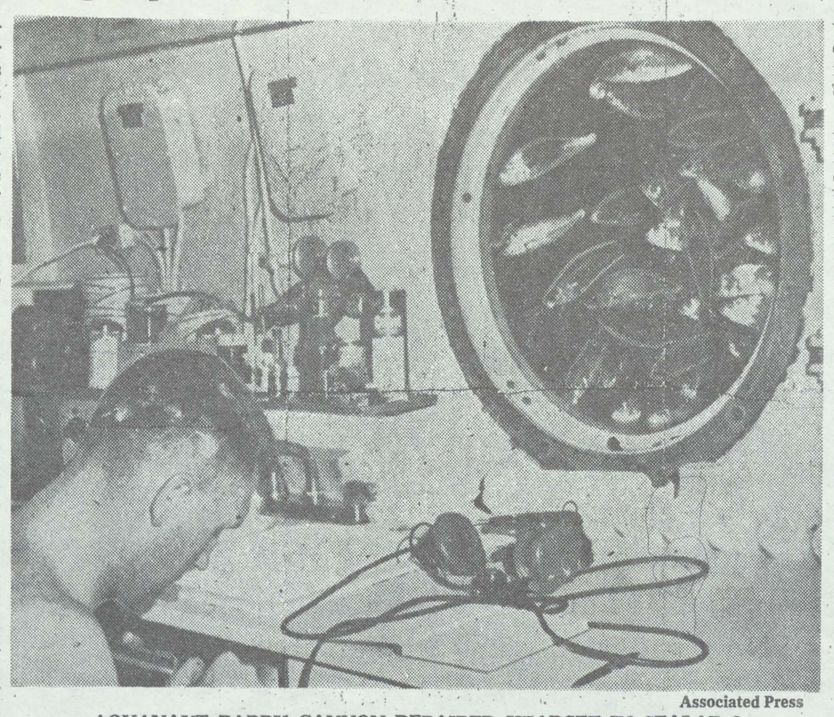
In 1957 Navy Capt. George Bond, a surgeon, proposed the theory that if a diver stayed at a fixed depth for about 24 hours his tissues would become saturated with the gases he was breathing. Once saturated, he would need the same period of decompression whether he stayed down one day or many.

Bond's proposal got a good test last summer, when the four-man crew of Sealab 1 stayed at a depth of 193 feet for 11 days with no ill effects.

Sealab 2 was sunk to a depth of 205 feet, off La Jolla, Calif. Of the first team of 10 aquanauts, nine stayed down 15 days and Scott Carpenter, the astronaut aquanaut, stayed on for another two weeks with the second crew.

WHEN THE first team reached the surface and completed its long session in the decompression chamber, Bond reported: "If we had used the standard method of decompression we would have had to go through more than 5,000 hours of decompression to perform the same amount of work. We finished decompressing in about 33 hours —so we feel this is significant step."

The Navy's goal, set out in its deep submergence systems project, is to be able to perform salvage and rescue operations down to 600 feet — and the men in the program are talking hopefully of being able eventually to work at depths of 1,000 feet or more.



Associated Press
AQUANAUT BARRY CANNON REPAIRED HEADSET IN SEALAB 2
Curious fish peered through porthole at 205-foot depth

When Carpenter finally surfaced he reported that "the ocean is a much more hostile enviroment than space." During the experiment, some men complained of having slight headaches in the morning, and most of them said they were tired a lot of the time, although they did their work satisfactorily.

A COUPLE of figures make it clear how hostile the enviroment is, normal atmospheric pressure is about 15 pounds per square inch. We spend our lives with that much pressure on every square inch of our bodies and don't notice it. At a depth of 205 feet the pressure of the ocean's water is 112 pounds per square inch — roughly 7½ times normal atmospheric pressure.

The Sealab is a big metal tank containing a breathing atmosphere at a pressure just slightly higher than the water pressure, so the water can't force its way in through the open hatch through which the divers come and go. For two weeks — or in Carpenter's case a month — they lived in an atmosphere 7½ times as heavy as normal.

It was also failrly hot — temperatures in the Sealab ranged between 86 and 90 degrees Fahrenheit — and the humidity varied between 69 and 77 per cent. Outside, the water temperatures range from about 45 to 56 degrees, and even in electrically-heated wet suits no one stayed outside longer than 167 minutes in one day. The average for the first team was 45 minutes a day in the water.

There were other problems. At very low pressures, such as those in a space capsule, a man can breathe pure oxygen for a few weeks with no bad effects.

But at high pressures, such as 7½ atmospheres, oxygen is poisonous. The Navy has set a limit of 30 minutes for breathing pure oxygen at two atmospheres. At higher pressures, or for long periods, it acts on the nervous system and may cause convulsions or death, or cause the lungs to fill with liquid.

THE SEALAB divers breathed a mixture of helium and oxygen. A minor disadvantage of helium is what divers call the Donald Duck effect — it makes the voice high-pitched and squeaky, and for a while divers have difficulty understanding each other. When President Johnson called Carpenter while he was still in the decompression chamber, Carpenter apologized for his squeaky voice — "it's absolutely the best I can do in this helium atmosphere."

A more serious disadvantage is that helium requires a longer decompression period than nitrogen. A nitrogen atmosphere can have a narcotic effect on a diver, producing the so-called "rapture of the deep." One thing the investigators were pleased to learn as a result of Sealab 2 is that helium does not produce narcosis, at least within a month's exposure.

Another dismal possibility is that breathing helium-and-oxygen for long periods may have some subtle effect on the heart. Experiments with animals raised in this atmosphere have hinted at some such effect, and the possibility is being investigated in a couple of laboratories.

Although the men running the experiment professed to be satisfied with the amount of work the crew was able to accomplish during the test, the crewmen themselves felt that it was harder than they had expected to accomplish anything.

One of their major tasks was to rig a 6½-inch nylon line to a stabilizing anchor. One of the divers said afterward "it took us two weeks to do something we were sure we could do in three days."

Cedar Rapids (Ia.) Gazette
SUNDAY, OCTOBER 3, 1965

Sea Lion Pokes Head in Sealab; To Be Watched

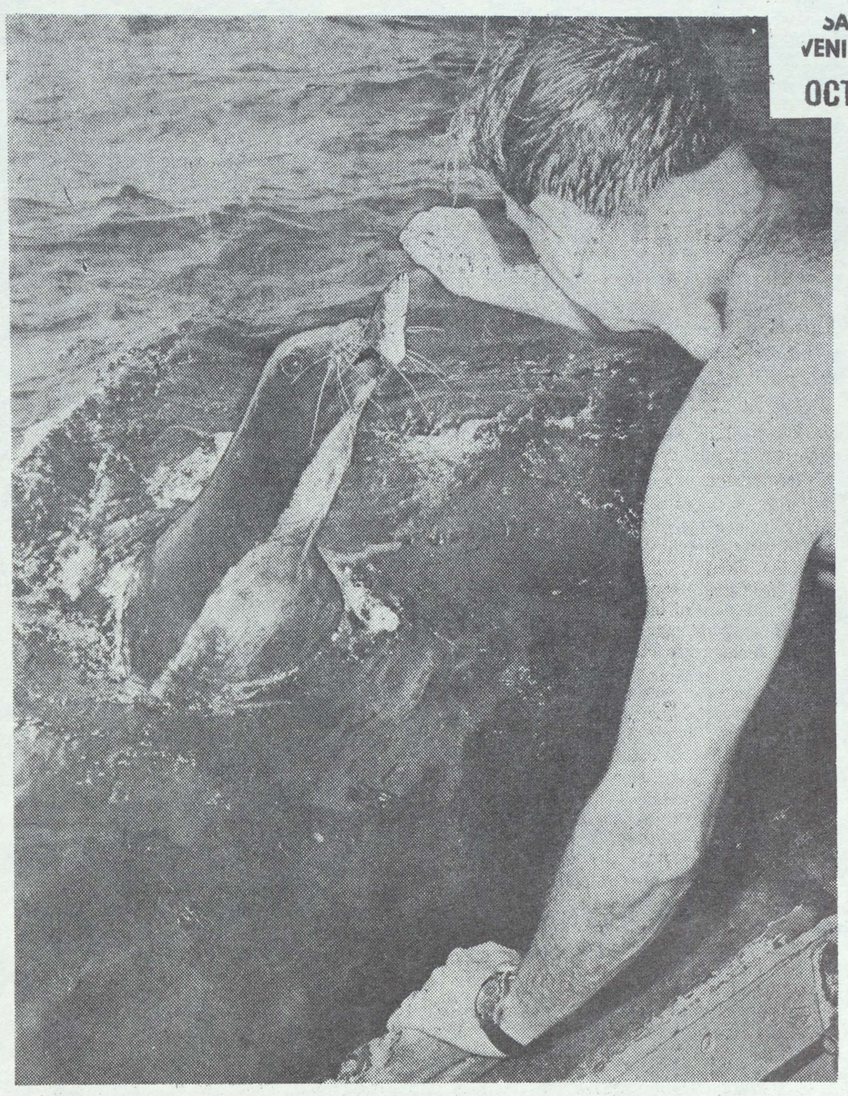
LA JOLLA, Calif. (UPI)—A friendly sea lion poked his head into Sealab 2 early Saturday, and project officials expressed optimistic concern that the mammal will survive breathing the pressurized, helium-filled air.

The sea lion made his way through the aquanauts' shark cage barrier at 3 a.m. and raised his head into the aquanauts' entry hatch "for a brief moment," a Sealab spokesman said.

Officials of the 45-day man-in-the-sea project said a head count would be attempted of the six known sea lions in the area to see if the animal survived the experience.

Humans are able to make the transition from underwater laboratory to surface environment by going through long decompression methods, but officials wondered whether a swift diving mammal such as a sea lion could do the same naturally.

The compressed air expands in the lungs as a mammal goes toward the surface, causing air embolism in a human if the transition is too swift.



SAN DIEGO
EVENING TRIBUNE
OCT 5 1965

Trick Gives Seal Bright Yellow Coat

If you see a sea lion off La Jolla with a bright yellow chest, call her Sam.

Sam eluded earlier efforts of Sealab scientists to mark her with spray paint as she swam near the Sealab mother ship Berkone, but yesterday she fell to trickery.

Mike Greenwood, who has trained Sam to respond to an underwater buzzer, wanted to mark her so that she could be recognized if she swam down to Sealab.

But she dodged Greenwood's spray can. So Greenwood put a rubber mat soaked in yellow paint on top of Sam's favorite buoy yesterday and when Sam climbed on the buoy for a nap, she became thoroughly smeared by the paint.

Greenwood and aquanaut Ken Conda, who ended his tour of duty in Sealab Sept. 26, worked with Sam yesterday afternoon, calling the animal to their boat and rewarding her with fish.

Conda is one of the two aquanauts who trained with Tuffy the porpoise for the mammal's participation in the Sealab experiment.

NEW HUE—Sam, the Sealab sea lion, displays yellow painted chest as she reaches for a fish offered by aquanaut Ken Conda during training session. Paint was applied so aquanauts can tell Sam from other sea lions.

From OCT - 6
STAR
Kansas City, Mo.

AQUANAUTS IN DEPTH RECORD

Swimmers Dive to 300 in an Offshore Canyon

PLANKTON A FOOD ITEM

'Better Than Starving,' One Reports of Marine Diet

La Jolla, Calif. (AP)—Two swimmers in the Navy's Sealab 2 project dived to a depth of 300 feet in an offshore canyon, setting a new depth record for the aquanauts.

Robert Sheats and Bill Bunton made the authorized descent into Scripps canyon yesterday, spending seven minutes descending, five minutes at the 300-foot depth and seven minutes coming back up to the Sealab.

Sealab divers had gone to a depth of 270 feet before, and the Sealab capsule rests at a depth of 205 feet.

Sheats and Bunton reported that the area of their dive did not contain much marine life, and that they found the canyon was chiefly rock outcroppings and shelves.

In another experiment yesterday, the aquanauts dined for the first time on plankton—tiny sea creatures and plants. They said plankton have a sweet, nutty flavor.

They planned further experiments with plankton, and most of the aquanauts said they'd like to try them cooked. Said Bunton:

"It's better than starving to death."

Another spokesman said the aquanauts scoop the plankton up with a net, adding:

"They were quite tasty. They found the plankton to be excellent eating and plan to make a soup, or even stew them. They have to eat them with spoons, because they are so small."

THE SAN DIEGO UNION
Tues., Oct. 5, 1965
SAN DIEGO, CALIFORNIA

YELLOW BELLY

SeaLab Seal Gets A New Hue

By JUDITH MORGAN

Samantha, a seal trained by a SeaLab II psychologist, is no coward despite her new yellow belly and flippers.

She was painted — for identification purposes — yesterday by Mike Greenwood, a psychologist on the mother ship Berkone, who trained Samantha to respond to a buzzer for a fish reward.

There are just too many sea lions around to permit easy spotting of Samantha.

Greenwood said Samantha is so comfortable around humans that yesterday she came out of the water and onto the bow of a small outboard-powered boat for a fish. Greenwood greeted her with a spray can of paint as well as fish.

SIGNAL PLANNED

Today, Greenwood plans to give Samantha the buzzer signal to bring her to his surface boat, after which aquanauts will signal her to dive below.

The aquanauts — living beneath the sea in an experiment — are hoping to get Samantha to enter SeaLab II and breathe the helium-filled atmosphere.

SeaLab personnel are eager to learn whether Samantha will exhale instinctively the gasses breathed in the undersea structure.

The pressure of SeaLab's atmosphere is 200 pounds a square inch. If Samantha swam to the surface with her lungs full of air, the gas would expand as she neared the top and tear the lung tissue.

DIVERS TAUGHT

SeaLab officials said divers are taught to exhale slowly from the bottom to the surface to prevent the deadly expansion.

Oceanographers at the Scripps Institution of oceanography also were watching the sea lion developments with interest to compare the instinctive actions of sea lions and dolphins.

The third team of SeaLab aquanauts will be brought to the surface Sunday and SeaLab will be raised from its site 205 feet below the surface Oct. 13.

Seattle, Wash.
Times
(Circ. D. 226,737
Sat. 214,851 - Sun. 267,958)
OCT 4 1965

One Week Left For Sealab Experiment

LA JOLLA, Calif., Oct. 4. — (UPI) — Sealab 2, America's 45 - day "man - in - the sea" experiment, entered its final week today.

Three teams of aquanauts have successively occupied the 57-foot steel cylinder since August 28 to determine how well man can live and work under pressure 6½ times greater than on land.

The 200-ton craft rests on a ledge 205 feet below the surface of the Pacific Ocean in Scripps Canyon, about 3,000 feet offshore.

The third team will ascend when the project is completed next Monday.

Rick Grigg, one of the aquanauts, was recovering today from severe scorpion stings. He was reported in satisfactory condition.

Dr. George Bond, Sealab medical officer, said Grigg was stung three times on the hand and once on the foot while diving for biological samples yesterday.

2 Aquanauts A-Okay After Deep Dive

LA JOLLA, Calif., Oct. 6 (UPI) — Sealab-2 aquanauts showed no ill effects today from yesterday's descent to a depth of 300 feet in Scripps Canyon.

The two aquanauts were Robert Sheats, leader of the final 15-day segment of the 45-day underwater experiment, and Bill Bunton, whose 19-minute dive took them deeper than any other aquanaut.

POST, Denver, Colo.
OCT 6 1965

2 Aquanauts Descend To 300 Feet

LA JOLLA, Calif. —(AP)— Two swimmers in the Navy's Sealab 2 project dived to a depth of 300 feet in an offshore canyon, setting a new depth record for the aquanauts.

Aquanauts Robert Sheats and Bill Bunton made the authorized descent into Scripps Canyon Tuesday, spending seven minutes descending, five minutes at the 300-foot depth and seven minutes coming back up to the Sealab.

RESTS AT 205 FEET

Sealab divers had gone to a depth of 270 feet before, and the Sealab capsule rests at a depth of 205 feet.

Sheats and Bunton reported that the area of their dive did not contain much marine life, and that they found the canyon was chiefly rock outcroppings and shelves.

In another experiment Tuesday, the aquanauts dined for the first time on plankton—tiny sea creatures and plants. They said the plankton has a sweet, nutty flavor.

From OCT 6 1965
PRESS
PITTSBURGH, PA.

KMR4

(SEALAB)

(LA JOLLA)--AN HISTORIC TELEPHONE CONVERSATION MAY BE HELD TODAY BETWEEN THE AQUANAUTS OF SEALAB TWO--205 FEET BELOW THE OCEAN SURFACE OFF LA JOLLA--AND THE SIX OCEANAUTS LIVING 330 FEET UNDER THE MEDITERRANEAN SEA IN JACQUES COUSTEAU'S DIVING BATHYSCAPH.

SEALAB OFFICIALS SAID THE CALL--IF PLACED FROM THE SEALAB--WOULD BE MADE THIS MORNING. IT WOULD BE PLACED THROUGH THE BENTHIC COMMUNICATIONS LABORATORY WHICH WAS ONE OF THE FIRST FACILITIES INSTALLED WHEN THE SEALAB WENT UNDER WATER AUGUST 28TH.

ONE OF THE FRENCH DIVERS IS COUSTEAU'S SON. THEY HAVE BEEN BELOW THE MEDITERRANEAN IN MONTE CARLO HARBOR SINCE SEPTEMBER 17TH.

RICK GRIFF--A MEMBER OF THE THIRD TEAM OF SEALAB AQUANAUTS--PROBABLY WOULD DO MOST OF THE TALKING SINCE HE SPEAKS FRENCH FLUENTLY.

IN OTHER SEALAB DEVELOPMENT, THE AQUANAUTS TODAY ARE WORKING ON SALVAGING A SUBMARINE HULL. A SIMULATED HULL WAS LOWERED YESTERDAY AND WILL BE FILLED WITH FOAM TO MAKE IT BUOYANT. EXPERIMENTS WITH AN AIRPLANE FUSELAGE AND OIL DRUMS HAVE WORKED SATISFACTORILY.

RM641APD10/1

Aquanaut Problems

The Navy's "aquanauts"—they call themselves "aquanuts"—are finding that life in a steel capsule 200 feet under the Pacific waves is no picnic.

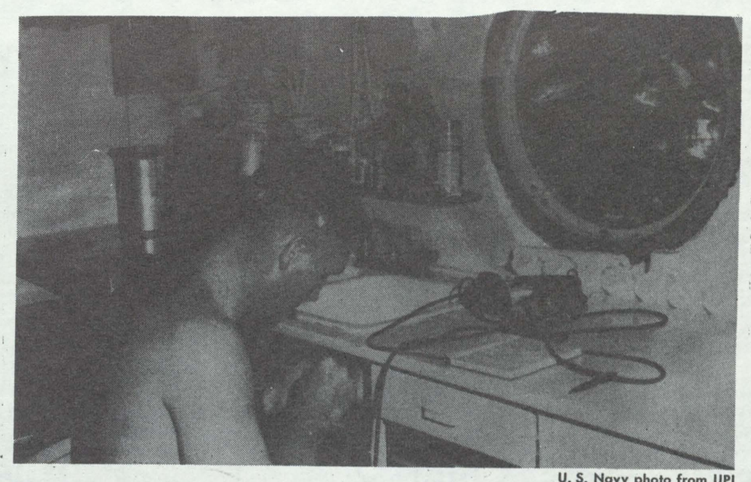
Seagoing microorganisms and scorpion fish teamed up to haze the human newcomers to the deeps of the Pacific off La Jolla, California. The microorganisms caused ear infections in nine of the ten-man first team of aquanauts. In addition, astronaut-turned-aquanaut M. Scott Carpenter was stung painfully on the finger by a scorpion fish. The sting results from touching the back spines of this small red fish. There were crowds of scorpion fish on the ocean floor near *Sealab 2*.

The aquanauts found that they couldn't cook a steak, or even light a match. The helium, oxygen, and nitrogen that formed *Sealab 2's* artificial atmosphere doesn't support fire. Frying food, like steak, would foul the mixture. What did the aquanauts eat? Steamed frozen food, occasionally enlivened by a fresh meal sent down by dumbwaiter.

Another part of *Sealab* life that probably took getting used to: The aquanauts' voices turned high-pitched. Why? *Sealab's* atmosphere was considerably lighter than the air through which sound waves usually travel. As a result, their voices turned high and squeaky.

SCHOLASTIC TEACHER - 78
(SENIOR SCIENCE EDITION)
50 W. 44th Street W
New York, N.Y. 10036

OCT 7 '65



U. S. Navy photo from UPI

Fish at porthole watch engineer Berry Cannon of Sealab 2 repair a headset in the steel laboratory 200 feet below the Pacific waves. Sealab 2 project tested ability of men to work and live in capsule on bottom of ocean. Sealab 2 was lowered off La Jolla, California. Wires attached to shaved spots on head measure effects of undersea living.

AQUANAUTS STAY AT DEPTH 5 MINUTES

Two Dive 300 Feet, Sample Plankton

Robert Sheats and Bill Bunton descended to a 300-foot depth off the La Jolla shoreline yesterday to set a diving record for aquanauts in the Navy's Sealab II project.

The two divers, along with aquanaut Rick Grigg, also sampled raw plankton and reported it tasted like shrimp — "sweet and kinda nutty."

"It's better than starving to death," Bunton said. Plankton is small sea life — much of it microscopic — which can be gathered in a cloth net.

It took Sheats and Bunton seven minutes to dive to the 300-foot depth. They remained at the depth for five minutes and then made the return trip to the Sealab II 205-foot level in seven minutes.

The two divers said there was little marine growth at 300-feet. They said the Scripps Canyon drops off suddenly like a cliff with rock outcroppings and shallow ledges.

Their observations confirmed data compiled by depth soundings of the Scripps Canyon over the last 40 years by scientists at Scripps Institution of Oceanography.

The dive is the deepest authorized by Dr. George F. Bond, principal investigator for the Sealab II project. The previous record was a 266-foot dive recorded by aquanauts Scott Carpenter and Wally Jenkins.

Sealab II officials were waiting permission for additional dives to the 300-foot depth from Dr. Henry Craven, chief scientist of the Navy Special Projects Office in Washington D.C.

But eating raw plankton was the aquanauts' original idea.

"They've been down there so long," a Navy public information officer said, "that they not only are beginning to think like fish, they are beginning to act like fish."

Grigg, a graduate student at Scripps, collected the plankton in a butterfly-like net. He said some of the larger specimens measured a quarter-inch long.

The aquanauts ate the plankton without washing out the sea salt. "One thing is for sure," Sheats said, "you don't have to add salt."

The gourmets were trying to convince the seven other aquanauts to have plankton soup, stew or souffle for dinner tonight.

Meanwhile, Sam the female sea lion contributed to the evidence being collected by the Navy in the Sealab II project.

Scientists noted that the sea lion surfaced from the Sealab II area and instinctively breathed out small amounts of air during the ascent.

Sea lions apparently do not become "over pressurized" when surfacing from great water depths as is the case with human beings, according to the scientists' observations.

Sam is splashed with paint for identification. She has been a mascot for the aquanauts and a willing patient for scientists aboard the mother ship Berkone.

The 10 aquanauts are scheduled to surface Sunday. They began preparations today for the surfacing.

When they surface, they will complete the last 45 days of experimental living beneath the ocean's surface. Sheats heads the team now submerged. Two other aquanaut teams preceded this one. Carpenter headed both of the earlier diving teams.

EVENING TRIBUNE
SAN DIEGO, CALIFORNIA
Wed., Oct. 6, 1965

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National City Star News 7 Oct 1965

AQUANAUT JAY SKIDMORE: WAR VETERAN AT 16

'Upstairs' Now, He Recalls Adventure

'Tiltin' Hilton' Chula Vistan's 15-Day 'Home'

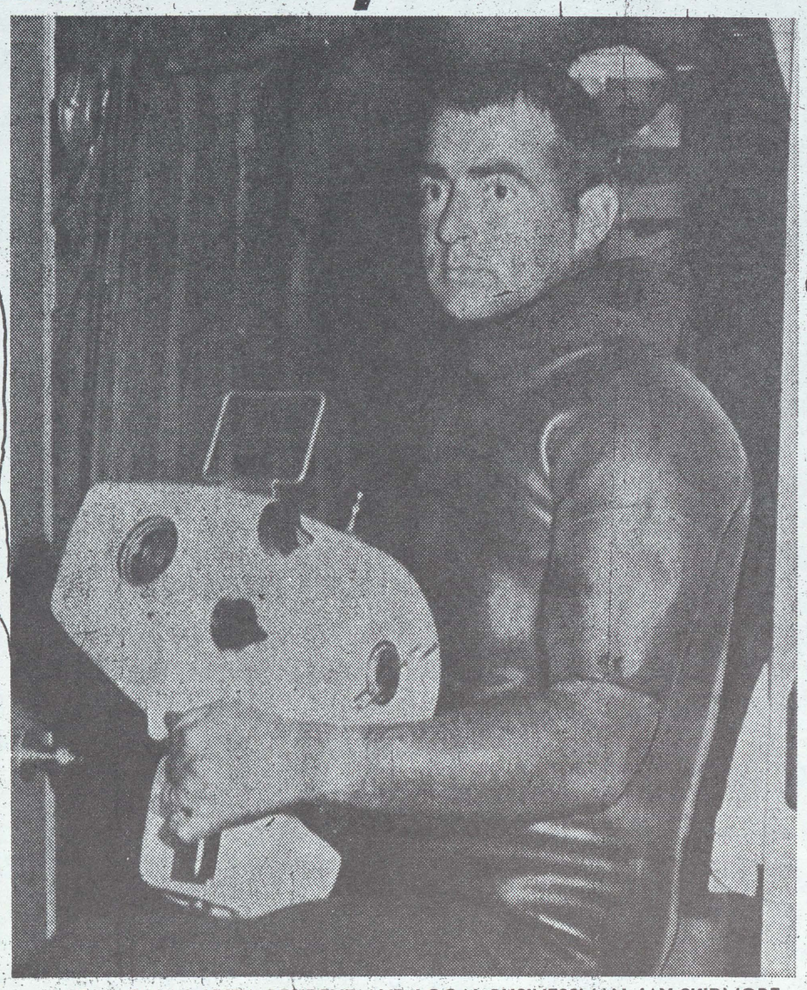
By RUTH NUTTALL

Some future day when the now vast and trackless ocean is farmed like a Kansas wheat field, mined like a Minnesota iron range and drilled like an Oklahoma oil field. Chula Vista can claim a pioneer who helped to make it so!

He is Jay Skidmore, 36, who lives with his wife Lois and their two children at 1089 Woodlawn Ave. A Navy chief photographer's mate, he is also a qualified diver.

Jay was a member of the first 10-man team of aquanauts to live 205 feet (or 1,230 fathoms) down on the bottom of the ocean for 15 days in a 12-by-57 foot capsule full of scientific equipment.

He is currently part of the "upstairs" supportive group servicing the third and last team on the ocean floor which will wind up the SeaLab II experiment Sunday. The capsule will be hauled to the surface Wednesday, towed to Long Beach by the USS Gear and hauled out of the water by a special crane.



20-YEAR CHULA VISTA RESIDENT AND LOCAL BUSINESSMAN JAY SKIDMORE
Co-owner of Candy Cane College is Chief Photographer's Mate-Aquanaut

HEADED BY astronaut-turned-aquanaut, M. Scott Carpenter, the Navy's "Man In The Sea" program off La Jolla, is manned primarily with enlisted men, Jay said.

"We have only average educations, but several years of diving experience," he said. "And nine out of 28 of us are civilians. The non-Navy men are a good group of oceanographers."

Jay said all personnel, handpicked from volunteers, were carefully "psyched" for quirks and screened for their ability to get along with others in close quarters.

"Nevertheless," the Chula Vista aquanaut laughed, "a psychiatrist reporting at a conference in Washington, D.C., told the brass, 'The aquanauts all were certified sane, but in my book they should be nuts — doing a thing like that voluntarily.'"

BUT JAY is one nut, at least, to whom the undersea adventure was pure thrill and the high water mark of a career already crammed with derring-do.

A Merchant Marine sailor in the South Pacific combat zone as a mere kid of 16, Jay, already a war veteran, switched to the Navy at 17. From boot camp in San Diego, he went directly to photo lab training.

From that point, his career reads like a television script. An assignment in Korea took him to the Chosin Reservoir where he survived two ambushes trying to get to the First Marine Division. As wave after wave of Reds threw themselves against the Marines, Jay's equipment was destroyed. So he picked up a rifle and fought alongside the Marines to break out of the trap.

Then he went to Tokyo, checked out more photographic equipment and returned to Hungnam to film the massive evacuation.

AFTER qualifying as a diver, Jay shot motion picture footage for a training film on escaping from a submarine.

He has worked with famed Hollywood director John Ford and others on such films as "This Is Korea," "Run Silent, Run Deep," "Onionhead," and "USS Teakettle."

Jay shot underwater Bathyscaph Trieste photos as she prepared to make her record dive in the Pacific.

Earlier, he photographed a midget Japanese submarine off Pearl Harbor, following it as it ascended after 20 years on a coral reef in 11 fathoms beneath the sea.

BUT HIS latest and greatest adventure is the climax to his dramatic career, Jay said this week. He will retire Dec. 6 after having extended his 20-year hitch from July 16 — the original retirement date in order to be part of Sealab II.

Jay said the object of testing man's ability to live and work productively for long periods of time on the ocean floor is to explore and exploit vast underwater continental shelves of minerals and natural resources.

"Before these experiments," he explained, "you'd put a man down from the surface for 12 minutes and it took 70 minutes of decompression time. Carpenter stayed 30 days and only 30 hours of decompression were required. After a man is down 24 hours a saturation point is reached that 30 hours of decompression takes care of."

JAY SAID one of the most dramatic results of ocean floor living resulted from the helium atmosphere that replaced the normal earth-level nitrogen.

"In helium atmosphere, a deep-voiced man sounded like Alvin the Chipmunk," Jay said. "It was very amusing, but after a while we could understand each other perfectly. We would even know who was speaking and, as time went on, the voices tended to deepen in range, although we weren't certain whether the deepening was real or imagined.

"On the other hand, we could hardly understand squeeky newcomers," he laughed.

"The other phenomenon was that nothing would burn down there. Smokers couldn't smoke. There was no oxygen to burn. And the electric cooking units on the range glowed black, not red."

HE SAID THE helium atmosphere was necessary because nitrogen at that depth would give a man nitrogen narcosis.

"It is known as 'rapture of the deep,'" he said. "In other words, 'you'd get higher than a kite on nitrogen. Sandhogs in tunnels under water have been known to experience the sensation."

Jay said one of the first things he noticed was when he swam down from the surface in a standard quarter-inch wet suit. "The pressure at the depth of the capsule compressed the suit to tissue-paper thinness," he said. It felt like a tight glove."

He said new arrivals just lowered themselves into an open hatch.

"No cover was needed," Jay said. "The hatch was just a manhole in the deck—open all the time. Pressure inside equaled pressure outside — it was that simple."

He said people even became acclimated to the frigid 48-degree water.

AT FIRST, it was all we could do to take 40-minute exposures," Jay recalled, "but then we started stretching the time outside the capsule and eventually Billy Coffman and I stayed out 2 hours and 45 minutes. Finally, during the last week rather than bother to suit up when pressure pots came down from the surface with supplies, we'd just hop into our bathing suits and go out and bring in the pots."

Jay said in their little cap sule with wall-to-wall carpeting, yet, and radiant heated decks with its electric range, television and shore-connected telephone, it was pretty well established that man could indeed live productively on the ocean floor and reach out for the riches just waiting to be harvested.

For years, scientists have been pointing to the mysterious sea as the answer to the over-populated world's food problems. A small group of U.S. Navy men seem to have proved it can be solved.

"BUT NOT by eating well ourselves," Jay groused. "I can't say we ate like kings. It was mostly canned stuff—spaghetti and meatballs, stews; powdered omelets that didn't fluff and a toaster that wouldn't toast because of the atmosphere."

One day, Lois and Sandra, 13, and John, 9, went out to the mother ship and saw Jay on closed-circuit TV and he talked to them.

"My daughter became a heroine by sending down a big batch of brownies she had baked for us," Jay said. "Scott Carpenter wrote her a thank you note that all the aquanauts signed."

Jay said the men could practically tell the time of day by the variety of fish milling around the portholes.

One time it would be anchovies. At night, it was big white croakers.

"BUT ALWAYS, it was big fish-eat-little-fish," Jay said. "A croaker would feed on baby shrimp, crabs and diatoms and along would come a really big fish and swallow the croaker. Sort of a split-level meal."

Jay said at a depth of 205 feet it is mostly dark, dark water. But looking up towards the surface where some light filters down, there is a lovely, eerie, irridescent aqua discernible even from the bottom.

"There were a couple of discomforts we mostly ignored," he said. "The humidity was high. The sheets were cold and clammy in our otherwise very nice bunk room. And the capsule itself was cocked at about an 8 degree incline, making walking rather unstable. Dishes tended to slide off the table, too.

"So I hung a nickname on our cock-eyed nest," Jay grinned. I named 'er the Tiltin' Hilton."

It figures. Even 205 feet down in the ocean — a Hilton already!

EVENING TRIBUNE SAN DIEGO, CALIFORNIA Tues., Oct. 5, 1965

2 Aquanauts Study Coral During Dive

By LEO BOWLER
EVENING TRIBUNE Science Writer

Aquanauts Rick Grigg and Bill Bunton yesterday explored a portion of Scripps Canyon 230 feet from Sealab to a depth of 240 feet.

Grigg, a student from Scripps Institution of Oceanography, had been stung by a scorpion fish Sunday, but was fully recovered yesterday.

He and Bunton, a photographer-diver from Navy Electronics Laboratory, studied large concentrations of gorgonian coral they found in the canyon for evidence of the direction of predominant water currents.

Called Sea Fan

The coral is commonly called sea fan because of its fan shape. It positions itself to offer the least resistance to the current.

The other aquanauts spent most of the day testing tools especially adapted for underwater use. The tools were brought to the Sealab site by the Battelle Memorial Institute, a Columbus, Ohio, research organization, which adapted for underwater use items now made commercially.

The aquanauts need special wrenches and drills to perform salvage tasks. Since the aquanauts work in a nearly weightless condition, the tools must exert force against the work at hand without spinning or pushing the user as normal tools would.

Tool Work Accomplished

Officials said that the aquanauts, using a special stand lowered to them, were able to drill holes, tap threads into holes, and loosen heavy bolts with the tools.

The current team of aquanauts is occupied primarily with salvage projects. Earlier they used a special gun to put bouyant foam into an airplane fuselage.

Hazards Uncovered

Capt. George Bond, principal investigator, said the foaming program was successful but revealed special hazards which divers must learn to overcome if they are to use the material.

The foam is formed by shooting a gas and a liquid into the airplane where it mixes and turns into a buoyant solid which sticks to metal and other surfaces.

One aquanaut found that the foam also stuck to his wet suit and his breathing device when it leaked out through a hole in the airplane.

Could Mean Death

The diver found himself becoming buoyant, a condition which could force him to the surface. This would mean certain death from the bends.

He found also that the foam had stuck to one of the valves on his breathing device and he was breathing his own exhaled breath.

Other aquanauts working nearby helped the diver back into Sealab before he was injured.

Sea Lion Checks on Aquanauts

The Atlanta Journal and CONSTITUTION SUNDAY, OCTOBER 3, 1965

LA JOLLA, Calif., Oct. 2 (AP)—Sealab 2 aquanauts had a visitor Saturday: a sea lion popped in on them. It may have been a fatal mistake, scientists say.

Curious sea lions have been peering in the windows of the underwater laboratory for weeks. One, dubbed Samantha, has been a constant visitor.

Aquanauts think it was Samantha which raised its head above the surface of the water in the Sealab entry hatch, took a breath of the air inside, and then swam away.

No door is neede on the hatch because the atmosphere inside—mostly helium gas—is maintained at seven times the pressure of the surface, enough to keep the water from coming in. It's because of the pressure factor that scientists are vitally interested in seeing what happens to Samantha.

The animal descended to the Sealab, at 205 feet below the surface, with its lungs full of air at sea-level pressure.

As a result of breathing the high-pressure atmosphere in the capsule, the sea lion would have had to expel air from its lungs instinctively as it ascended to the surface.

If it did not, the lungs could have overexpanded and the animal would have died of an embolism, or air in the blood vessels, the Navy said.

Divers are taught to release high-pressure air during emergency ascent but it is not known if an animal will do it.

Fate of the sea lion probably will not be known for several days.

From OCT 13 1965
GLOBE DEMOCRAT
St. Louis, Mo.

Key Goals Attained, Navy Says of Sealab

By Associated Press

LA JOLLA, CAL.—The director of the Navy's Sealab 2 underwater research project, summarizing its achievements, said Tuesday: "We obtained our key goals. We proved that men can live in ocean depths without physical harm while they carry out work assigned them."

Sealab 2 is an underwater laboratory 205 feet deep off the Southern California coast. The third of three diver teams who spent 15 days each living and working there told about it at a news conference Tuesday morning. Each said it was the thrill of a lifetime.

Capt. L. B. Melson, project director, who visited the lab but wasn't a team member, said:

"We don't really know yet all that we have learned. It will take a long time to study and analyze information. . . .

"We are muddling our way through. The sea is a hard master. What we've learned at 200 feet won't apply at 400 feet. What we know at 400 won't apply at 600."

Undersea divers traditionally have been able to work for short periods in shallow depths, descending quickly and rising slowly to avoid the dread water pressure affliction, bends.

The Sealab series is aimed at finding ways to permit divers to stay in depths for long periods—days or weeks—and perform useful work . . . salvage, construction, research.

The last team came up Sunday. All but one left a decompression chamber Monday. The team commander, Robert Sheats, a master chief torpedoman and veteran diver, suffered from bends and didn't get out until Tuesday morning. He wasn't at the news conference. But a Navy spokesman said he was in good condition.

Capt. George Bond, the project medical officer, said the Scalab experiment achieved "major accomplishments" but added that the data would be fed through a computer before officials would know exactly what the experiment had revealed.

In all, 30 aquanauts spent a total of 45 days in the 12 by 58 foot steel Sealab 2. The project began Aug. 26 and the third team ascended to the mother ship about a half mile off the La Jolla coast Sunday morning.

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Mpls. (Minn.) Morning Tribune
WEDNESDAY, OCTOBER 13, 1965

Sealab 2 Project Achieved Major Goals, Chief Says

LA JOLLA, Calif. — (AP) — The director of the Navy's Sealab 2 underwater research project, summarizing its achievements, said Tuesday:

"We attained our key goals. We proved that men can live in ocean depths without physical harm while they carry out work assigned them."

Sealab 2 was brought to the surface yesterday and will be towed to Long Beach, Calif., today. There it will undergo study and modification that may allow it to be used in the planned Sealab 3 project, the Navy said.

The third of three diver teams that spent 15 days each living and working there told about it at a press conference yesterday morning.

Capt. L. B. Melson, project director, who visited the lab but wasn't a team member, said:

"We don't really know yet all that we have learned. It will take a long time to study and analyze information...

"We are muddling our way through. The sea is a hard master. What we've learned at 200 feet won't apply at 400 feet. What we know at 400 won't apply at 600."

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From OCT 13 1965
DAILY NEWS
New York, N. Y.

The Oldest Salt On the Sealab KOs the Bends

La Jolla, Calif., Oct. 12 (UPI) —Navy Chief Robert Sheats, at 50 the oldest among the three teams of aquanauts in the Sealab 2 underwater-living project, was discharged from the decompression chamber today and appeared in good condition following a mild, but painful case of "bends."

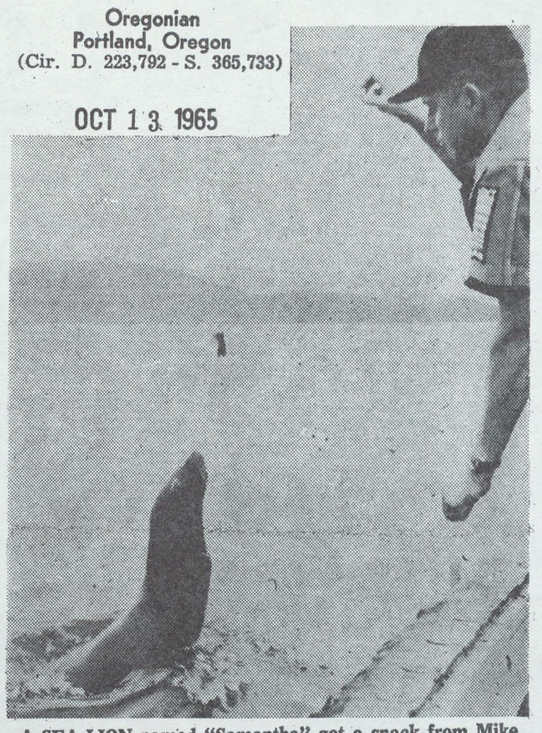
Sheats was the last of the 10 aquanauts to leave the chamber. He spent an additional 12 hours in it because of the pain in his hip.

The bends is a condition resulting from a supersaturation of tissue with gas, causing the formation of bubbles in the tissue.

Three teams of aquanauts occupied the 57-foot Sealab 2 capsule, at a depth of 205 feet, for 15-day periods. Navy officials said the experiment was a complete success and proved that man could operate efficiently under pressure six times that on the surface.

Oregonian
Portland, Oregon
(Cir. D. 223,792 - S. 365,733)

OCT 13 1965



A SEA LION named "Samantha" got a snack from Mike Greenwood recently at Sealab 2 — the Navy's underwater living experiment near La Jolla, Calif. The Navy said it hopes to capture "Samantha" to see if she can be trained to aid "aquanauts." (AP Wirephoto)

A P PM

A95LA .

LA JOLLA, CALIF., OCT. 8 (AP)-THE PERSONNEL TRANSFER CAPSULE THAT WILL BRING THE SEALAB AQUANAUTS TO THE SURFACE SUNDAY HAS BEEN CHECKED OUT AND REPAIRED.

CREWS BROUGHT THE CAPSULE TO THE SURFACE YESTERDAY TO REPLACE A DEFECTIVE POWER CABLE AND MODIFY A COMMUNICATIONS CIRCUIT.

THE 10 AQUANAUTS WILL RIDE UP IN THE CAPSULE AFTER THEIR 15-DAY STAY AT 205 FEET BENEATH THE SURFACE OF THE OCEAN.

A SEALAB SPOKESMAN SAID TWO TEAMS OF TWO DIVERS MADE DIVES TO 300 FEET YESTERDAY AND GATHERED BIOLOGICAL SAMPLES.

OTHERWISE, MOST OF THE AQUANAUTS' EFFORTS ARE BEING DIRECTED TOWARD CLEANING UP THE AREA AROUND THE SEALAB AND PREPARING TO COME BACK TO THE SURFACE.

EE330APD NM

Sealab Team Prepares for Resurfacing

Scientists corrected a malfunction in the steel capsule yesterday which will hoist the third team of 10 aquanauts to the surface Sunday in the final leg of the 45-day Sealab II project off La Jolla.

Navy officials said a power cable in the capsule was defective. The electrical unit was replaced, and the capsule sent back down to the bottom.

The capsule is kept near the 57-foot-long Sealab II and is used as an elevator for lowering and raising the 10 aquanauts to and from their habitat and the mother ship Berkone.

Preparations Made

Aquanauts divided their time between final housekeeping preparations for the scheduled surfacing and underwater biological studies yesterday.

They tested power tools on sunken 55-gallon steel drums filled with plastic foam.

A total of eight drums were dropped to the ocean floor on Sept. 28 when they were filled with the foam.

Two drums were released and surfaced on Sept. 28, another two four days later, another set yesterday and the final set will be released for resurfacing tomorrow.

Buoyancy Test

Purpose of the project is to test the longevity of the plastic foam buoyancy capabilities. All projects have been successful.

The aquanauts' activities were inspected over a closed-circuit television hookup by 35 members of the Navy's steering committee for the deep submergence program.

The third team of aquanauts has been living undersea for 15 days — the same period of time as the first two teams. The third team has spent much of its time in salvage projects. Earlier teams were occupied essentially with housekeeping duties and physiological tests.

San Francisco, Calif.
Examiner
(Cir. D. 289,469 - S. 427,093)

OCT. 8 1965



A Snack for Samantha

Samantha the sea lion gets a snack from Mike Greenwood, a psychologist at Sealab 2, the Navy's underwater living experiment at La Jolla. The Navy is attempting to train Samantha to aid aquanauts.

U.S. Navy Photo

SAN DIEGO UN.

OCT 8 1965

D.C. Officials Visit SeaLab Mother Ship

Group Watches Test Raising Of Crew Transfer Capsule

By JUDITH MORGAN

Officials of the Navy's Deep Submergence Systems Project visited the mother ship Berkone and watched the raising of the personnel transfer capsule which will return the third and final SeaLab II crew to the surface this weekend.

The capsule was raised from the bottom in a test before the crew, which has been living on the bottom for 15 days, is raised 205 feet to the surface.

The SeaLab chamber, which will remain on the ocean floor off La Jolla for 45 days, is part of the Navy's long-range Man-in-the-Sea Program.

ACCOUNT GIVEN

Capt. George Bond, principal investigator for the project, gave a detailed account of the SeaLab for the 35 members of the steering committee from Washington, D. C. Committee members watched through closed-circuit television while aquanauts demonstrated underwater power tools which could be used in submarine salvage operations.

The orange and red capsule was returned to the bottom late yesterday.

Four aquanauts continued tests with buoyant foam and released two 55-gallon drums. The drums, which had been filled with foam Sept. 28 and then forced to the bottom, soon floated to the surface yesterday.

The drums were buoyant, the test showed, despite the action of the sea on the plastic foam. Two more drums will be released tomorrow.

WAITER BUSY

Aquanauts have kept busy the dumb waiter which runs on a cable between the Berkone and the SeaLab chamber. It has been used to return small items to the surface by aquanauts, who are beginning to clean out the undersea chamber in preparation for its return to the surface about Wednesday. Officials said the raising of the 60-foot chamber will take four to six hours.

Aquanauts yesterday also began policing the area around their undersea home.

SeaLab officials plan to talk to experts at the San Diego Zoo today about possible ways of capturing Samantha, a tame sealion, for transfer to the Naval Missile Center at Point Mugu. Samantha was "enlisted" in the Navy because of her successful work in diving to and from SeaLab on signal from aquanauts and surface personnel.

SeaLab officials said Samantha probably would have to be given a tranquilizer for the capture as well as the trip.

Officials Of Project Open Conference

Military, scientific and industrial leaders of the Navy's Deep Submergence Systems Project opened a two-day conference yesterday at Ballast Point.

The conferees, who make up the steering task group for the project, will review progress on development of new deep submergence vehicles for underwater exploration and research.

Dr. J. P. Craven, chairman of the task group and chief scientist, and Capt. J. H. Dolan, head of the Deep Submergence Systems Project, are presiding at the sessions.

The steering task group includes seven naval officers and seven civilian scientists, all representing Navy commands and research agencies concerned with deep submergence systems. About 30 others, including shipyard representatives, also are taking part.

LIFE MAGAZINE
OCT 8 1965



Scott Carpenter up from 'inner space'

Another astronaut was in the news last week. Out of a decompression chamber stepped Scott Carpenter, with a new scientific achievement behind him—this time in "inner space." He had spent 30 days 205 feet underneath the sea as boss of the Navy's *Sealab II*, a submarine-like research vessel tethered off La Jolla, Calif. Carpenter went through some arduous experiences that he said were "harder than in the space capsule." In next week's LIFE he will tell of his adventures and their importance in the whole vast exploration of the sea.

From OCT 11 1965
DAILY NEWS
New York, N. Y.

10 Aquanauts Surface After A-1 Sealab Test

La Jolla, Calif., Oct. 10 (UPI)—The final team of 10 aquanauts from the Sealab 2 Man in the Sea project were brought safely to the surface today, ending the successful 45-day project.

The men reported some trouble in getting into the transfer capsule because of poor visibility underwater. However, the transfer was made without serious incident.

Into Decompression

The capsule was attached to a decompression chamber aboard the surface ship Berkone, where the men will remain for about 30 hours.

Capt. George Bond, scientific director of the $1.8 million project, said it looked as if the project was a complete success.

The capsule was lowered to a dept of 205 feet late on Aug. 26 and the first team of 10 aquanauts — headed by astronaut Scott Carpenter — descended on Aug. 28.

Each team spent 15 days underwater, traveling outside the Sealab every day and conducting various experiments. Carpenter headed the first and second team and remained underwater 30 days.

OCT - 8 1965
NEWS
Dallas, Texas

Sealab 2 Aquanauts Sample Ocean Fare

LA JOLLA, Calif. (AP) — Plankton soup is on the menu for the aquanauts living in Sealab 2.

The 10 divers living in the capsule at 205 feet beneath the ocean's surface whetted their appetites Tuesday by eating the tiny sea animals and plants raw.

"They were quite tasty," a spokesman said. They scoop the plankton with a seine or a net.

"They found the plankton to be excellent eating and plan to make soup, or even stew with it," he said.

"They have to eat them with spoons because they are so small," the spokesman said.

He added that there are many kinds of plankton and that the aquanauts did not report the type of plankton they are sampling.

It will be significant for the underwater living experiment if the soup proves successful, he said, because it could make it easier for man to live beneath the sea.

Meanwhile, the divers continued their efforts to work with the six sea lions that have been hanging around for the past two weeks.

Only two of them—Samantha and Susie—have responded to training.

"It appears that it was Susie, not Samantha as believed earlier, who poked her nose inside the sealab last week and breathed the atmosphere," the spokesman said. "Yesterday she was active in the water and showed no ill effects."

Samantha is shy, but her hunger got the best of her yesterday. She jumped six feet above the water and grabbed a fish, but swam away when two trainers tried to enter the water near her.

Attempts were to be made tonight to use a buzzer to call both of the sea lions down to the sealab.

SCIENCE

OCEANOLOGY

Deep Thoughts

Commander Scott Carpenter is a man of extremes. He has orbited the earth three times as an astronaut, and last week he returned from living a record 30 days beneath the sea as an aquanaut. After surfacing from the Navy's Sealab II off the coast of Southern California, the versatile Carpenter made the inevitable comparison. "The sea," he said, "is a more hostile environment than space." He could also proudly report that the men of Sealab II stood up surprisingly well under the unusual stresses of the deep; they proved that man can live and work in safety as he seeks out the sea's riches.

The aquanauts' first steps into the inky black 205 ft. down were terrifying. They found that they could get lost only 20 ft. from the capsule. At 50° F., the water felt breathtakingly cold despite their special rubber suits. Gradually, Sealab crews grew more confident; they were soon taking only 30 minutes to perform tasks that had taken them three days at the start.

"Ello" for "Aul." Now as a third and final team finishes the 45-day exercise in underwater living, the aquanauts are busy with the last of 47 scheduled experiments. They are setting up mining equipment and collecting biological samples, examining the gas in fish bladders, and squirting clam juice into the water to see what species of marine life it attracts. As one of their most spectacular tasks, they are trying to salvage a submerged fighter plane by filling it with polyurethane foam and floating it to the surface.

The problems of living beneath the sea were varied and puzzling. All the men suffered frequent headaches, occasional absent-mindedness, and the strange experience of waking at night perspiring even while feeling bone-chilling cold. Often they noticed a cloudy inability to reason quickly that became known as "the Sealab effect." In the helium-filled atmosphere of the capsule, sounds took some weird twists, and it was often hard to tell which direction a voice was coming from. Consonants got lost in the thin air. Paul became "aul" and Jell-O "ello." "Every time someone opened his mouth," said Carpenter, "the rest of us were in hysterics."

Families in the Future. As a result of their experience, the aquanauts brought back recommendations for changes in future Sealab equipment. They found that the staging area, a 4-ft. by 6-ft. section where the divers change their suits, was too small. The ladder was not designed with flipper-feet in mind. And the refrigerator was too small. Otherwise, the aquanauts are ready and anxious to return to the depths. "It's in the state of the art now to build an underwater home for a family," says Carpenter. And the Carpenter family, he allows, wouldn't mind moving in for a while.



AQUANAUT CARPENTER & WIFE
More hostile than space.

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Undersea Rescue Vehicle Planned

(Continued from a-17)

from the surface. Also, since the rescue operation would involve only submarines, rough water or weather on the surface would not interfere.

The rescue vehicle would be cigar-shaped, resembling a miniature submarine. Its two-man crew would pilot it in a forward compartment, and there would be space for rescued seamen in the aft section of the hull, which would have a diameter of about eight feet.

Craven said the development of the rescue vehicle was one of four principal goals of the deep submergence program in the next five years. The goals involve both men and vehicles.

One is represented by the SeaLab II project — sending aquanauts into the water as "free swimmers" at unusual depths. Eventually the Navy would like to see aquanauts exploring the undersea world at depths of 1,000 feet.

Another goal is to develop techniques and tools to perform actual "engineering jobs" on the floor of the continental shelf, especially salvage operations.

The fourth is the development of vehicles that can operate at depths up to 20,000 feet, equipped with external manipulators to locate and retrieve objects and materials on the sea bottom. Such a vehicle would be able to probe 98 per cent of the earth's ocean floor.

The San Diego Deep Submergence Group now operates the bathyscaph Trieste II, which was used to locate debris from the Thresher at a depth of 8,000 feet. As newer vehicles are developed, they will be brought to San Diego for testing and training of crews.

Dolan said the Deep Rescue Vessel willl be far more maneuverable than the larger Trieste-type vessels. "The Trieste might be compared to a balloon," he said. "The rescue vessel will be able to move more like an airplane."

Firms that have expressed an interest in bidding on the construction contract for the rescue vessel are General Dynamics-Electric Boat, Lockheed, Westinghouse, North American Aviation, General Electric, Grumman, Lear-Siegler, Litton Industries, General Motors, Boeing and the Newport News Shipbuilding Co.

SeaLab Faces A Busy Finale

(Continued from a-17)

lions have a large bump on their heads and he had not seen this on Sam. Greenwood made his decision yesterday after a closer examination. The divers feel better now about Sam's close friendship with Susie, another sea lion.

Efforts to tranquilize Sam so he would rest quietly on a buoy and could be transferred to Point Mugu for further training at the Naval Missile Center failed yesterday and will be continued today.

Greenwood circled the area in a small power boat, carrying a bucket of fish which he shot with tranquilizing drug. Sam appeared once, ate some fish, and continued on his way. Apparently the dose was not strong enough to slow him down, an official said.

The last phase of the 45-day SeaLab II project will begin tomorrow when the third team swims 15 feet to the personnel transfer capsule and is raised to the staging vessel. The aquanauts will be transferred to the deck decompression chamber for 31 hours.

Aquanauts Facing A Busy Wind-Up

Pictures a-3; Another story, a-18

Team 3 aquanauts will work around the clock in day and night shifts to get equipment around the SeaLab site dismantled before their ascent tomorrow, Robert Sheats, team leader, said yesterday.

The 10 aquanauts living 205 feet under the surface off La Jolla must pack in two days what the first two teams took a month to accumulate, Sheats said.

VISIBILITY POOR

The underwater weather station, an emergency way station, a current meter, a light density meter, a fish cage and various tools used outside the SeaLab chamber yesterday were lifted by crane to the deck of the staging ship Berkone.

Visibility at the SeaLab site on the ocean floor was poor yesterday, Capt. George Bond, principal project investigator, reported.

Bond and Capt. Walter Mazzone, physiological measurement and atmosphere control officer, swam to SeaLab yesterday for a brief visit with the aquanauts. The two officers had visited with each of the other teams on similar dives.

Bond said the water was "as black as the ace of spades."

As of yesterday morning, Bond said, Team 3 aquanauts had been in the water outside SeLab 24 hours longer than either of the first teams. They will widen the margin a great deal by the time they surface because of the required area cleanup work, an official said.

MEETING SET

The salvage committee of the Navy's Deep Submergence Systems Project will meet on board the Berkone this morning to discuss the relation of the man-in-the-sea phase and the salvage phase of the DSSP program.

Mike Greenwood, psychologist aboard the Berkone who has trained sea lions to respond to buzzer signals for fish, yesterday learned that a sea lion first called Sam — and later Samantha when it was thought to be female — actually is a male.

Greenwood said male sea

(Continued on a-24, Col. 3)

Sea Lion's Sex Confuses Aquanauts

LA JOLLA — (UPI) — Sealab II scientists have discovered Samantha, the sea lion mascot ot the aquanauts, should have been named Sam.

The error was noticed while giving Sam tranquilizers. Lack of a characteristic male bump on the forehead had led them to believe the friendly creature, who likes to lounge on buoys, was a male.

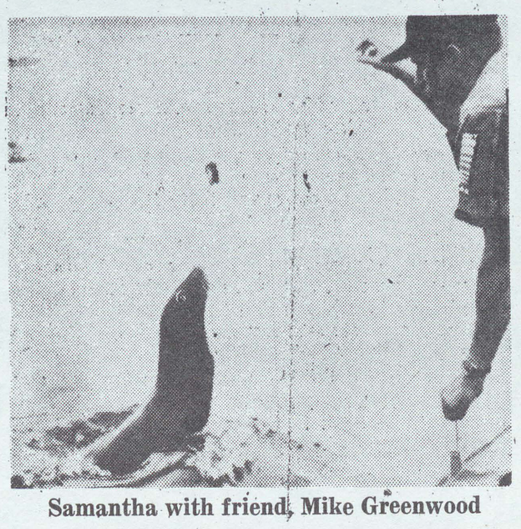
Sam, perhaps a bit miffed at scientists' ignorance about he and she sea lions, swam off to pout after the tranquilizers didn't work.

The scientists had hoped to net Sam for transfer to the naval missile center at Point Mugu, Calif., where he would join a class of porpoises being trained to work with humans underwater.

They plan to try to draft Sam again today.

The third team of aquanauts, down 205 feet in the Pacific, are looking forward to their return to the surface tomorrow to complete the 45-day man in the sea" project.

Names and Faces



Samantha with friend, Mike Greenwood

Sailors Like Her; The Chase Is On

Navy scientists conducting the man-in-the-sea experiment off La Jolla, Calif., have found a sea lion they want to train like the famous handyman porpoise Tuffy.

They call her Samantha and their problem is to catch her.

Tuffy made headlines by rescuing simulated lost divers and delivering tools and mail. Tuffy stays in a special training tank when he isn't working with Sealab divers.

But Samantha is an unexpected bonus. The sea lion has shown remarkable intelligence in responding to the same buzzing device which is used to summon Tuffy.

Catching Samantha isn't going to be easy.

"It's very tricky and we don't have too much time left," said Mike Greenwood.

The 10 divers of the third team are scheduled to end the experiment when they surface Sunday after nearly 15 days at a depth of 203 feet.

"We hope to catch Samantha Saturday, perhaps tranquilize her and put her in a cage," Greenwood said.

The best time, he said, would probably be when Samantha responds to the buzzer and jumps up for her fish reward near the side of the support vessel Berkone.

San Francisco, Calif.
Examiner
(Cir. D. 289,469 - S. 427,093)

OCT 9 1965

POST, Denver, Colo.

'PAPA TOPSIDE'

Skipper Of SeaLab Dotes On Adventure

By JUDITH MORGAN

You wonder if the Navy has a casting department when you meet Capt. George F. Bond, the former country doctor whose role in SeaLab II is principal project investigator.

Bond is a tall, tan southerner with salt-and-pepper hair and bushy eyebrows. He will be 50 years old Nov. 14 but is as eager for adventures as a teen-ager when it comes to diving 205 feet to visit the SeaLab aquanauts.

'PAPA TOPSIDE'

Bond, called "Papa Topside" by the aquanauts whose activities he follows on closed circuit television — has been living on board the surface ship Berkone since Aug. 17.

"I really enjoy sea duty," Bond said with a hearty laugh one sunny morning, "especially when the shore is in sight."

The La Jolla coast glittered less than a mile to his right and flags fluttered overhead in a stiff breeze.

He was drinking coffee at a picnic-sized table on the Berkone's top deck where Bond eats, writes letters, studies underwater cameras, gives interviews and, in general, holds court.

STUDIES FRUIT

Bond leaned back in a red canvas deck chair and studied some lemons and oranges on the table in front of him.

"Still a little green," he said. "Maybe they'll be ripe tomorrow."

Bond knew there was no rush. The Berkone wasn't going anywhere and neither was Bond.

Ever alert to the aquanauts' safety, Bond nevertheless seems to run on patience. The mood on the Berkone is one of competence and care — not impending disaster.

During spare time, Bond may be sidetracked to look for his misplaced prayer book with which he leads Sunday services for the men below or reminisce about the color of the hills around Bat Cave, N.C., in autumn.



CAPT. GEORGE BOND
. . . he keeps busy

He strides around the Berkone in brown canvas shoes, shorts and a green shirt with the red, white and blue SeaLab emblem on one sleeve.

Over the upper right hand pocket is printed "P. Topside" instead of "G. Bond."

Always within reach is a pipe, usually lit, and a can of Sir Walter Raleigh tobacco. One afternoon, Bond left the Berkone in a small motor boat with two newsreel photographers to see Tuffy, the trained porpoise, whose cage floated in the sea a few hundred feet away.

HOLDS LINE

The photographers were having a hard time balancing their cameras and gear while staying dry at the same time.

Bond held the boat's line while standing on a foot-wide plank that behaved like a teeter-totter in the waves. At the same time he filled his pipe from his orange and black tobacco can.

Each day Bond writes two SeaLab accounts on his outdoor deck table. His chronicle of SeaLab I ran 800 pages.

"The log is the shorter account," he said with a grin. "It says what I'm going to turn in. The chronicle will be at least twice as long. It says what I think."

Bond interrupts his writing to greet visitors or to snap a Polaroid picture of sharks or fish who swim nearby. He has been up at 4 or 4:30 several mornings to take photographs of sunrises over La Jolla.

MUCH TRAVEL

Bond estimates he traveled more than 125,000 miles around the country on SeaLab business between November, 1964, and July.

"Then I screeched to a halt and now I'm sitting for three months," he said.

But he never sits very still. Once he even recited a long chunk of poetry in his rolling bass voice.

He had been talking about his daughter, Judy, 20, who is going with a "Yankee." Bond gave an expression of mock horror at the thought of a northern boy in the family and swung into several powerful verses from "John Brown's Body."

OTHER CHILDREN

Bond, who delivered Judy himself, and his wife, Marjorie, have three other children: Gail (Mrs. William Edwards), 24; George Jr., 21, and David, 13.

He was a practicing country doctor from 1946 to 1953, when he began active duty in the Navy's Medical Corps. In October, 1948, Bond founded the Valley Clinic and 16-bed General Community Hospital in Bat Cave, where he was sole physician for 6,000 persons in a 400-square mile area.

Presently, Bond is head of the Navy's man-in-the-sea program in the Special Projects Office in Washington.

OCT 4 1965

Curious Sea Lion Survives Sealab Stop

LA JOLLA, Calif.—(AP)—A curious sea lion apparently has survived her brief whiff of the high-pressure, helium-charged atmosphere in Sealab 2, a Navy spokesman said Monday.

The visitor appeared Saturday. Aquanauts were routed from their bunks by a strange barking.

The sea lion, dubbed Samantha, had poked its head through the capsule's entry hatch. Aquanauts grabbed their cameras but the flashbulbs startled her and she withdrew.

The capsule hatch is left open to the sea because the atmosphere inside—80 per cent helium, 16 per cent nitrogen and 4 per cent oxygen—is maintained at seven times the pressure of the surface, sufficient to keep the water from rushing into the capsule.

Navy scientists feared that as the sea lion later ascended the 205 feet to the surface, its lungs would expand and the mammal would die of embolism—air in the blood vessels.

A death watch was established by surfers and lifeguards from Coronado to Huntington Beach—70 miles north of the project.

But no sea lions washed ashore, the spokesman said—indicating Samantha instinctively exhaled the fumes in her ascent.

Monday aquanauts planned to buzz for Samantha, who has responded to earlier buzzer calls.

SAN DIEGO UN

OCT 9 1965

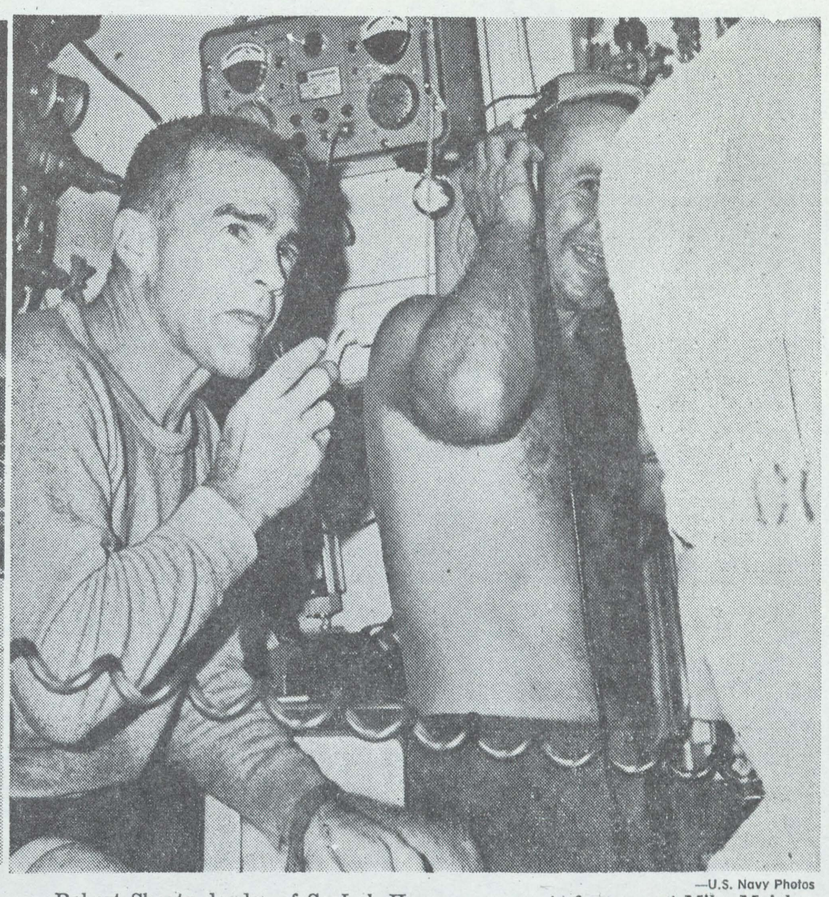
Work And Play With SeaLab Aquanauts



Nozzle used to produce foam inside hulk of old aircraft is shown during underwater salvage operation performed by SeaLab II aquanauts in this photo by Navy Electronics Laboratory diver Bill Bunton. (Story, a-17).



Aquanaut Rick Grigg pours crustacean samples he has collected into bucket for transport to Scripps Institution of Oceanography from inside SeaLab II.



—U.S. Navy Photos

Robert Sheats, leader of SeaLab II team 3, plays harmonica during underwater hootenany, much to the amusement of aquanaut Mike Meisky, right. Photo shows that aquanauts have little room to move around.

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Wed., Oct. 6, 1965
SAN DIEGO, CALIFORNIA

Aquanauts, Beware



Two sculpin or scorpion fish, which have come by hundreds to vicinity of Navy's SeaLab on ocean bottom off La Jolla, are handled gingerly by aquanaut Billy Meeks in photo aboard undersea laboratory. Aquanauts Scott Carpenter and more recently Rick Grigg have been stung by fish.

SCHOLASTIC TEACHER - 77
(NEWSTIME EDITON)
50 W. 44th Street W
New York 36, N.Y. Circ. 354,153

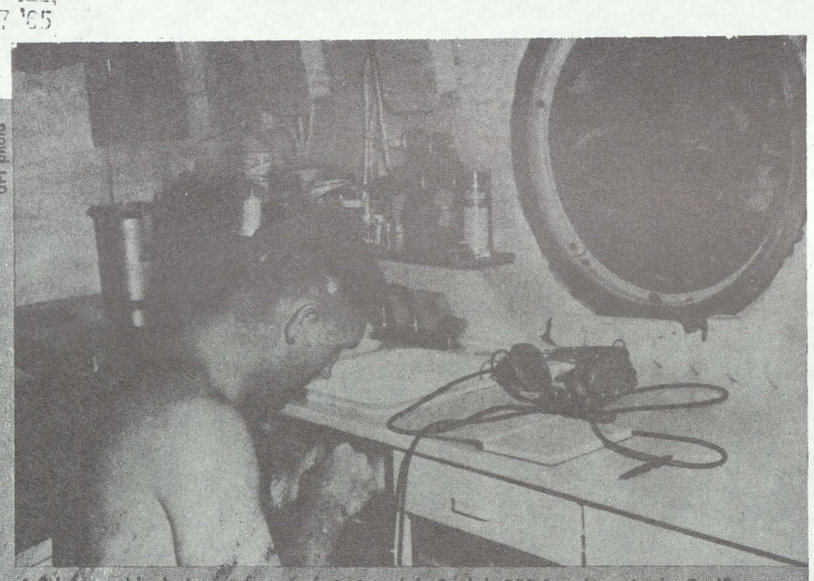
OCT 7 '65

Minneapolis (Minn) Sunday Tribune
SUNDAY, OCTOBER 10, 1965

6

Astronaut Dips Down

UPI photo



A fishy crowd looks in on an aquanaut at work in Sealab, 215 feet down in the Pacific.

The night is dark and deep outside the glass-covered portholes. In the darkness the astronaut sees little sparks of light flash by like stars.

When day comes, it lasts only a few hours. Sometimes daylight is a dim, cold blue. More often, day is as dark as night.

Is this a science fiction story about a trip to another planet? No! It's a true story. And it's still happening—right here on Earth.

The astronaut is U.S. Navy Commander Scott Carpenter, the second American to orbit Earth in a spacecraft. Last month Carpenter was not hundreds of miles out in space. He was 215 feet beneath the waves of the Pacific Ocean, and 3,000 feet off the California coast. There he and a team of U.S. Navy men are taking turns living in an underwater home—Sealab II *(photo above)*.

The team includes scientists and diving experts. Except for Carpenter, none of them will live in Sealab II for more than 15 days. Carpenter was scheduled to spend a whole month on the Pacific floor.

Sealab II is helping U.S. scientists study and explore Earth's continental shelf. This is the ocean floor around the continents of the world, where the sea is not very deep. The average depth there is about 400 feet. Other parts of the ocean are up to seven *miles* deep.

Many parts of the continental shelf are rich in minerals such as oil, gold, diamonds, iron. A thick carpet of seaweed covers it. Swarms of fish and other creatures feed on this seaweed—and on each other. So the shelf may become a rich source of food and other wealth for man. Scientists say the continental shelves around the world take up as much space as all of Asia.

GUIDING PORPOISE

The men in Sealab II spend several hours each day exploring the area of the shelf near their home, wearing special diving equipment. Some of them studied the animals and plants that live at these depths.

Other explorers from Sealab II studied the material of the ocean floor itself. They found out what makes up this underwater "soil."

Often currents in the water stirred up the fine sand and mud of the ocean floor. Then, even in daytime, it was pitch dark. But the aquanauts had a "guide" to help them. The guide is a 270-pound porpoise, Tuffy.

Tuffy was caught in the Atlantic Ocean about three years ago. He was trained to wear a simple harness made of leather. Guide lines can be attached to his harness.

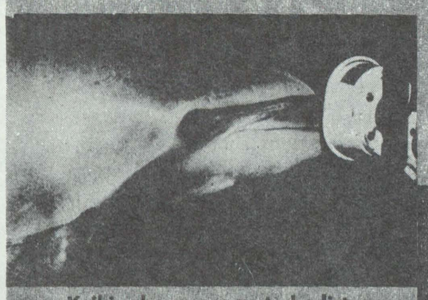
Tuffy can hear clicking signals sent out by lost divers when he is 550 yards away from them. Then he can help guide them "home."

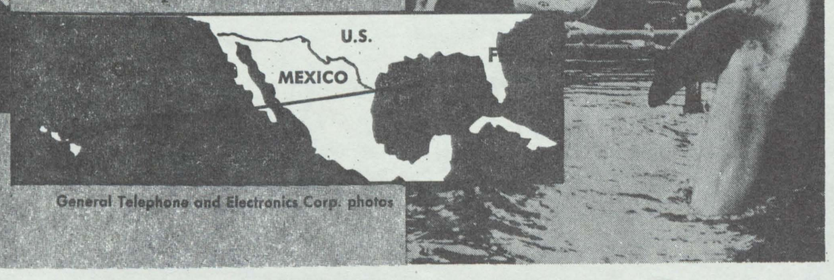
Porpoises have been making some unusual long-distance phone calls too! *(See story below!)*

Area Code SQUEAK one one GRUNT, please

A porpoise "talked" for five minutes with another porpoise—thousands of miles away. Porpoise Moby Dick squealed and squeaked into special underwater phones at a pool in Florida. Cable and wire carried the sound across land and water to the Sea Life Park at Hawaii. There, porpoise Keiki stuck his snout in the underwater speaker, and listened.

Science in the News





Keiki, above, seems to be listening closely to Moby Dick, at right. They are 4,700 miles apart.

General Telephone and Electronics Corp. photos

THE SAN DIEGO UNION
Wed., Oct. 6, 1965
SAN DIEGO, CALIFORNIA

2 Aquanauts Break Deep-Diving Record

Plunge To 300 Feet

By JUDITH MORGAN

Two SeaLab II aquanauts yesterday set a Navy deep-diving record for exploration dives.

CPO Robert Sheats, leader of Team 3, and aquanaut-photographer William Bunton made a dive to 300 feet in Scripps Submarine Canyon.

Special authorization for the record-breaking dive was given by Dr. George Bond, principal investigator for SeaLab II, and Dr. Henry Craven, chief scientist of the Navy's Special Projects Office in Washington, D.C.

19 MINUTES

SeaLab officials said the successful dive lasted 19 minutes. The aquanauts took seven minutes to get to the 300-foot level from their SeaLab habitat at 205 feet under the surface, spent five minutes at 300 feet and returned to SeaLab in seven minutes.

Dives can be made only to a depth of 271 feet without special permission. This is a change of two atmospheres from the SeaLab level and the pressure change involved is known to be safe.

Sheats and Bunton reported the canyon was rather bare of marine life at 300 feet but they took color photographs of their surroundings.

STAKE FOUND

The two aquanauts found a stake left by Team 2 aquanauts Scott Carpenter and Wallace Jenkins at the 266-foot level, which was the deepest dive into the canyon before yesterday's exploration.

Sheats and Bunton measured their descent from the stake by wrapping a 50-foot line around it. The line was marked in 10-foot lengths so they would not venture below 300 feet. They also checked their depth on wrist gauges.

Sheats said last night that all Team 3 aquanauts were hoping to get permission from Bond to descend to the 300-foot level.

NEW FOOD

Meanwhile, aquanaut Rick Grigg, a student at the Scripps Institution of Oceanography, added a little variety to yesterday's menu. On a 2 a.m. excursion outside for plankton samples he caught more of the small animals in his net than he needed to preserve in jars for study.

The rest of the shrimp-like plankton were put in a bowl. Grigg said he and Sheats thought they looked good enough to eat and tried some raw.

They reported this species of plankton is about one-quarter inch long from antenna to tail and has a sweet nutty flavor. Sheats said when it is eaten fresh from the ocean no salt is needed.

SEAL DIVES

Samantha, a yellow-bellied seal lion, breathed of the SeaLab atmosphere yesterday in a dive to the 205-foot site and apparently knew enough to breathe out the gas during her return to the surface.

The sea lion had been painted for identification and was called by buzzer to the ocean floor and then to the surface to see if, by instinct, she would exhale the gases which would expand and tear lung tissue if kept inside.

EVENING NEWS
Newark, N. J.
OCT 10 1965

Aquanauts Rising

Ending 45-Day Underwater Test

LA JOLLA, Calif. AP — The nation's aquanauts of Sealab 2 will ascend to the surface today to wind up the 45-day undersea living experiment.

The 10 divers of the third team to live at the 205-foot depth were busy yesterday making final preparations to leave the undersea laboratory.

After nearly 15 days on the Pacific Ocean bottom, the aquanauts will secure the Sealab and enter the pressurized personnel transfer capsule for the 10-minute rise to the surface. Then they'll spend about 30 hours in a decompression chamber aboard the support vessel Berkone.

Sealab 2 will be hauled to the surface Wednesday and will be towed to Long Beach, Calif.

Meanwhile, attempts were made yesterday to tranquilize and capture Sam the sea lion.

Men got a close look at Sam on Friday while he was sleeping on a buoy and decided Samantha should be Sam because he is a male, instead of a female.

They want to catch the sea lion and transport him to Point Mugu, Calif., to join Tuffy the Porpoise in a training tank. Tuffy took part in a scheduled experiment earlier by rescuing "lost" divers and delivering tools and mail.

Sam took only several days to learn to respond to the buzzer used to summon Tuffy. The porpoise underwent months of training. Both were conditioned by fishy rewards.

Aquanauts Will Surface Today

LA JOLLA—(AP)—The Sealab 2 aquanauts will surface today to end a 45-day undersea living experiment.

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Sealab 2 will be hauled to the surface Wednesday.

Sealab Crew Prepares for Resurfacing

The Sealab II aquanauts began putting their house in order today for a scheduled resurfacing on Sunday after setting performance records for working time and diving depths yesterday.

Officials also disclosed today that Sam the female sea lion who has befriended the aquanauts has been drafted into the Navy.

Divided into Teams

Sam, whose body is swabbed with yellow paint for identification, is scheduled to be transported to the naval missile center at Point Mugu on Monday.

Eight aquanauts divided into four teams descended to a 300-foot depth at the brink of the Scripps Canyon.

They followed the same depth record trail marked by aquanauts Robert Sheats and Bill Bunton on Tuesday

Bunton is a civilian photographer-diver from Navy Electronics Labroratory here. Sheats is leader of the team now in Sealab.

Pictures Taken

The excursion required a total 798 minutes (an average 80 minutes per aquanaut) for total time in the cool water — 48 degrees — away from the Sealab II habitat.

The 57-foot-long cylinder Sealab II is submerged in 205 feet of water off the La Jolla coastline.

While on the descent to the Scripps Canyon shelf, the aquanauts succeeded in taking pictures and conducting biological surveys of marine life.

Samples Taken

They collected samples of gas from fish bladders for analysis by scientists in determining how fish survive at various ocean depths.

Some of the ocean samples taken included plankton, tiny particles of marine life which most of the aquanauts ate for dinner.

Plankton also was packaged and surfaced to scientists aboard the mother ship Berkone.

The 10 aquanauts preparing to resurface Sunday are the last of three Navy diving teams undergoing underwater living conditions in the Sealab II habitat. The entire project will have lasted 45 days.

SAN DIEGO UN
OCT 3 1965

Aquanauts Get Turkey Trimmings

Special Dinner Is Prepared By Scripps Secretary

By JAMIE BRYSON

The crew of SeaLab II worked up man-sized appetites with a full schedule of chores inside and outside their sea-bottom home yesterday, then feasted on a surprise turkey dinner with trimmings.

Joan Percy, a secretary at Scripps Institution of Oceanography who has been following progress of the undersea adventure closely, brought the food to the mother ship Berkone and it was lowered to the men 205 feet below in a waterproof "dumbwaiter."

"I thought of those poor guys eating their own cooking," said Miss Percy, "and I decided to do something about it."

She said she spent the day preparing the turkey, sweet potatoes and home-made cranberry sauce, then hitched a ride on one of the Berkone's orange utility boats, which shuttle between the ship and Scripps Institution pier, to bring it out.

SALVAGE PRACTICE

The 10-man SeaLab crew, scheduled to ascend next Sunday and end the Navy's 45-day Man-in-the-Sea project, spent the day practicing salvage and repair work on the bottom.

Using compressed air hoses from the surface, they inflated several giant pontoons made of rubber, which are designed to raise objects from the ocean floor, and operated special explosive guns which drive studs, affixing a patch to a curved section of 1¼-inch thick steel. The operation simulated underwater repair of a submarine hull, Capt. George Bond, director of the program, said. The section will be raised and the patch tested for strength, he said.

The divers worked in water which was perhaps the clearest since the project began. One aquanaut reported 90 feet visibility at one spot.

STRANGE VISITOR

SeaLab crewmen also had an unannounced visitor—a sea lion—which poked its head into the undersea vessel at 3 a.m., took a breath, and left. No door is needed on the hatch because the atmosphere inside is maintained at a pressure high enough to keep sea water from coming in.

Today, the aquanauts will get a chance to rest, attend church services, watch television or take "pleasure" excursions outside.

San Diego, Calif.
Thursday, October 7, 1965
From OCT 10 1965
INQUIRER
Philadelphia, Pa.

161

Aquanauts Ready To Leave Sealab

LA JOLLA, Calif., Oct. 9 (UPI).—The Sealab 2 "man-in-the-sea" project will end 45 days of underwater living and working Sunday.

On Saturday the 10 aquanauts of the third team were completing the dismantling of thousands of feet of cable, the closed circuit television setup and other equipment in the 57-foot Sealab, resting on a ledge 205 feet below the surface of the Pacific.

They were expected to come up to the tending vessel Berkone in the late afternoon Sunday and begin 30 to 35 hours in a decompression chamber.

SAN DIEGO UN.

OCT 10 1965

Sea Study Merger Proposed

Honolulu, S.D. Oceanography Partnership Urged

The Honolulu Advertiser has proposed that San Diego and Honolulu explore the idea of becoming "sister cities" in oceanographic development on the theory that "we can do it better together."

In an editorial Oct. 1, George Chaplin, editor of the Advertiser, says that the two cities, while geographically different, share an interest in oceanography, have in many ways parallel facilities and that "the result of broad cooperation could work to the benefit of not only the communities involved but of the nation and the world."

The editorial said that oceanographic development has been lacking facilities and industrial support in depth. "There hasn't been a focal point where you could get a 'critical mass' of facilities — an institute here, one there; a vessel here, one someplace else, not a total approach in the way, say, that Detroit approaches the matter of automobiles."

COMBINATION URGED

"The ideal," the editorial continued, "is to bring all of the necessary resources together in a mutually supporting way and focused on the single activity."

Honolulu and San Diego, the editorial theorized, "together can cover the whole base."

The newspaper, Honolulu's morning daily, proposed that both communities explore the idea at all levels. The study it said, should start with Hawaii's Gov. John A. Burns and California's Gov. Edmond G. Brown.

San Diego Mayor Frank Curran and Honolulu Mayor Neil Blaisdell should get together, according to the editorial, as should the cities' chambers of commerce which "well might sponsor series of sessions in both cities, to pinpoint the areas of overlap."

The newspaper suggested also that mutual discussions between the University of Hawaii and Scripps Institution of Oceanography be conducted.

Some San Diegans who have been appraised of the sister city idea, have suggested that the proposed "Maritime Pacific," complex of San Diego could serve as a clearing house for development of the program.

SENATOR'S IDEA

The Advertiser attributed the idea to Hawaii State Sen. Taylor (Tap) Pryor, who operates Sea Life Park on Oahu's windward side. Pryor says the park combines many of the scientific aspects of San Diego's Scripps Institution with the amusement characteristics of the SeaWorld oceanarium here.

Pryor pointed out that an oceanographic trade journal recently commented that five U.S. cities are striving to be the number one oceanographic center: New York, Boston, Fort Pierce, Fla., San Diego and Honolulu.

"He then came up with this stimulating idea — that Honolulu and San Diego join hands, that they become 'sister cities' in oceanography."

The Advertiser indorsed Pryor's reasons, which included:

1. San Diego and Honolulu have equal assets, "but they don't seem to overlap." For instance, San Diego has the Navy Electronic Laboratory, Scripps and its "broad academic spectrum of conventional oceanography, a leader in the traditional approach." Honolulu has the University of Hawaii Institute of Geophysics, combined with the zoology department, which "gives promise of being a close parallel."

2. Both areas have an offshore continental shelf, on which a substantial part of all oceanographic work is conducted. California's extends outward several hundred miles; Hawaii's is "within an arm's reach of the beach" and within one to three miles the depth goes to 600 feet.

3. Hawaii can do its research in clear, warm water the year around, "and the results can be put to use off California or South Africa or any land mass."

STUDY PLANNED

The journal of Geomarine Technology plans a full issue soon, the editorial said, comparing the natural assets, harbor facilities, industrial support, technical accessories and tax structures of the five communities competing in oceanography.

"The indication," the Advertiser said, quoting Pryor, "was that here's a sort of buyer's market and a chance to shop around."

The Advertiser called Pryor's idea "a big one . . . for some it may seem too big" but added "we don't think it is."

SAN DIEGO UN.

Aquanauts Locate 2 TV Cameras

Aquanauts of SeaLab II yesterday found a couple of television cameras 215 feet down in the ocean off La Jolla.

One camera is worth $12,000; the other, $6,000.

They were found the same way they had been lost — by accident.

The more expensive camera fell off its platform while being lowered during the early days of the underwater-living experiment. It was to have been used for closed circuit television from the SeaLab capsule to its mother ship, the Berkone.

LOST IN MUD

The other camera was lost in mud. It is a benthic camera, used for underwater viewing.

Other cameras were substituted.

Television played another part yesterday aboard SeaLab. A few of the 10 aquanauts who had some free time managed to watch a few innings of the World Series game.

Otherwise, they were busy making final preparations to leave their habitat today. They will ascend this morning for transfer to a decompression chamber aboard the Berkone to rid their tissues of the gases that cause the bends. They will spend about 31 hours in the chamber.

FINAL TEAM

This is the third and last team of 10 aquanauts to work in and outside SeaLab on biological research, salvage operations and a host of other projects.

Each team spent 15 days below. Cmdr. Scott Carpenter, the astronaut-turned-aquanaut, spent a record 30 straight days underwater. He came up with the second team. Dr. Robert Sonnenburg went down with the first team, returned topside, then descended again with the third team.

TIME IN WATER

Aquanaut Teams Set Diving Mark

By JUDITH MORGAN

Four teams of aquanauts yesterday duplicated a record 300 foot dive and set a new record for total time spent outside SeaLab II 205 feet under the ocean surface off La Jolla.

Eight aquanauts, two to a team, descended to 300 feet in Scripps Canyon. Aquanauts Robert Sheats and William Bunton had made the same dive Monday, setting the record.

Bunton took pictures of the aquanauts working at 300 feet yesterday. They made biological surveys of the canyon.

Ten aquanauts spent a total of 798 minutes outside SeaLab II yesterday. It was a record for time spent outside the helium-oxygen atmosphere in the underwater habitat.

WASHINGTON VISITORS

The SeaLab II mothership Berkone will have visitors from Washington today. Members of the steering task group of the Navy's Deep Submergence Systems Program will go aboard.

Yesterday the Berkone was visited by two groups of medical officers. The 25 visitors in the groups are attending a Navy Reserve medical officers research seminar at North Island Naval Air Station.

Two trained sea lions, Samantha and Susie, frolicked about the Berkone yesterday, apparently in robust health. The yellow paint with which they have been daubed to identify them from others of their kind loomed brightly.

The day before Samantha had descended and entered SeaLab II, breathed its atmosphere and then came rapidly to the surface. She instinctively exhaled to prevent lung tissue damage during the rapid ascent. Mike Greenwood, Berkone psychologist, has trained the two sea lions to respond to signals from a buzzer.

SEA LION FOUND

A dead sea lion was found 1,200 yards north of Scripps Pier yesterday. It was not part of the SeaLab experiment.

Dr. Carl Hubbs, professor of marine biology, Scripps Institution of Oceanography, examined the carcass. He said it had been dead "probably longer than a week."

Samantha's career in the Navy is assured. It was announced she will be transferred to the Missile Center at Point Mugu.

ROCKY MOUNTAIN NEWS

Sealab 2 Project To Surface Sunday

LA JOLLA, Calif., Oct. 9 — (UPI) — The highly successful Sealab 2 "man-in-the-sea" project will end 45 days of underwater living and working Sunday.

The 10 aquanauts of the third team Saturday were completing the dismantling of thousands of feet of cable, the closed circuit television setup and other equipment in the 57-foot Sealab resting on a ledge 205 feet below the surface of the Pacific.

They were expected to come up to the tending vessel Berkone in the late afternoon Sunday and begin 30-35 hours in a decompression chamber.

Project officials have been impressed with the industriousness of the third aquanaut team, which has been in the dismantling process since Thursday.

"They have done the same amount of work in reverse that the first team took two weeks to do," a spokesman said.

Houston Post 10/10/65

Called Big Success

10 Aquanauts End Sealab Stay Today

By GENE BYLINSKY
Progress Reports Writer

WASHINGTON — Ten aquanauts will emerge from the depths Sunday, completing a 45-day underwater living and working experiment in the Navy's Sealab II.

The long test is being hailed by Navy officials as a "fantastic success."

A total of 28 undersea explorers, Navy men and civilians, including Astronaut Scott Carpenter, have lived in the 57-foot cylinder for 15-day periods. It is moored half a mile off La Jolla, Calif, in 210 feet of water.

IN SOME ways, life below resembled that in a spaceship —except the aquanauts were able to move freely, take hot showers and soak in a warm tub. Such comforts aren't available in orbit.

The Navy had prescribed 47 experiments to be conducted outside the undersea laboratory and the aquanauts will have accomplished most of them.

They exited from the submerged craft, averaging 45 minutes per man per day in the dark water. At that depth surface light is so feeble visibility was only 15 feet.

But thousands of fish were attracted by the underwater activity. They were so numerous that aquanauts inside Sealab had trouble seeing through the portholes. Fish normally not seen at a depth of 200 feet also were attracted to the scene, as well as swarms of scorpion fish which painfully stung two of the underwater explorers.

AQUANAUTS successfully raised a Navy fighter plane, which had been sunk earlier, using an experimental salvage technique. The plane was kept buoyant for 30 hours.

The explorers, working in skin-tight "wet" suits made of rubber, also patched holes in a piece of steel hull previously deposited on the bottom, to investigate underwater repair methods. They worked with a "stud gun" that produces no recoil. This type of tool will also be tried in space by Gemini astronauts working outside their orbiting ships.

Aquanauts investigated sea life, tested the bottom for geological deposits, conducted various measurements of underwater currents, and tested new diving suits which are warmed by batteries inside.

They worked with a trained porpoise named Tuffy. When the porpoise was first brought to the scene, it became confused by the multitude of wires and equipment cluttering the water above and below, and showed signs of fright. This earned Tuffy the nickname of "chicken of the sea."

THE NEXT DAY, however, Tuffy was delivering mail from the surface to the Sealab and performing other tasks. The porpoise was trained to respond to a buzzer whose sound carried at least 500 yards.

When a buzzer sounded in the Sealab, Tuffy would promptly dive, carrying a container attached to a harness. A buzzer sound from a support vessel above would send the porpoise scurrying to the surface.

Tuffy also came to the aid of a "lost" diver, 70 feet away from Sealab. The diver had sounded a buzzer, testing the animal.

The porpoise is one of four being trained at the naval missile center at Point Mugu, Calif. Tuffy was kept in a low-bordered stall near the support vessel.

FROM POST NEWS SERVICES

● The 10 divers of the third Sealab 2 team were busy Saturday off La Jolla, Calif, making final preparations to leave the undersea laboratory Sunday.

Sealab 2 will be hauled to the surface Wednesday and will be towed to Long Beach, Calif.

MEANWHILE, attempts were made Saturday to tranquilize and capture Sam the sea lion.

Men got a close look at Sam Friday while he was sleeping on a buoy and decided Samantha should be Sam because he is a male, instead of a female.

They want to catch the sea lion and transport him to Point Mugu, Calif, to join Tuffy the porpoise in a training tank.

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San Francisco, Calif.
Examiner
(Cir. D. 289,469 - S. 427,093)
OCT 10 1965

SEALAB II

Two Tough Babies of The Deep



Aquanaut Billy Meeks gingerly holds two scorpion fish collected on a dive 205 feet beneath the ocean surface in Sealab II off La Jolla, Calif.

SAN DIEGO UN.

OCT 7 1965



Navy photographer-aquanaut William Bunton took this picture yesterday 300 feet under the surface of the ocean in Scripps Canyon off La Jolla. The unidentified aquanaut is one of eight who went there from SeaLab II. The aquanauts made a biological survey of the canyon.

Page 10—Section I ☆☆☆☆ Sunday, October 10, 1965 S. F. SUNDAY EXAMINER & CHRONICLE

Sealab Aquanauts End Undersea Experiment Today

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Des Moines (Ia.) Register
SUNDAY, OCTOBER 10, 1965

Sealab Dispels Old Woes, Produces New Problems

By Jack Wilson
(Of The Register's Washington Bureau)

WASHINGTON, D. C.—As usual at this stage of exploring a new environment, the Sealab 2 experiment in underwater living erased some expected problems—and produced some unexpected ones.



The Sealab

It's still too early to give a complete report on the effects of spending several weeks in a tank under 205 feet of seawater, Navy authorities here said last week.

But at least a few of the expected hobgoblins failed to show up.

And the experiment bolstered the Navy's confidence in its new system of underwater operations, called saturation diving. Briefly, the theory is that since a deep sea diver has to spend a long time in a decompression chamber getting adjusted to normal air pressure after each dive, he might as well stay down long enough to get his job done in one dive.

The "Bends"

Under normal Navy procedure, the longest and deepest dive that can now be made is 380 feet for 30 minutes. And when the diver comes up, he must spend several hours going through decompression, to avoid the diver's disease, the "bends," or other manifestations that can include nausea, paralysis, or death.

In 1957, Navy Capt. George Bond, a surgeon, proposed the theory that if a diver stayed at a fixed depth for about 24 hours, his tissues would become saturated with the gases he was breathing. Once saturated, he would need the same period of decompression whether he stayed down one day or many.

Bond's proposal got a good test last summer, when the 4-man crew of Sealab 1 stayed at a depth of 193 feet for 11 days with no ill effects.

Sealab 2 was sunk to a depth of 205 feet, off La Jolla, Calif. Of the first team of 10 aquanauts, nine stayed down 15 days, and Scott Carpenter, the astronaut-aquanaut, stayed on for another two weeks with the second crew.

When the first team reached the surface and completed its long session in the decompression chamber, Bond reported:

"If we had used the standard method of decompression, we would have had to go through more than 5,000 hours of decompression to perform the same amount of work. We finished decompressing in about 33 hours—so we feel this is a significant step."

Navy's Goal

The Navy's goal, set out in its deep submergence systems project, is to be able to perform salvage and rescue operations down to 600 feet—and the men in the program are talking hopefully of being able to work eventually at depths of 1,000 feet or more.

When Carpenter finally surfaced, he reported that "the ocean is much more hostile environment than space." During the experiment, some men complained of having slight headaches in the morning, and most of them said they were tired a lot of the time, although they did their work satisfactorily.

A couple of figures make it clear how hostile the environment is.

Normal atmospheric pressure is about 15 pounds per square inch. We spend our lives with that much pressure on every square inch of our bodies, and don't notice it.

At a depth of 205 feet, the pressure of the ocean's water is 112 pounds per square inch—roughly 7½ times normal atmospheric pressure.

Metal Tank

The Sealab is a big metal tank containing a breathing atmosphere at a pressure just slightly higher than the water pressure, so the water can't force its way in through the open hatch through which the divers come and go.

For two weeks—or in Carpenter's case, a month—they lived in an atmosphere 7½ times as heavy as normal.

It was also fairly hot—temperature in the Sealab ranged between 86 and 90 degrees fahrenheit—and the humidity varied between 69 and 77 per cent.

Outside, the water temperatures ranged from about 45 to 56 degrees, and even in electrically heated wet suits, no one stayed outside longer than 167 minutes in one day. The average for the first team was 45 minutes a day in the water.

Other Problems

There were other problems. At very low pressures, such as those in a space capsule, a man can breathe pure oxygen for a few weeks with no bad effects.

But at high pressures, such as 7½ atmospheres, oxygen is poisonous.

The Navy has set a limit of 30 minutes for breathing pure oxygen at two atmospheres. At higher pressures, or for long periods, it acts on the nervous system and may cause convulsions or death, or cause the lungs to fill with liquid.

The Sealab divers breathed a mixture of helium and oxygen. A minor disadvantage of helium is what divers call the Donald Duck effect—it makes the voice high pitched and squeaky, and for a while divers have difficulty understanding each other.

When President Johnson called Carpenter while he was still in the decompression chamber, Carpenter apologized for his squeaky voice — *"It's absolutely the best I can do in this helium atmosphere."*

A more serious disadvantage is that helium requires a longer decompression period than nitrogen. A nitrogen atmosphere can have a narcotic effect on a diver, producing the so-called "rapture of the deep."

One thing the investigators were pleased to learn as a result of Sealab 2 is that helium does not produce narcosis, at least within a month's exposure.

Effect on Heart?

Another dismal possibility is that breathing helium and oxygen for long periods may have some subtle effect on the heart. Experiments with animals raised in this atmosphere have hinted at some such effect, and the possibility is being investigated in a couple of laboratories.

Although the men running the experiment professed to be satisfied with the amount of work the crew was able to accomplish during the test, the crewmen themselves felt that it was harder than they had expected to accomplish anything.

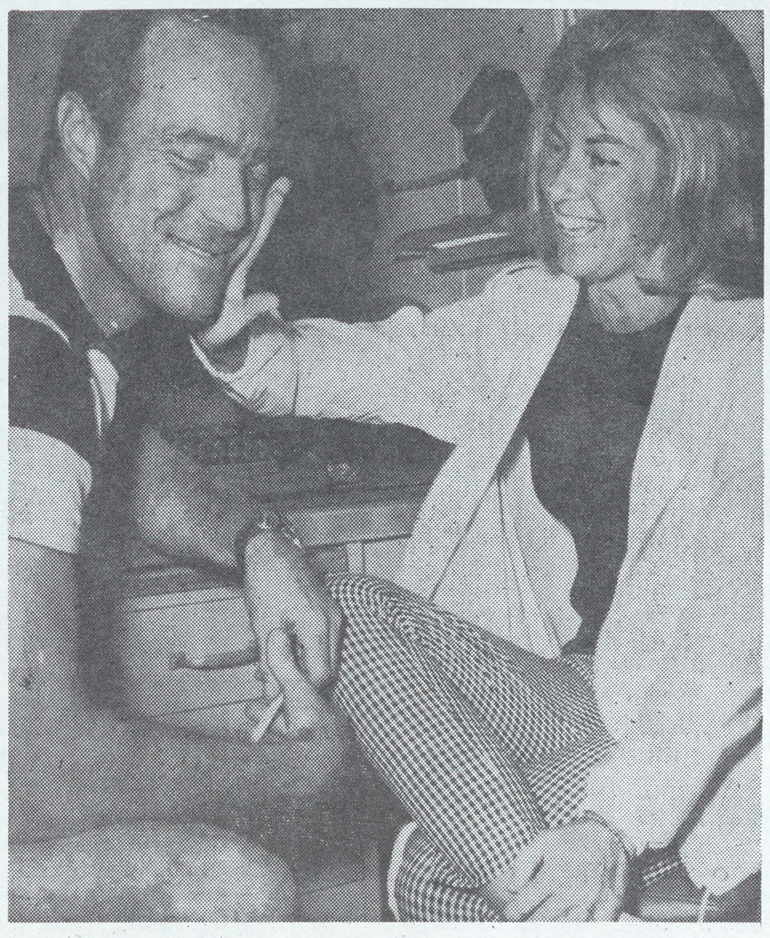
One of their major tasks was to rig a 6½-inch nylon line to a stabilizing anchor. One of the divers said afterward: "It took us 2 weeks to do something we were sure we could do in 3 days."

The experiment did nothing to solve the principal mechanical obstacle to long-term underwater operations — providing a good source of power.

Recently, Capt. L. B. Melson, director of the Naval applications group at the Office of Naval Research, said the engineers now know how to build a mobile underwater shelter from which men could operate at great depths — "except for the energy package needed to drive the propulsion motors and support the structure and its inhabitants."

Sealab 2 was tied to its support equipment on the surface by umbilicals carrying electricity and the air supply — and went through a minor crisis when one of the cables developed a short.

OCT 10 1965



HI, STRANGER!

Mrs. M. Scott Carpenter welcomes her astro-aquanaut husband back from the bottom of the ocean off La Jolla, Calif., yesterday where he and nine teammates spent a month aboard a sea laboratory. The test was run to study man's reaction to extended periods far below the ocean surface.—AP Wirephoto.

DIEGO, CALIFORNIA, MONDAY MORNING, OCTOBER 11, 1965 ④* PAGE A-23

SeaLab Experiment Ends As Aquanauts Come Up

10 Men Undergo Decompression

Picture — Page a-3

By S. A. DESICK

The world's most ambitious project to find out whether man can live beneath the sea ended yesterday.

At 10:05 a.m., the final team of 10 aquanauts was hoisted in a capsule from SeaLab II, the Navy's experimental underwater home off La Jolla.

The aquanauts were immediately transferred to a decompression chamber aboard SeaLab's mother ship, the Berkone. There they will stay for about 31 hours to allow their tissues to get rid of the gases that cause the bends.

Capt. George Bond, medical director of the project, said:

"We will know if it is a complete success after decompression. We've got a no-hitter going, and we don't want to discuss it too much."

SPORTS SUPERSTITION

Bond apparently was borrowing a superstition from baseball. When a pitcher has a no-hitter going, neither he nor his teammates are supposed to mention it.

Bond's reference to a no-hitter meant that if the aquanauts emerge from the chamber in good shape, as did two previous aquanaut teams, then the entire project will have been a success.

This was the Navy's second such project. Last year, aquanauts lived and worked in SeaLab I off Bermuda. That experiment lasted 11 days. SeaLab II, a 57-foot-long and 12-foot-wide steel cylinder, was used for 45 days.

It was lowered to a depth of 205 feet into the sea Aug. 26. Two days later, the first team of 10 aquanauts went down to it. They included Cmdr. Scott Carpenter, the astronaut who has transferred from outer to inner space, and a physician, Dr. Robert Sonnenburg.

TEAM SEQUENCE

At the end of almost 15 days, Carpenter's nine teammates were brought up. He stayed below for another 15 days with nine other aquanauts. They were then replaced by the third and final team, including Sonnenburg again.

All the teams performed a host of experiments inside and outside SeaLab, working under a pressure almost seven times greater than on land.

They carried out marine biological research. They made a series of dives — to 266 feet, then 300 feet. They tested various kinds of equipment.

They executed a salvage operation by pumping foam into an old jet fighter that was dropped near them; when the foam hardened, the plane became buoyant and later was recovered.

PLANTS GROWN

They even grew plants in pots attached to the bathroom wall; this was to see how plants would react to the helium atmosphere inside SeaLab.

They underwent physiological and psychological tests.

They set up an underwater weather station — the most important such installation made by any country. And the reason it's important is that there is weather beneath the sea, too—pressures, storms, the shifting direction of currents.

Above all, they tried to determine whether man can perform usefully at great depths underwater and how a marine fraternity could function.

So much information has been gathered that it will take months to analyze it. After that, the Navy will decide whether to go ahead with a SeaLab III.

In the meantime, SeaLab II will be raised, probably Wednesday, and towed to the Long Beach naval shipyard for inspection. Presumably, improvements will be made in it in line with suggestions by the aquanauts.

Some of the scientists will remain aboard the Berkone for another two days. One of them, Mike Greenwood, still hopes to capture Sam the sea lion. One previous attempt failed.

Sam showed up about 11 days ago with a small pride of other sea lions. Smarter than the others, he learned to show up whenever Greenwood used a buzzer. Sam also made several dives down to SeaLab.

TUFFY THE PORPOISE

Greenwood would like to transfer him to the naval base at Pt. Mugu for further training. It's at Pt. Mugu that Tuffy the porpoise lives. Tuffy was brought here, and in a series of experiments he carried the mail down to SeaLab and took part in the simulated rescue of a diver by bringing him a line.

A Navy spokesman said yesterday that when Tuffy got back to Pt. Mugu he "acted like a prima donna; all he wanted to do was to work with aquanauts; he didn't want to do regular experiments; it was obvious that he liked the acclaim that went with working with aquanauts.

"So he had to be punished. His trainer whacked him across the snout several times, so Tuffy is now behaving himself."

Aquanauts End SeaLab Stay

STAR
Kansas City, Mo.

End 45-Day Undersea Experiment

La Jolla, Calif. (AP)—The nation's aquanauts of Selab 2 will ascend to the surface today to wind up the 45-day undersea experiment.

The 10 divers of the third team to live at the 205-foot depth were busy yesterday making preparations to leave the undersea laboratory.

After nearly 15 days on the Pacific ocean bottom, the aquanauts will secure the Sealab and enter the pressurized personnel transfer capsule for the 10-minute ascent to the surface. Then they'll spend about 30 hours in a decompression chamber aboard the support vessel Berkone.

Sealab 2 will be hauled to the surface Wednesday and towed to Long Beach, Calif.

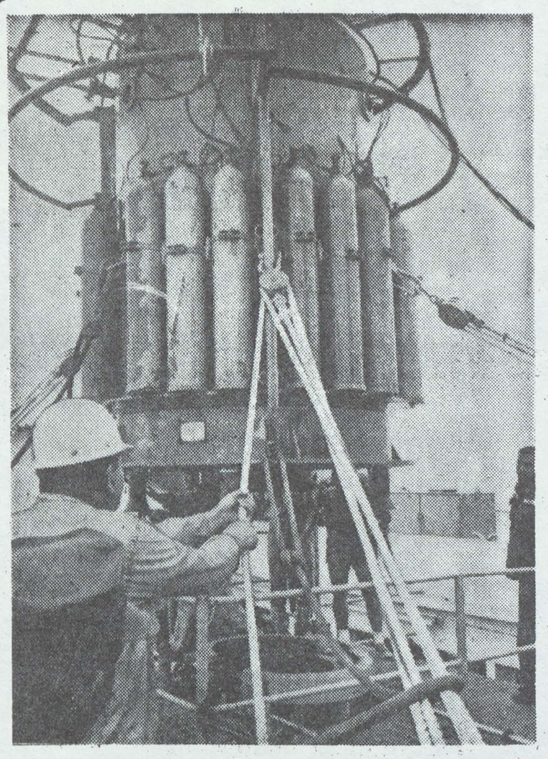
Meanwhile, attempts were made yesterday to tranquilize and capture Sam, the sea lion.

Men got a close look at Sam Friday while he was sleeping on a buoy and decided Samantha should be Sam because it is a male.

They want to catch the sea lion and transport him to Point Mugu, Calif., to join Tuffy, the porpoise, in a training tank. Tuffy took part in an experiment by rescuing "lost" divers and delivering tools and mail.

Sam took only several days to learn to respond to the buzzer used to summon Tuffy. The porpoise underwent months of training. Both were conditioned by rewards of fish.

From OCT 11 19[illegible]
[illegible], Atlanta, Ga.



Associated Press Wirephoto

CANFUL OF AQUANAUTS—La Jolla, Calif., Oct. 11—Workers prepare to connect a cannister-like transfer capsule to a decompression chamber aboard the support ship Berkone which tends Sealab 2. The 10 aquanauts in the capsule have just been hauled up 205 feet. They must spend about 30 hours decompressing after the weekend ascent.

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SISTER CITIES OF THE SEA

Research Cooperation Proposed

San Diego is aggressively pursuing research programs to realize more fully the vast potential of the ocean, our insurance policy for economic growth in the future.

Hawaii, which has a great community of interest with San Diego, also has a compelling interest in oceanography and is emerging as a center for sea research.

"Why don't San Diego and Honolulu pool interests and form a Sister City in Oceanography program?" asks Hawaii State Sen. Taylor Pryor.

His ideas, advanced by George Chaplin, editor of the Honolulu Advertiser, take a practical and imaginative look at the mutual benefits that could result from a Sister City oceanography program.

"Oceanic development has been lacking facilities and industrial support in depth. There hasn't been a focal point where you can get a 'critical mass' of facilities . . . not a total approach," says Mr. Chaplin.

"The ideal is to bring all the necessary resources together in a mutually supporting way and focused on the single activity.

"Honolulu and San Diego together can cover the whole base."

Sen. Pryor supports the view. "We're all working for a national breakout to the sea. It's entirely possible Oahu and San Diego, by combining assets, by providing all the necessary facilities which neither can provide by itself, can create this breakout."

Comparing the individual assets, Mr. Chaplin points out San Diego is ahead technologically with such outstanding institutions as the Navy Electronics Laboratory, the Scripps Institution of Oceanography and others.

Additionally, San Diego has a continental shelf which extends a great distance into the ocean, and it is on the shelf where most mineral yields from the sea are anticipated.

Hawaii has a growing oceanography research complex, a short continental shelf, but great depths relatively near the islands, and the potential for year-around research in clear, warm water.

Admittedly, there are areas where San Diego and Honolulu will be in competition, but even this could act as a spur to development. In a sense, the Sister City in Oceanography program has been initiated with the Mohole project. Mohole will be conducted in the depths near Hawaii, but the heart of the program, a drilling platform, will be constructed in San Diego.

The Sister City program suggested by Hawaii is a big idea, but it will take big thinking to make the important breakthrough to a consolidated oceanography program. It merits our serious consideration as we develop the complex "Maritime Pacific" at San Diego.

Navy Plans Vehicle For Undersea Rescue

Would Aid Crews Of Subs

By ROBERT ZIMMERMAN
The San Diego Union's Military Writer

Officials of the Navy's Deep Submergence Systems Project disclosed here yesterday that the Navy is ready to begin development of a new deep-diving vessel to rescue crewmen from crippled submarines.

Crews to pilot and maintain the Deep Rescue Vehicle will be trained in San Diego at the new Deep Submergence Group Schoool at Ballast Point.

Eleven aerospace firms were invited this week to submit proposals for construction of the 45-foot, highly-maneuverable underwater craft. A prototype is expected to be ready for testing off San Diego early in 1968.

Eventually, the Navy plans to acquire five of the vehicles. Three of them will be kept available to be rushed by air transport to the scene of a submarine accident or to perform other undersea emergency missions.

PLANS DISCUSSED

Plans for the Deep Rescue Vehicle were discussed here yesterday by Capt. J. H. Dolan, head of the Deep Submergence Project in Washington, and Dr. J. P. Craven, chairman and chief scientist of the project's steering group.

The 14-member steering group last night concluded a two-day meeting at the Deep Submergence School. Some of the members—representing military commands and research agencies involved in the deep submergence program—will remain here for the conclusion of the Sealab II project tomorrow.

Craven said the scientists were "tickled pink" with the results of Sealab II. He said the 45-day project not only had met but exceeded expectations, especially in the work and salvage operations performed by aquanauts in the last two weeks.

5-YEAR PROGRAM

At its meeting the deep submergence steering group reviewed progress in the various phases of a five-year, $260 million program that will carry the Navy's underwater capability into exciting new fields by 1971. Much of the activity will center in San Diego.

Dolan said the plans for a Deep Rescue Vehicle had been given impetus by the loss of the submarine Thresher in 1963, although the death of all hands in that tragedy could not have been averted by any rescue effort. The Thresher sank in water of such depth that its hull was crushed.

"But the Thresher reminded us that we don't have the best rescue capability in case a submarine goes to the bottom within its 'collapse depth' and can't resurface," he said. The rescue vessel would be able to operate to that depth — more than 3,000 feet.

The rescue submarine will be designed to maneuver over the escape hatch of the crippled sub, take trapped personnel aboard 14 at a time, and then transfer them to another submarine operating submerged in the same area.

This technique, Dolan explained, would eliminate the problem of pressure differences between the disabled submarine and a rescue vessel operating

(Continued on a-24, Col. 1)

New York 38, N. Y.
From OCT 11 1965
SUN-TIMES
Chicago, Ill.

Final Sealab Team Surfaces

LA JOLLA, Calif. (UPI)—The final team of 10 aquanauts from the Sealab 2 Man in the Sea project were brought safely to the surface Sunday, climaxing the highly successful 45-day project.

The 10 men broke the surface at 9:54 a.m. after a nine-minute ride in a transfer capsule.

They reported some trouble in getting into the transfer capsule because of poor visibility underwater. However, the transfer was made without serious incident.

The capsule was attached to a decompression chamber aboard the surface ship Berkone, where the men will remain for about 30 hours.

The 57-foot Sealab was sealed off by the men before they surfaced. Project officials said it would be raise Wednesday afternoon and then towed to the Long Beach (Calif.) Naval Shipyard.

Capt. George Bond, scientific director of the project, said it appeared the project was a complete success.

He said none of the men reported any ill effects.

The $1,800,000 project officially was ended when the transfer capsule broke the surface, but Bond said it would take months to analyze the data collected during the experiment.

Final project of the experiment to determine how man can live and work underwater was the dismantling of thousands of feet of cable which made up the closed circuit television setup.

The capsule was lowered to a depth of 205 feet Aug. 26, and the first tema of 10 aquanauts—headed by astronaut M. Scott Carpenter—descended Aug. 28.

Each team spent 15 days underwater, traveling outside the Sealab every day and conducting various experiments. Carpenter headed the first and second team and remained underwater 30 days.

Among the experiments were deep dives to depths of 300 feet to explore the ocean.

LATIMES 10-11-65

3rd Aquanaut Team Finishes Undersea Test

Exclusive to The Times from a Staff Writer

LA JOLLA—Sealab 2, the Navy's ambitious, 45-day undersea experiment, ended Sunday when a third team of 10 aquanauts emerged from the ocean floor off La Jolla.

Led by veteran Navy diver Robert Sheats of Bremerton, Wash., the men were lifted to the Sealab mother vessel for decompression after living 15 days in a 57-foot, cigar-shaped capsule 205 feet beneath the sea.

It took 10 minutes for the ascent in a special, pressurized personnel transfer capsule.

Enter Decompression

The 10 divers and scientific team members will continue to undergo decompression for 31 hours—from 10 a.m. Sunday to about 5 p.m. today.

M. Scott Carpenter, the world's first astro-aquanaut, entered Sealab Aug. 28 to launch the "inner space" project. Since then, 30 men have lived and worked inside and outside the snow-white vehicle to prove man's capability under pressure six times greater than at the surface.

"The sea is a tough adversary—much more hostile an environment than space,"

Please Turn to Pg. 33, Col. 1

SEALAB

Continued from Third Page

said Carpenter after living at a greater depth in the sea for a longer period of time—a month—than any person in history.

Carpenter was the second American to orbit the earth.

The Sealab capsule will be hoisted from the bottom Wednesday with an enormous winch. Sealab weighs 200 tons on the surface, 14 tons in the sea.

It will then be towed to Long Beach Naval Shipyard to be inspected, modified and stored for future use.

Seattle, Wash.
Times
(Circ. D. 226,737
Sat. 214,851 - Sun. 267,958)
OCT 9 1965

New York 38, N. Y.
From OCT
MORNING SUN
Baltimore, Md.

3D AQUANAUT TEAM RAISED; VENTURE ENDS

Navy Says Sealab 2 Succeeded In Ocean-floor Trial

La Jolla, Cal., Oct. 10 (AP)—Aquanaut Team No. 3 rose smoothly 205 feet to the surface today as the Navy ended a 45-day experiment it said proved man can work on the ocean floor.

"Smooth ride," the team leader, Bob Sheats, commented by telephone as a winch hoisted him and nine fellow aquanauts from Sealab 2.

Winch and workmen brought up a pressurized transfer capsule carrying the aquanauts and mated it to a decompression chamber on the deck of the escort vessel Berkone.

The divers will wait 31 hours in the chamber while its pressure is gradually reduced to that of sea level.

To Emerge This Afternoon

They are scheduled to emerge from the chamber about 5:30 P.M. tomorrow and hold a news conference at 9:30 A.M. Tuesday.

Skies were gray and the sea gentle around the Berkone, 1,000 yards off La Jolla, a picturesque Southern California residential community. On the deck more than 100 newsmen and participants watched the end of the Navy's boldest experiment in ocean-bottom laboratory living.

A spokesman said:

"Sealab 2 has proved that man can successfully do work for extended periods of time at depths under high pressure at the bottom of the ocean. That is basically what we set out to prove."

3 Successive 10-Man Teams

Each of Sealab 2's three successive ten-man teams stayed down about fifteen days except for two men who were below 30 days.

Lt. Cmdr. M. Scott Carpenter, of the Navy, three-orbit astronaut-turned-aquanaut, was down the first 30 days. Lt. Robert Sonnenburg, 28, of San Diego, a Medical Corps doctor, was a member of both the first and third teams.

The aquanauts who emerged today spent their time testing new salvage procedures with potential application in aircraft and ship disasters.

From OCT 11 1965
EVENING SUN
Baltimore, Md.

Aquanauts Up; Sealab Ends

La Jolla, Cal., Oct. 11 (AP)—The Navy's Sealab 2 experiment officially ends today—proving, the Navy says, that man can work for long periods, at high pressures, on the bottom of the sea.

The 45-day project will end when ten aquanauts wind up 31 hours in a decompression chamber.

The men, members of the third and last team, transferred yesterday to a pressurized capsule which hoisted them to the Pacific Ocean surface.

The capsule was attached to the decompression chamber aboard the escort vessel Berkone and, gradually, the chamber's pressure was reduced to sea level.

News Conference

At 5:30 P.M., the men are scheduled to emerge from the capsule. They are to hold a news conference at 9:30 A.M. tomorrow.

Three successive ten-man teams have spent 15 days below the surface, except for two men who were below 30 days.

Navy Cmdr. M. Scott Carpenter, a three-orbit astronaut, spent the first 30 days below. Lt. Robert Sonnenburg, 28, of San Diego, a medical corps doctor, joined the first and third teams.

The last team of aquanauts spent their duty testing new salvage procedures which may eventually be applied in aircraft and ship disasters.

Plane Dropped

A wingless Navy F-85 Cougar jet fighter was dropped to the ocean floor near Sealab 2. The aquanauts pumped into the fuselage a foam which hardened, becaue bouyant and raised the hulk to the surface.

Sealab 2, the 12-by-58-foot, cigar-shaped laboratory, will be [illegible]d Wednesday to Long Beach, Calif., for examination, equipment removal and storage.

From GLOBE DEMOCRAT
St. Louis, Mo.

Aquanauts End Test In Sealab

LA JOLLA, CAL. (AP).—Aquanaut team No. 3 rose smoothly 205 feet to the surface Sunday as the Navy ended a 45-day experiment it said proved man can work on the ocean floor.

"Smooth ride," team leader Bob Sheats commented by telephone as a winch hoisted him and nine fellow aquanauts from Sealab 2.

Winch and workmen mated a pressurized transfer capsule carrying the aquanauts to a decompression chamber on the deck of the escort vessel Berkone.

The divers will wait 31 hours in the chamber while its pressure is gradually reduced to that of sea level. They are scheduled to emerge from the chamber at 5:30 p. m. Monday and hold a news conference at 9:30 a. m. Tuesday.

From OCT 11 1965
DAILY NEWS
Chicago, Ill.

Aquanauts Unwind In Pressure Box

LA JOLLA, Calif. (AP)—The Navy's Sea Lab 2 experiment officially ends Monday—proving, the Navy says, that man can work for long periods at high pressures on the bottom of the sea.

The project will end when 10 aquanauts wind up 31 hours in a decompression chamber, concluding the 45-day undersea experiment.

The men, members of the third and last team, transferred Sunday to a pressurized capsule that hoisted them to the Pacific surface.

The capsule was attached to the decompression chamber aboard the escort vessel Berkone and, gradually, the chamber's pressure was reduced to sea level.

LATE MONDAY afternoon, the men are scheduled to emerge from the capsule. They are to hold a news conference Tuesday morning.

Three successive 10-man teams have spent 15 days below the surface, except for two men who were below 30 days.

From EVENING NEWS
Newark, N. J.
OCT 11 1965

AQUANAUTS COMPLETING 'CLASSIC' EXPERIMENT

By FRANK SIS

LA JOLLA, Calif.—(UPI)—America's final team of Sealab 2 aquanauts today end what scientists called a "classic" 45-day experiment in ocean technology.

The 10-man team, led by veteran Navy diver Robert Sheats, left its 57-foot steel capsule on the ocean floor Sunday to make the 205-foot ascent in a special pressurized personnel transfer capsule. The trip up to the mother ship Berkone took about 10 minutes.

The aquanauts were placed in a decompression chamber from which they were to emerge tonight.

The team was the third to spend 15 days in the 200-ton craft, studying man's capabilities under pressure six times that on the surface.

The first and second teams were led by astronaut-aquanaut M. Scott Carpenter, who remained below 30 days.

The capsule will be raised by a winch Wednesday and towed to the Long Beach, Calif., Naval Shipyard for inspection.

Carpenter and the other aquanauts plan a press conference Tuesday morning at Scripps Institution of Oceanography, at which they and other project officials are scheduled to summarize the experiment and discuss future phases of the program.

Sam, perhaps a bit miffed at scientists' ignorance about he and she sea lions, swam off to pout after the tranquilizers in fish fed him by the scientists didn't work.

The scientists had hoped to net Sam for transfer to the naval missile center at Point Mugu, Calif., where he would join a class of porpoises being trained to work with human beings under water.

They planned to try to draft Sam again today.

The third team of aquanaughts, down 205 feet in the Pacific in Sealab II., were reported in good spirits today and looking forward to their return to the surface tomorrow to complete the 45-day "man in the sea" project.

SAN DIEGO UN
OCT 11 1965

Samantha, 2235 It Seems, Is Sam

LA JOLLA, Calif., Oct. 9.—(UPI)—Sealab II. scientists learned yesterday that Samantha, the sea-lion mascot of the aquanauts, should have been named Sam.

The error was noticed while giving Sam tranquilizers. Lack of a characteristic male bump on the forehead had led them to believe the friendly creature who likes to lounge on bouys was a male.

Seattle, Wash.
Times
(Circ. D. 226,737
Sat. 214,851 - Sun. 267,958)
OCT 11 1965

Diver Spends Birthday 2235 Under Sea

LA JOLLA, Calif., Oct. 11.—(AP)—A Bremerton, Wash., man, described as probably the Navy's most experienced diver, celebrated his 50th birthday in Sealab 2, far below the ocean's surface.

Bob Sheats, master chief torpedoman, leader of Aquanaut team No. 3, and his nine mates were hoisted to the surface yesterday to enter a pressurized capsule, for transfer to a decompression chamber on the deck of the escort vessel Berkone.

They were scheduled to spend 31 hours in the chamber, while the pressure was gradually reduced to that of sea level, and emerge from the chamber about 5:30 o'clock this afternoon.

Each of Sealab 2's successive ten-man teams stayed down about 205 feet on the ocean floor for approximately 15 days, except two who were down 30 days.

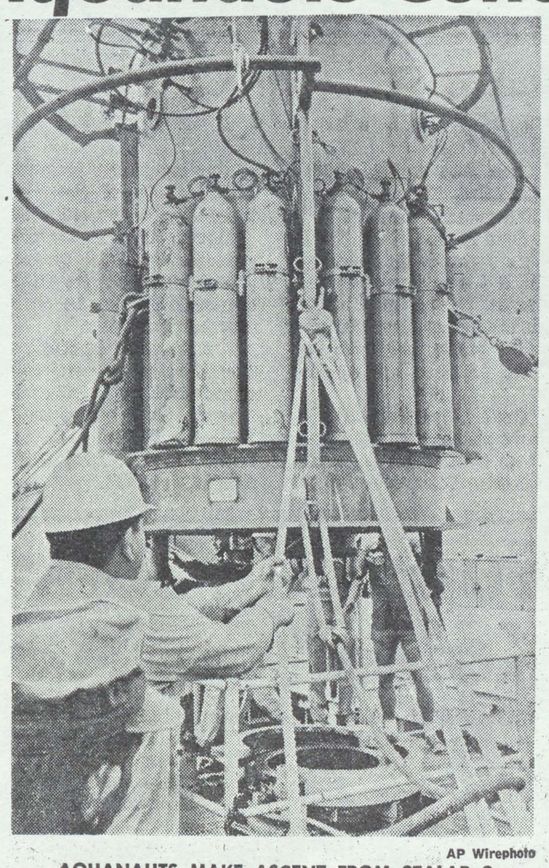
One was Navy Comdr. M. Scott Carpenter, three-orbit astronaut-turned-aquanaut, who spent the first 30 days below. The other was Lieut. Robert Sonnenberg, a doctor, who was with the first and third teams.

On Sheats' birthday, a spokesman said, a cake was lowered to him in a pressure pot used to send down food and equipment.

SAN DIEGO UN
OCT 11 1965

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Aquanauts Conclude Sea Bottom Project



AP Wirephoto

AQUANAUTS MAKE ASCENT FROM SEALAB 2
The pressurized capsule, with 10 men inside, is being connected to decompression chamber aboard the Berkone.

LA JOLLA, Calif.—(AP)—The Navy's Sealab 2 experiment officially ends Monday—proving, the Navy says, that man can work for long periods, at high pressures, on the bottom of the sa.

The project will end when 10 aquanauts wind up 31 hours in a decompression chamber, concluding the 45-day undersea experiment.

The men, members of the third and last team, transferred Sunday to a pressurized capsule which hoisted them to the Pacific Ocean surface.

PRESSURE REDUCED

The capsule was attached to the decompression chamber aboard the escort vessel Berkone and, gradually, the chamber's pressure was reduced to sea level.

At 5:30 p.m., the men are scheduled to emerge from the capsule. They are to hold a press conference at 9:30 a.m. Tuesday.

Three successive 10 - man teams have spent 15 days below the surface, except for two men who were below 30 days.

Navy Cmdr. Malcolm Scott Carpenter, a three-orbit astronaut, spent the first 30 days below. Lt. Robert Sonnenburg, 28, San Diego, a Medical Corps doctor, joined the first and third teams.

The last team of aquanauts spent their duty testing new salvage procedures which may eventually be applied in aircraft and ship disasters.

POST, Denver, Colo.

OCT 1 1 1965

Aquanauts To Surface

LA JOLLA, Calif. (AP) — The Navy's Sealab 2 experiment officially ends today — proving, the Navy says, that man can work for long periods, at high pressures, on the bottom of the sea.

The project will end when 10 aquanauts wind up 31 hours in a decompression chamber, concluding the 45-day undersea experiment.

The men, members of the third and last team, transferred Sunday to a pressurized capsule which hoisted them to the Pacific Ocean surface.

The capsule was attached to the decompression chamber aboard the escort vessel Berkone and, gradually, the chamber's pressure was reduced to sea level.

Aquanauts end 45-day 'classic'

LA JOLLA, Calif (UPI) — America's final team of Sealab 2 aquanauts today end what scientists called a "classic" 45-day experiment in ocean technology.

The 10-man team, led by veteran Navy diver Robert Sheats, left its 57-foot steel capsule on the ocean floor Sunday to make the 205-foot ascent in special pressurized personnel transfer capsule. The trip up to the mother ship Berkone took about 10 minutes.

The aquanauts were placed in a decompression chamber from which they were to emerge about 8 p.m. EDT.

The team was the third to spend 15 days in the 200-ton craft,

CHICAGO DAILY LAW BULLETIN
OCT 1 1 '65

Houston POST 10/11

3rd Team Of Sealab 2 On Surface

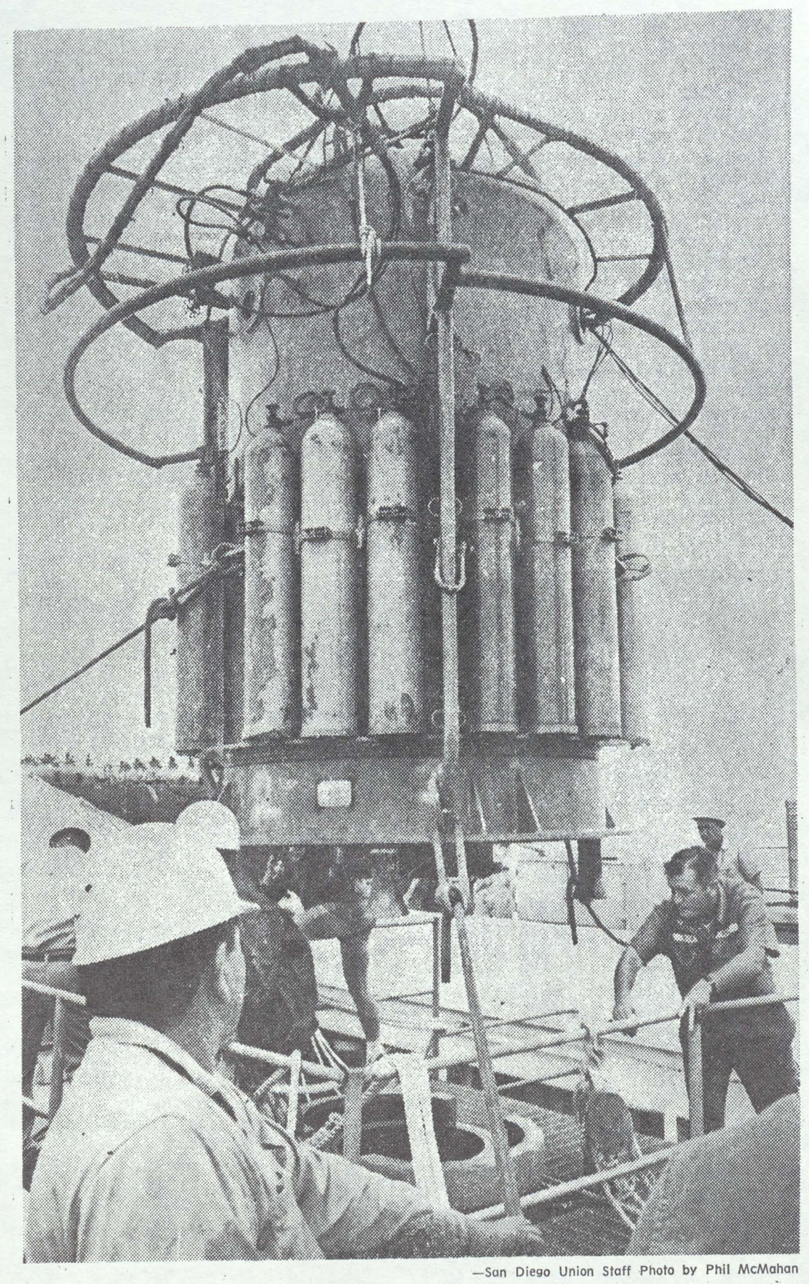
LA JOLLA, Calif — (AP) — Aquanaut team Number 3 rose smoothly 205 feet to the surface Sunday as the Navy ended a 45-day experiment it said proved man can work on the ocean floor.

The 10 divers will wait 31 hours in the chamber while its pressure is gradually reduced to that of sea level. They are scheduled to emerge from the chamber about 5:30 PM Monday.

Each of Sealab 2's three successive 10-man teams stayed down approximately 15 days except for two men—Lcdr M. Scott Carpenter and Lt Robert Sonnenburg — who were below 30 days.

The aquanauts who emerged Sunday spent their time testing new salvage procedures with potential application in aircraft and ship disasters.

An old Navy F-85 Cougar jet fighter, its wings removed, was dropped to the ocean floor near them. Into the fuselage they pumped a foam that hardened, became buoyant and raised the hulk to the surface.



—San Diego Union Staff Photo by Phil McMahan

Home—And Soon Free

Inside this capsule is final team of SeaLab aquanauts. They're being hoisted onto mother ship to undergo decompression. (Story, Page a-23)

Sealab Testers Up For Decompression

LA JOLLA, Calif. (AP)—The Navy's Sealab 2 experiment officially ends today — proving, the Navy says, that man can work for long periods, at high pressures, on the bottom of the sea.

The project will end when 10 aquanauts wind up 31 hours in a decompression chamber, concluding the 45-day undersea experiment.

The men, members of the third and last team, transferred yesterday to a pressurized capsule which hoisted them to the Pacific Ocean surface.

The capsule was attached to the decompression chamber aboard the escort vessel Berkone and, gradually, the chamber's pressure was reduced to sea level.

Three Teams

The men are scheduled to emerge from the capsule this afternoon. They are to hold a news conference tomorrow.

Three successive 10-man teams have spent 15 days below the surface, except for two men who were below 30 days.

Navy Cmdr. M. Scott Carpenter, a three-orbit astronaut, spent the first 30 days below. Lt. Robert Sonnenburg, 28, San Diego, a medical corps doctor, joined the first and third teams.

The last team of aquanauts spent their duty testing new salvage procedures which may eventually be applied in aircraft and ship disasters.

Sealab 2, the 12-by-58-foot, cigar-shaped laboratory, will be towed Wednesday to Long Beach, Calif., for examination, equipment removal and storage.

Aquanauts Surface; Tests by Sealab End

La Jolla, Cal., Oct. 10 (UPI)—The final team of 10 aquanauts from the Sealab 2 "Man in the Sea" project was brought safely to the surface today, climaxing the 45-day project.

The crew members reported some trouble in getting into the transfer capsule for a 9-minute ride to the surface because of poor visibility underwater. However, the transfer was made without serious incident.

The capsule was attached to a decompression chamber aboard the surface ship Berkone where the men will remain for about 30 hours.

Sealab Sealed off

The 57-foot Sealab was sealed off by the men before they surfaced, and project officials said it would be raised Wednesday afternoon and then towed to Long Beach, Cal., naval shipyard.

Capt. George Bond, scientific director of the project, said it appeared that the project was a complete success.

"We will know if it is a complete success after decompression," Bond said. "We've got a no-hitter going now and we don't want to discuss it too much." He said none of the men have reported any ill effects so far.

The 1.8 million dollar project was ended officially when the transfer capsule broke the surface, but Bond said it would take months to analyze the data collected during the experiment.

Must Dismantle Cable

Final project of the experiment to determine how man can live and work underwater was the dismantling of thousands of feet of cable which made up the closed circuit television setup.

The capsule was lowered to a depth of 205 feet Aug. 26, and the first team of 10 aquanauts —headed by Astronaut Scott Carpenter—descended on Aug. 28.

Each team spent 15 days underwater, traveling outside the Sealab every day and conducting various experiments. Carpenter headed both the first and second team and remained underwater a full 30 days.

Among the experiments conducted by the aquanauts were dives to depths of 300 feet to explore the ocean.

Dolphin Has Role

A dolphin named "Tuffy" also played a part in the navy-sponsored project. The dolphin had been trained to respond to a buzzer which meant an aquanaut was in trouble.

Officials termed Tuffy's two-day performance a partial success. The dolphin appeared afraid of the aquanauts the first day, but on the scond he carried the mail to Sealab 2 and performed other experiments with some success.

The aquanauts lived under pressure 6½ times greater than on land, and most of them reported after surfacing that they believed they could live and work efficiently underwater for an indefinite period of time.

Sealab-2's Last Crew Surfaces

By United Press International

LA JOLLA, Calif.

The final team of 10 aquanauts from the Sealab-2 "Man in the Sea" project were brought safely to the surface yesterday, climaxing the highly successful 45-day project. The ten men broke the surface at 9:54 a. m. after a nine-minute ride in the transfer capsule.

The men reported some trouble in getting into the transfer capsule because of poor visibility underwater. However, the transfer was made without serious incident. The capsule was attached to a decompression chamber aboard the surface ship Berkone, where the men will remain for about 30 hours.

The 57-foot Sealab was sealed off by the men before they surfaced, and project officials said it would be raised Wednesday afternoon and then towed to the Long Beach, Calif., naval shipyard.

Capt. Lewis Melson, director of the $1.8 million project, said, "the project has accomplished all the objectives originally set and many others which were added during the operation. We have been able to prove conclusively that man can work at great depths under water as members of a marine fraternity."

Capt. Melson said the work of "the three teams in Sealab-2 will prove to be a classic in ocean technology."

From HERALD TRIBUNE New York, N. Y.
OCT 11 1965

Navy Says Sealab Proves Man Can Work in Depths

LA JOLLA, Calif. (AP)—Aquanaut team No. 3 rose smoothly 205 feet to the surface yesterday as the Navy ended a 45-day experiment it said proved man can work on the ocean floor.

A winch hoisted the aquanauts from Sealab 2 in a pressurized transfer capsule that was mated to a decompression chamber on the deck of the escort vessel Berkone.

The divers will wait 31 hours in the chamber while its pressure is gradually reduced to that of sea level. They are scheduled to emerge from the chamber about 5:30 p.m. today and hold a news conference at 9:30 a.m. tomorrow.

THE AQUANAUTS spent their time testing new salvage procedures. An old Navy F85 Cougar jet fighter, its wings removed, was dropped to the ocean floor near them. Into the fuselage they pumped a foam that hardened, became buoyant and raised the hulk to the surface.

The Plain Dealer
Cleveland, O.
A.M.-circ. 339,112
Sun.-circ. 494,645

OCT 1 1 1965

AMA NEWS - 50
535 N. Dearborn Street W
Chicago, Ill. 60610
Circ. 283,766

OCT 1 1 '65

10 Men Undergo Decompression

By S. A. DESICK

The world's most ambitious project to find out whether man can live beneath the sea ended yesterday.

At 10:05 a.m., the final team of 10 aquanauts was hoisted in a capsule from SeaLab II, the Navy's experimental underwater home off La Jolla.

The aquanauts were immediately transferred to a decompression chamber aboard SeaLab's mother ship, the Berkone. There they will stay for about 31 hours to allow their tissues to get rid of the gases that cause the bends.

Capt. George Bond, medical director of the project, said:

"We will know if it is a complete success after decompression. We've got a no-hitter going, and we don't want to discuss it too much."

SPORTS SUPERSTITION

Bond apparently was borrowing a superstition from baseball. When a pitcher has a no-hitter going, neither he nor his teammates are supposed to mention it.

Bond's reference to a no-hitter meant that if the aquanauts emerge from the chamber in good shape, as did two previous aquanaut teams, then the entire project will have been a success.

This was the Navy's second such project. Last year, aquanauts lived and worked in SeaLab I off Bermuda. That experiment lasted 11 days. SeaLab II, a 57-foot-long and 12-foot-wide steel cylinder, was used for 45 days.

It was lowered to a depth of 205 feet into the sea Aug. 26. Two days later, the first team of 10 aquanauts went down to it. They included Cmdr. Scott Carpenter, the astronaut who has transferred from outer to inner space, and a physician, Dr. Robert Sonnenburg.

TEAM SEQUENCE

At the end of almost 15 days, Carpenter's nine teammates were brought up. He stayed below for another 15 days with nine other aquanauts. They were then replaced by the third and final team, including Sonnenburg again.

All the teams performed a host of experiments inside and outside SeaLab, working under a pressure almost seven times greater than on land.

They carried out marine biological research. They made a series of dives — to 266 feet, then 300 feet. They tested various kinds of equipment.

They executed a salvage operation by pumping foam into an old jet fighter that was dropped near them; when the foam hardened, the plane became buoyant and later was recovered.

PLANTS GROWN

They even grew plants in pots attached to the bathroom wall; this was to see how plants would react to the helium atmosphere inside SeaLab.

They underwent physiological and psychological tests.

They set up an underwater weather station — the most important such installation made by any country. And the reason it's important is that there is weather beneath the sea, too—pressures, storms, the shifting direction of currents.

Above all, they tried to determine whether man can perform usefully at great depths underwater and how a marine fraternity could function.

So much information has been gathered that it will take months to analyze it. After that, the Navy will decide whether to go ahead with a SeaLab III.

In the meantime, SeaLab II will be raised, probably Wednesday, and towed to the Long Beach naval shipyard for inspection. Presumably, improvements will be made in it in line with suggestions by the aquanauts.

SAN DIEGO UN
OCT 11 1965

Some of the scientists will remain aboard the Berkone for another two days. One of them, Mike Greenwood, still hopes to capture Sam the sea lion. One previous attempt failed.

Sam showed up about 11 days ago with a small pride of other sea lions. Smarter than the others, he learned to show up whenever Greenwood used a buzzer. Sam also made several dives down to SeaLab.

TUFFY THE PORPOISE

Greenwood would like to transfer him to the naval base at Pt. Mugu for further training. It's at Pt. Mugu that Tuffy the porpoise lives. Tuffy was brought here, and in a series of experiments he carried the mail down to SeaLab and took part in the simulated rescue of a diver by bringing him a line.

A Navy spokesman said yesterday that when Tuffy got back to Pt. Mugu he "acted like a prima donna; all he wanted to do was to work with aquanauts; he didn't want to do regular experiments; it was obvious that he liked the acclaim that went with working with aquanauts.

"So he had to be punished. His trainer whacked him across the snout several times, so Tuffy is now behaving himself."

From OCT 11 1965
TRIBUNE
Chicago, Ill.

WASH POST 10/11/65

Sealab Surfaces, Shows Undersea Toil Is Feasible

LA JOLLA, Calif., Oct. 10 (AP)—Aquanaut Team No. 3 rose smoothly 205 feet to the surface today as the Navy ended a 45-day experiment it said proved man can work on the ocean floor.

"Smooth ride," team leader Bob Sheats commented by telephone as a winch hoisted him and nine fellow aquanauts from Sealab 2.

Winch and workmen mated a pressurized transfer capsule carrying the aquanauts to a decompression chamber on the deck of the escort vessel Berkone.

The divers will wait 31 hours in the chamber while its pressure is gradually reduced to that of sea level. They are scheduled to emerge from the chamber about 5:30 p.m. Monday and hold a news conference Tuesday morning.

Skies were gray and the sea gentle around the Berkone, 1,000 yards off La Jolla, a picturesque Southern California residential community. On the deck more than 100 newsmen and participants watched the end of the Navy's boldest experiment in ocean-bottom laboratory living.

"Sealab 2 has proved that man can successfully do work for extended periods of time at depths under high pressure at the bottom of the ocean. That is basically what we set out prove."

Each of Sealab 2's three successive 10-man teams stayed down approximately 15 days except for two men who were below 30 days.

Navy Lt. Comdr. M. Scott Carpenter, three-obit astronaut-turned-aquanaut, was down the first 30 days. Lt. Robert Sonnenburg, 28, San Diego, a medical corps doctor, was a member of both the first and third teams.

The aqanaut who emerged today spent their time testing new salvage procedures with potential application in aircraft and ship disasters.



—Wide World Photo

THE NATION'S FIRST physician-aquanaut, Navy Lt. Robert E. Sonnenburg, MC (right), takes a blood sample from fellow aquanaut Earl A. Murray as part of tests made 205 feet below the surface of the Pacific in Sealab II, in which scientists spent 15 to 45 days (*The AMA News*, Sept. 20). Lt. Sonnenburg spent 15 days underwater.

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Sealab Diver Better After Case of Bends



FOURTH TIME—Aquanaut Bob Sheats, wearing his Sealab green uniform, Sealab patch, and diving watch, talks with a reporter aboard Sealab mothership Berkone today. He suffered fourth attack of bends in his 27 years as a Navy diver.

By LEO BOWLER
EVENING TRIBUNE Science Writer

Aquanaut Bob Sheats, leader of the third team of divers in Sealab II, recovered today from a case of bends he suffered while decompressing aboard the Sealab mother ship Berkone.

Sheats, a Navy chief torpedoman, got the bends yesterday in the decompression chamber. He was separated from the nine other aquanauts in the chamber and was subjected to pressure equivalent to 60-foot water depth.

The other nine aquanauts left their decompression room at 8:30 last night and took part in a press interview this morning.

Sheats was released from the chamber at 9 a.m. today. He said he felt well. He was kept aboard the Berkone for a time in order to be near the chamber in case of emergency.

Chief Hospital Corpsman Sanders W. (Tiger) Manning entered the chamber with Sheats and stayed with him during the decompression procedure. Manning is one of the four divers from Sealab I, which was held last year off Bermuda at a depth of 192 feet.

Sheats had complained of a pain in his hip. When the pressure in his part of the chamber was increased, the pain was relieved.

Newsmen and families of the men watched at the press conference today as RAdm. John K. Leydon, director of the Office of Naval Research, awarded a Navy Unit Commendation to all those connected with the project.

Leydon represented the secretary of the Navy at the ceremony which was held in Sumner Auditorium on the Scripps Institution of Oceanography campus.

The event was attended by aquanauts from the first and second teams who were led by Cdr. Scott Carpenter during their underwater stay. Aquanauts from Team 3 came up from Sealab Sunday. Team 2 came to the surface Sept. 26 with Carpenter who had stayed down for 30 days. Team 1 came up Sept. 12.

The aquanauts wore their green dungaree uniforms and answered questions about their stay under the sea.

Capt. Lewis B. Melson, director of the project, said Sealab has been a complete success. He said the Navy spent $1.8 million on the project between November of last year and the present.

Capt. George Bond, a Navy doctor who is principal investigator for the Sealab project and director of the Navy's Man in the Sea program, said that the Sealab III project will be held within a year.

Aquanaut's Bends Hit In Same Leg as Before

Aquanaut Bob Sheats described today how the bends hit him in the same leg where he had suffered an attack a year ago.

Sheats, 50, was interviewed in the diving locker of the Sealab mothership Berkone. He said the attack he suffered yesterday in the Berkone's decompression chamber was the fourth in his 27 years as a Navy diver.

While the other aquanauts and Sealab officials were holding a press conference ashore, Sheats worked in the locker catching up on his diving logs from Sealab excursions.

Sheats, a master chief torpedoman, described the pain that hit him from his right knee to his hip as similar to a case of bends he got a year ago in Washington while helping a stricken civilian diver.

The bends hit him that time after he left a decompression chamber where he had been tending a civilian who had the bends. The civilian also recovered.

"Once the tissue is damaged it seems to predispose you to bends in the same area," he said.

"I felt them coming in the decompression chamber quite a while before I said anything. I held off because I wanted Sealab to have a perfect record, but then the pain got too bad."

Sheats got extra decompression and didn't come out of the chamber until 9 this morning. He said he felt fine but was a little tired this afternoon.

Sheats, team leader for the final group of aquanauts to occupy the lab, had his 50th birthday during his stay beneath the surface. He plans to retire from the navy next March with more than 30 years of service.



HIGH AND DRY—Aquanauts who put in their tour of duty far below the surface of the ocean in Sealab II touch on the high points of their adventure at a press conference today at Scripps Institution of Oceanography. Shown at the meeting, from left, are aquanauts Paul Wells, Michael Meisky, Bill Meeks, Rick Grigg, Robert Sonnenburg, Bill Bunton, Charles Coggeshall, Morgan Wells and John Lyons. All received a Navy Unit Commendation for their efforts in the vital research project.

Minneapolis (Minn.) Star
TUESDAY, OCTOBER 12, 1965

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Aquanaut Stricken by Bends

LA JOLLA, Calif. — (AP) — The Navy reported all its Sealob-2 aquanauts hale, hearty and enjoying fresh air today but one — Robert Sheats, 50, stricken by the painful bends.

Sheats was gripped by a pain in his hip Monday night as the chamber containing the project's third team was decompressed to the minus 12-foot level.

At 6 p.m Sealab doctors separated Sheats from his nine comrades and returned him to a simulated depth of 60 feet.

Pain Subsides

As atmospheric pressure increased, the pain subsided and Sheats, oldest member of the project, remained somewhat lonely but in relative comfort.

A spokesman said Sheats was decompressing at the rate of four feet an hour and if the pain did not return, he was to emerge from the chamber today at 10 a.m.

Sheats talked to his doctors during the night through an intercom connecting the chamber and the Sealab surface vessel, Berkone.

Friends marvelled at the morale of the master chief torpedoman from Bremerton, Wash. Said one:

"He's the kind of guy who wouldn't complain until it really hurt. Finally the pain was too much. When you go through decompression for 27 years, you get a little tired."

The exhausting process is necessary to rid the body of helium bubbles which would form in the bloodstream if a diver ascended too fast after breathing the helium-rich atmosphere in the Sealab-2 underwater living project.

At 205 Feet

Three teams occupied the Sealab-2 capsule, at a depth of 205 feet, for 15-day periods.

First to emerge at 8:35 p.m. Monday night from the decompression chamber was Navy Lt. Robert Sonnenburg, 28, San Diego, the third team's only medical doctor.

Other Navy Aquanauts included Chief Laverne Meisky, 38, a ship fitter from Lancaster, Penn.; Chief Charles Coggeshall, 35, gunners mate, Ft. Wayne, Ind.; Chief Paul A. Wells, 36, Mineman, Ft. Lauderdale, Fla., PO 1. C. William Meeks, 34, boat swain's mate, Poncho City, Okla.; and PO 1. C. John J. Lyons, 35, engineman, Middletown, N.Y.

The team also included two civilian research scientists, Richard Griegg, 28, and John Morgan Wells, 25, both with the Scripps Institute of Oceanography at La Jolla.

The aquanauts headed straight for the showers aboard the Berkone, visited briefly with their wives and then retired.

The Navy requires divers to remain near the decompression chambers at least 12 hours, on the chance the bends should develop at the surface.

A news conference with Sealab's 27 other aquanauts was scheduled for 9:30 a.m. today.

POST, Denver, Colo.



AP Wirephoto
ROBERT SHEATS CUTS CAKE ABOARD SEALAB SEPT. 30
The oldest aquanaut at 50 was stricken by painful bends.

Aquanauts Leave Poor Sheats to Bends

LA JOLLA, Calif. (UPI) — Navy Chief Robert Sheats of Bremerton, Wash., the last of the 10 aquanauts in the Sealab 2 project to remain behind in a decompression chamber because of a mild case of "bends," was discharged Tuesday and appeared in good condition.

Sheats, 50, spent an additional 12 hours in the decompression chamber because of the mild attack.

Sheats was gripped by a pain in his hip Monday night as the chamber containing the project's third team was decompressed to the minus 12-foot level.

At 6 p.m. Sealab doctors separated Sheats from his nine comrades and returned him to a simulated depth of 60 feet.

As atmospheric pressure increased, the pain subsided and Sheats, oldest member of the project, remained somewhat lonely but in relative comfort.

Sheats talked to his doctors during the night through an intercom connecting the chamber and the Sealab surface vessel, Berkone.

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"He's the kind of guy who wouldn't complain until it really hurt. Finally the pain was too much. When you go through decompression for 27 years, you get a little tired."

The exhausting process is necessary to rid the body of helium bubbles which would form in the bloodstream if a diver ascended too fast after breathing the helium-rich atmosphere in the Sealab 2 underwater living project.

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From
EVENING NEWS
OCT 12 1965

Aquanaut Stricken

Bends Fell Oldest of Sealab Crew

LA JOLLA, Calif. (AP) — The Navy reported all its Sealab 2 aquanauts hale, hearty and enjoying fresh air today but one — Robert Sheats, 50, stricken by the painful bends.

Sheats was gripped by a pain in his hip last night as the chamber containing the project's third team was decompressed to the minus 12-foot level.

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As atmospheric pressure increased, the pain subsided and Sheats, oldest member of the project, remained somewhat lonely but in relative comfort.

A spokesman said Sheats, from Bremerton, Wash., was decompressing at the rate of four feet an hour and if the pain did not return, he was to emerge from the chamber today at 10 a.m.

Sheats talked to his doctors during the night through an intercom connecting the chamber and the Sealab surface vessel, Berkone.

The exhausting decompression process is necessary to rid the body of helium bubbles which would form in the bloodstream if a diver ascended too fast after breathing the helium-rich atmosphere in the Sealab 2 underwater living project.

Three teams occupied the Sealab 2 capsule, at a depth of 205 feet, for 15-day periods.

First to emerge at 8:35 p.m. last night from the decompression chamber was Navy Lt. Robert Sonnenburg, 28, San Diego, the third team's only medical doctor.

Other Navy aquanauts included Chief Laverne Meisky, 38, a ship fitter from Lancaster, Pa.; Chief Charles Coggeshall, 35, gunners mate, Fort Wayne, Ind.; Chief Paul A. Wells, 36, mineman, Fort Lauderdale, Fla.; PO 1. C. William Meeks, 34, boatswain's mate, Ponca City, Okla.; and PO 1.C. John J. Lyons, 35, engineman, Middletown, N.Y.

The team also included two civilian research scientists, Richard Griegg, 28, and John Morgan Wells, 25, both with the Scripps Institute of Oceanography at La Jolla.

From OCT 12 1965
FREE PRESS
Detroit, Mich.

TESTS APPLAUDED

Last Sealab Team Leaves Chamber

LA JOLLA, Calif—(AP)—The last of three 10-man teams to live beneath the ocean was eager to breathe fresh air again Monday, but reluctant to end the 45-day experiment in Sealab 2.

The aquanauts, who ascended from the 205-foot depth Sunday, ended a 31-hour stay in a decompression chamber Monday.

The decompression was necessary to rid their bodies of gases they had breathed during their 15-day stay in the 12-by-58-foot capsule 1,000 yards offshore.

"They are all fine and happy," a spokesman said. "There have been no problems in the process.

"They seemed reluctant to leave," he said. "Like the other two teams, they wanted to know if there was more they could do to stretch their experiences a few more days."

Navy officials have said the tests in Sealab 2, in which each team spent 15 days, has been "one hundred times better" than the Sealab 1 experiment last year off Bermuda, in which four divers lived 11 days at a depth of 192 feet.

* * *

SEALAB 2 was lowered Aug. 26, and two days later the first team took up residence.

Cmdr. M. Scott Carpenter lived for 30 days in Sealab 2 as leader of the first two teams. Lt. Robert Sonnenburg, a Navy doctor, also lived below for 30 days with the first and third teams.

LA TIMES 10-12-65

Bends Attack Delays Ending Sealab Test

LA JOLLA (UPI)—Nine of the 10 aquanauts in the third team of Sealab 2 emerged Monday night from a decompression chamber. But the team leader, who developed the bends, remained inside delaying the finale of the 45-day experiment in undersea living.

Navy Chief Robert Sheats of Bremerton, Wash., the oldest of the aquanauts at 50, has overcome the bends, the Navy said, and is scheduled to leave the chamber today.

The other nine aquanauts, who climbed out of the chamber at 8:35 p.m., are reported in good condition. The team entered the chamber Sunday after leaving Sealab 2 205 feet beneath the surface of the ocean.

Capt. George Bond, principal investigator of the project, said Monday night "everything is going all right."

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From
FREE PRESS
Detroit, Mich.

Sealab Divers Surface, End 45-Day Test

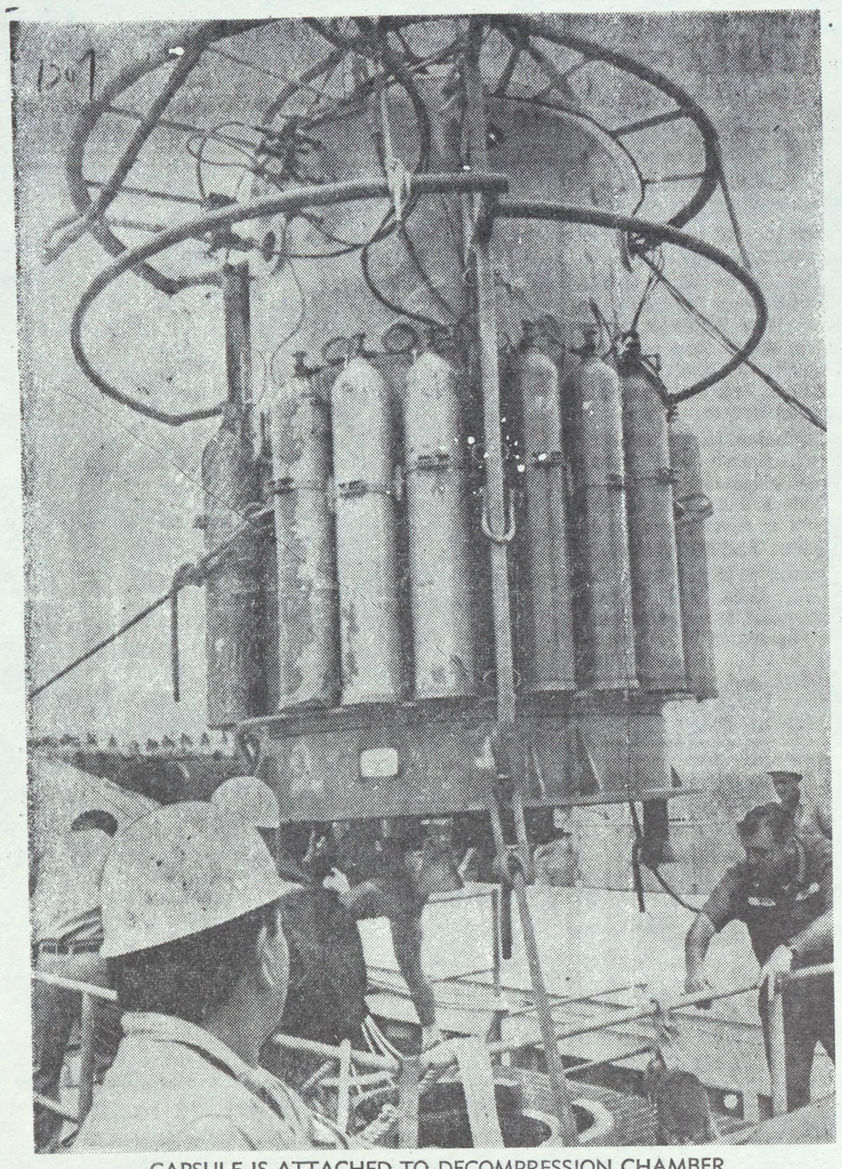
LA JOLLA, Calif. — (UPI) — The final team of 10 aquanauts from the man in the sea project were brought to the surface Sunday, ending the highly successful 45-day project.

The 57-foot Sealab was sealed and officials said it would be raised Wednesday and towed to the Long Beach naval shipyard.

Capt. George Bond, scientific director of the project, said it appeared the project was a success.

"We will know after decompression," Bond said. "We've got a no hitter going now and we don't want to discuss it too much."

He said none of the 20 aquanauts have reported ill effect.



CAPSULE IS ATTACHED TO DECOMPRESSION CHAMBER
The pressure was gradually reduced to that of sea level

Aquanauts Decompressing

Sealab II Venture Winding Up

Only hours remained today of the 45-day Sealab II undersea experiment as the Navy capsule's third and final 10-man team of divers underwent decompression aboard a surface vessel off La Jolla.

A transfer capsule carrying the divers from the ocean floor 205 feet below, broke the surface at 9:54 a.m. Sunday after a 10-minute ascent.

DECOMPRESSED

The men began a 31-hour decompression period aboard the mother sip, Berkone, and were scheduled to emerge at 5 p.m. today.

The 57-foot cylindrical underwater laboratory was lowered Aug. 26. The first 15-day cycle of aquanauts descended Aug. 28.

"Sealab II has proved that man can successfully do work for extended periods of time at depths under high pressure at the bottom of the ocean. That is basically what we set out to prove," a spokesman said.

The aquanauts lived under pressure 6½ times greater than on land. Most reported they felt they could continue to do so for an indefinite period of time.

The team which emerged Sunday, headed by veteran navy diver Robert Sheats, spent much of its submerged time testing new salvage techniques.

Earlier teams studied the ocean floor and logged plant and fish life they observed in ventures outside the capsule.

Scott Carpenter, former three-orbit astronaut, and Lt. Robert Sonnenburg, 28, each spent 30 days in the capsule.

They and the 28 other aquanauts were scheduled to hold a press conference Tuesdy morning at Scripps Institute of Oceanography.

B—Back Page THE EVENING STAR
Washington, D. C., Tuesday, October 12, 1965

Sealab 2 Men Surface; 1 Stricken With Bends

LA JOLLA, Calif. (AP)—The Navy reported all but one of its Sealab 2 aquanauts hale, hearty and enjoying fresh air today. Robert Sheats, 50, was stricken by the bends.

Sheats, of Bremerton, Wash., was gripped by a pain in his hip yesterday as the chamber containing the project's third team was decompressed to the minus 12-foot level.

At 6 p.m., Sealab doctors separated Sheats from his nine comrades and returned him to a simulated depth of 60 feet.

As atmospheric pressure increased, the pain subsided.

A spokesman said Sheats was decompressing at the rate of 4 feet an hour and that if the pain did not return he was to emerge from the chamber today.

The decompressing process is necessary to rid the body of helium bubbles which would form in the bloodstream if a diver ascended too fast after breathing the helium-rich atmosphere in the Sealab 2 underwater living project.

Three teams occupied the Sealab 2 capsule, at a depth of 205 feet, for 15-day periods.

First to emerge last night from the decompression chamber was Navy Lt. Robert Sonenburg, 28, San Diego, the third team's only medical doctor.

Other Navy aquanauts included Chief Laverne Meisky, 38, from Lancaster, Pa.; Chief Charles Coggeshall, 35, Ft. Wayne, Ind.; Chief Paul A. Wells, 36, Ft. Lauderdale, Fla.; PO 1.C. William Meeks, 34, Ponco City, Okla., and PO 1.C. John J. Lyons, 35, Middletown, N.Y.

The team also included two civilian research scientists, Richard Griegg, 28, and John Morgan Wells, 25, both with the Scripps Institute of Oceanography at La Jolla.

Sealab Crew Ends Journey In Success

LA JOLLA, Calif. (UPI)—The final team of 10 aquanauts from the Sealab-2 "man in the sea" project were brought safely to the surface Sunday, climaxing the highly successful 45-day project.

The ten men broke the surface at 9:54 a.m. PDT (12:54 p.m. EDT) after a nine-minute ride in the transfer capsule.

The men reported some trouble in getting into the transfer capsule because of poor visibility underwater. However, the transfer was made without serious incident.

The capsule was attached to a decompression chamber aboard the surface ship Berkone where the men will remain for about 30 hours.

Davenport (Ia) Times-Democrat
MONDAY, OCTOBER 11, 1965

Sealab to Be Floated; Last Crew on Surface

By LEO BOWLER
EVENING TRIBUNE Science Writer

Scientists and technicians aboard the mothership Berkone prepared today to bring Sealab II to the surface so it could be towed back to Long Beach.

Raising the undersea residence which has been continuously occupied for 45 days in 205 feet of water off La Jolla would bring a successful end to the experiment.

The last team of 10 divers came to the surface yesterday and spent last night and today in a decompression chamber aboard the Berkone. The team had been in Sealab since Sept. 27.

The aquanauts seemed in good spirits as they sat out the decompression. The long session was necessary to keep them from getting the bends.

Technicians worked yesterday and through much of the night in preparations for the surfacing of the 57-foot steel cylinder which comprises Sealab. They were to pump air into ballast tanks which had been flooded with water to make the craft more stable on the bottom.

The addition of the air would make the lab light enough so that winches aboard the Berkone could lift it to the surface.

Mpls. (Minn.) Morning Tribune
MONDAY, OCTOBER 11, 1965

The End of Sealab Experiment

Men Back to Normal Today

LA JOLLA (AP) — The Navy's Sealab 2 experiment officially ends today—proving, the Navy says, that man can work for long periods, at high pressures, on the bottom of the sea.

The project will end when 10 aquanauts wind up 31 hours in a decompression chamber, concluding the 45-day undersea experiment.

The men, members of the third and last team, transferred yesterday to a pressurized capsule which hoisted them to the Pacific Ocean surface.

The capsule was attached to the decompression chamber aboard the escort vessel Berkone and, gradually, the chamber's pressure was reduced to sea level.

At 5:30 p.m., the men are scheduled to emerge from the capsule.

Three successive 10-man teams have spent 15 days below the surface, except for two men who were below 30 days.

Navy Cmdr. M. Scott Carpenter, a three-orbit astronaut, spent the first 30 days below. Lt. Robert Sonnenburg, 28, of San Diego, a doctor, joined the first and third teams.

The last team of aquanauts tested new salvage procedures which may eventually be applied in aircraft and ship disasters.

SeaLab Experiment Ends After 45 Days

By ROBERT ZIMMERMAN
The San Diego Union's Military Writer

A SeaLab aquanaut developed a mild case of the bends yesterday and had to stay sealed up in a decompression chamber while others in his team made their return to the normal world.

The SeaLab II experiment came to an end at 8:35 p.m. yesterday for nine aquanauts of the final team that spent 15 days 205 feet under the sea off La Jolla.

They had spent 34½ hours in decompression since leaving the SeaLab Sunday morning.

However, for Bob Sheats, 50, a chief torpedoman and master diver, the project ground on for another night and will not end until this morning.

Sheats, who lives in Bremerton, Wash., developed bends in his right hip yesterday afternoon as he and his fellow aquanauts were nearing the end of what was to be 31 hours of decompression aboard the SeaLab mother ship Berkone.

A spokesman for the SeaLab medical team said the "bubble" which formed in Sheats' hip was painful but not serious. Divers often will develop the bends in a particular part of their body while the rest of it is not affected.

PAIN DEVELOPS

Doctors said Sheats may have strained a muscle in his hip during his two-week stay in SeaLab. This would cause blood circulation to the hip to lag a little behind circulation in the rest of his body. As a result, the decompression process would work more slowly in the hip muscle.

The 10 aquanauts had been scheduled to leave the decompression chamber at 5 p.m. yesterday. Sheats began developing the tell-tale pain of the bends about 2 p.m.

A decision was made to separate Sheats from the other nine aquanauts. First, pressure was increased in the chamber to have the effect of returning all of them to a greater "depth." Then Sheats and a hospital corpsman went into one compartment, and the other nine aquanauts into another, and the two compartments were sealed off from each other.

OTHERS DELAYED

This arrangement permitted Sheats to resume the final period of decompression at a slower rate than usual, while the other nine resumed decompression at the regular rate.

As a result of the interruption, the other nine aquanauts — who all reported feeling fine — did not get out of decompression until 8:35.

They remained aboard the Berkone last night under observation, and were scheduled to appear at a press conference at 9:30 a.m. today in Sumner Auditorium at the Scripps Institution of Oceanography.

If the decompression of Sheats proceeds as expected, he will be ready to leave the chamber at 10 a.m. today, but he will have to remain on the Berkone for several hours for observation.

Meanwhile, SeaLab II was returned to the surface yesterday and developed its own problems in the ascent from the ocean floor.

The 57-foot-long white cyclinder, which was lowered to the sea bottom 45 days earlier, was lifted by a cable and winch while held in a harness of lines from the Berkone and the tug Gear anchored above. The retrieval crew began bringing it up at 1 p.m. yesterday.

To give the SeaLab buoyancy for the return to the surface, gas that had been under pressure in the living space of the vessel was released into ballast tanks in the upper part of the hull, driving water out of the tanks.

Water escaped more rapidly from the tanks in the forward section of the vessel, and it came to the surface bow first about 3:30 p.m. Divers had to work for an extra hour manipulating valves and lines to get the SeaLab back to its normal horizontal position. It is scheduled to be towed back to the Long Beach Naval Shipyard today.

SAN DIEGO
EVENING TRIBUNE
OCT 11 1965

Transfer Capsule For Aquanauts Checked, Fixed

LA JOLLA, Calif. (AP)—The personnel transfer capsule that will bring the Sealab aquanauts to the surface Sunday has been checked out and repaired.

Crews brought the capsule to the surface yesterday to replace a defective power cable and modify a communications circuit.

The 10 aquanauts will ride up in the capsule after their 15-day stay at 205 feet beneath the surface of the ocean.

A Sealab spokesman said two teams of two divers made dives to 300 feet yesterday and gathered biological samples.

Otherwise, most of the aquanauts' efforts are being directed toward cleaning up the area around the Sealab and preparing to come back to the surface.

Sealab Aquanauts Make 300-ft. Dive

Sealab II aquanauts showed no ill effects last week one day after descending to a depth of 300 ft. in Scripps Canyon off the coast of La Jolla, Calif.

The 19-min. dive of Robert Sheats and Bill Bunton took them deeper than any other aquanaut has gone. Sheats is leader of the final 15-day segment of the 45-day underwater experiment, which is to end Oct. 11.

MISSILES & ROCKETS - 5
1001 Vermont Ave., N.W.
Washington 5, D.C.
OCT 11 '65

Sheats and Bunton took photographs of what they called a virtual sea desert during the dive. The entire 10-man team (team 3) spent a total of 706 minutes outside their 57-ft. steel cylinder Oct. 5. The cylinder rests on a cliff 205 ft. below the surface.

Minneapolis (Minn.) Star
MONDAY, OCTOBER 11, 1965

Sealab Team Emerges From Ocean, Ending 45-Day Test

LA JOLLA, Calif. —(AP)— Aquanaut team No. 3 rose smoothly 205 feet to the surface Sunday as the Navy ended a 45-day experiment it said proven man can work on the ocean floor.

"Smooth ride," team leader Bob Sheats commented by telephone as a winch hoisted him and nine fellow aquanauts from Sealab 2.

Winch and workmen took a pressurized transfer capsule carrying the aquanauts to a decompression chamber on the deck of the escort vessel Berkone.

The divers will wait 31 hours in the chamber while its pressure is gradually reduced to that of sea level. They are schedule to emerge from the chamber about 5:30 p.m. today and hold a news conference at 9:30 a.m. Tuesday.

Skies were gray and the sea gentle around the Berkone, 1,000-yards off La Jolla, a picturesque southern California residential community. On the deck more than 100 newsmen and participants watched the end of the Navy's boldest experiment in ocean-bottom laboratory living.

Said a spokesman:

"Sealab 2 has proved that man can successfully do work for extended periods of time at depths under high pressure at the bottom of the ocean. That is basically what we set out to prove."

Each of Sealab 2's three successive 10-man teams stayed down approximately 15 days except for two men who were below 30 days.

Navy Lt. Cmdr. M. Scott Carpenter, three-orbit astronaut-turned-aquanaut, was down the first 30 days. Lt. Robert Sonnenburg, 28, San Diego, Calif., a medical corps doctor, was a member of both the first and third teams.

The aquanauts who emerge yesterday spent their time testing new salvage procedures with potential application in aircraft and ship disasters.

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San Francisco, Calif.
Examiner
(Cir. D. 289,469 - S. 427,093)

OCT 11 1965

From OCT 11 1965
INQUIRER
Philadelphia, Pa.

Sealab Finishes 45-Day Project

By CHARLES HILLINGER
Special to The Inquirer And Los Angeles Times

LA JOLLA, Calif., Oct. 10.—Sealab 2, the Navy's ambitious 45-day undersea experiment, ended Sunday when a third team of 10 aquanauts surfaced from the ocean floor off La Jolla.

The 10 aquanauts led by veteran Navy diver Robert Sheats, of Bremerton, Wash., were lifted to the Sealab mother vessel for decompression after living 15 days in a 57-foot cigar shaped capsule 205 feet beneath the sea.

10-MINUTE ASCENT

It took 10 minutes for the ascent in a special pressurized personnel transfer capsule.

The 10 divers and scientific team members will continue to undergo decompression for 31 hours.

M. Scott Carpenter, the world's first astro-aquanaut, entered Sealab Aug. 28 to launch the "inner space" project. Since then, 30 men have lived and worked inside and outside the snow-white vehicle to prove man's capability under pressure six times that at the surface.

"The sea is a tough adversary, much more hostile an environment than space," said Carpenter after living at a greater depth in the sea for a longer period of time—a month—than any person in history.

SECOND TO ORBIT

Carpenter was the second American to orbit the earth.

The Sealab capsule will be hoisted from the bottom Wednesday with an enormous winch. Sealab weighs 200 tons on the surface, 14 tons in the sea.

It will then be towed to Long Beach Naval Shipyard to be inspected, modified and stored for future use.

Carpenter and the 29 other aquanauts hold a press conference Tuesday morning at Scripps Institution of Oceanography to summarize the project and discuss the next phase of the Navy's Man-in-the-Sea program.

Aquanaut Isolated By Bends

LA JOLLA (AP)—The Navy reported all its Sealab 2 aquanauts hale, hearty and enjoying fresh air today but one—Robert Sheats, 50, stricken by the painful bends.

Sheats was gripped by a pain in his hip last night as the chamber containing the project's third team was decompressed to the minus 12-foot level.

Simulated Depth

At 6 p.m., Sealab doctors separated Sheats from his nine comrades and returned him to a simulated depth of 60 feet.

As atmospheric pressure increased, the pain subsided and Sheats, oldest member of the project, remained somewhat lonely but in relative comfort.

A spokesman said Sheats was decompressing at the rate of 4 feet an hour and if the pain did not return, he was to emerge from the chamber today at 10 a.m.

Sheats talked to his doctors during the night through an intercom connecting the chamber and the Sealab surface vessel, Berkone.

Friends marvelled at the morale of the master chief torpedoman from Bremerton, Wash. Said one:

"He's the kind of guy who wouldn't complain until it really hurt. Finally the pain was too much. When you go through decompression for 27 years, you get a little tired."

The exhausting process is necessary to rid the body of helium bubbles which would form in the bloodstream if a diver ascended too fast after breathing the helium-rich atmosphere in the Sealab 2 underwater living project.

Three Teams

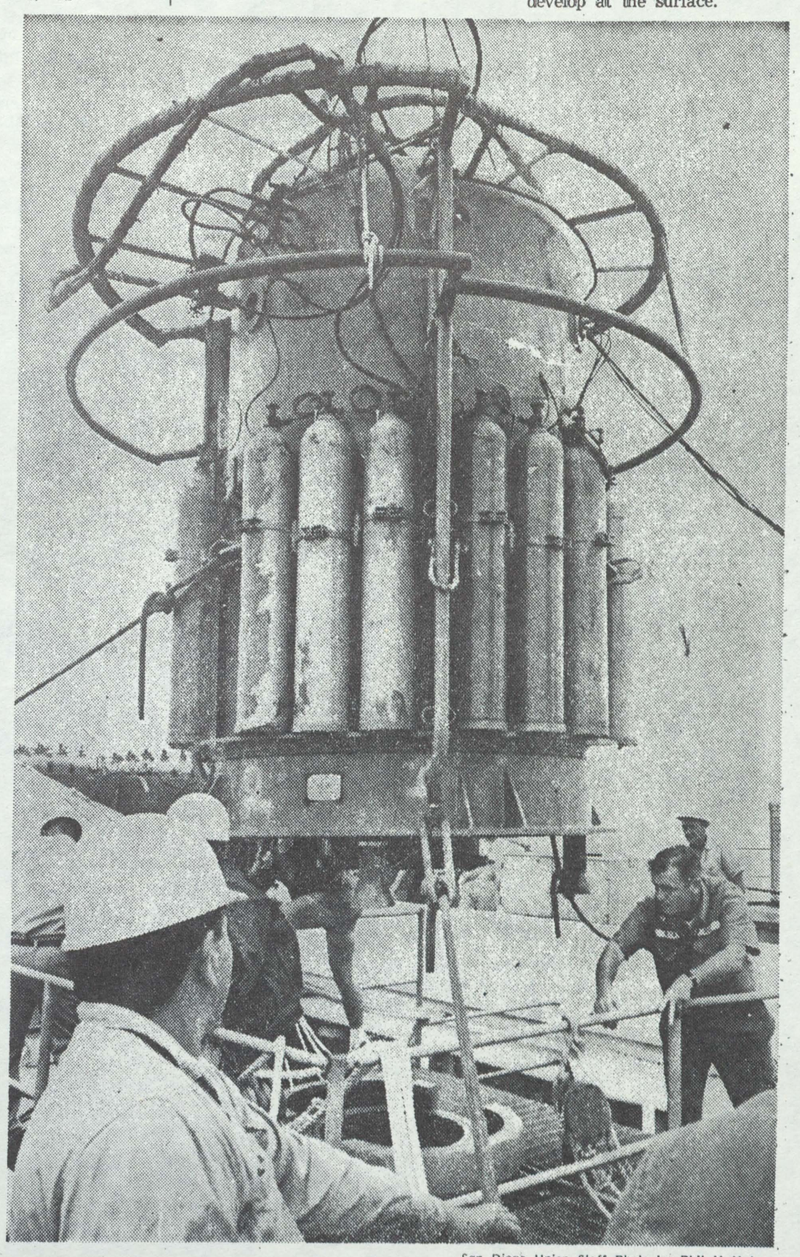
Three teams occupied the Sealab 2 capsule, at a depth of 205 feet, for 15-day periods.

First to emerge at 8:35 p.m. Monday night from the decompression chamber was Navy Lt. Robert Sonnenburg, 28, San Diego, the third team's only medical doctor.

The team also included two civilian research scientists, Richard Griegg, 28, and John Morgan Wells, 25, both with the Scripps Institute of Oceanography at La Jolla.

The aquanauts headed straight for the showers aboard the Berkone, visited briefly with their wives and then retired.

The Navy requires divers to remain near the decompression chambers at least 12 hours, on the chance the bends should develop at the surface.



—San Diego Union Staff Photo by Phil McMahan

Home—And Soon Free

Inside this capsule is final team of SeaLab aquanauts. They're being hoisted onto mother ship to undergo decompression. (Story, Page a-23)

HCR17

(SUB SEALAB)

~~(LA JOLLA)~~ -NAVY CHIEF ROBERT SHEATS--THE LAST OF THE FINAL 10 AQUANAUTS IN THE SEALAB 2 PROJECT TO EMERGE FROM THE DECOMPRESSION CHAMBER HAS BEEN DISCHARGED ~~AND APPEARS~~ IN GOOD CONDITION.

OFFICIALS SAY SHEATS--WHO SUFFERED A MILD CASE OF THE BENDS--WAS TAKEN OUT OF THE DECOMPRESSION CHAMBER SHORTLY AFTER 9 A.M. AND APPEARS TO BE SUFFERING NO ILL EFFECTS.

THE OTHER NINE MEMBERS OF THE THIRD TEAM IN THE 45-DAY PROJECT EMERGED FROM THE CHAMBER LAST NIGHT AND ALL APPEAR TO BE IN GOOD SHAPE. SHEATS BEGAN TO NOTICE DISCOMFORT ABOUT TWO HOURS BEFORE THE AQUANAUTS WERE TO BE RELEASED FROM THE CHAMBER LAST NIGHT. THE PRESSURE WAS LOWERED IMMEDIATELY AND HE WAS ORDERED TO SPEND ANOTHER 12 HOURS INSIDE THE CHAMBER.

SHEATS--AT 50 THE OLDEST MEMBER OF THE SELAB TEAM--WAS SUFFERING FROM A CONDITION WHICH RESULTS FROM A SUPERSATURATION OF ITTUE WITH GAS CAUSIN

SHEATS--AT 50 THE OLDEST MEMBER OF THE SEALAB TEAM--WAS SUFFERING FROM A CONDITION WHICH RESULTS FROM A SUPERSATURATION OF TISUE WIPH

SHEATS--AT 50 THE OLDEST MEMBER OF THE SEALAB TEAM--WAS SUFFERING FROM A CONDITION WHICH RESULTS FROM A SUPERSATURATION OF TISSUE WITH GAS CAUSING THE FORMATION OF BUBBLES IN THE TIESSUE. IN SEVERE CASES, THE BUBBLES CAN CAUSE PARALYSIS AND EVEN DEATH, BUT PROJECT OFFICIALS SAY SHEATS SUFFERED ONLY A MILD CASE.

THE OTHER NINE AQUANAUTS ARE SCHEDULED TO HOLD A PRESS CONFEENCE AT LA JOLLA LATER THIS MORNING.

EM/P954APD10/12..

Sealab 2 Returns From Ocean Floor

LA JOLLA, Calif. (AP) — Aquanaut team No. 3 rose smoothly 205 feet to the surface Sunday as the Navy ended a 45-day experiment it said had proved man can work on the ocean floor.

"Smooth ride," team leader Bob Sheats commented by telephone as a winch hoisted him and nine fellow aquanauts from Sealab 2.

Winch and workmen mated a pressurized transfer capsule carrying the aquanauts to a decompression chamber on the deck of the escort vessel Berkone.

WAIT 31 HOURS

The divers will wait 31 hours in the chamber while its pressure is gradually reduced to that of sea level. They are expected to emerge from the chamber about 5:30 p.m. Monday and hold a news conference at 9:30 a.m. Tuesday.

Skies were gray and the sea gentle around the Berkone, 1,000 yards off La Jolla, a picturesque southern California residential community. On the deck more than 100 newsmen and participants watched the end of the Navy's boldest experiment in ocean-bottom laboratory living.

EXTENDED PERIODS

Said a spokesman: "Sealab 2 has proved that man can successfully do work for extended periods of time at depths under high pressure at the bottom of the ocean. That is basically what we set out to prove."

Each of Sealab 2's three successive 10-man teams stayed down approximately 15 days except for two men who were below 30 days.

Navy Lt. Cmdr. M. Scott Carpenter, three-orbit astronaut turned aquanaut, was down the first 30 days. Lt. Robert Sonnenburg, 28, San Diego, a Medical Corps doctor, was a member of both the first and third teams.

The aquanauts who emerged Sunday spent their time testing new salvage procedures with potential application in aircraft and ship disasters.

An old Navy Cougar jet fighter, its wings removed, was dropped to the ocean floor near them. Into the fuselage they pumped a foam that hardened, became buoyant and raised the hulk to the surface.

Sealab 2, the 12 by 58-foot ocean-bottom laboratory, will be towed Wednesday to Long Beach, Calif., for examination, equipment removal and storage.

om OCT 11

Plants Can Grow in Sealab, Scientists at A&M Report

COLLEGE STATION, Texas (AP)—Plants can grow in the high-pressure, 90 per cent helium atmosphere of a sea laboratory, Texas A&M University scientiests said Thursday.

Barley grew faster than peas and marigolds—but they all germinated and sprouted toward incandescent artificial lights substituting for the sun, said Dr. Page W. Morgan, plant physiologist.

Morgan said the experiment indicated that plants enclosed with men 200 feet under the sea consume carbon dioxide exhaled by man and manufacture oxygen for man—the same as above the ground.

Morgan said if plants prove to grow well, men on undersea missions or space travel might use plants to purify the air instead of expensive and bulky purifying equipment.

Scott Carpenter, astronaut turned aquanaut, first wondered if plants would grow in the artificial atmosphere of Sealab 2.

Texas A&M's department of plant sciences sent seed, planter boxes with peat moss, and light filters to La Jolla, Calif., where scientists lowered them 200 feet to the Navy's 100-ton Sealab 2.

Ten-man crews photographed the growth.

Morgan said the barley, peas and marigold plants were being dried or frozen and sent here for further analysis.

In addition to the potential give-and-take relationship of plants and man underwater, Morgan said, plants may be used as medical indicators.

OCT 15 19

NEWS
Dallas, Texas

205 FEET DOWN, SEALAB CREW EATS RAW FISH

50 Per Cent of Food Is Taken from Water

BY RONALD KOTULAK

Man's ability to live off the ocean while submerged far below sea level was demonstrated by the third team of aquanauts in Sealab II, it was disclosed yesterday.

Fish caught and fileted 205 feet under the Pacific ocean made up half the diet of the nine-man crew who spent 15 days on the ocean floor, said Capt. George F. Bond of the navy medical corps, a member of the surface team that directed the experiment.

Bond said at a press conference in the Palmer House that the Sealab experiment was "a large stride" to man's ultimate control of the sea and the sea floor. He later addressed a meeting of the American Academy of Dermatology.

Permit to Spear Fish

"Team 3 lived 50 per cent off the sea," Bond said. "It could have been more but unfortunately well wishers ashore wanted to send the men prepared meals and we couldn't refuse them all."

He said the team, one of three which spent a total of 45 days 3,000 feet offshore from La Jolla, Cal., came close to living off the sea. The navy experiment, which ended in October, is designed to test man's adaptability to the hostile environment of the ocean.

The first two teams were not permitted to kill fish but the last team was given clearance to spear fish for food supply.

The men had a variety of fish to choose from, almost like a menu at a seafood restaurant, and most of it was delicious, Bond said.

Fish Eaten Raw

The fish was eaten raw, Japanese style, and garnished with a sauce called sashini. Most of the aquanauts were used to eating raw fish just as others eat raw oysters, clams, and shrimp.

The sauce was made up of soya sauce, lemon juice, and Tabasco sauce, a fairly common mixture for seafood sauces.

"The scorpion fish was very good, there were millions of them down there," Bond said. "The rubber-lipped perch and the cabezon were good and the vermillion grupper—a beautiful fish—was very tasty."

Like Breakfast Food

Another item on the seafood menu was the zoo plankton, a tiny, whitish sea animal, which the aquanauts were able to get three to four gallons at a time.

"They ate the plankton for breakfast because it tasted and smelled just like wheat flakes cereal," Bond said. The plankton were alive when eaten.

Tastes were somewhat dulled in the pressurized hull because of the special atmosphere inside, which was 80 per cent helium, he said.

Medical checkups on shore showed no apparent change in the aquanauts' digestive system from the raw-fish diet, he added.

Orlando Sentinel
Phone GA 3-4411
Classified GA 3-8871

General News

Friday, Dec. 3, 1965

Sea Work Far Behind Space Gain

North American Newspaper Alliance

WASHINGTON — Gemini 7's 16-day orbital mission calls attention to a situation which history some day may record as a prime example of national illogic.

The situation is the almost total lack of popular and government interest in exploring the world of the ocean depths, a world so rich in promise that scientist predict it could revolutionize life on this planet.

YET IN comparison with the national time, effort and money devoted to exploring outer space, the program to conquer inner space is on a dime-a-day basis.

On Oct. 10, the U. S. Navy brought up to the surface a final team of 10 aquanauts who had spent 15 days living underwater in a capsule called Sealab Two. In all, three teams spent 45 days at a depth of 205 to 300 feet, traveling outside the Sealab every day on oceanographic experiments.



SCOTT CARPENTER
. . . More important

Their courage and daring and the significance of their exploits was attested by astronaut M. Scott Carpenter, who has switched from space exploration to undersea work with Sealab Two.

"I HAVE now lived with real heroes," said Carpenter.

How would he compare the potential importance of exploring space and the sea?

"I feel that whatever material gains come from the two programs, the ones we might get from the assault on the ocean are much more immediate than those we might get from the assault on the moon, for example," Carpenter said.

CAPT. George Bond, scientific director of the Sealab project, believes the quality of human life will be vitally affected by the ability or inability of man to extract the underwater resources of the sea for his daily life.

With the world's agriculture specialists already predicting a shortage of food in the next 15 years as population growth continues, the sea could become a valuable source of edible foodstuffs and fresh water. Whole new families of antibiotics, so vital to medical science, are lurking in the ocean depths. Minerals, scarce metals and other riches as yet untouched by man are available for extraction and use. Compared with the bleak and inhospitable surface of the moon, the underwater domain of the seven seas loom as a lush paradise.

But what has happened thus far?

UNDERSEA exploration at present, says Carpenter, "is like a newly legitimized child, represented by a nucleus of 50 dedicated men working with mail-order equipment in marginal conditions, using outmoded techniques."

Sealab was a $1.8 million project. The Gemini program is a billion-dollar project.

SUN STAR 10/10/65

TRIBUNE Chicago, ILL.

DEC 8 1965

Crewmen of Selab 2 Due to End Test Today

LA JOLLA, Calif. (AP) — The nation's aquanauts of Sealab 2 will ascend to the surface today to wind up the 45-day undersea living experiment.

The 10 divers of the third team to live at the 205-foot depth were busy yesterday making final preparations to leave the undersea laboratory.

After nearly 15 days on the Pacific Ocean bottom, the aquanauts will secure the Sealab and enter the pressurized personnel transfer capsule for the 10-minute ascent. Then they'll spend about 30 hours in a decompression chamber aboard the support vessel Berkone.

Sealab 2 will be hauled to the surface Wednesday and will be towed to Long Beach, Calif.

Meanwhile, attempts were made yesterday to tranquilize and capture Sam the sea lion.

Men got a close look at Sam Friday while he was sleeping on a buoy and decided Samantha should be Sam because he is a male, instead of a female.

They want to catch the sea lion and transport him to Point Mugu, Calif., to join Tuffy the porpoise in a training tank. Tuffy took part in a scheduled experiment earlier by rescuing "lost" divers and delivering tools and mail.

LA MESA, CALIFORNIA, THURSDAY, OCT. 14, 1965

Aquanauts Due Thursday



AQUANAUT "Tuck" Tuckfield shows members of the "Unlimiteds" (La Mesa Diving Club) through Sea Lab II at La Jolla. Tuckfield will be one of many aquanauts whom the La Mesa Club will be hosting for a public appearance this Thursday at the La Mesa Junior High School, starting at 8:15 p.m. From left to right: Tuckfield, top Dick Long, bottom Berry Thurman, Tim Maynard and Larry Mendel.

Sea Lab aquanauts who completed a 45-day underwater project at La Jolla will speak at a public meeting in La Mesa Junior High School this Thursday evening.

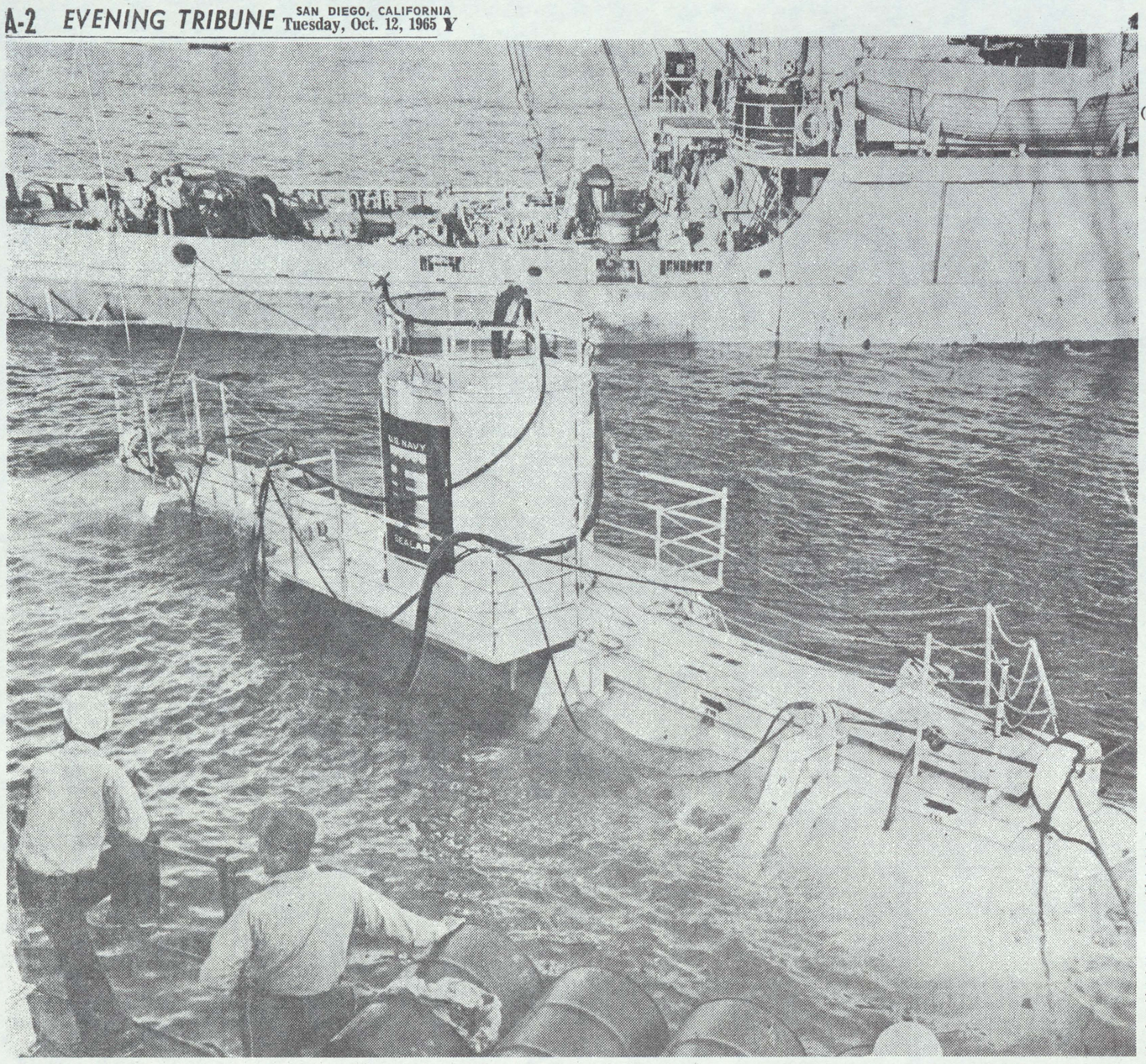
Bob Sheets, team leader of one of the groups which made the 200-foot, prolonged dive in the La Jolla Canyon, will give the audience insights on the problems and results of the nationally-publicized project. Sheets and other aquanauts, including "Tuck" Tuckfield, Wilbur Eaton and John Reeves, will answer questions from members of the audience. If time permits, uncut films and slides from Sea Lab II will be shown, according to Skip Fenn, program supervisor of La Mesa Recreation Dept., which is sponsoring the program.

Program time tomorrow at the junior high, located at 4200 Parks, is 8:15 p.m. It will be one of the first public appearances of SeaLab members. The meeting, open to the public, will be free of charge.

Aquanauts completed the final phase of the 45-day stay under water Sunday when the third team of aquanauts left their habitat on the ocean floor. The raising of SeaLab yesterday (Wednesday) signaled the end of the project.

Dick Long, instructor of the La Mesa Recreation skin and scuba diving classes, was instrumental in obtaining the aquanauts for the public address, according to Fenn.

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BACK ON TOP—Sealab II floats on the surface of the water off La Jolla after being raised yesterday from the ocean floor where it had rested for 45 days. It came up from a depth of 205 feet bow first because of difficulty in ballasting.

San Francisco, Calif.
Examiner
(Cir. D. 289,469 - S. 427,093)

OCT 12 1965

Trouble For One Aquanaut

LA JOLLA—(AP)—The Navy reported all its Sealab 2 aquanauts hale, hearty and enjoying fresh air today but one—Robert Sheats, 50, stricken by the painful bends.

Sheats was gripped by a pain in his hip last night as the chamber containing the project's third team was decompressed to the minus 12-foot level.

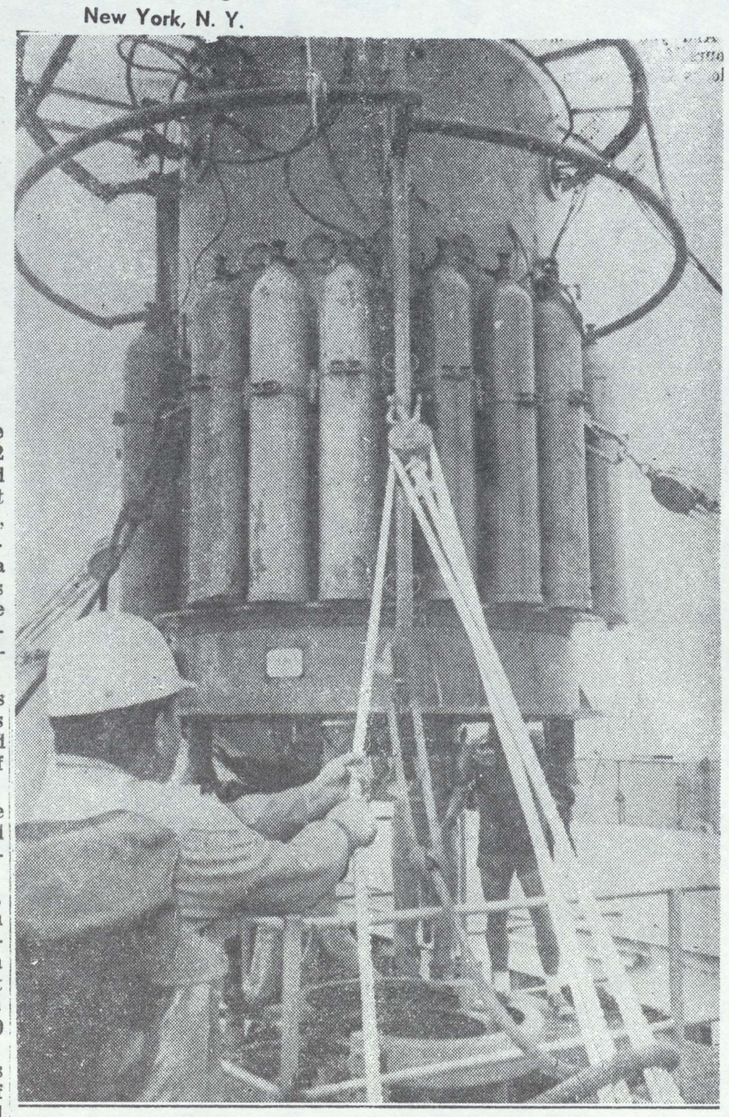
At 6 p.m., Sealab doctors separated Sheats from his nine comrades and returned him to a simulated depth of 60 feet.

As atmospheric pressure increased, the pain subsided and Sheats remained in relative comfort.

A spokesman said Sheats, who spent 15 days at a depth of 205 feet, was decompressing at the rate of 4 feet an hour and if the pain did not return, he was to emerge from the chamber today at 10 a.m.

The exhausting process is necessary to rid the body of helium bubbles which would form in the bloodstream if a diver ascended too fast after breathing the helium-rich atmosphere in the Sealab 2 underwater living project.

From OCT 12 1965
DAILY NEWS
New York, N. Y.

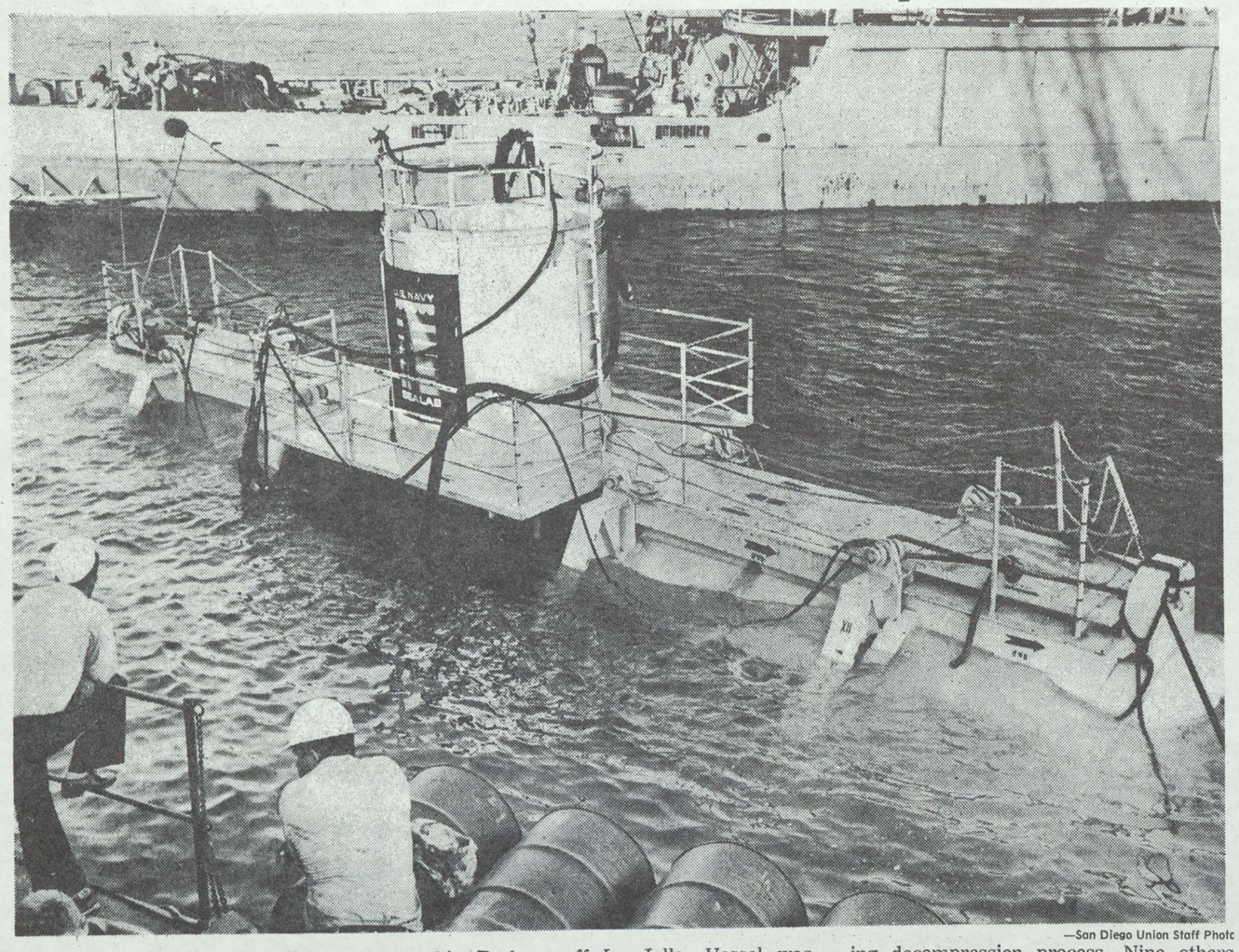


(Associated Press Wirefoto)

Working Under Pressure. Workers connect pressurized transfer capsule containing 10 aquanauts to decompression chamber aboard support ship Berkone off La Jolla, Calif. The men, who ended their stay in the chamber late yesterday, had ascended from the 205-foot-deep Sealab 2. They were reported in good shape as the 45-day deep-sea experiment drew to a close.

Aquanaut Gets Bends; 9 Finish Decompression

SeaLab Returns To Surface After Historic Project



—San Diego Union Staff Photo

SeaLab II, which was "home" for aquanauts for 45 days on ocean floor, was returned to surface yesterday beside mother ship Berkone off La Jolla. Vessel was raised as one aquanaut who left SeaLab Sunday developed mild case of bends during decompression process. Nine others had no ill effects. (Story, Page a-13)

SAN DIEGO
EVENING TRIBUNE

OCT 14 196

Diver Suffers Bends After Sealab Ascent

By LEO BOWLER
EVENING TRIBUNE Science Writer

Aquanaut Bob Sheats, leader of the third team of divers in Sealab II, was recovering today from a case of bends he suffered while decompressing aboard the Sealab mother ship Berkone.

Sheats, a Navy chief torpedoman, got the bends yesterday in the decompression chamber. He was separated from the nine other aquanauts in the chamber and was subjected to pressure equivalent to 60-foot water depth.

The other nine aquanauts left their decompression room at 8:30 last night and took part in a press interview this morning.

Sheats was released from the chamber at 9 a.m. today. He said he felt well. He was kept in bed aboard the Berkone in order to be near the chamber in case of emergency.

Chief Hospital Corpsman Sanders W. (Tiger) Manning entered the chamber with Sheats and stayed with him during the decompression procedure. Manning is one of the four divers from Sealab I, which was held last year off Bermuda at a depth of 192 feet.

Sheats had complained of a pain in his hip. When the pressure in his part of the chamber was increased, the pain was relieved.

Newsmen and families of the men watched at the press conference today as RAdm. John K. Leydon, director of the Office of Naval Research, awarded a Navy Unit Commendation to all those connected with the project.

Leydon represented the secretary of the Navy at the ceremony which was held in Sumner Auditorium on the Scripps Institution of Oceanography campus.

The event was attended by aquanauts from the first and second teams who were led by Cdr. Scott Carpenter during their underwater stay. Aquanauts from Team 3 came up from Sealab Sunday. Team 2 came to the surface Sept. 26 with Carpenter who had stayed down for 30 days. Team 1 came up Sept. 12.

The aquanauts wore their green dungaree uniforms and answered questions about their stay under the sea.

Capt. Lewis B. Melson, director of the project, said Sealab has been a complete success. He said the Navy spent $1.8 million on the project between November of last year and the present.

Capt. George Bond, a Navy doctor who is principal investigator for the Sealab project and director of the Navy's Man in the Sea program, said that Sealab III will be held within a year.

In the next experiment, Bond told the Evening Tribune, the aquanauts will work from a residence placed at a depth of between 400 and 450 feet.

Sealab was brought to the surface yesterday afternoon. It was to be towed back to Long Beach today.

The lab came up bow first because of difficulty in ballasting. It was stabilized by divers and technicians after if emerged.



BOB SHEATS
Had pain in hip

The lab first was pulled from mud on the bottom at 1 p.m. Earlier water in some of its ballst tanks had been blown out with compressed air to make it lighter. The list in Sealab gave engineers trouble, but by putting a near-maximum strain on their winches, they were able to free it from the bottom and start its trip to the surface.

LEMON GROVE (CALIF.) REVIEW
10-14-65

Sea Lab Crew To Appear In La Mesa

Twenty members of the Sea Lab Aquanauts, including Team III leader Bob Sheets, will appear at La Mesa Junior High School tonight in a special program beginning at 8:15.

Their appearance is free to the public and is under the sponsorship of the La Mesa Park-Recreation Department.

Sheets will discuss the La Jolla Canyon dive, giving the audience insight into the problems and results of the nationally-important project.

Sheets and other aquanauts, including Tuc Tuckfield and Wilbur Eaton of Team I and John Reeves of Team II, will answer questions from the audience.

In addition, if time permits, uncut films and slides from Sea Lab II will be shown.

POST 10/13/65

No-Hitter Underwater

LA JOLLA, Calif. — The U.S. Navy verged on pronouncing its "Man-in-the-Sea" project with Sealab 2 a complete success — but didn't quite. As the 45-day underwater drama came to an end, director Dr. George Bond said only, "We've got a no-hitter going now and we don't want to discuss it too much." But the Navy claimed a series of accomplishments: man was "conclusively" shown to be able to work underwater for long periods, a porpoise named Tuffy performed fairly successfully as a submarine St. Bernard, astronaut-cum-aquanaut M. Scott Carpenter talked to astronaut Gordon Cooper as he orbited the earth, the American aquanauts talked by telephone to oceanauts submerged 8000 miles away in the Mediterranean.

The experiments' end was just slightly clouded by one aquanaut who developed "the bends"—decompression sickness—in the landbased decompression chamber.

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(200)

LA JOLLA, CALIF., SEPT. 24 (AP)-AQUANAUTS M. SCOTT CARPENTER AND WALLACE T. JENKINS HAVE DESCENDED TO 253 FEET IN THE DEEPEST OCEAN DIVE YET AT THE SEALAB 2 UNDERWATER LIVING PROJECT.

TWO PREVIOUS ATTEMPTS TO MAKE DEEP DIVES HAD BEEN POSTPONED AND APPARENT TROUBLE WITH A DEPTH GAUGE REQUIRED THE AQUANAUTS YESTERDAY TO STOP SHORT OF THEIR GOAL OF 266 FEET. THEIR PREVIOUS RECORD WAS 234 FEET.

CARPENTER SAID THE DEPTH GAUGE DID NOT SEEM TO BE FUNCTIONING CORRECTLY AND HE CALLED OFF THE DIVE. HE SAID IT APPEARED THAT THEY WERE DEEPER THAN THE GAUGE RECORDED.

WATER CLARITY WAS IMPROVED AT THE SEALAB SITE 205 FEET BENEATH THE OCEAN'S SURFACE YESTERDAY WITH VISIBILITY TO 30 FEET.

THE CULINARY ASPECTS OF UNDERSEA LIVING WILL OCCUPY SOME OF THE AQUANAUTS TODAY.

"THEY'LL MAKE PANCAKES FOR THE FIRST TIME, USING A GREASELESS GRIDDLE," A SPOKESMAN SAID. "THEY ALSO WILL ATTEMPT TO MAKE HOMEMADE BUSCUITS."

COOKING IS NO EASY CHORE AT THAT DEPTH, WHERE THE AIR INSIDE SEALAB 2 IS

Y 3.5 PER CENT OXYGEN WITH THE REST

COOKING IS NO EASY CHORE AT THAT DEPTH, WHERE THE AIR INSIDE SEALAB 2 IS ONLY 3.5 PER CENT OXYGEN WITH THE REST PRIMARILY HELIUM.

"THE BISCUITS WILL PROBABLY END UP BEING FLAT, BUT EDIBLE," THE SPOKESMAN SAID. "IT'S HARD TO GET THEM FLUFFY UNDER SEVEN ATMOSPHERES OF PRESSURE. THEY WILL USE A LOT MORE BAKING POWDER, TOO.

"THEY CAN'T USE GREASE BECAUSE IT WOULD RESULT IN TOO MUCH TOXIC GAS," HE ADDED.

EE152APD NM

The San Diego Union

PAGE B-2 WEDNESDAY MORNING, OCTOBER 13, 1965

Well Done, SeaLab

The Navy expression "Well done, all hands," a high accolade because it is a rarely-given understatement for great accomplishments, is particularly fitting for the men who conducted SeaLab II.

The teams of aquanauts who lived on the ocean floor off La Jolla for 45 days, and their backup teams have made a significant contribution to U.S. development of the important ocean frontier.

It also is a matter of pride that the aquanauts carried out their duties in the all-American way that seems casual, yet is the highest mark of superb professional ability and dedication.

San Diegans join the nation in congratulating the aquanauts and SeaLab crews. The experiment has further enhanced San Diego's reputation as the oceanography capital of the world.

Aquanauts Complete Underwater Tests

Jr Scholastic 10/14/65

The U.S. Navy's Sealab II was scheduled to complete a 45-day undersea mission this week.

Sealab II, with its aquanaut crew, had been perched on the Continental Shelf, about 205 feet below the surface of the Pacific Ocean. It was some 3,000 feet off the beach at La Jolla ("luh hoya"), Calif.

The Continental Shelf is the ocean floor around each of the continents. Its average depth is 400 feet. (Other ocean depths are as much as seven miles.) The shelf is rich in minerals such as oil and iron.

Sealab II's mission was to explore this floor and to find out how well men could live and work on it (*watch for Frontiers of Science, Nov. 4*). Crew members also set up the world's first underwater weather station, using new kinds of diving equipment.

Undersea Tests to Go Deeper

1,700-Ft. Dives Seen as Result of Sealab 2

LA JOLLA, Calif., Oct. 13. — (AP) — The Navy's plans for making man amphibian indicate that future man-in-the-sea experiments will be deeper, darker and more dangerous.

"I firmly believe that in four or five years man will be living at a depth of 600 feet and diving to 1,700 feet," Capt. George Bond, principal medical investigator for the recently ended Sealab 2 project, said yesterday.

In that 45-day experiment in underwater living, 28 men in three teams manned the Sea lab cylinder on the Pacific Ocean floor, 205 feet below the surface. They suffered no serious ill effects, Bond said.

POTENTIAL UNLIMITED

"Our work was done in the face of cries that this was 'Buck Rogersish,' and in the face of questions from high places about its value to society or the Navy," he declared.

"But we've confirmed that it is possible . . . to put men into a hostile environment and have them do work. This was highly contested a few years ago. Its value, its potential, is unlimited."

Bond, other officers and the aquanauts attended a news conference yesterday to discuss future plans.

He said the 200-ton cigar-shaped steel Sealab capsule will be usable in the next experiment. It was built at a cost of $1.8 million.

400 FEET NEXT?

Bond said no date for the next experiment has been set, pending reports from Sealab 2, but added it will probably be conducted at a depth of 400 feet.

What was accomplished by the Sealab 2 experiment?

The first two teams, led by astronaut-aquanaut Navy Commander M. Scott Carpenter, set up housekeeping, erected a weather station, experimented with plants and served as guinea pigs for physiological and psychological studies.

e The third team worked successfully on several experimental salvage operations.

PETS PROVE HANDY

They learned that the helium-rich atmosphere inside the undersea capsule gave their voices a high-pitched quality, that it's difficult to fry pancakes under pressure, and that it's nice to have friends like Tuffy the porpoise and Sam the sea lion around. Pressure on them was seven times that at the surface.

Tuffy was trained to run errands, and did, and after meeting Sam, the aquanauts trained him to answer a buzzer.

The aquanauts wore protective rubber suits, but, Bond said, a more protective outfit would be needed for future deep dives.

JOINTS ACHE AT FIRST

Bond also mentioned a discovery that was puzzling:

"The first few days under, all the men had general soreness and joint pains—a sensation of having been through violent muscular effort."

One aquanaut, Bob Sheats, has recovered from a mild case of the bends.

Bond, introducing the aquanauts after they had received meritorious service awards, said:

"They're my buddies, every one of them, and I'm proud to say it."

NEWS Detroit Mich.

OCT 13 1965

LA. HERALD-EXAMINER 13 OCT 1965

Deeper Dive Next for Sealab

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"I firmly believe that in four or five years man will be living at a depth of 600 feet and diving to 1700 feet," Capt. George Bond, principal medical investigator for the recently ended Sealab 2 project, said yesterday.

In that 45-day experiment in underwater living, 28 men in three teams manned the Sealab cylinder on the Pacific Ocean floor, 205 feet below the surface. They suffered no serious ill effects, Bond said.

"Our work was done in the face of cries that this was 'Buck Rogersish,' and in the face of questions from high places about its value to society or the Navy," he declared.

"But we've confirmed that it is possible . . . to put men into a hostile environment and have them do work. This was highly contested a few years ago. Its value, its potential, is unlimited," he added.

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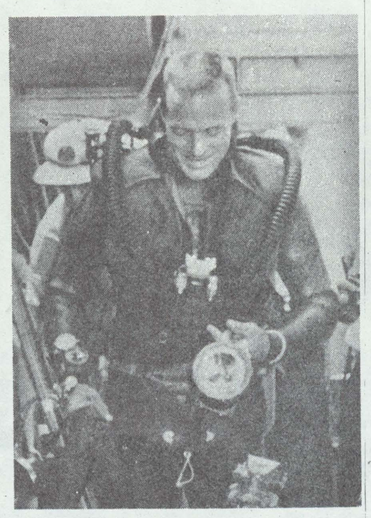
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The third team worked sucessfully on several experimental salvage operations.

Récord submarino: El astronauta norteamericano Scott Carpenter estableció un récord . . . en el fondo del mar. Carpenter, que ya tenía en su haber un vuelo en el espacio, permaneció 30 días a bordo de la nave "Sealab II," a alrededor de 60 metros de profundidad, a casi un kilómetro mar adentro frente a las costas de La Jolla, California. Carpenter estuvo acompañado por otros "acuanautas," pero éstos fueron reemplazados a intervalos regulares. El astronauta fue el único que permaneció en el "Sealab II" desde el 29 de agosto hasta el 27 de septiembre. El propósito del experimento fue realizar una amplia serie de estudios e investigaciones submarinos y comprobar la adaptabilidad del ser humano a la vida en esas condiciones, es decir, en una nave-laboratorio de unos 16 metros de largo y cuatro de ancho. Es cierto que los tripulantes de algunos submarinos atómicos han permanecido "bajo el agua" muchos más días que Carpenter, pero el Sealab no reúne todas sus comodidades, por ser propiamente un laboratorio.



Carpenter: 30 días en el fondo del mar

VISION - 27
635 Madison Avenue Bi-W
New York 22, N.Y. Circ. 131,364

OCT 15 '65

Aquanauts, SeaLab Taken To Long Beach

Most of the SeaLab II aquanauts left La Jolla yesterday for the Long Beach Naval Shipyard to rejoin the SeaLab chamber which was towed north by the submarine rescue ship Gear.

The 57-foot-long chamber will be extensively modified for use in SeaLab III, next year's proposed underwater living experiment.

A SeaLab official said about 20 of the 28 aquanauts were in Long Beach to give advice on modifications of the steel cylinder which was home to the men for 45 days on the ocean floor off La Jolla.

Changes in the living compartment, air conditioning system, laboratory area, and galley will be among the considerations, a spokesman said.

After depositing the SeaLab, the Gear returned last night to tow the surface ship Berkone to Long Beach. It is expected to arrive tonight.

Chief Master Torpedoman Robert Sheats, leader of Team 3, went through a medical debriefing yesterday morning at Naval Hospital in Balboa Park.

Sheats, called by Capt. George Bond, SeaLab's principal investigator, "the finest man I've ever known," suffered a case of the bends during decompression Monday and had to remain in the Berkone's decompression chamber 12½ hours longer than the other Team 3 aquanauts.

Sheats, 47, whose retirement after 30 years in the Navy was postponed so he could take part in SeaLab, expects to be in Long Beach today.

Bond said at a press conference that the success of SeaLab II was due almost entirely to its team leaders, Cmdr. Scott Carpenter and Sheats.

"Bob Sheats is not a commissioned officer," Bond said, "but all his life he has been a leader of men."

SAN DIEGO EVENING TRIBUNE

OCT 14 1965

CARPENTER IS CITED FOR AQUANAUT WORK

WASHINGTON, Nov. 16 (UPI)—Comdr. M. Scott Carpenter received the Legion of Merit today for his work as an aquanaut.

The astronaut was one of two team captains in Project Sealab II, which conducted scientific tests last August. The two 14-man teams of quanauts spent two weeks at 200-foot depth off the California Coast.

Commander Carpenter made a three-orbit space flight in 1962.

Secretary of the Navy Paul H. Nitze, who pinned the medal on Commander Carpenter in a Pentagon ceremony, said the astronaut-aquanaut "is fast becoming a legend of our time."

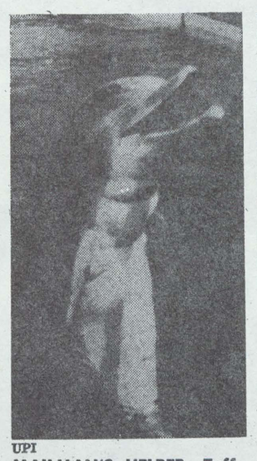
"The day is just over the horizon when we will be harvesting food, medicine, minerals and oils from the ocean floor," Mr. Nitze said.

The citation said:

"Living at a depth of 205 feet beneath the Pacific Ocean for a period of 30 days, in a hostile and artificial environment he skillfully guided his teams through arduous and potentially hazardous tasks.

"He demonstrated the capability of highly trained naval personnel to live and work effectively as inhabitants of the ocean environment."

Commander Carpenter went down for two 15-day periods. The other team captain, Chief Petty Officer Robert Sheats, received the Legion of Merit last month.



UPI



Wide World

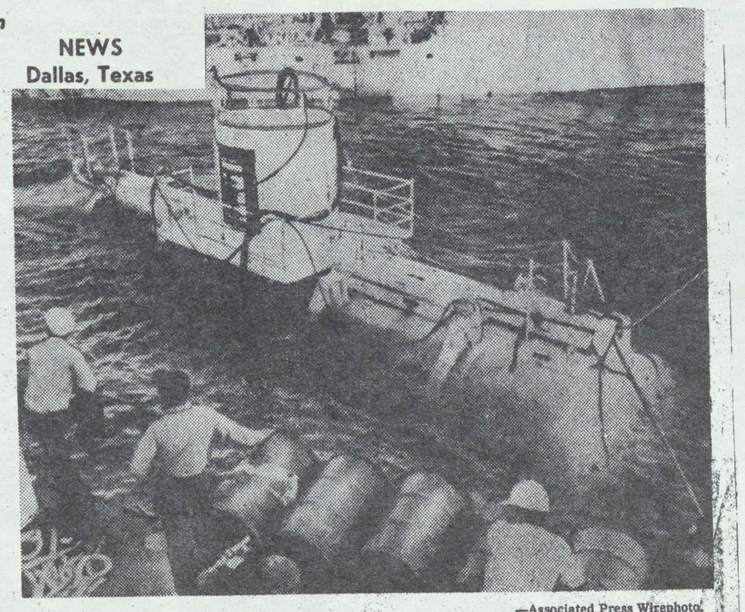
MAILMAN'S HELPER: Tuffy, a porpoise trained by the Navy, helped the aquanauts of Sealab II find their way around the ocean floor. In his spare time, Tuffy did some extra jobs, such as carrying the mail. Mrs. John Reaves, wife of one of the aquanauts, holds a letter autographed by the Sealab crew. Tuffy brought it to the surface. The letter's postmark reads: "From the Bottom of the Pacific Ocean."

JR. SCHOLASTIC 10/14/65

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New York 13 Oct 1965

From NEWS
Dallas, Texas



—Associated Press Wirephoto

Its work finished, the 12x58-foot Sealab 2 capsule is brought to the surface from the 205-foot-deep ocean bottom where it served as the home of aquanauts during a 45-day undersea experiment. Salvage ship Gear, in background, will tow Sealab to Long Beach, Calif.

Director of Sealab Says Project Completed Goals

LA JOLLA, Calif. (AP)—Sealab 2, the Navy's underwater research project, accomplished its key goals, the project's director said here Tuesday.

"We proved that men can live in ocean depths without physical harm while they carry out work assigned to them," Capt. L. B. Melson said. "We don't really know yet all that we have learned. It will take time to study and analyze the information."

Sealab 2 was an underwater laboratory 205 feet deep off the Southern California coast. The last of three diver teams who spent 15 days each living and working there told about it at a news conference Tuesday. The team came up Sunday. All but one left a decompression chamber Monday. The team commander, Robert Sheats, a master chief torpedoman and veteran diver, suffered from bends and didn't get out until Tuesday morning. He wasn't at the news conference.

Sheats, 50, required an extra-long stay int he decompression chamber to remove helium gases that had built up in his body tissue due to water pressure. But a Navy spokesman said he was in good condition.

Capt. George Bond, the project medical officer, said the Sealab experiment achieved "major accomplishments" but added that the data would be fed through a computer before officials would know exactly what the experiment had revealed.

"Maybe we will come up with some additional minor findings after studying the data, but I don't believe that we will discover any major findings to reverse the conclusions we've already drawn," said Bond.

Prior to the morning news conference, Rear Adm. John Leydon, chief of naval research, presented the aquanauts with the Navy unit commendation ribbon for meritorious service.

In all, 30 aquanauts spent a total of 45 days in the 12 by 58 foot steel Sealab 2. The project began Aug. 26 and the third team ascended to the mother ship about one-half mile of the La Jolla coast Sunday morning.

Melson said the project was characterized by hard work in a strange environment.

"This has not been a vacation, every minute of it has been fraught with peril."

No one was injured in the experiment.

ROCKY MOUNTAIN NEWS
Denver, Colo.
OCT 13 1965

DEEPER DIVES FOR SEALABS ARE PREDICTED

Could Work at 600 Ft., Aquanauts Say

BY SEYMOUR KORMAN
[Chicago Tribune Press Service]

La Jolla, Cal., Oct. 12 — Experiences of 28 aquanauts in a 45-day underwater experiment just concluded reinforced the probability that within four or five years men will be able to work at ocean depths of 600 feet and dive to nearly three times that distance without pressure perils.

These predictions were offered by nine of the 10 aquanauts who were below for the final 15 days of the Sealab 2 project, and by Capt. George F. Bond of the navy medical corps, a member of the surface team directing the test.

Moored 205 Ft. Below

The 10 aquanauts came up Sunday from the 57-foot long steel capsule housing which had been moored 205 feet below the Pacific surface, 3,000 feet off-shore from La Jolla. Nine of them were fit after 30 hours of decompression. The tenth, Robert Sheats, 50, of Los Angeles, a navy enlisted man, required 12 additional hours in the decompression chamber and was unable to attend today's press conference. His condition was reported satisfactory.

Navy Comdr. M. Scott Carpenter, the only man who is both an astronaut and an aquanaut, was underwater for the first 30 days of the experiment. He offered today to volunteer for Sealab 3 whenever that is scheduled.

Site Is Undetermined

Bond said Sealab 3 may go into operation within 12 months, but the site has not yet been decided. In Sealab 1, held off Bermuda in July, 1964, four men stayed in an underwater habitat 11 days at 197 foot depth.

"We will study all the lessons of Sealab 2," Bond said, "for Sealab 3 we expect to place our housing at 400 to 450 foot depth. It could be in four or five years, our people will be living at 600 foot depth, and will be able to plunge to 1,700 feet without paying the penalty of additional decompression.

"Sealab 2 showed that men living in the pressure there, [100 pounds per square inch, approximately seven times that of surface pressure] could dive to 300 feet without decompression being required on their returning to 205 feet."

Members of the third aquanaut team, in addition to Sheats, were Lt. Robert Sonnenburg, 38, navy medical officer, of Panama City, Fla., five enlisted men, Paul Wells, 38, Mission Beach, Cal.; Lavern Meisky, 38, Spring Valley, Minn.; William Meeks, 34, Washington; Charles Coggeshall, 35, Charleston, S. C. and John Lyons, 35, whose family lives at 1945 Melrose St., Chicago, and three civilians, Richard Grigg, 28, of Honolulu; William Bunton, 32, of Detroit, and John Morgan Wells, 25, of Delmar, Cal. Those three civilians are on the staff of the Scripps Institution of Oceanography, a branch of the University of California at San Diego.

From OCT 13 1965
TRIBUNE
Chicago, Ill.

Sealab Tests Proved Man Can Work Safely Undersea, Chief Says

LA JOLLA, Calif., Oct. 12 (AP).—The director of the Navy's Sealab 2 underwater research project, summarizing its achievements, said Tuesday: "We obtained our key goals. We proved that men can live in ocean depths without physical harm while they carry out work assigned them.

Sealab 2 is an underwater laboratory 205 feet deep off the Southern California coast. The third of three diver teams who spent 15 days each living and working there told about it at a news conference Tuesday morning. Each said it was the thrill of a lifetime.

Capt. L. B. Melson, project director, who visited the lab but wasn't a team member, said:

"We don't really know yet all that we have learned. It will take a long time to study and analyze information. . . .

"We are muddling our way through. The sea is a hard master. What we've learned at 200 feet won't apply at 400 feet. What we know at 400 won't apply at 600."

Undersea divers traditionally have been able to work for short periods in shallow depths, descending quickly and rising slowly to avoid the dread water pressure affliction, bends.

The Sealab series is aimed at finding ways to permit divers to stay in depths for long periods—days or weeks—and perform useful work . . . salvage, construction, research.

CHIEF STRICKEN

The last team came up Sunday. All but one left a decompression chamber Monday. The team commander, Robert Sheats, 50, a master chief torpedoman and veteran diver, suffered from bends and didn't get out until Tuesday morning. He wasn't at the news conference, but a Navy spokesman said he was in good condition.

Prior to the news conference, Rear Adm. John Leydon, Chief of Naval Research, presented the aquanauts with the Navy Unit Commendation ribbon for meritorious service.

In all, 30 aquanauts spent a total of 45 days in the 12- by 58-foot steel Sealab 2.

NO ONE INJURED

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From OCT 13 1965
INQUIRER
Philadelphia, Pa.

Director Hails Sealab Results

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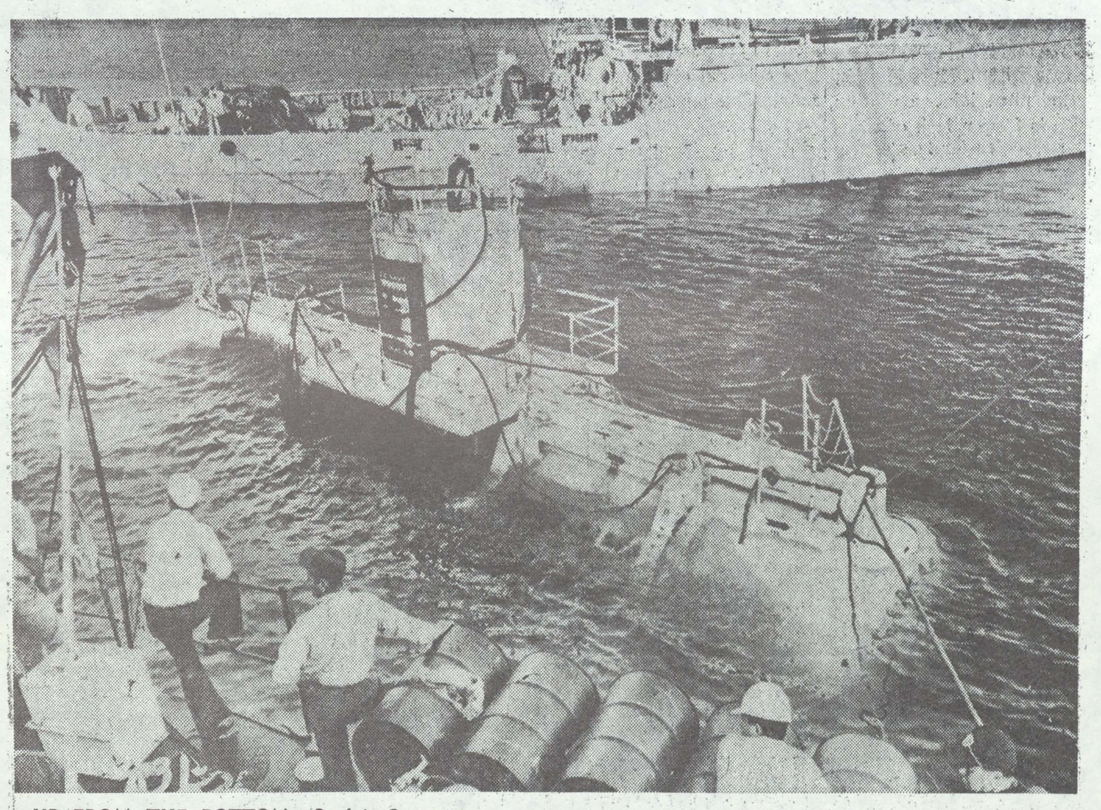
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LA TIMES 13 Oct 1965



UP FROM THE BOTTOM—Sealab 2, center, as it was brought to the ocean surface off La Jolla.
UPI Telephoto

Deeper, Darker Dives In Mankind's Future

LA JOLLA (AP)—The Navy's plans for making man amphibian indicate that future man-in-the-sea experiments will be deeper, darker and more dangerous.

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'BUCK ROGERISH'

"Our work was done in the face of cries that this was 'Buck Rogerish,' and in the face of questions from high places about its value to society or the Navy," he declared.

"But we've confirmed that it is possible . . . to put men into a hostile environment and have them do work. This was highly contested a few years ago. Its value, its potential, is unlimited," he added.

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Bond said no date for the next experiment has been set, pending reports from Sealab 2, but added it will probably be conducted at a depth of 400 feet.

ACCOMPLISHMENTS

And what was accomplished by the Sealab 2 experiment?

The first two teams, led by astronaut-aquanaut Navy Cmdr. M. Scott Carpenter, set up housekeeping, erected a weather station, experimented with plants and served as guinea pigs for physiological and psychological studies.

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RAN ERRANDS

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One aquanaut, Bob Sheats, has recovered from a mild case of the bends.

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"They're my buddies, every one of them, and I'm proud to say it."

Santa Barbara, Calif.
News Press
(Circ. D. 31,466 - S. 32,654)

OCT 13 '65

New Undersea Tests Planned for Sealab

Sealab, the 57-foot steel cylinder which was home for 45 days for three teams of aquanauts, will undergo extensive modifications in Long Beach.

It will become Sealab III and will be used for another undersea project next year.

The submarine rescue ship Gear took Sealab in tow yesterday afternoon for the overnight trip to Long Beach. The lab was built in San Francisco and based in Long Beach. It was towed to La Jolla in August for the Sealab II project.

Successes Pointed Out

The Navy yesterday pointed out three special areas of success in the Sealab II project.

Capt. Lewis B. Melson, director, said the project proved that men could live in an artificial atmosphere and function with their bodies totally saturated with the gases from the atmosphere; that they could make deep dives from their underwater residence without the need for decompression on the way back to the residence, and that a single continuous decompression after a prolonged stay underwater was safe.

Three such decompressions were done during Sealab II, one for each returning team. Only one man, Chief Bob Sheats, got the bends, and he recovered as soon as he was given additional decompression.

Deeper Dives Seen

Capt. George Bond, principal investigator for Sealab II, said he thinks that in a few years divers living at 600 feet will be able to make excursions to 1,700 feet without "paying the penalty of excessive decompression."

Bond said there were few surprises in the condition of the men when they returned to the surface. He said the only ill effects noticed so far occurred in the first few days after the teams occupied Sealab.

He said they felt ill-defined muscle and joint soreness like they had been subjected to great physical strain, but that no cause for this has been discovered.

Infections Prevented

Lt. Robert Sonnenburg, a San Diego Navy doctor who was a member of two of the teams and the only physician in Sealab, said tests on the third team proved that swabbing out a diver's ears before and after a dive would alleviate the ear infections which plagued the first team.

Sonnenburg said headaches among aquanauts decreased after the amount of carbon monoxide in the atmosphere was reduced, and the treatment cleared up skin rashes which the aquanauts experienced.

The three maladies were the only ones experienced by the aquanauts, Sonnenburg said.

Greatest Thrill

All the third team divers who participated in excursion dives to 300 feet described them as the greatest thrill of their stay underwater.

Bill Bunton, a civilian diver-photographer for Navy Electronics Laboratory, said the 300-foot depth has always been an unobtainable goal, although he has dived from the surface to nearly that depth.

From OCT 14 1965
EVENING SUN
Baltimore, Md.

Sealab's Success

It was a hot summer day when Sealab 2 settled onto the ocean floor, half a mile west of California; it was brisk autumn when the last experimenter in undersea living slowly resurfaced and the Navy hauled its watertight outpost back up again. By all accounts, this second venture, much elaborating on one conducted last year off Bermuda, was a success. Friendly porpoises hung around while unfriendly sharks stayed away. Successive teams of divers did manual labor in the water 205 feet down without ill effects beyond ear infections from micro organisms and gashes from spiny fish; they gauged their own favorable physiological reactions to life in a part-helium atmosphere under several times the pressure of sea-level atmosphere; they took advantage of good weather, which is to say unexpected periods of clear water, to observe their many marine neighbors; they talked on the phone to a passing spacecraft.

All in all, Davey Jones's locker was still full of dangers, but men exercising due caution found life about as safe and as bearable as regular submariners do. The project's medical officer is optimistic to the point of forecasting similar ventures soon at three times the depth. Given the inexpensiveness of such enterprises, compared with space exploration, and their non-competitiveness in oceans with plenty of room for all, the prospect is bright for continuing descent into the long-forbidden deeps.

SAN DIEGO
EVENING TRIBUNE
OCT 13 1965

Sealab 2 Brought Up; Success of Tests Hailed

Teams Prove Man Can Live 200 Feet Down, Officer Says; New Project Set for 1966

Exclusive to The Times from a Staff Writer

LA JOLLA—The successful conclusion of the Sealab 2 project has proved that man can live at a depth of 200 feet for indefinite periods and function well, it was claimed here Tuesday.

In making this assertion at a press conference at the Scripps Institute of Oceanography, Capt. George Bond, principal medical investigator for the project and head of the Navy's "Man in the Sea" program, said:

"The data we have gathered will be evaluated in preparation for Sealab 3, which will be about one year from now, and will test man's ability to live at a depth of 400 feet. Our ultimate goal is to learn if men can work and live and be productive at 600 feet."

200-Ton Load

The Sealab capsule was hoisted from the bottom of the sea Tuesday with an enormous winch on the deck of a Navy ship. It weighs 200 tons on the surface, 14 tons in the sea.

It will be towed to Long Beach Naval Shipyard to be inspected, modified and stored for future use.

The press conference was highlighted by the issuance of a Navy unit commendation to all 28 Navy aquanauts who took part in Sealab 2.

The 28 included Comdr. Scott Carpenter, astronaut turned aquanaut, who was down the first 30 days of the 45-day project and headed the first two teams.

Help on Salvage

Carpenter told assembled newsmen that he felt one of the major achievements of the project was the development of salvage procedures, under which submarines or sunken vessels could be returned to the surface.

Capt. Bond said the waters off La Jolla were selected because at the 200-foot depth visibility is limited and the water is extremely cold, providing a more critical test than could be obtained in clearer, warmer tropical waters.

"We have shown that the Navy's 'Man in the Sea' program is worthwhile and is not a Buck Rogers undertaking," Bond declared.

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Honors And Welcome For Aquanauts



Capt. Lewis B. Melson holds up medal before making presentation to aquanauts Paul Wells, center, and Mike Meisky. Ceremony ended test.



Raina Grigg, 2, borrows cap of father, Richard, to welcome him back from depths.



Mrs. Robert Sheats accepts award for husband from Rear Adm. John K. Leydon, right. Sheats suffered bends. At left is Scott Carpenter. Story, a-13

—San Diego Union Staff Photo

AQUANAUT AWARDS

Achievements Of SeaLab 11 Are Revealed

Pictures — Page a-3

By JUDITH MORGAN

The head of the Navy's man-in-the-sea project yesterday predicted within four or five years man will be living at 600 feet below the surface of the ocean.

And from that level they will be diving to 1,700 feet to work without any problems of pressure change, said Capt. George Bond. Bond, who also is principal investigator for SeaLab II, commented at a press conference.

Twenty-seven aquanauts received Navy awards for distinguished service as the 45-day underwater living experiment ended off La Jolla and officers began looking ahead to SeaLab III.

Missing from the press conference and awards presentation in Sumner Auditorium at Scripps Institution of Oceanography was Robert Sheats, leader of Team 3, who suffered a case of the bends during decompression Monday.

His wife, Mrs. Margaret Sheats of Bremerton, Wash., accepted his citation.

Bond said Sheats left the decompression chamber at 9:01 a.m. yesterday and was feeling fine.

Rests Aboard Berkone

Sheats rested aboard the surface ship Berkone until 4 p.m. to be near the decompression chamber in event of emergency need. Then he joined his wife on shore.

The other aquanauts of Team 3 left the chamber at 8:30 p.m. Monday.

Rear Adm. John K. Leydon, director of the office of naval research, awarded Navy unit commendations to all those connected with the project. He read a citation from Paul Nitze, secretary of the Navy, commending SeaLab II for "exceptionally meritorious service."

Aquanauts from Teams 1 and 2 sat in the audience yesterday as members of Team 3 and SeaLab officials answered questions from the press.

Capt. Bond said SeaLab III experiments probably will be held within at year at a depth of 400 to 450 feet. The exact location has not been decided, he said.

He said it was a great breakthrough to prove the concept that once a man is saturated with the gasses of an artificial atmosphere at a given depth he can go to any lower depth without the problems of decompression on his return.

Seriousness, Perils Are Cited

All the officers emphasized the seriousness of the SeaLab mission and the dangers involved.

"This has not been a vacation," Capt. Lewis B. Melson, director of the project, said. "The mission was fraught with peril. After a few minutes below, the aquanauts are saturated with the gasses they breathe and the surface is denied to them as space is denied to us."

Leydon said the Navy awards had been given only one other time in history to an organization that was not formally commissioned. He said the other awards were given the men on the bathyscaph Trieste in the search for the lost nuclear submarine, Thresher.

Bond said he feels that SeaLab has shown that men can stay on the ocean bottom almost indefinitely, though a successful heated diving suit to combat cold water has not yet been developed.

He said SeaLab volunteers did not receive "one penny extra money" for their job and several took a pay cut to take part in the project.

Bond said the 28 men were chosen from 600 volunteers.

Cmdr. Scott Carpenter, leader of Teams 1 and 2 who remained in SeaLab 30 days, praised the ability of Team 3 to develop salvage procedures. Carpenter said he would be a volunteer for SeaLab III.

Impressions Of Aquanauts

Each Team 3 aquanaut was asked his impressions of his 15 days at 205 feet below the surface.

Most said the biggest thrill was the record-breaking excursion dive in Scripps Canyon to a depth of 300 feet.

Aquanaut Rick Grigg said he was impressed with the tremendous struggle for survival among the marine life on the sea floor.

"We saw anchovies eaten by squid," he said, "and then sea lions woulld swoop down and eat the squid before they were through with the anchovies"

Grigg said it was exciting to watch the fish through SeaLab's portholes

"When you dive from the surface you disturb the bottom and the fish are scared and swim away. Looking out the portholes you see the marine life doing things in a natural way."

Grigg said that invading the harsh environment underwater gave him a new perspective of life with man "at the top of the totem pole of evolution"

"Tom Clarke (Team 2 aquanaut) said when I got down there I would go out of my mind," Grigg said with enthusiasm. "Well, I did."

Ventilation Improved Health

Dr. Robert Sonnenburg, who was a member of both Teams 1 and 3, said morning headaches were a problem with the third team but these were somewhat alleviated by improving the ventilation in the sleeping area and adding a chemical to the air cleanser to remove carbon monoxide.

Aquanaut Bill Bunton, called by Capt. Bond "The finest underwater photographer I've ever met," said making the initial dive to 300 feet and breaking "the magic barrier" with Robert Sheats was the highlight of SeaLab for him. He compared the descent into the canyon with mountain climbing since they held a rope while skidding down the canyon walls.

Aquanauts Paul Wells, Lavern (Mike) Meisky and William Meeks said they liked the feeling of accomplishment of the salvage work and were impressed by the deep canyon dive.

Morgan Wells, a Scripps student and bachelor aquanaut, said he was impressed not so much with the scientific information received but the ability of men and machines "down there" to gather information. He called the efficience and dexterity of work accomplished "nothing short of miraculous."

Charles M. Coggeshall said he enjoyed the project but "15 days is sufficient."

John J. Lyons, who was chef as well as aquanaut, thanked the housewives of America for sending suggestions on how to cook pancakes—which was a problem in the pressure and atmosphere of SeaLab.

Oceanography's Impact On S.D. Revealed

The science of oceans is fast becoming a serious competitor for world attention with the science of outer space. And the aquanaut is as important as the astronaut.

But most important to San Diegans is the impact this growing field of scientific endeavor is having on San Diego, the unchallenged leader in this field.

Just how important oceanography is to the future of San Diego will be told in The San Diego Union starting Sunday. Read the first stories in Today's World Magazine Sunday, and then read The Union daily for the remainder of this important story.

The Plain Dealer
Cleveland, O.
A.M.-circ. 339,112
Sun.-circ. 494,645
OCT 13 1965

Sealab Project Called a Success

LA JOLLA, Calif. (AP)—Capt. L. B. Melson, director of the Navy's Sealab 2 underwater research project, summarizing its achievements, said yesterday: "We obtained our primary goals. We proved that men can live in ocean depths without physical harm while they carry out work assigned to them."

Sealab 2 is an underwater laboratory 205 feet deep off the southern California coast. The third of three diver teams who spent 15 days each living and working there told about it at a news conference yesterday. Each said it was the thrill of a lifetime.

The Sealab series is aimed at finding ways to permit divers to stay in depths for days or weeks and perform useful work . . . salvage, construction, research.

The last team came up Sunday. All but one left a decompression chamber Monday. The team commander, Robert Sheats, a master chief torpedoman and veteran diver, suffered from bends and didn't get out until yesterday morning.

OCEAN STUDY SERIES DUE

The recent SeaLab II experiments off La Jolla brought San Diego worldwide prominence as a center for oceanographic research.

The science of the oceans is fast becoming a major pioneering endeavour, along with the exploration of space, and San Diego is leader in this field.

Read the story of San Diego's contributions to, and future with, oceanography which will be told beginning Sunday in The San Diego Union's Today's World section. Then read The Union daily for more details on this important topic.

600 Feet Down

Deeper, Darker Sealabs Planned

LA JOLLA, Calif. (AP) — The Navy's plans for making man amphibious indicate that future man-in-the-sea experiments will be deeper, darker and more dangerous.

"I firmly believe that in four or five years man will be living at a depth of 600 feet and diving to 1,700 feet," Capt. George Bond, principal medical investigator for the recently ended Sealab 2 project, said yesterday.

In that 45-day experiment in underwater living, 28 men in three teams manned the Sealab cylinder on the Pacific Ocean floor, 205 feet below the surface. They suffered no serious ill effects, Bond said.

"Our work was done in the face of cries that this was 'Buck Rogerish,' and in the face of questions from high places about its value to society or the Navy," he declared.

"Value Is Unlimited"

"But we've confirmed that it is possible to put men into a hostile environment and have them do work. This was highly contested a few years ago. Its value, its potential, is unlimited," he added.

Bond, other officers and the aquanauts attended a news conference yesterday to discuss future plans.

He said the 200-ton cigar-shaped steel Sealab capsule will be usable in the next experiment. It was built at a cost of $1.8 million.

Bond said no date for the next experiment has been set, pending reports from Sealab 2, but added it will probably be conducted at a depth of 400 feet.

And what was accomplished by the Sealab 2 experiment?

Led by Carpenter

The first two teams, led by astronaut-aquanaut Navy Cmdr. M. Scott Carpenter, set up housekeeping, erected a weather station, experimented with plants and served as guinea pigs for physiological and psychological studies.

The third team worked successfully on several experimental salvage operations.

They learned that the helium-rich atmosphere inside the undersea capsule gave their voices a high-pitched quality, that it's difficult to fry pancakes under pressure, and that it's nice to have friends like Tuffy the porpoise and Sam the sea lion around. Pressure on them was seven times that at the surface.

Tuffy was trained to run errands, and did, and after meeting Sam, the aquanauts trained him to answer a buzzer.

From EVENING NEWS
Newark, N. J.
OCT 13 1965

TO DIVE 400 FEET NEXT

The Navy Hails Results of Sealab Experiment and Says Deeper, Darker and More Dangerous Underwater Tests Are Ahead

HAS BIG POTENTIAL

Medical Man on Project Believes Deep Dives Possible

La Jolla, Calif. (AP) — The Navy's plans for making man amphibian indicate that future man-in-the-sea experiments will be deeper, darker and more dangerous.

"I firmly believe that in four or five years man will be living at a depth of 600 feet and diving to 1,700 feet," Capt. George Bond, principal medical investigator for the recently-ended Sealab 2 project, said.

No Ill Effects

In that 45-day experiment in underwater living, 28 men in three teams manned the Sealab cylinder on the Pacific ocean floor, 205 feet below the surface. They suffered no serious ill effects, Bond said.

"Our work was done in the face of cries that this was 'Buck Rogerish,' and in the face of questions from high places about its value to society or the Navy," he declared.

"But we've confirmed that it is possible ..... to put men into a hostile environment and have them do work. This was highly contested a few years ago. Its value, its potential, is unlimited," he added.

Bond said the 200-ton cigar-shaped steel Sealab capsule will be usable in the next experiment. It was built at a cost of 1.8 million dollars.

Date Not Set

Bond said no date for the next experiment has been set, pending reports from Sealab 2, but added it will probably be conducted at a depth of 400 feet.

And what was accomplished by the Sealab 2 experiment?

The first two teams, led by M. Scott Carpenter, astronaut-aquanaut Navy commander, set up housekeeping, erected a weather station, experimented with plants and served as guinea pigs for physiological and psychological studies.

The third team worked successfully on several experimental salvage operations.

They learned that the helium-rich atmosphere inside the undersea capsule gave their voices a high-pitched quality, that it's difficult to fry pancakes under pressure, and that it's nice to have friends like Tuffy the porpoise and Sam the sea lion around. Pressure on them was seven times that at the surface.

Trained to Help

Tuffy was trained to run errands, and did, and after meeting Sam, the aquanauts trained him to answer a buzzer.

The aquanauts wore protective rubber suits, but, Bond said, a more protective outfit would be needed for future deep dives.

Bond also mentioned a discovery that was puzzling:

"The first few days under, all the men had general soreness and joint pains—a sensation of having been through violent muscular effort."

One aquanaut, Bob Sheats, has recovered from a mild case of the bends.

From OCT 13 1965
STAR
Kansas City, Mo.

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From OCT 13



Associated Press Wirephoto

HONORED—La Jolla, Calif., Oct. 13—Cmdr. M. Scott Carpenter (L) and Mrs. Bob Sheats, wife of aquanaut who suffered bends, receive medals from Adm. John A. Leydon. Carpenter and Sheats led team of divers who lived in Sealab 2. Mrs. Sheats accepted the award for her stricken, but recovering, husband.

FOR AQUANAUTS

Undersea Living To Get Tougher

LA JOLLA, Calif., Oct. 13 (AP)—The Navy's plans for making man amphibian indicate that future man-in-the-sea experiments will be deeper, darker and more dangerous.

"I firmly believe that in four or five years man will be living at a depth of 600 feet and diving to 1,700 feet," Capt. George Bond, principal medical investigator for the recently ended Sealab 2 project, said Tuesday.

In that 45-day experiment in underwater living, 28 men in three teams manned the Sealab cylinder on the Pacific Ocean floor, 205 feet below the surface. They suffered no serious ill effects, Bond said.

"Our work was done in the face of cries that this was 'Buck Rogerish,' and in the face of questions from high places about its value to society or the Navy," he declared.

"But we've confirmed that it is possible to put men into a hostile environment and have them do work. This was highly contested a few years ago. Its value, its potential, is unlimited," he added.

Bond, other officers and the aquanauts attended a news conference Tuesday to discuss future plans.

He said the 200-ton cigar-shaped steel Sealab capsule will be usable in the next experiment. It was built at a cost of $1.8 million.

Bond said no date for the next experiment has been set, pending reports from Sealab 2, but added it will probably be conducted at a depth of 400 feet.

And what was accomplished by the Sealab 2 experiment?

The first two teams, led by astronaut-aquanaut Navy Cmdr. M. Scott Carpenter, set up housekeeping, erected a weather station, experimented with plants and served as guinea pigs for physiological and psychological studies.

The third team worked successfully on several experimental salvage operations.

They learned that the helium-rich atmosphere inside the undersea capsule gave their voices a high-pitched quality, that it's difficult to fry pancakes under pressure, and that it's nice to have friends like Tufffy the porpoise and Sam the sea lion around. Pressure on them was seven times that at the surface.

Tufffy was trained to run errands, and did, and after meeting Sam, the aquanauts trained him to answer a buzzer.

Deeper, Darker Sealab Tests Projected After 45-Day Success

LA JOLLA, Calif., Oct. 13 (AP) —The Navy's plans for making man amphibian indicate that future man-in-the-sea experiments will be deeper, darker and more dangerous.

"I firmly believe that in four or five years man will be living at a depth of 600 feet and diving to 1700 feet," Capt. George Bond, principal medical investigator for the Sealab 2 project, said yesterday.

In that 45-day experiment in underwater living, 28 men in three teams manned the Sealab cylinder on the Pacific ocean floor, 205 feet below the surface. They suffered no serious ill effects, Bond said.

"Our work was done in the face of cries that this was 'Buck Rogersish,' and in the face of questions from high places about its value to society or the Navy," he declared.

"But we've confirmed that it is possible . . . to put men into a hostile environment and have them do work. This was highly contested a few years ago. Its value, its potential, is unlimited," he said.

Bond, other officers and the aquanauts attended a press conference yesterday. He said the 200-ton cigar-shaped steel Sealab capsule would be usable in the next experiment. It was built at a cost of $1,800,000.

Bond said no date for the next experiment had been set, pending reports from Sealab 2, but that it will probably be conducted at a depth of 400 feet.

The first two teams, led by Astronaut Navy Comdr. M. Scott Carpenter, set up housekeeping, erected a weather station, experimented with plants and served as guinea pigs for physiological and psychological studies.

The third team worked successfully on several experimental salvage operations. They learned that the helium-rich atmosphere inside the undersea capsule gave their voices a high-pitched quality, that it is difficult to fry pancakes under pressure, and that it's nice to have friends like Tuffy the Porpoise and Sam the Sea Lion around. Pressure on them was seven times that at the surface.

Tuffy was trained to run errands, and did, and after meeting Sam, the aquanauts trained him to answer a buzzer.

The aquanauts wore protective rubber suits, but, Bond said, a more protective outfit would be needed for future deep dives.

Bond mentioned a discovery that was puzzling:

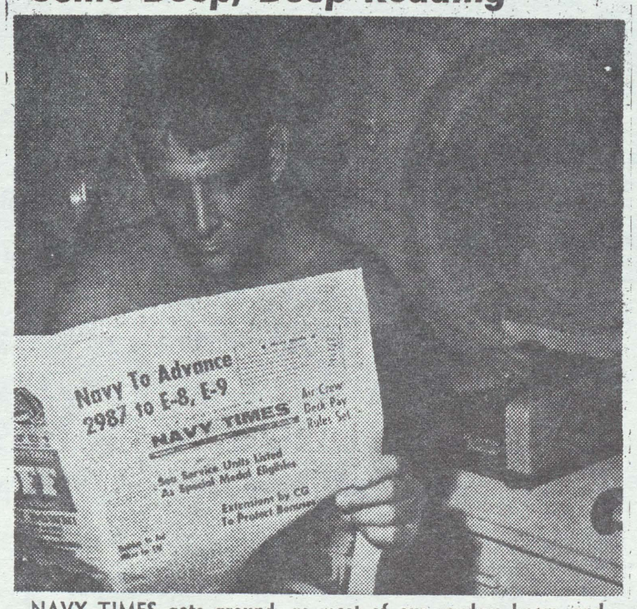
"The first few days under, all the men had general soreness and joint pains—a sensation of having been through violent muscular efforts."

One aquanaut, Bob Sheats, has recovered from a mild case of the bends.

From OCT 13 1965
POST-DISPATCH
St. Louis, Mo.

NAVY TIMES - 10/13/65

Some Deep, Deep Reading



NAVY TIMES gets around, as most of our readers know, and here's pictorial proof. That's one of the Navy's aquanauts, Gene Buckner, chief steelworker, reading a recent issue inside Sealab II on the ocean floor a mile off San Diego. Bob Barth, QMC, another aquanaut, works in the background and waits his turn for the paper, which was delivered by Tuffy the porpoise to the underwater laboratory. (Photo by Aquanaut John Reaves, PH1.)

HCR9

(SEALAB)

(LA JOLLA)---NAVY CHIEF ROBERT SHEATS -- AT 50 THE OLDEST SEALAB 2 AQUANAUT -- IS DUE OUT OF A DECOMPRESSION CHAMBER TODAY AFTER AN EXTENDED STAY CAUSED BY A MILD CASE OF "THE BENDS."

NINE OTHER MEMBERS OF THE THIRD AND FINAL TEAM LEFT THE CHAMBER LAST NIGHT AFTER SPENDING NEARLY 35 HOURS THERE.

THEY HAD ENTERED THE CHAMBER ABOUT 10 A.M. SUNDAY AFTER LEAVING THEIR 57-FOOT CYLINDER 205 FEET BELOW ON THE OCEAN'S FLOOR AND ENDING THE NAVY'S 45-DAY "MAN-IN-THE-SEA" EXPERIMENT.

SHEATS BEGAN EXPERIENCING DISCOMFORT ABOUT TWO HOURS BEFORE THE AQUANAUTS WERE SCHEDULED TO LEAVE THE CHAMBER. AS A RESULT, PROGRAM OFFICIALS LOWERED THE SIMULATED PRESSURE IN THE CHAMBER TO A GREATER DEPTY FOR ALL 10 MEN AND THEN ORDERED SHEATS TO REMAIN WHEN THE OTHERS EMERGED.

"THE BENDS" IS A CONDITION WHICH RESULTS FROM A SUPERSATURATION OF TISSUE WITH GAS, CAUSING THE FORMATION OF BUBBLES IN THE TISSUE. IN SEVERE CASES, THE BUBBLES CAUSE PARALYSIS AND EVEN DEATH.

THE OTHER AQUANAUTS WERE REPORTED IN GOOD CONDITION BY CAPTAIN GEORGE BOND--PRINCIPAL INVESTIGATOR OF THE PROJECT.

THE SEALAB 2 CAPSULE--WHICH WEIGHED 200 TONS AT ITS SUBMERGED DEPTH BUT ONLY 14 TONS ON THE SURFACE--WAS RAISED YESTERDAY AND WILL BE TOWED TO THE LONG BEACH NAVAL SHIPYARD TODAY.

P842APD10/12

A75LA

(170)

LA JOLLA, CALIF., SEPT. 23 (AP)-A FOULED LINE HAS CAUSED THE AQUANAUTS IN SEALAB 2 TO POSTPONE THEIR SCHEDULED DEEP DIVE FOR THE SECOND TIME.

THE AQUANAUTS LEFT THEIR CAPSULE AT 205 FEET BENEATH THE SEA YESTERDAY ON AN EXCURSION THAT COULD HAVE TAKEN THEM DOWN TO THEIR SAFETY LIMIT OF 266 FEET.

THEIR RECORD TO DATE IS 234 FEET.

BUT A KINK DEVELOPED IN THE AIR LINE TO THEIR DEPTH GAUGE AND THEY HAD TO GIVE IT UP FOR ANOTHER DAY.

OBJECT OF THE DEEP DIVE IS TO RECOVER A WAY STATION, A SMALL CHAMBER WHERE THE DIVERS CAN REST AND REPLENISH THEIR SUPPLY OF BREATHING GAS.

VISIBILITY IN THE WATER AROUND THE NAVY'S UNDERWATER LIVING PROJECT WAS THE BEST IT HAS BEEN SINCE THE PROGRAM STARTED AUG. 28. THE AQUANAUTS SAID THEY COULD SEE 25 FEET.

THE MEN ARE IN GOOD CONDITION, ACCORDING TO TWO OFFICIALS WHO PAID THEM A SHORT VISIT YESTERDAY.

DR. GEORGE BOND, PRINCIPAL INVESTIGATOR, AND CAPT. WALTER MAZZONE, PHYSIOLOGICAL CONTROL OFFICER, SWAM DOWN TO THE CAPSULE AND TALKED TO THE MEN FOR ABOUT 11 MINUTES.

"THEY LOOK MUCH MORE HEALTHY IN PERSON THAN THEY DO IN THOSE SHADOWY PICTURES I SEE OF THEM ON THE TELEVISION," BOND SAID.

EE246APD

Crack Navy Camera Crew Covers Sealab II From Start to Finish

By GERALD R. BOLING, JO1

SAN DIEGO — The Sealab II project will find its proper place in history because of a handful of Navy men of the North Island Naval Air Station here.

They are photographers of the Pacific Fleet Mobile Photographic Unit. Even when the 57-foot capsule was lowered 205 feet below the surface, it still did not escape the camera lenses.

The photogs were on hand while the capsule was being built in San Francisco. While Sealab II was being outfitted at the Long Beach Naval Shipyard, unit cameramen were there.

During the christening in July the movie and "still" cameras continued to record. Much of the movie footage has been shown on TV news programs nationwide. Still photos have been published throughout the U.S. and several have been released for publication in Europe.

To be sure all angles of Sealab II were covered, other unit photographers shot aerial photos from helicopters. This was accomplished during the capsule's tow to La Jolla, Calif., and again before she was lowered.

Two unit photographers are aquanaut members of the Sealab team. Jay D. Skidmore, chief photographer's mate, of the first team, was submerged in Sealab II. His photos, published nationwide, have pictured aquanauts inside their steel home and while performing assignments outside.

John F. Reaves, photographer's mate first, also a unit member relieved Skidmore on the second team.

* * *

ON THE SURFACE aboard the mother ship movie cameras grind 24 hours. In addition, still cameras also are at work.

The cameramen have left no area uncovered. Two of the underwater photographers are surface divers.

They work at depths of 130 feet. They cover the action of support divers and events involving the aquanauts and support personnel at their depths.

The team is headed by Crew Chief Gene Doubleday, chief photographer's mate; Richard Johnson, photographer's mate first, and George S. Zebrowski, photographer's mate airman, and this journalist, a still photographer.

Minneapolis (Minn.) Star
WEDNESDAY, OCTOBER 13, 1965

Next Sealab Project to Go Deeper

By WALTER GRAY

LA JOLLA, Calif. — (AP) — The Navy's plans for making man amphibian indicate that future man-in-the-sea experiments will be deeper, darker and more dangerous.

"I firmly believe that in four or five years man will be living at a depth of 600 feet and diving to 1,700 feet," Capt. George Bond, principal medical investigator for the recently-ended Sealab-2 project, said Tuesday.

In that 45-day experiment in underwater living, 28 men in three teams manned the Sealab cylinder of the Pacific floor, 205 feet below the surface. They suffered no serious ill effects, Bond said.

"Our work was done in the face of cries that this was 'Buck Rogersish,' and in the face of questions from high places about its value to society or the Navy," he declared.

"But we've confirmed that it is possible . . . to put men into a hostile environment and have them do work. This was highly contested a few years ago. Its value, its potential, is unlimited," he added.

Bond, other officers and the aquanauts ended a news conference yesterday to discuss future plans.

He said the 200-ton, cigar-shaped steel Sealab capsule will be usable in the next experiment. It cost $1.8 million.

Bond said no date for the next experiment has been set, pending study of reports from Sealab-2, but added it probably will be conducted at a depth of 400 feet.

And what was accomplished by the Sealab-2 experiment?

The first two teams, led by astronaut-aquanaut Navy Cmdr. M. Scott Carpenter, set up housekeeping, erected a weather station, experimented with plants and served as guinea pigs for physiological and psychological studies.

The third team worked successfully on several experimental salvage operations.

They learned that the helium-rich atmosphere inside the undersea capsule gave their voices a high-pitched quality, that it's difficult to fry pancakes under pressure, and that it's nice to have friends like Tuffy the porpoise and Sam the sea lion around. Pressure on them was seven times that at the surface.

Tuffy was trained to run errands, and did, and after meeting Sam, the aquanauts trained him to answer a buzzer.

The aquanauts wore protective rubber suits, but, Bond said, a more protective outfit would be needed for future deep dives.

Bond also mentioned a discovery that was puzzling:

"The first few days under, all the men had general soreness and joint pains — a sensation of having been through violent muscular effort."

One aquanaut, Bob Sheats, has recovered from a mild case of the bends.

173

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PMS BUDGET

SEALAB 2 (400)

BY WALTER GRAY

ASSOCIATED PRESS WRITER

LA JOLLA, CALIF., OCT. 13 (AP)-THE NAVY'S PLANS FOR MAKING MAN AMPHIBIAN INDICATE THAT FUTURE MAN-IN-THE-SEA EXPERIMENTS WILL BE DEEPER, DARKER AND MORE DANGEROUS.

"I FIRMLY BELIEVE THAT IN FOUR OR FIVE YEARS MAN WILL BE LIVING AT A DEPTH OF 600 FEET AND DIVING TO 1,700 FEET," CAPT. GEORGE BOND, PRINCIPAL MEDICAL INVESTIGATOR FOR THE RECENTLY-ENDED SEALAB 2 PROJECT, SAID YESTERDAY.

IN THAT 45-DAY EXPERIMENT IN UNDERWATER LIVING, 28 MEN IN THREE TEAMS MANNED THE SEALAB CYLINDER ON THE PACIFIC OCEAN FLOOR, 205 FEET BELOW THE SURFACE. THEY SUFFERED NO SERIOUS ILL EFFECTS, BOND SAID.

"OUR WORK WAS DONE IN THE FACE OF CRIES THAT THIS WAS 'BUCK ROGERSISH,' AND IN THE FACE OF QUESTIONS FROM HIGH PLACES ABOUT ITS VALUE TO SOCIETY OR THE NAVY," HE DECLARED.

"BUT WE'VE CONFIRMED THAT IT IS POSSIBLE. . .TO PUT MEN INTO A HOSTILE ENVIRONMENT AND HAVE THEM DO WORK. THIS WAS HIGHLY CONTESTED A FEW YEARS AGO. ITS VALUE, ITS POTENTIAL, IS UNLIMITED," HE ADDED.

BOND, OTHER OFFICERS AND THE AQUANAUTS ATTENDED A NEWS CONFERENCE YESTERDAY TO DISCUSS FUTURE PLANS.

HE SAID THE 200-TON CIGAR-SHAPED STEEL SEALAB CAPSULE WILL BE USABLE IN THE NEXT EXPERIMENT. IT WAS BUILT AT A COST OF $1.8 MILLION.

BOND SAID NO DATE FOR THE NEXT EXPERIMENT HAS BEEN SET, PENDING REPORTS FROM SEALAB 2, BUT ADDED IT WILL PROBABLY BE CONDUCTED AT A DEPTH OF 400 FEET.

AND WHAT WAS ACCOMPLISHED BY THE SEALAB 2 EXPERIMENT?

THE FIRST TWO TEAMS, LED BY ASTRONAUT-AQUANAUT NAVY CMDR. M. SCOTT CARPENTER, SET UP HOUSEKEEPING, ERECTED A WEATHER STATION, EXPERIMENTED WITH PLANTS AND SERVED AS GUINEA PIGS FOR PHYSIOLOGICAL AND PSYCHOLOGICAL STUDIES.

A47LA

THE THIRD TEAM WORKED SUCCESSFULLY ON SEVERAL EXPERIMENTAL SALVAGE OPERATIONS.

THEY LEARNED THAT THE HELIUM-RICH ATMOSPHERE INSIDE THE UNDERSEA CAPSULE GAVE THEIR VOICES A HIGH-PITCHED QUALITY, THAT IT'S DIFFICULT TO FRY PANCAKES UNDER PRESSURE, AND THAT IT'S NICE TO HAVE FRIENDS LIKE TUFFY THE PORPOISE AND SAM THE SEA LION AROUND. PRESSURE ON THEM WAS SEVEN TIMES THAT AT THE SURFACE.

TUFFY WAS TRAINED TO RUN ERRANDS, AND DID, AND AFTER MEETING SAM, THE AQUANAUTS TRAINED HIM TO ANSWER A BUZZER.

THE AQUANAUTS WORE PROTECTIVE RUBBER SUITS, BUT, BOND SAID, A MORE PROTECTIVE OUTFIT WOULD BE NEEDED FOR FUTURE DEEP DIVES.

BOND ALSO MENTIONED A DISCOVERY THAT WAS PUZZLING:

"THE FIRST FEW DAYS UNDER, ALL THE MEN HAD GENERAL SORENESS AND JOINT PAINS -- A SENSATION OF HAVING BEEN THROUGH VIOLENT MUSCULAR EFFORT."

ONE AQUANAUT, BOB SHEATS, HAS RECOVERED FROM A MILD CASE OF THE BENDS.

BOND, INTRODUCING THE AQUANAUTS AFTER THEY HAD RECEIVED MERITORIOUS SERVICE AWARDS, SAID:

"THEY'RE MY BUDDIES, EVERY ONE OF THEM, AND I'M PROUD TO SAY IT."

EE110APD NM

A70LA

PMS BUDGET

SEALAB 2 (350)

BY THE ASSOCIATED PRESS

LA JOLLA, CALIF., OCT. 12 (AP)-THE NAVY REPORTED ALL ITS SEALAB 2 SQUANAUTS HALE, HEARTY AND ENJOYING FRESH AIR TODAY BUT ONE -- ROBERT SHEATS, 50, STRICKEN BY THE PAINFUL BENDS.

SHEATS WAS GRIPPED BY A PAIN IN HIS HIP LAST NIGHT AS THE CHAMBER CONTAINING THE PROJECT'S THIRD TEAM WAS DECOMPRESSED TO THE MINUS 12-FOOT LEVEL.

AT 6 P.M., SEALAB DOCTORS SEPARATED SHEATS FROM HIS NINE COMRADES AND RETURNED HIM TO A SIMULATED DEPTH OF 60 FEET.

AS ATMOSPHERIC PRESSURE INCREASED, THE PAIN SUBSIDED AND SHEATS, OLDEST MEMBER OF THE PROJECT, REMAINED SOMEWHAT LONELY BUT IN RELATIVE COMFORT.

A SPOKESMAN SAID SHEATS WAS DECOMPRESSING AT THE RATE OF 4 FEET AN HOUR AND IF THE PAIN DID NOT RETURN, HE WAS TO EMERGE FROM THE CHAMBER TODAY AT 10 A.M.

SHEATS TALKED TO HIS DOCTORS DURING THE NIGHT THROUGH AN INTERCOM CONNECTING THE CHAMBER AND THE SEALAB SURFACE VESSEL, BERKONE.

FRIENDS MARVELLED AT THE MORALE OF THE MASTER CHIEF TORPEDOMAN FROM BREMERTON, WASH. SAID ONE:

"HE'S THE KIND OF GUY WHO WOULDN'T COMPLAIN UNTIL IT REALLY HURT. FINALLY THE PAIN WAS TOO MUCH. WHEN YOU GO THROUGH DECOMPRESSION FOR 27 YEARS, YOU GET A LITTLE TIRED."

THE EXHAUSTING PROCESS IS NECESSARY TO RID THE BODY OF HELIUM BUBBLES WHICH WOULD FORM IN THE BLOODSTREAM IF A DIVER ASCENDED TOO FAST AFTER BREATHING THE HELIUM-RICH ATMOSPHERE IN THE SEALAB 2 UNDERWATER LIVING PROJECT.

THREE TEAMS OCCUPIED THE SEALAB 2 CAPSULE, AT A DEPTH OF 205 FEET, FOR 15-DAY PERIODS.

FIRST TO EMERGE AT 8:35 P.M. LAST NIGHT FROM THE DECOMPRESSION CHAMBER WAS NAVY LT. ROBERT SONNENBURG, 28, SAN DIEGO, THE THIRD TEAM'S ONLY MEDICAL DOCTOR.

A71LA

OTHER NAVY AQUANAUTS INCLUDED CHIEF LAVERNE MEISKY, 38, A SHIP FITTER FROM LANCASTER, PENN.; CHIEF CHARLES COGGESHALL, 35, GUNNERS MATE, FT. WAYNE, IND.; CHIEF PAUL A. WELLS, 36, MINEMAN, FT. LAUDERDALE, FLA.; PO 1. C. WILLIAM MEEKS, 34, BOATSWAIN'S MATE, PONCO CITY, OKLA.; AND PO 1.C. JOHN J. LYONS, 35, ENGINEMAN, MIDDLETOWN, N.Y.

THE TEAM ALSO INCLUDED TWO CIVILIAN RESEARCH SCIENTISTS, RICHARD GRIEGG, 28, AND JOHN MORGAN WELLS, 25, BOTH WITH THE SCRIPPS INSTITUTE OF OCEANOGRAPHY AT LA JOLLA.

THE AQUANAUTS HEADED STRAIGHT FOR THE SHOWERS ABOARD THE BERKONE, VISITED BRIEFLY WITH THEIR WIVES AND THEN RETIRED.

THE NAVY REQUIRES DIVERS TO REMAIN NEAR THE DECOMPRESSION CHAMBERS AT LEAST 12 HOURS, ON THE CHANCE THE BENDS SHOULD DEVELOP AT THE SURFACE.

A NEWS CONFERENCE WITH SEALAB'S 27 OTHER AQUANAUTS WAS SCHEDULED FOR 9:30 A.M. TODAY.

EE216APD

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(SEALAB)

THE NAVY'S SEALAB-TWO---HOME FOR U-S AQUANAUTS FOR 45 DAYS---IS HEADED FOR DRYDOCK.

THE 57-FOOT CYLINDER IS UNDER TOW TO THE LONG BEACH, CALIFORNIA, NAVAL SHIPYARD WHERE IT WILL BE INSPECTED, MODIFIED AND STORED FOR FUTURE USE.

THE SEALAB-TWO PROJECT---WHICH ENDED SUNDAY---WAS THE SECOND PHASE OF THE NAVY'S FIVE-YEAR "MAN-IN-THE-SEA" PROGRAM DESIGNED AS A PRELUDE TO EXPLORATION OF THE MINERAL-RICH CONTINENTAL SHELF. A TOTAL OF 28 AQUANAUTS TOOK PART IN THE SEALAB-TWO TESTS, SOME SPENDING AS MUCH AS 30 DAYS 200 FEET UNDER WATER.

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LIFE

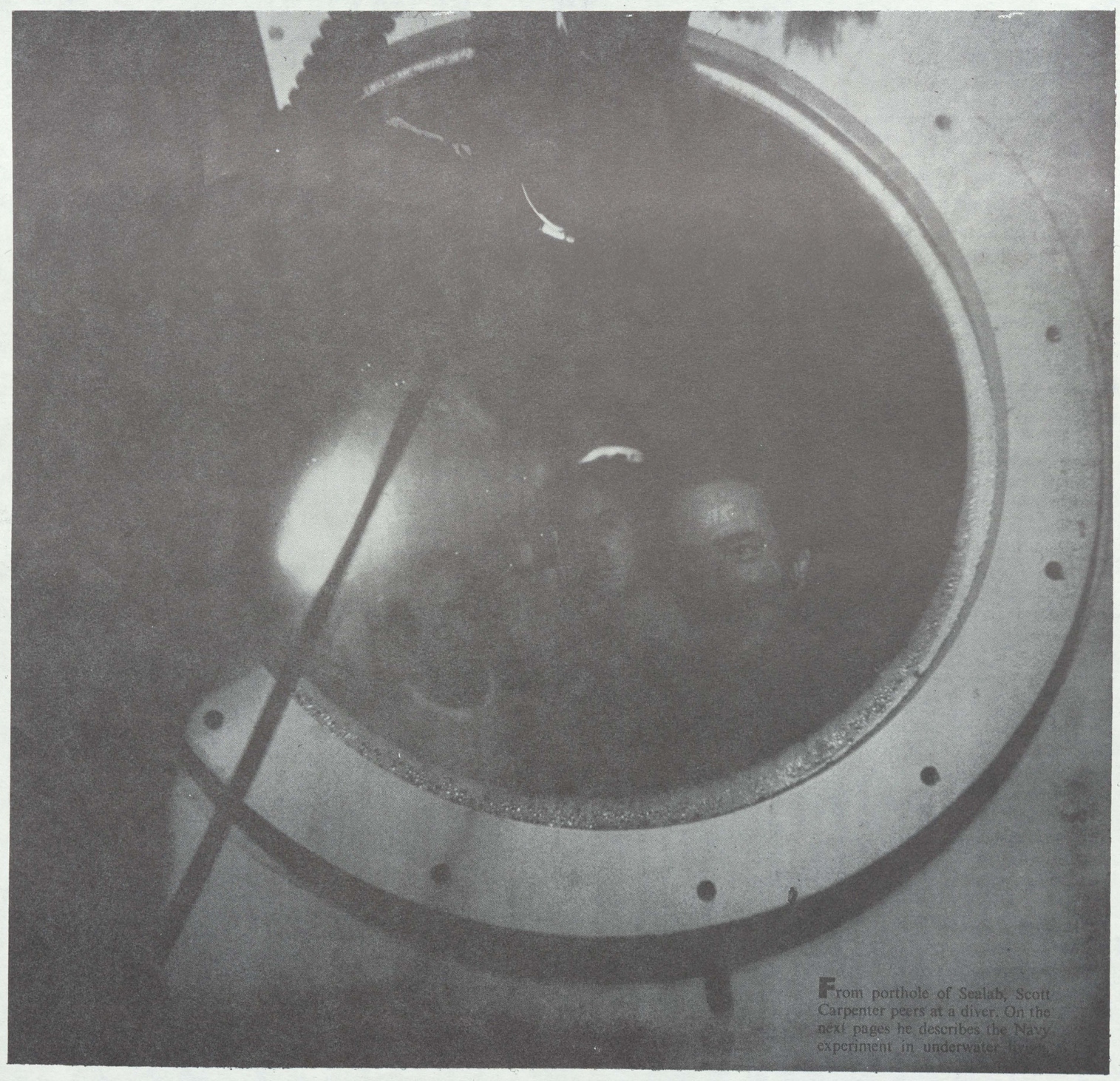
In Color

POPE PAUL VI
IN AMERICA

SCIENCE

Scott Carpenter writes of his underwater adventure

30 Days in Sealab



From porthole of Sealab, Scott Carpenter peers at a diver. On the next pages he describes the Navy experiment in underwater living

LIFE . OCTOBER 15, 1965

200 Feet Down, the Next U.S. Frontier

Commander Scott Carpenter, the second U.S. astronaut to make an orbital flight, volunteered last year for the Navy's underwater research program. Last month as head of the crew of Sealab, he completed a record-breaking stay of 30 days, 200 feet beneath the waters off La Jolla, Calif.

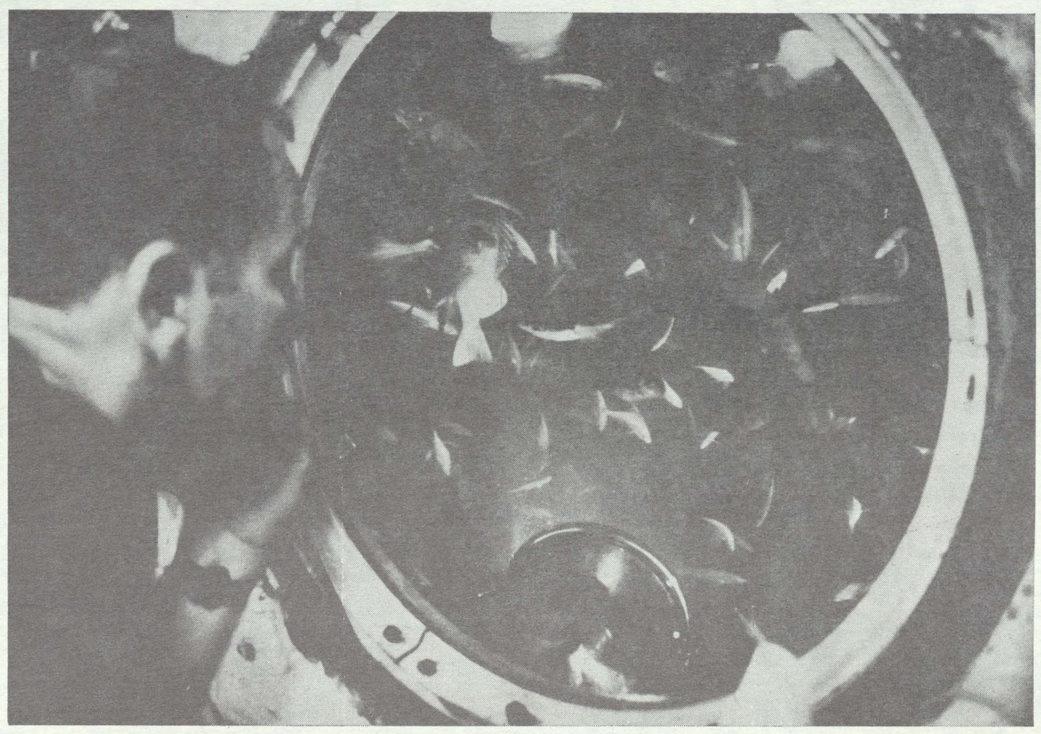
by SCOTT CARPENTER

No matter how often one dives, the beginning is always strange, and it was a strange feeling that August day when I put my flippered feet above my head and swam straight down. Except for the buddy diver swimming next to me, there was nothing in view through my face mask but the thin yellow guideline which led us into the deepening green, and we followed it trustingly, sure that it would not go on forever. Yet it led us on and on in a seemingly endless descent into silent darkness and cold, and we could feel the great pressure gathering against our ears. Then there it was, a ghostly shadow in the green gloom at the end of the line, and we had arrived at Sealab II. Only two minutes had passed since we left the surface more than 200 feet away. It would be almost 30 days before I made the return trip and brought to an end the most richly satisfying experience of my life.

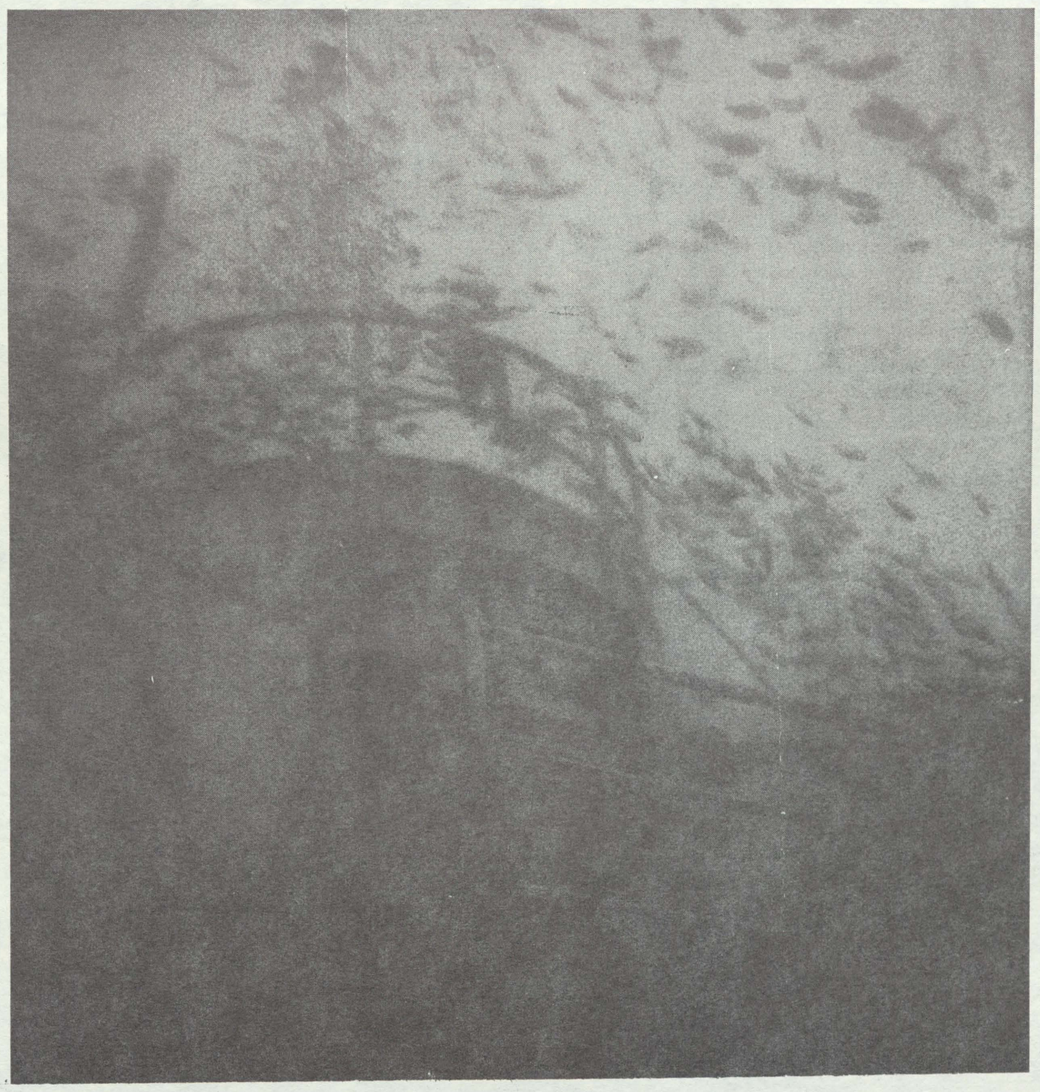
Of course, the three-orbit space flight I made in May 1962 was tremendous too. Nothing could top the exhilaration I felt during and immediately after that four-and-a-half-hour trip. It was a short, glorious experience. This one, on the other hand, was long and grueling, far more taxing physically than the flight in Aurora 7, and the job we did under the water off La Jolla, Calif. was always hard. Yet I have come away from it with a sense of pride in my own ability to direct a difficult operation and with enormous respect for the talents and courage of the men who dived with me.

Preparation of Sealab—planning experiments, gathering and checking equipment—had occupied us for months and thus it was a climactic moment for Navy diver Wilbur Eaton and me when we opened the hatch and climbed inside. And then, almost immediately, I thought something had gone very wrong. Eaton was talking to me, but he seemed to be jabbering at insane speed, and I was afraid for the moment that the pressure in Sealab—roughly seven times greater than the pressure on the surface—had affected his mind. Then I heard my own voice as I tried to answer Eaton and I remembered that this was the way we would all sound in the helium-dominated atmosphere of Sealab. Helium distorts human speech and raises the pitch of voices so that they sound like mad, Donald Duck gabble. This was our tongue, and we would have to learn to under-

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A crew member (*above*) watches the crowds of fish which clustered around Sealab, attracted to it as by a reef (*below*). They were so numerous they often blotted out the little daylight that came down to the bottom. Fish, in turn, attracted sea lions, and the men felt bumpings on Sealab as the animals rested on top. By using a buzzer, divers trained one sea lion to come up to them in the water. They named the animal Samantha, and once she poked her head right into Sealab's entry hatch. This worried the crew. If she breathed their pressurized atmosphere and went right up to the surface, she might die of an embolism. But she returned unharmed.



In All the Sea, One Tiny Place of Safety

SEALAB CONTINUED

stand each other in it. The learning period, which lasted only a few days, was hilarious. It was impossible not to laugh as we listened to each other. The divers repeatedly snickered or even broke up when I gave directions, and I found myself having to cover my mouth with my hand to keep the person speaking to me from knowing I thought he was terribly funny.

Once the remaining eight divers from that first Sealab team joined us, we began getting the lab ready for the experiments that would be carried out under water in the next 45 days. The first team was scheduled to stay down for 15 days before they were replaced by another group; I would leave after 30 days when a third team of 10 men would take over the lab. Many sciences were to be served in this project. Civilian divers from the Scripps Institution of Oceanography would study various facets of marine biology and take measurements which would give them more knowledge of underwater topography and weather. Scientists of the Navy's Mine Defense Laboratory would be diving with us. But the Navy's main job on this venture was to seek better understanding of man's reactions to prolonged exposure to pressure, isolation and cold water.

The possibilities, military and otherwise, of exploration and exploitation of the continental shelves of the earth are enormous. But before we can begin to tap these great resources, we must learn how to survive and work effectively at depths of up to 600 feet—which is precisely why we were down there in Sealab.

I discovered very quickly how close to danger we would be living in Sealab. On the second night down I was working in the water with my buddy diver, this time Bill Coffman, at the forward end of the habitat more than 50 feet away from the entrance hatch. On this occasion we were not using the breathing tanks we wore most often but instead were relying on hoses which fed us the mixture of helium, nitrogen and oxygen direct from Sealab. It was very dark and very cold, but everything seemed all right until I suddenly noticed that I was having difficulty inhaling. It rapidly got worse and then I had nothing at all to breathe. It was a bad situation. All I could do now was swim as fast as I could back the length of Sealab, and up into the hatch. It seemed a long way in the darkness. I was afraid that the other diver, too, had lost his air and was in the same trouble. As I surfaced in the hatch, I gasped for somebody to go get Coffman. Then he popped up right beside me. He had been having no breathing problem, had noticed me take off fast for the hatch and followed. It turned out that my line had simply kinked. We straightened it out and went back in the water. But it had been a frightening experience, and it emphasized one profound truth of underwater existence for me. I had a lot of ocean to swim in, but only one tiny place—that four-foot hatch in Sealab—represented safety and home.

In those first days we worked at an exhausting pace. Just the preparations for diving took great amounts of time as we struggled into the tight-fitting foam-rubber suits we wore to ward off the cold water and strapped the 84-pound breathing tanks to our backs. That cold water (which ranged in temperature from 50° to 55°) was very definitely unpleasant. In the suit a diver would feel quite comfortable for a bit; then a sudden move would send a big gulp of water pouring in on his back or down his rubber sleeve. But even if the suit fitted perfectly the coldness crept in. Soon, after perhaps 10 minutes in the water, the shivering would start. With some of us it reached the point where the whole body was shaking and our arms moved several inches up and down in great shudders. Under such conditions it became impossible to work and we would have to get back into the lab and get under the hot shower. Those showers after getting out of the cold were unbelievably delicious. We would stand under the hot fresh water and strip off the gear and the suits and in our funny Donald Duck tones just moan with relief.

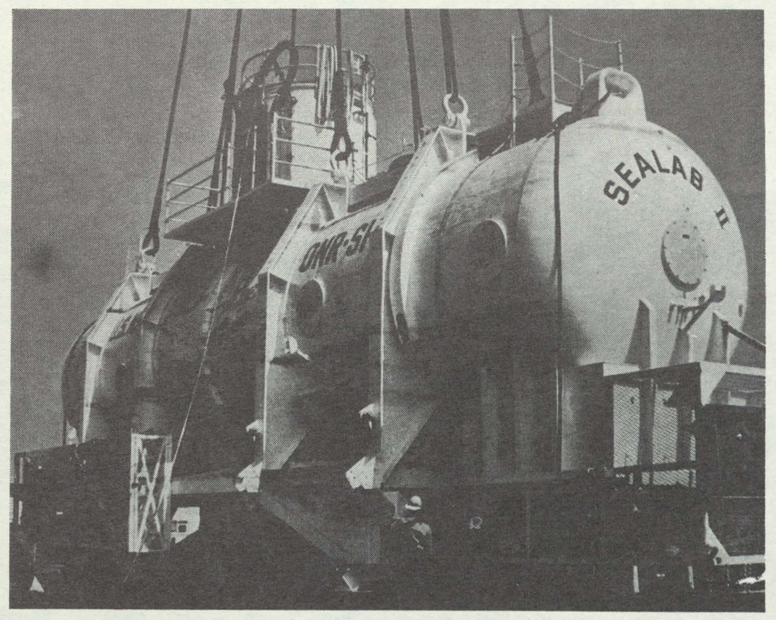
Inside the lab things were pretty comfortable. It was listing slightly to port and the bow was pointed uphill. This minor inconvenience made it necessary for us to readjust the support chains on our bunks, to tie the pots to the stove and to eat either standing up or sitting on the deck. The pressurized atmosphere was somewhat humid, and for a while I kept waking up at night, chilled by sweat-clammy sheets and not quite able to make up my mind whether I was hot or cold. I solved this particular problem by sleeping on top of an electric blanket which kept me dry and comfortable. No one could smoke because there wasn't enough oxygen in our breathing mixture to support either the lighting or the burning of a cigaret. But the food tasted good almost all the time, we had plenty of hot water, a television set, mail deliveries every day, and cakes and cookies from thoughtful wives on the surface. Over a special line we made a lot of collect telephone calls to families and friends around the country and all in all felt quite in touch with the world outside the sea.

Curiously enough, we did experience some difficulty with that world. Directly over us was the support vessel, *Berkone*, and on board was the project's field headquarters and control center. There, too, were the Sealab's senior officers, among them Dr. George Bond, a Navy captain who is the man most responsible for the whole concept of the project. A top diver himself, Dr. Bond is one of the world's foremost authorities on the subject of man living and working under water. He and others on the *Berkone* were in constant communication with us, and they could watch us in the lab over closed-circuit television. Generally their counsel and their prompt and cheerful guidance —even their normal, or earthman voices—were extremely welcome and necessary. Yet, though we were only 200 feet apart, there were times when there was very little rapport between us. They would insist on scheduling something—the sending down of supplies, for example—at a time which we below would find inconvenient. We felt the work in the water was more important than anything else and that the schedules should be arranged not to interfere with it. The fact is that it is impossible for the people topside to know the exact conditions prevailing in the sea beneath them. I feel that future operations of this sort should as much as possible be directed by the men in the water. As later Sealabs become more self-sustaining—with nuclear reactors to provide their own heat and light, for instance—this will be possible.

As the days passed, we began to discover interesting things about man's reactions to the underwater environment. In the first place, our bodies began a gradual acclimation to the cold. Divers would not be overtaken by the shivers as soon, nor would they be as severe. By taking measurements of strength and dexterity we found that there was very little loss of either even after diving times of as long as one hour. Sometimes we used electrically heated suits, and it is clear that future models of such suits will allow a man to work in cold water until he is tired or hungry enough to come home. Though because of the strange environment and the high humidity, we suffered headaches and ear infections, the men generally retained their cheerful mood throughout. This was something of a surprise, and a lot of this had to do, I think, with the fact that divers are a very special breed. It's a profession calling for more guts and motivation than any other I know. They are particularly accustomed to living with danger and, strangely, this seems to produce in them a real gentleness, which is most apparent in their relations with other divers. Because divers working together depend on each other so much, a man will take great pains to see that his buddy's breathing equipment is functioning exactly as it should, that he is not getting too cold or too tired and that no danger, unseen by him, is threatening. The mutual affection these men demonstrate is almost tender, a touching and surprising contrast to their rough Navy language and tattoos.

Though we really could not measure it with any of the simple number tests or brain teasers we tried out in the lab, I think a swimmer's mental function is just not as sharp as it can be on the surface. Another diver and I were out on a dive in which we planned to go perhaps 150 feet away from the lab. Instead of a tether line for guidance we were this time dragging two special hoses, pneumofathometers, from which we would be

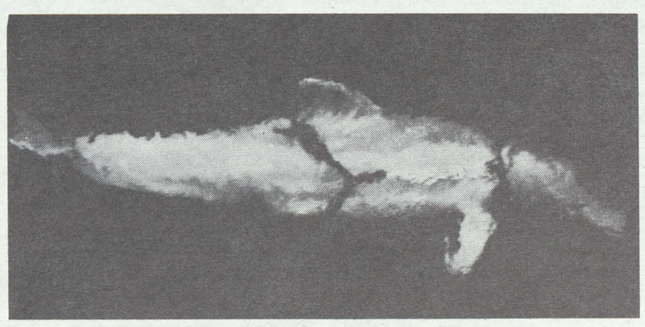
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Sealab is a 100-ton, 57-foot-long cylinder of one-inch steel which houses 10 divers. They enter it through wire cage (*right*) which keeps out sharks and then climb through hatch in the bottom. Hatch is always open but the water stays out of Sealab because pressure inside equals that outside. Tower contains emergency exit. Power comes by cable from shore one half mile away.

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A Venomous Lash from a Scorpion Fish



Tuffy, the trained porpoise, leaves the surface for Sealab in experiments to see if these animals can assist men under water. Tuffy impressed the Navy by carrying messages to the bottom in a 90-second round trip and rescuing a simulated lost diver who called him with a buzzer.

SEALAB CONTINUED

able to get accurate depth readings. Both of these were trailing behind us in the same direction, but one led to the lab and the other, at a point we could not see, left the ocean floor and curved up to the surface vessel. We were about halfway to our destination when one of the hoses apparently snagged on something and we could pull it no farther. At first I wanted to go ahead with just the other hose, and I had almost made up my mind to do that when a simple question hit me. What if we went on with the good hose, did the job and then followed it back—only to find that it eventually led to the surface, to the never-never land we could not enter without a long period of decompression? The answer was clear. We turned back and followed both hoses to the point where we could see which one led to the safety of the lab. Actually, it was the untangled hose, but we were right to avoid the deadly risk.

I think the answer is that the stress of deep diving fills the swimmer's mind with silent questions he is always asking himself. It is a questionnaire of survival and the answers must all be yes. Does the air taste right? Are my hoses free of water? How much breathing gas is left? Are bubbles coming properly out of my exhaust valve? Is my buddy where I can see him? Is he all right and is his gear working well? These vital queries can dominate a man's thinking and possibly make him sluggish in response to other problems.

The scorpion fish stung me one day when I was in the water near the hatch and made the mistake of groping in the dark with my hand. The spines on the fish's dorsal fin caught me on the right index finger, and the pain was instant, a sharp and poisonous feeling. Though I never saw the fish, I knew what it was; we had noted hundreds of them—six to 18 inches long—around the lab in recent days.

I got out of the water, undressed and went to bed immediately. The pain spread from my finger to my hand and arm and became excruciating. My nose and sinuses filled with fluid and I had to breathe completely by mouth. Bob Sonnenburg, the diver-doctor on board, moved fast. He gave me antihistamine shots, cortisone and pain killers, but I hurt. There was some discussion with the surface as to whether or not I should come up right then with the first team. We decided I could stay down but would probably have to stay out of the water for five days. As it turned out, I felt somewhat better in a few hours, was much improved the next day and was in the water the day after that. Still, it could have been a bad thing, and it would have been a great disappointment to me to have to go to the surface before my scheduled 30 days were up.

The portholes of the lab were often completely filled by fish which, drawn to the lights, crowded to the glass. The muddy sea bottom around the lab had been almost free of them when we first went down; now there were sculpin—spiny, ugly fish—everywhere. We swam through great schools of croakers which parted before us instantly and then closed ranks again. On one occasion I was swimming near the lab and was untangling the breathing lines. I was upright in the water, five feet from the bottom, spinning and twisting around as I worked on the lines. Suddenly I noticed that my strange dance had drawn an audience. I was completely surrounded by a big school of rockfish, perhaps 1,000 of them up to 18 inches long, all absolutely still, three or four feet from me. I was virtually encased in a cylinder of watching fish.

For a few days we had the Navy-trained porpoise, Tuffy, working outside the lab with some of the crew. His performance proved that these animals can be of great help to divers. They could be excellent lifesavers. Tuffy, who was kept in a pen near the *Berkone*, had been trained to swim to places in the water where sounds were being made. He made many

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Finale: Harmony in Helium

SEALAB CONTINUED

quick dives, trailing safety lines from a harness strapped to his body, and he was able to locate the swimmers easily. Tuffy was a playful animal who liked to be paid on time. One day he came to diver Ken Conda on signal and after doing his job waited for the fish he was supposed to get then. Conda was unable to open the fish package and tried to push Tuffy away. Seeing he wasn't going to get his just reward, Tuffy turned, raised his flukes and batted Conda smartly on top of the head. Then, his indignation clearly expressed, he swam off at a tremendous speed.

The sea is a hard place and trouble is never far away. One day I was standing near the hatch in my bathing trunks when suddenly I thought about a diver who was out on a job near the lab. This was his second trip of the day and I wondered about his gas supply. I asked the log-keeper how much gas this diver had started with in his breathing tanks. Enough for 35 minutes, I was advised. I then asked for the diver's total time in the water. There was a pause while he did his addition, and the answer came—35 minutes. Not bothering with face mask or fins, I jumped through the hatch and swam to a bell we'd placed out there for just such emergencies. I grabbed the clapper and rang it four times, the traditional divers' distress and recall signal. Almost immediately the tardy diver came back to the hatch, and when we checked his gas bottles we found them empty. He had lost track of his time and so had we in the lab. We were all lucky. With our type of breathing apparatus, the man could have simply passed out in the water without realizing what was happening to him.

The great majority of our days below passed in routine that was free of emergencies. The work went on outside the lab—marine sampling, measuring of currents and temperatures, swimming on various jobs to distances of 200 feet from the habitat. Inside we stood watches around the clock and all shared the household duties, except for cooking. When my turn came up in that department, I usually found that I had more pressing business. But some of the men really liked to cook and could get some fine results out of canned stews and powdered omelet mixes. Roasts and steaks occasionally were sent, precooked, from the surface, and we sometimes caught fish —using a hook baited with bread—in the open hatch, skinned and ate them raw as *sashimi*. But we never bothered Herman, a sculpin about two feet long who had taken up residence on the top of the lab. Herman became something of a favorite, and when some wit on the surface suggested that Herman might be tasty, the crew firmly rejected the idea.

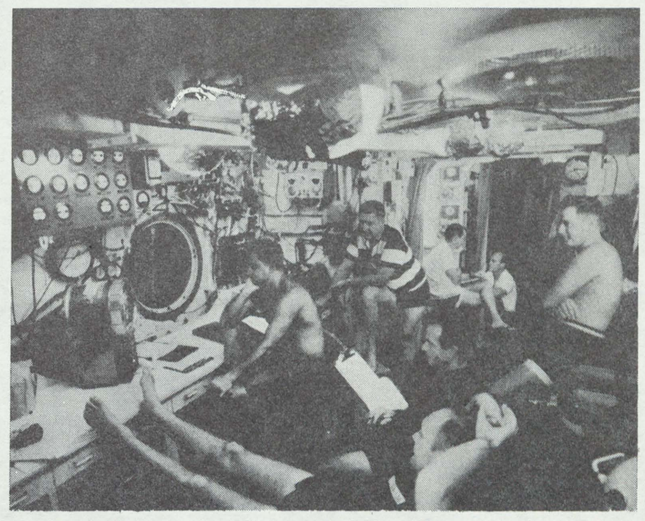
During the long evenings I prepared the schedules for the next day's work. Most nights I had long conversations with the surface, particularly with Captain Walter Mazzone, who acted as the project's executive officer. Mazzone is a wise, calm and humorous man, and it was good to talk things over with him after a hard day's work. When I stood watch alone at night, the lab seemed very homelike—locked in the sea, with lights burning here and there and the sound of helium-diminished snores floating back from the bunkroom. And it looked particularly cozy from the outside. It was a strange sensation to swim up to a lighted port and after poking through the dark greens and browns of the bottom, see the warm red of the covers on the bunks.

Still, the best experiences took place on the dives. At one point Wally Jenkins and I were going to a depth of 266 feet below the surface. This was exactly two atmospheres greater than the pressure at the level of Sealab and was as deep a dive as we were permitted to make. We swam together down the slope where Sealab rested, noting that the slope got steeper. Then we could see that the mud was changing to an outcropping of black rock. Suddenly the slope was very steep, perhaps 70 or 80 degrees, and though we could only see about 10 feet down, we knew we were swimming over a cliff which was the wall of an underwater canyon. At the sight of the ground falling away from him, Wally stopped being a diver and became a mountain-climber. He turned around in the water and started trying to climb down the slope. As I pulled for him to come on, he kept reaching down with a big finny foot for something to stand on. It was obvious that the view of the cliff made him feel that he might fall. We talked about it later and I discovered that divers often have this sensation, so appropriate on land and unnecessary in the water, when they swim over sudden drops in the terrain.

As the time drew close for me to leave the Tiltin' Hilton, I felt many things. Though I wasn't anxious to go, I wouldn't regret it. I had planned on staying 30 days, and that time was almost up. Perhaps I was readier than I thought; on a couple of occasions in the lab, I'd imagined I heard the wind blowing. And I did miss my family and the sight of blue sky and clouds.

But much more than these personal things, I felt that we had done a remarkably good job. Mostly we had proved that men can live and perform well in the sea environment. Working with the crude equipment of what is really a brand-new art, we discovered its faults on the spot, and future Sealabs and their divers will benefit from our findings, our successes and our mistakes. The project's third and final team, which will be winding up its work at the time this article appears, will surely make still further contributions to this pioneering effort. I am convinced that the effort is worth far more support than it has so far received. In the space program I have seen how very much can be accomplished when the country gets behind a program. I am not suggesting that the country needs to undertake a huge, crash undersea program. But I do think very urgently that it needs more men, more talent, more money and more public understanding than it has now. An important national frontier lies just under the surface of the sea, and we must get down to it and stay there.

I didn't really take anything with me when I left Sealab. I just wore trunks, a rubber vest and a face mask for the short swim to the transfer capsule. This would take us topside to a chamber on the *Berkone* where we would be brought back to a normal earth atmosphere after 34 hours of decompression. Some of the members of the new team were in the lab when I left, and I patted the hull as I swam out. Safely recorded on tape on the surface vessel with a perfect memento of my stay. We had made the recordings two nights earlier, and it consisted of our rendition of *Goodnight, Irene*—Donald Duck voices by all, ukulele by Carpenter. It is a marvelously funny harmony in helium, and I'm sure I'll listen to it with pleasure and pride for the rest of my life.



Scott Carpenter, on the floor, looks up from clipboard to join some teammates in favorite pastime of fish-watching from the combined lab and kitchen quarters of Sealab. Bunkroom is beyond. Air in Sealab was purified and recirculated, heated to a high 88° because helium cools off the skin much faster than air.

Aquanauts Recount the Thrills And Chills of Living 45 Days Under the Sea

LA JOLLA, CALIF.

They lived in a cramped iron cabin perched on the ledge of a submarine canyon, 205 feet below the Pacific Ocean. During the day, they donned rubber "wet" suits, plunged through a hatch and became a part of the cold, dark, wet world that surrounded their cabin. In the darkness of this underwater world, they squinted at sea lions gorging on squid and watched schools of silvery anchovies pass like a rainshower. The stings of small scorpion fish often pierced their rubber suits. And, after a while, the 48-degree water would chase the shivering men back to the warmth of the cabin. Declared William Tolbert, through chattering teeth, "Why did I ever volunteer for this?"

"This" was Sealab 2, the Navy's 45-day experiment in underwater living, held a half mile away from a San Diego, Calif., beach where surfers catch waves and bikini-clad coeds acquire golden tans. Despite the darkness, the cold water, and the stinging scorpion fish, the experiment—which ended last week—proved so successful that even Mr. Tolbert now wants to volunteer for Sealab 3.

In the experiment, three 10-man "aquanaut" teams took 15-day turns at living in the 57-foot-long iron cylinder that was Sealab. Although unaccustomed to such a harsh environment, the aquanauts accomplished a series of tasks that the Navy hopes will be routine in the future. With the aid of buoyant foam they raised a jet aircraft that had been sunk deliberately. They repaired a mock submarine hull with an explosive rivet gun. They established an underwater weather station, and retrieved mineral samples with a suction gun. They even established diplomatic relations with one representative of the marine world, a porpoise. Above all, the aquanauts demonstrated that man, by breathing mixtures of helium and oxygen, can adapt to the ocean's high pressures and remain underwater indefinitely.

"Within five years, if the program continues as it has," declared the project's chief investigator, Capt. George Bond, of the Navy Medical Corps, "I feel we will be doing useful work at 800-foot depths with crews of as many as 300 men living underwater for long periods of time."

More Hostile Than Space

Earlier marine live-ins have benefited from tropical locations, like the Bermuda waters or the Red Sea, where water is both warm and clear. But tropical waters do not conform to the general nature of the ocean. "The sea is a tough adversary —much more hostile an environment than space," summed up one Sealab aquanaut who should know. He is Navy Cmdr. M. Scott Carpenter, who, before spending a record 30 days in Sealab, became in May 1962 the second American astronaut to orbit the earth.

Commander Carpenter believes that man's ability to adapt helped the aquanauts overcome the cold hostility of the world around Sealab. "When we first went out of Sealab, we would swim 25 or 30 minutes, then shiver so badly it was unbelievable. But within two weeks we were staying out for an hour or more." Mr. Tolbert, who shivered along with Commander Carpenter, tested — with much pleasure—an electrically heated wet suit that made even longer stints possible.

Besides the adaptability and technology of man, the sheer fascination of the marine environment helped the aquanauts overcome the environment's hostility. They found themselves mesmerized by the deadly battle of survival that was enacted daily outside Sealab: Fish swallowing the small anchovy, squid gulping down the fish, and seals downing the squid, sometimes at the very moment the squid was digesting a fish.

Discovered Danger in Time

The planners of Sealab 3, which will be conducted next year, hope to make the cabin atmosphere more hospitable. Sealab 2 was constantly humid and its floor slippery.

Although Sealab 3's location has not been selected yet, the depth has—400 feet. This distance is little more than the length of a football field on land, but 400 feet under the sea becomes a perilous journey with far greater pressures and colder temperatures than those encountered at 200 feet. Despite this increased challenge, the Sealab 2 aquanauts still would like to go down for the ride. Commander Carpenter, who like Mr. Tolbert, has already volunteered his services, remembers not the scorpion sting he suffered or the cold that numbed his body, but the fascination of the inner ocean. "For all of us," he says, "it was the best time we've ever had, made us feel we weren't working hard enough, that it shouldn't be this much fun."

—WESLEY MARX
NATIONAL OBSERVER

OCT 18 1965

LOS ANGELES EVENING AND SUNDAY
HERALD EXAMINER

B-2 Monday, Oct. 18, 1965 ★

George R. Hearst Jr., Publisher — Donald Goodenow, Managing Editor

The Sealab Story

Months will be required to analyze the experiences of Sealab 2 and years must pass before mankind will benefit from the extraordinary experiment recently conducted on the sea bottom off La Jolla.

In a 45-day adventure, a team of Navy personnel spent 15-day shifts living and working inside and outside a 200-ton cylindrical capsule submerged 200 feet. One team member, astronaut-aquanaut Scott Carpenter, braved the depths for a month.

Man has achieved astounding accomplishments on earth, in the skies and has reached commandingly into space. And now man knows that he has an ecological destiny in the forbidding sea.

It is certain that humans can function rationally and well at 200-foot depths and probably at 400 feet which will be the goal of Sealab 3, a year hence. The ultimate goal is 600 feet and—then—who knows?

Aside from the long-range experimental hopes, Sealab 2 has given us an immediate benefit. It has developed new salvaging methods by which sunken submarines and merchantmen, heretofore irretrievably lost, can be surfaced.

Some will continue to question the wisdom of such costly and dangerous experiments. But those who think of the sea in a scientific way, as a vast harvesting place, will not.

The oceans of the world can be incomparably more yielding than our own Great Plains, subdued less than 100 years ago.

Sealab Follow-up Planned

The Navy is planning a manned underwater laboratory to operate at depths between 400 and 450 ft. within the next year as a result of the Sealab II program.

The Sealab project was successfully concluded Oct. 12 when the third team of 10 men returned to the surface after 15 days. Twenty-eight men spent a total of 45 days in the 57-ft.-long capsule anchored 205 ft. below the surface off the coast of La Jolla, Calif.

Cmdr. M. Scott Carpenter, NASA astronaut on loan to the Naval program, spent a total of 30 days in the capsule.

According to Capt. George Bond, chief scientific investigator of the program, the experiment yielded valuable information about the science of underwater living that has greatly advanced the Navy's man-in-the-sea program. Stepped-up exploration of the underwater continental shelves is expected.

missiles and rockets, October 18, 1965

MISSILES & ROCKETS - 5
1001 Vermont Ave., N.W.
Washington 5, D.C. Circ. 30,000

OCT 18 '65

30 DAYS 200 FEET DOWN

The Story of Sealab

By Commander M. Scott Carpenter

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SCOTT CARPENTER'S OWN ACCOUNT OF . . .

A Kinked Lifeline. The Super Shivers A Scorpion Sting

LA JOLLA, Calif.—The stress of deep diving fills the swimmer's mind with silent questions.

Does the air taste right? Are the hoses free of water? Are bubbles coming out of the exhaust valve properly?

The answers must all be yes, as they were on that August day when I pushed my flippered feet above my head and swam straight down.

* * *

THROUGH my face mask I saw my buddy diver, Wilbur Eaton, and the thin yellow life-line. I could feel the pressure gathering against my ears as we trustingly followed the line in a seemingly endless descent into silent darkness and cold.

Then there it was, a ghostly shadow in the green gloom at the end of the line. We had arrived at Sealab II.

Only two minutes had passed since we left the surface more than 200 feet away. It would be almost 30 days before I was to make the return trip and end the most richly satisfying experience of my life.

Once the remaining eight divers of the first team joined us, we began getting the craft ready for the experiments that would be carried out under water in the next 45 days.

The first team was scheduled to stay down with me for 15 days before they were replaced by another group. I would leave after 30 days when a third team of 10 men would take over the lab.

* * *

MANY SCIENCES were to be served in this project. But the Navy's main job was to seek better understanding of man's reaction to prolonged exposure to pressure, isolation and cold water. I discovered very quickly how close to danger we would be.

On the second night I was working with my buddy diver, Bill Coffman. We were more than 50 feet away from the entrance hatch of our 57-foot long undersea capsule.

Instead of breathing tanks we relied on hoses to feed us the mixture of nitrogen and oxygen direct from Sealab. It was very dark and cold.

Everything seemed all right until I suddenly noticed that I was having difficulty inhaling. It rapidly got worse, then I had nothing at all to breathe. All I could do was swim as fast as I could back to Sealab. It seemed a very long way in the darkness.

As I surfaced in the hatch, I gasped for somebody to go get Coffman. But he popped up right beside me.

He had been having no breathing problem, had noticed me take off fast for the hatch and followed. It turned out that my line had simply kinked. We straightened it out and went back in the water. But it had been a frightening experience.



Scott Carpenter dons diving suit

* * *

INSIDE the lab things were pretty comfortable. The pressurized atmosphere was somewhat humid, and for a while I kept waking up at night not quite able to make up my mind whether I was hot or cold. I solved this particular problem by sleeping on top of an electric blanket.

No one could smoke because there wasn't enough oxygen in our breathing mixture to support the burning of a cigaret.

The food tasted good almost all the time. We had plenty of hot water, a television set, mail every day, and cakes and cookies from thoughtful wives on the surface.

Over a special line we made collect telephone calls to families and friends around the country. And all in all we felt quite in touch with the world outside the sea.

* * *

DURING the initial days, the cold water (which ranged in temperature from 50 to 55 degrees F.) was definitely unpleasant. Even if the suit fit perfectly coldness crept in. Soon, after perhaps 10 minutes in the water, the shivering would start.

With some of us it reached the point where the whole body was shaking and our arms moved several inches up and down in great shudders. It became impossible to work, and we would go back into the lab, get under the shower and in our funny Donald Duck tones moan with relief. (The helium-rich atmosphere affected the divers' voice tones).

But as the days passed our bodies began a gradual acclimation to the cold. Divers would not be overtaken by the shivers so soon, nor would they be as severe. Sometimes we used electrically-heated suits, and it is clear that future models of such suits will allow a man to dive into cold water until he is tired or hungry enough to come home.

Because of the pressure and high humidity, we suffered frequent headaches and ear infections. And we would get glum and silent. When the problem passed, we would snap right back.

* * *

A SCORPION FISH stung me one day when I made the mistake of groping in the dark with my hand. The spines on the fish's dorsal fin went right through my glove and the pain was instant, a sharp and poisonous feeling.

I got out of the water, undressed and went to bed immediately. The pain spread from my finger to my hand and arm and became excruciating. My nose and sinuses filled with fluid and I had to breathe completely by mouth.

The diver-doctor on board gave me anti-histamine shots, cortisone and pain killers. I felt somewhat better in a few hours, was much improved the next day and was in the water the day after that.

* * *

THE PORTHOLES of the lab were often completely filled by fish which, drawn to the lights, crowded to the glass. We swam through great schools of croakers which parted before us instantly and then closed ranks again.

On one occasion I was swimming near the lab untangling breathing lines. I was upright in the water, spinning and twisting around as I worked.

Suddenly I noticed that my strange dance had drawn an audience. I was completely surrounded by a big school of rockfish, perhaps 1,000 of them up to 18 inches long.

* * *

FOR A FEW DAYS we had the Navy-trained porpoise, Tuffy, working with some of the crew. His performance proved that these animals can be of great help to divers.

They could be excellent lifesavers. They can be trained to swim to places in the water where sounds are being made. Tuffy lived in a pen on the surface but made many quick trips trailing safety lines from a harness strapped to his body.

One day he came to diver Ken Conda on signal after doing his job and waited for the fish he was supposed to get. Conda was unable to open the fish package and tried to push Tuffy away.

Seeing he wasn't going to get his just reward, Tuffy turned, raised his flukes and batted Conda smartly on top of the head. Then, his indignation clearly expressed, he swam off at a tremendous speed.

* * *

THE GREAT majority of our days below passed in routine that was free of emergencies. The work went on outside the lab—marine sampling, measuring of currents and temperatures, swimming on various jobs to distances of 200 feet from the habitat.

When I stood watch alone at night, it all seemed very homelike—locked in the sea, with lights burning here and there and the sound of helium-diminished snores floating back from the bunkroom.

As time drew close for me to leave, I felt many things. Though I wasn't anxious to go, I wouldn't regret it.

Perhaps I was readier than I thought; on a couple of occasions in the lab, I'd imagined I heard the wind blowing. And I did miss my family and the sight of blue sky and clouds.

The three-orbit space flight I made in May, 1963, was tremendous. Nothing could top the exhiliration I felt during and immediately after that short, glorious experience. This one, on the other hand, was long and grueling, far more taxing physically than the flight in Aurora 7.

OCT 17 1965
FREE PRESS
Detroit, Mich.

SAN DIEGO UN

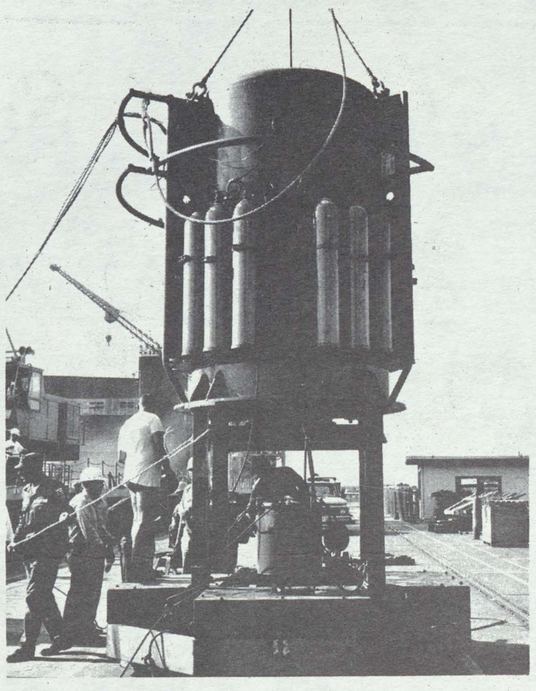
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AQUANAUT TALK SLATED

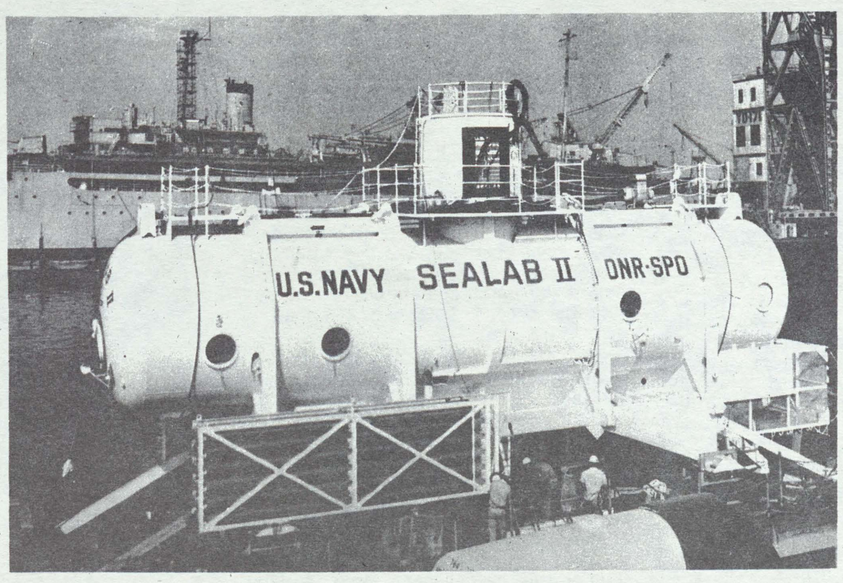
Tom Clarke, one of the SeaLab II aquanauts, will describe his adventures during two weeks under the sea at a dinner meeting of the San Diego Propeller Club at 6:30 tonight at the Point Loma Inn.

Clarke, a Scripps Institution of Oceanography diver, was with the first team, headed by astronaut Scott Carpenter. He will show pictures as well as relate experiences during his 14 days on the bottom off Scripps Institution.

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Special pressurized capsule is used to transfer aquanauts from SeaLab II to decompression chamber aboard the staging vessel, Berkone. Once aboard, aquanauts spend 33 hours in decompression chamber on ship whose entrance is shown in deck view, while air pressure gradually is reduced to that of the ordinary atmosphere–15 pounds a square inch. The so-called personnel transfer capsule is both an elevator and, in an emergency, an escape vehicle for SeaLab II workers.



Seen ashore and at rest, unique undersea laboratory rather resembles an oversized railroad tank car; photo was taken when lab was on barge at Long Beach Naval Shipyard, prior to being put in water, towed to LaJolla and sunk.

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(NEWSTIME EDITON)
50 W. 44th Street W
New York 36, N.Y. Circ. 354,153

OCT 28 '65

NOVEMBER 4, 1965

FRONTIERS OF SCIENCE

Sealab II

EVERYTHING IS SHIPSHAPE

EVER SINCE men have gone to sea they have sailed only on its surface or have slipped below as deep as their submarines or bathyscaphs could carry them. Now all that's being changed. Men are invading the sea with the idea of living and working on its bottom. These invaders are a new breed of sailor-explorer-scientist called *aquanauts.*

Many nations, including Soviet Russia, France, Italy, Japan, and the U. S. have a variety of aquanaut, or "man-in-the-sea," research programs. One of the U. S. programs, run by the U. S. Navy, is called Sealab. The latest episode in the Sealab story is Sealab II (*see JS World Reporter, Oct. 14*).

Sealab I, conducted in the summer of 1964 in the Atlantic, lasted 11 days. Four aquanauts lived and worked in an iron tank placed on the bottom, 193 feet below the surface of the sea. Sealab II used three teams of 10 men each. Each team stayed below for about 15 days in a tank anchored 205 feet deep in the Pacific, off the California coast.

The Sealab II aquanauts performed many experiments. They learned how to function in a completely new kind of diving and exploration suit *(see boxed story at right).* They studied how the chemistry of the human body changes under deep-sea conditions. They sent blood, saliva, and liquid human waste samples "topside" each day to the supply ship moored above them.

Why does the body work differently at great depths? One reason is that the atmospheric pressure inside the Sealab was seven times greater than at the surface. Another is that the aquanauts breathed air containing only 3.5 per cent oxygen. The rest of the air was mainly helium. The low oxygen, high helium, air permitted the aquanauts to work with comfort in their diving suits outside the lab and live, desuited, in the lab. But before they returned to the surface, they had to spend hours in a decompression chamber. There the oxygen content was gradually raised from 3.5 to 21 per cent, and the pressure was restored to normal.

Living and working in the hut, the aquanauts encountered a number of unexpected problems. They developed painful skin sores and had trouble hearing. Some of their electronic gear failed to work as expected.

All the aquanauts are ready to take part in Sealab III. Before Sealab III is ready, however, Navy scientists have a nine-months job to do. That's how long it will take to study man's latest plunge into the deep blue sea.

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SCIENCE IN THE NEWS

A Chain of Life



What do Earth, a spacecraft, an undersea ship have in common?

Drawing by DOM LUPO

Last week we saw that bacteria are part of the chain of life. Using this fact, scientists are finding new ways to put green plants to work. Plants may go with explorers in space and beneath the waves to "grow" air to breathe.

Astronaut Scott Carpenter came *up* this month – up from a month on the ocean floor in Sealab II *(see October 7 issue).* Why send an astronaut down to the ocean floor?

One reason: Life in an orbiting spacecraft and life in an undersea "home" have things in common.

Both the capsule and Sealab are small. Outside the orbiting spacecraft there's almost no air – only space. Outside Sealab there's almost no air – only water. So both must carry their air with them.

In both, men breathe air that is taken along in metal tanks. The tanks carry a mixture of oxygen and other gases. Oxygen is needed to support human and animal life.

The men aboard Sealab, or in a spacecraft, breathe in the oxygen. It helps supply energy for their bodies. The oxygen is turned into another gas – carbon dioxide – and breathed out. The carbon dioxide is removed from the air by special chemicals. New oxygen goes into the air from the tanks.

But as men spend more and more time in space or beneath the waves they may not have room enough for tanks to carry their oxygen.

How will they be sure of having enough air? One way scientists are working on: the crews may be able to "grow" most of their air!

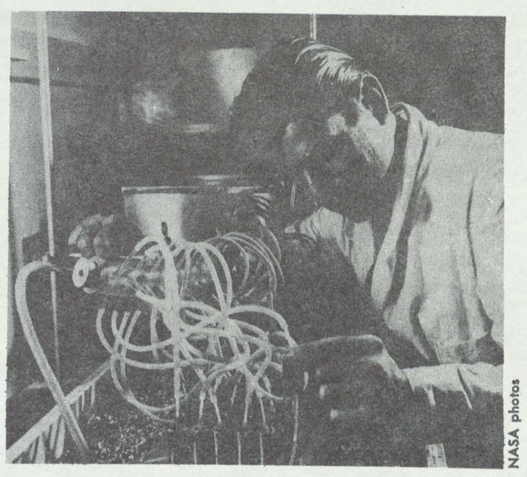
Question: What does a spacecraft on its way to our moon have in common with Earth? Answer: Outside the craft, you know, there is almost no air – only space. Beyond our atmosphere our planet is surrounded by space, too.

People and animals would soon turn all the oxygen in Earth's air into carbon dioxide. Then they would die. But green plants use carbon dioxide to help them grow. They turn it back into oxygen again.

This chain of events – oxygen to carbon dioxide and back to oxygen – helps keep life going on Earth *(see drawing above).* – MALCOLM WEISS



These men are "farming" algae – simple green plants – from the surface of a pond. The algae may be used in spacecraft like that in drawing.



No – it's not a spaghetti factory! These scientists are growing algae and studying how men in spacecraft and undersea ships may be able to use these tiny green plants to "grow" oxygen. The plants may help supply food for the crews as well.

NASA photos

Bulletin (m)
NORWICH, Conn.
Circ. 30,344

OCT 31 1965

Genesis I Officer

Capt. Mazzone To Address EB Alumni Group

GROTON—While their shipmates at the submarine base were preparing a big welcome for 12 Connecticut navy men who took part in the Navy's Sealab 11 operation at La Jolla, Calif., the Electric Boat Apprentice Alumni association announced Saturday that one of them will be a guest speaker on Nov. 13.

Capt. Walter F. Mazzone of 390 Long Hill Rd. will address the alumni and show films of the underwater operation at the association's seventh annual banquet, at the Gam restaurant, Ocean Beach Park, New London.

The Medical Service corps captain was project officer for all five phases of the navy's Genesis I (Man in the Sea) program and also project officer for Sealab I. A former submarine combat officer, Capt. Mazzone is also a qualified deep sea diver and a scuba diver.

Besides association alumni all EB apprentices have been invited to the banquet. Tickets are priced at $4. A steak or lobster dinner will be served at 8 p. m., following a cocktail hour.

A navy base spokesman said that some of the sub base men who took part in the operation had arrived Friday and others are expected to arrive this week.

Groton men, besides Capt. Mazzone, Medical Corps Lt. R. T. Larson of Ibis La.; are George T. Jenkins, hospital corpsman, first class, of 63 Charter Oak Dr.; Frederick J. Johler, chief engineman, 67 Nerius Ave. and Glenn Leroy Iley, chief hospitalman, 110 Burningtree Dr.

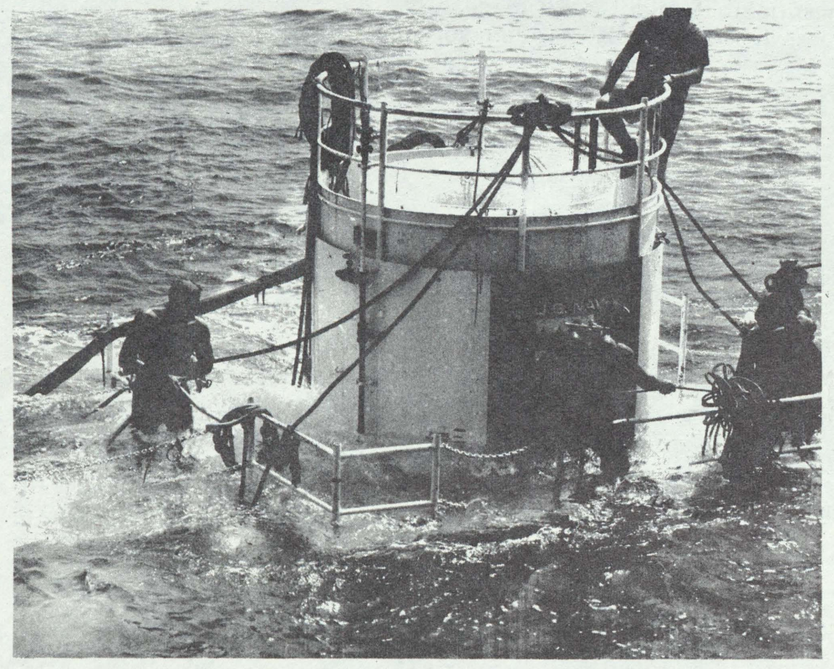
The other men are Kenneth J. Conda, torpedo mate, first class, Avery Hill Acres, Ledyard; Lester E. Anderson, gunners mate, first class, 49 Haley Rd., Uncasville; Billy L. Coffman, torpedo mate, first class, Willimantic; Raymond R. Lavoie, chief hospitalman, Harmony, R. I.; Daniel D. Price, chief machinists mate, Madison and Michael Greenwood, a civilian scientist RFD 5, Gales Ferry.

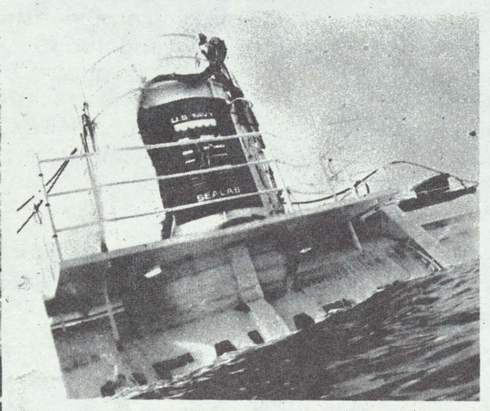
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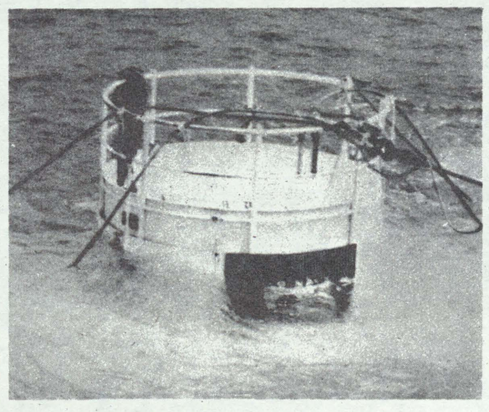
The Southeasterner

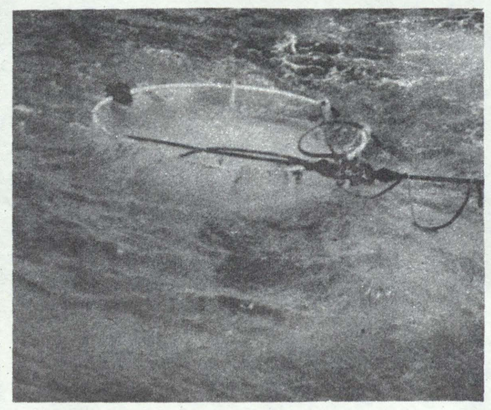
The New Bedford Sunday Standard-Times — October 24, 1965

SEALAB II: Satellite on the Ocean Floor









Sequence of photos show skindivers opening conning tower valve on SeaLab II, filling her ballast tanks with water to make her sink from sight toward the ocean floor.

By John H. Ackerman
Sunday Editor

His presence hasn't been reported yet . . . but it's by no means unlikely that the ghost of a Frenchman named Jules Verne is perched smiling on the bottom of the Pacific Ocean off Lajolla, Cal., watching the proceedings of SeaLab II with smug interest . . . smug, because the idea of a colony of researchers, scientists and technicians living in a snug haven on the sea bottom and moving about with SCUBA gear had long ago been suggested in his 19th Century science-fiction classics.

That kind of prophecy is hardly new with Verne; modern science is transforming his fiction into hard fact . . . as he always believed it would. When the members of the Baltimore Gun Club in his "From the Earth to the Moon" plotted the best site for their cannon to fire a shell at the moon, they chose a piece of land named Cape Canaveral on the east coast of Florida. They had to abandon that site for the Florida Gulf Coast farther north — better rail and harbor facilities—but surely this was the first mention of what is today Cape Kennedy . . . more than half a century before it was anything but a snake-ridden sand pit.

Not even the use of Tuffy, a trained porpoise,

(Continued on Page 8)

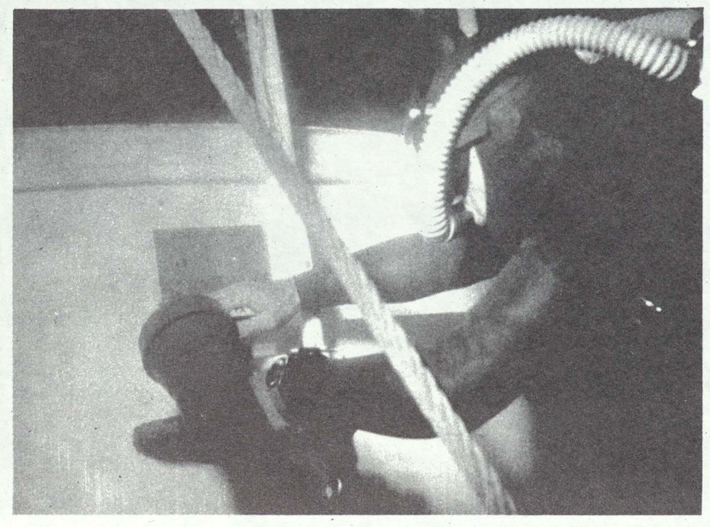
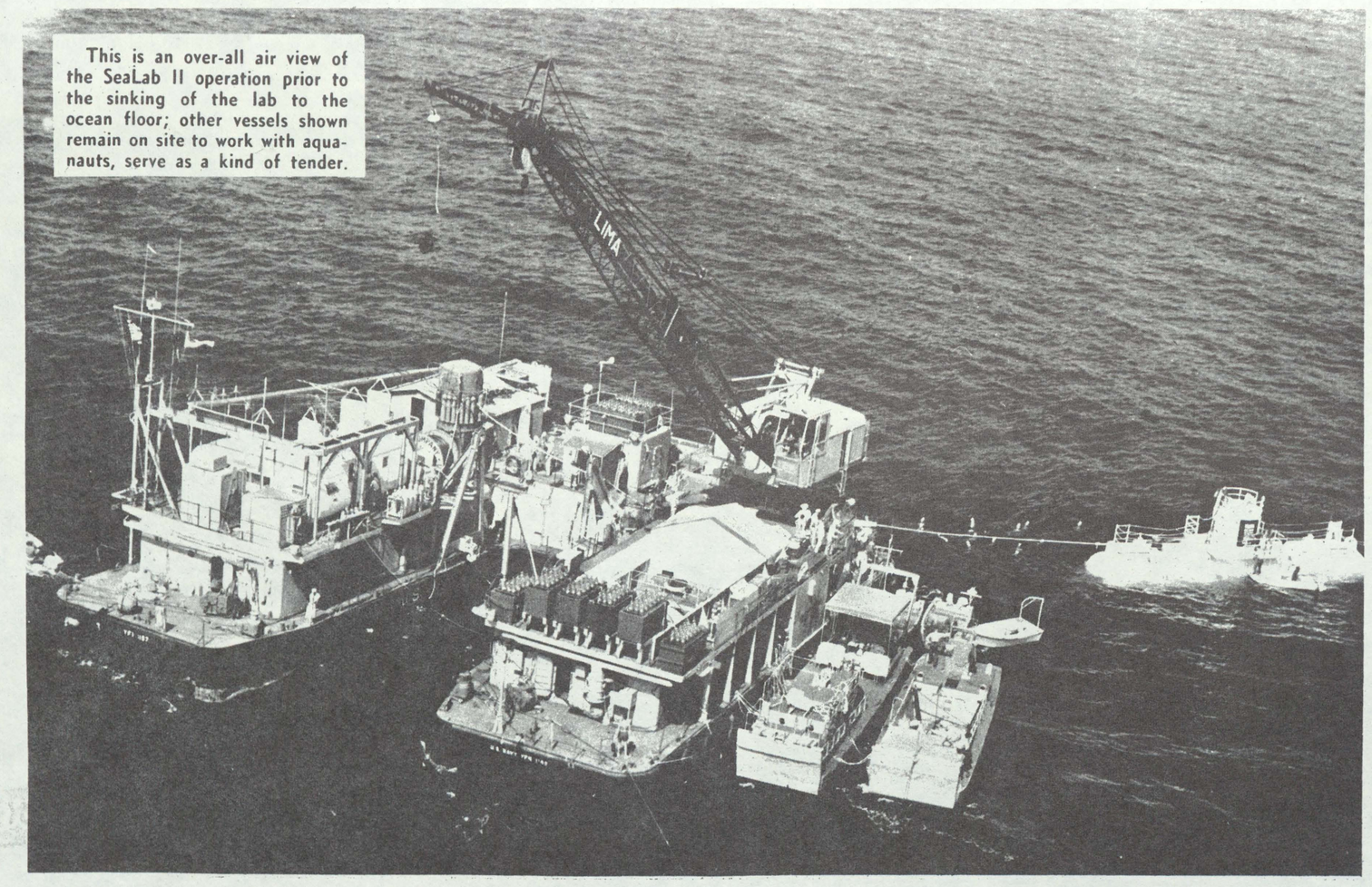
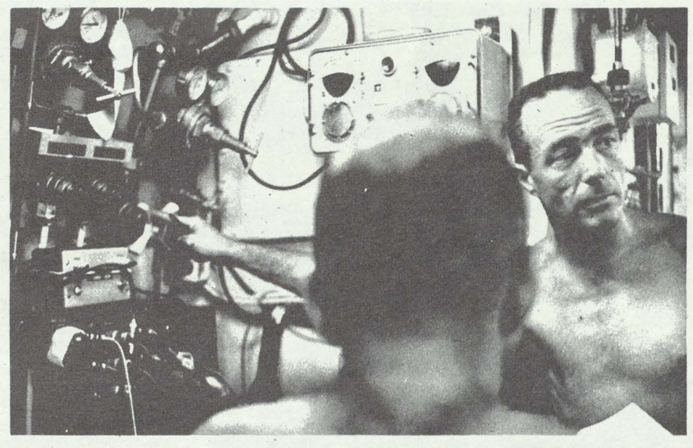


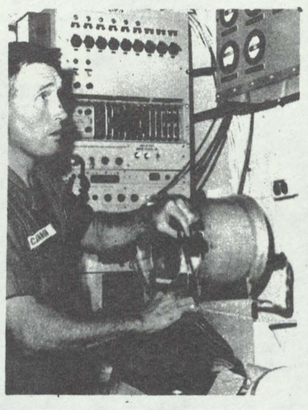
Photo taken on bottom at 215 feet shows Master Diver Robert A. Sheats, USN, opening main vent valve on SeaLab II's conning tower to flood ballast tank.



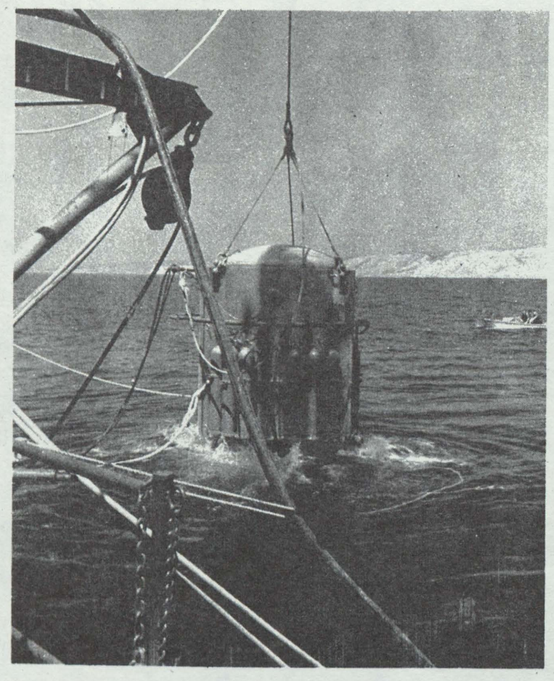
This is an over-all air view of the SeaLab II operation prior to the sinking of the lab to the ocean floor; other vessels shown remain on site to work with aquanauts, serve as a kind of tender.

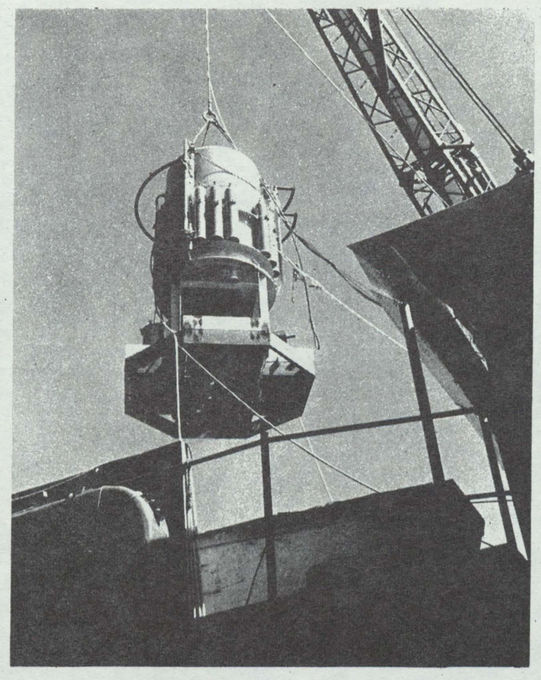


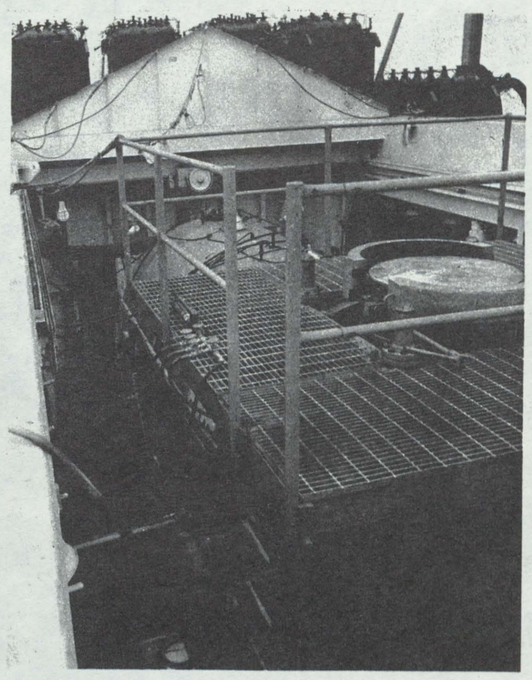
Commander M. Scott Carpenter, right, explains SeaLab II life-support system to his team of bottom-dwellers.



Navy aquanaut Berry L. Cannon checks SeaLab II's pressurized television receiver, which enables SeaLab II occupants to enjoy — if that's the word — commercial TV when off-duty.







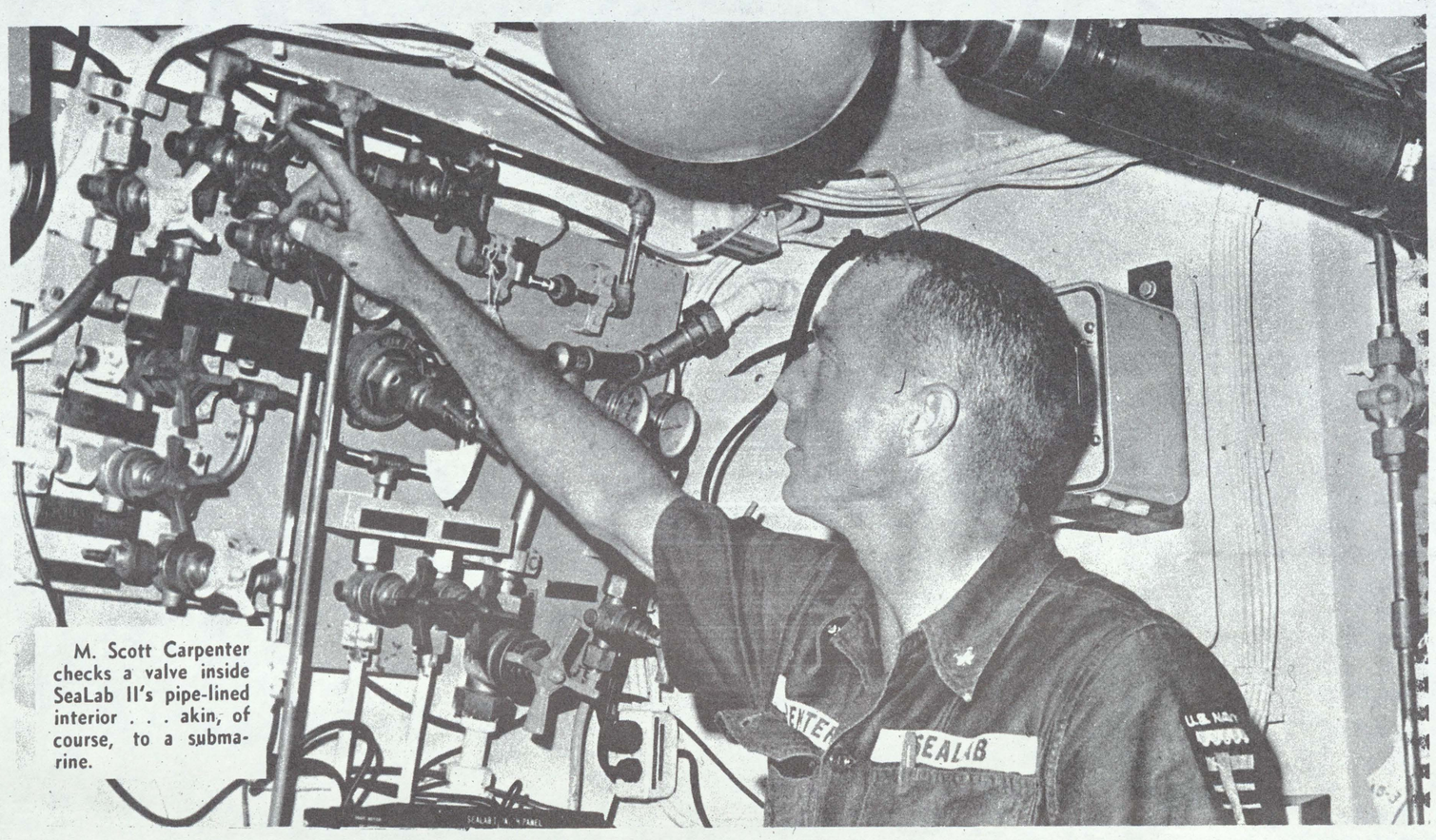
The Southeasterner

SEA LAB II

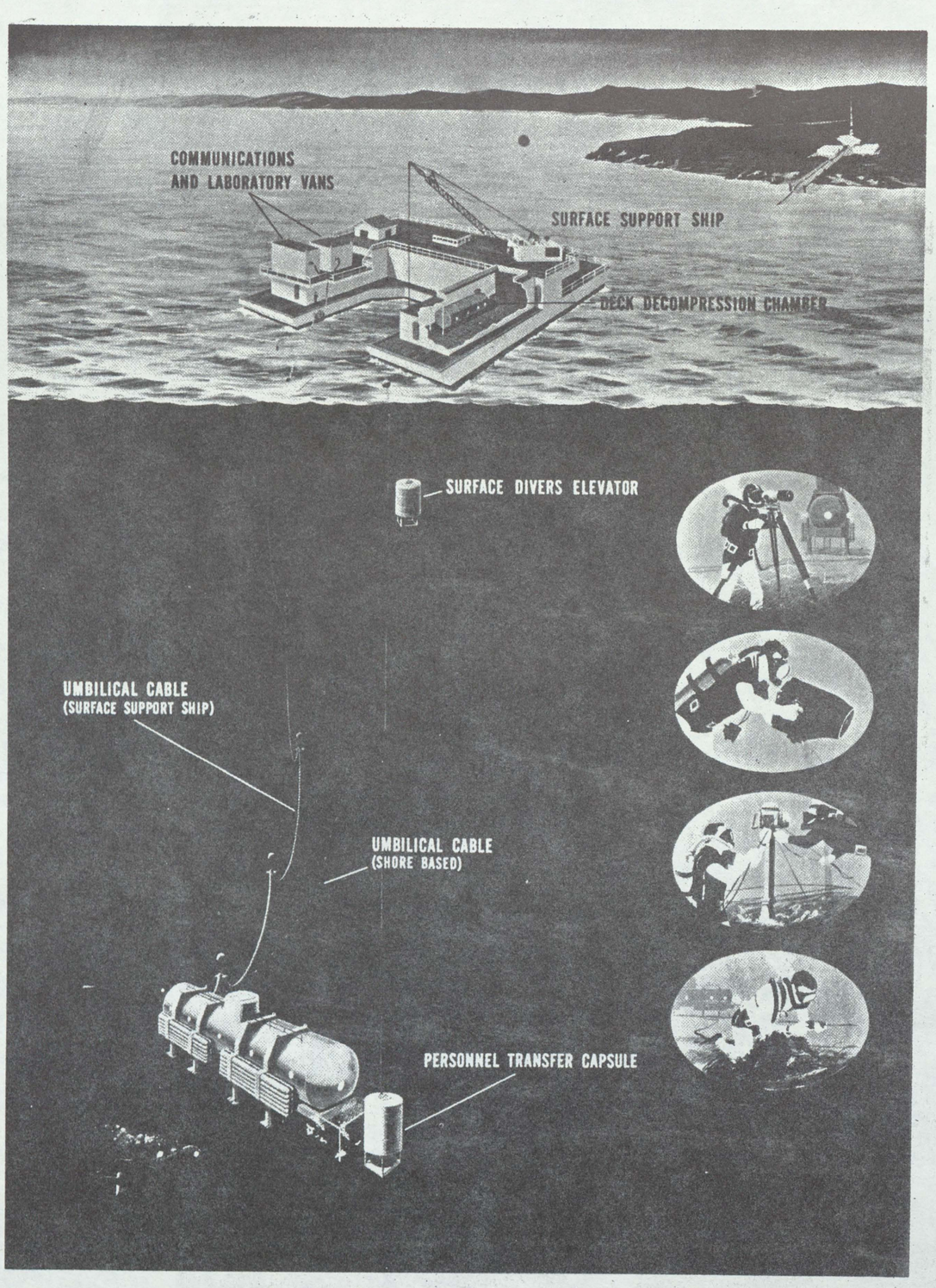
Continued from Page 7.

would probably astonish Verne; it surely delights innumerable young adherents of Flipper who cavorts on television. And Verne would approve the very concrete scientific reasons for SeaLab II: To find information about such matters as a safe breathing-gas, inert gas (nitrogen) narcosis, the so-called "rapture of the deep;" a breathing fluid such as a special oxygen-saturated water which men could breathe under pressure; decompression sickness ("the bends"), the dangerous accumulation of carbon dioxide; body heat loss, and the effect of a helium-oxygen environment on the heart, (helium-oxygen mixtures are breathed by the men within SeaLab II).

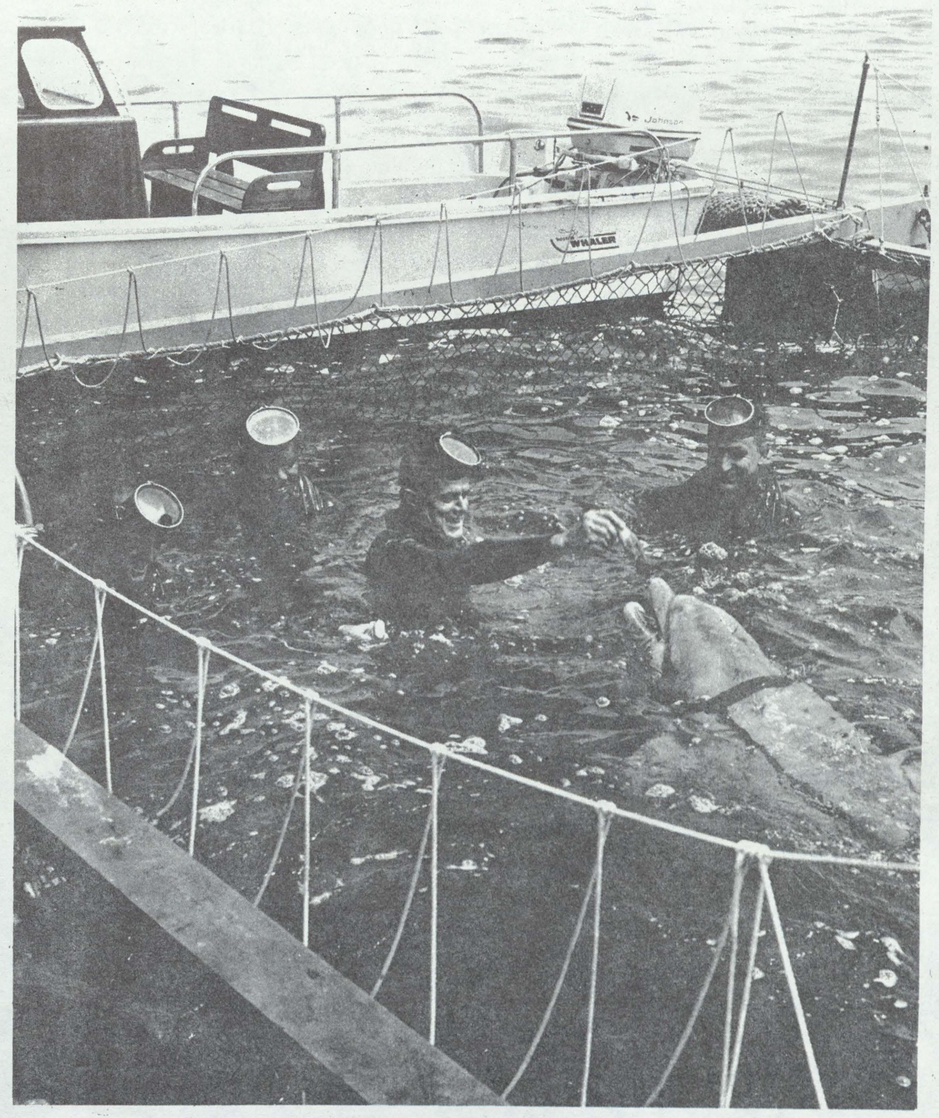
Astronaut M. Scott Carpenter, a Navy commander, heads the SeaLab II diver teams; he's recovered now from a scorpion fish sting that might have made him briefly long for the less thorny aspects of outer space research as opposed to inner space research. These U. S. Navy photos give you an idea of the men and the work now under way 215 feet below the blue Pacific off Southern California.



M. Scott Carpenter checks a valve inside SeaLab II's pipe-lined interior . . . akin, of course, to a submarine.



Navy diagram shows SeaLab II setup on ocean floor off LaJolla, Cal., a suburb of San Diego. SeaLab II rests on Pacific bottom at a depth of 215 feet.



Flipper's kin, Tuffy, a versatile porpoise 7 feet long who weighs 270 pounds, has been trained to assist SeaLab II workers, shown getting acquainted with him. Tuffy is expected to make up to 20 message runs daily, can also respond to an underwater buzzer pressed by a diver in distress. Tuffy has no need for a decompression chamber either which is another reason this seagoing mammal, already noted for its unusually-high intelligence, is under close study by scientists who'd like to find out how these animals can avoid the bends . . . and if the reason is one that could be, somehow, adapted or created, for human benefit.

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PLAN THIRD PROJECT - DEEPER

SeaLab Disappears; Leaves Data Impact

The men in the now familiar "SeaLab green" may have disappeared from the La Jolla scene this week, but the importance of their 45 days of experimentation off the Scripps Institute of Oceanography pier is considerable.

Coupled with the results from SeaLab I in Bermuda over a year ago, the data obtained from both operations will provide a solid footing for a third SeaLab project at an unannounced location.

"We'll be at 400 to 450 feet in 12 months if it's possible," said Capt. George Bond, principal medical investigator for the project. Speaking at a final press conference, Bond said "that if gaps can be filled readily, the program will move rapidly."

Bond's "gaps" are any new scientific information which may require more information and explanation. According to the doctor, very little new information was learned from SeaLab II that the Navy had not obtained in its first project or through other testing.

Bond stated that the real highlight of the program was "sending 28 men down and getting 28 men back."

"This is a high risk program," explained Bond. "These men are under hazardous conditions 24 hours a day."

Bond said another result of the second session "was confirmation of a sneaking suspicion that it's possible to put a man under high pressure, in a hostile environment, and have him do useful work."

The program, which began on a shoestring budget of $148,000 last year and exceeded $1.8 million this time, is now waiting on the results of physiological data compiled from the 45 days of testing. Bond said an analysis is being made by computer.

To date the only physiological puzzle, explained Bond, is a general feeling of soreness the aquanauts experienced for their first several days on the bottom.

Physically Violent

"They had a sense of being through a violent physical effort," said Bond.

Despite the fact there were no "great findings," Bond was pleased with his "negative results."

For him and other project officials it's a "green light" to move on to deeper and more sophisticated experimentation.

"We feel that man can stay an almost indefinite period on the ocean bottom," said Bond.

"In four or five years we expect to have men making dives from the 600-foot level where they live to 1,700 feet where he can perform some useful activity — all without paying the price of a long period of decompression.

"It may sound like a wild Buck Rodgers concept, but keep your eye on the next two years."

Bond said one of the greatest necessities for further experimentation is suitable thermoprotective suits for divers. He said man could probably remain outside his habitat up to six hours with proper equipment.

Deeper Difference

Capt. Lewis B. Melson, director of the project, told the press that "everytime you go deeper into the ocean you're going to have a different environment. What you know at 200 feet will not suffice for 400."

Melson said SeaLab's goal is "to learn to work in the environment, not to fight it." Melson also indicated there would be "SeaLab III's, IV's and V's, and whatever others needed to accomplish our goals."

Rear Adm. John K. Leyden, director of the Office of Naval Research in Washington, DC, indicated that interest has been shown in establishing a national oceanographic agency, somewhat comparable to the National Aeronautics and Space Administration.

Admiral Leyden said the ocean "represents the next frontier." He said that as a result of SeaLab projects the term "aquanaut" is now in household usage by young children.

After calling the sea a "realm of the world where the Navy should be pre-eminent," Leyden awarded 27 of the aquanauts a unit citation from the Secretary of the Navy. The citation of Robert Sheats, team three leader, who was detained for additional decompression, was received by his wife, Mrs. Margaret Sheats.

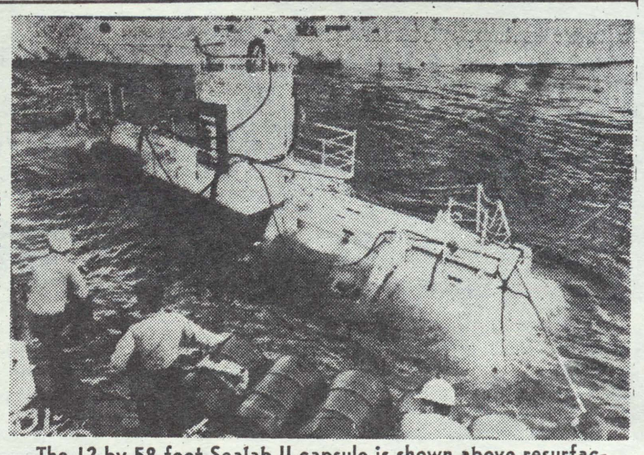
28 Men Cited

The commendations, awarded a non-commissioned group for only the second time in Navy history, cited the 28 men for "exceptionally meritorious service . . . in cheerfully and willingly exposing themselves to a hostile and unknown environment to further the capability of the United States Navy in maintaining its position as the leader in the field of undersea rescue and salvage."

With a second project over, speculation is high as to where Sea Lab will go next. Sources close to the Navy indicate the Gulf of Mexico on the East Coast as a prime location, or the San Clemente Islands on the West Coast. San Clemente has been mentioned prominently because the operation would be easy to support and a good, sandy bottom is available.

Meanwhile project officials are breathing easy — waiting, experimenting, and analyzing.

Sealab II Experiment A Success



The 12 by 58-foot Sealab II capsule is shown above resurfacing off La Jolla, California after completion of 45 day experiment in which diver-scientists lived and worked for extended periods 205 feet beneath the sea on the edge of the continental shelf.

LA JOLLA, Calif.—The Navy's undersea experiment Sealab II which ended here recently was a success according to Navy spokesmen and chalked up several "firsts," including an undersea telephone call between the U.S. aquanauts in Sealab II at the bottom of the Pacific and French divers at the bottom of the Mediterranean.

"Sealab II has proved that man can successfully do work for extended periods of time at depths under high pressure at the bottom of the ocean,' said a Navy spokesman. "That is basically what we set out to prove."

Three successive 10-man teams stayed down 15 days each—except for two men who were below for 30 days—astronaut-aquanaut Lt. Commander M. Scott Carpenter and Lt. Robert Sonnenberg, a Medical Corps doctor.

The undersea telephone conversation between the U.S. team 205 feet down on the U.S. continental shelf of La Jolla, California and the French team 330 feet down near Cape Ferrat, France, was just one of many experiments carried on inside and outside the 12 by 58-foot ocean bottom laboratory known as Sealab II. Undersea salvage techniques and biological studies were among the most notable of these.

The basic experiment, however, was that of testing man's ability to live and work for extended periods beneath the sea.

SEAFARERS' LOG - 101
675 Fourth Ave. M
Brooklyn, N.Y. 11232

OCT 29 '65

AVIATION DAILY - 5
1001 Vermont Avenue, N.W. D
Washington, D.C. 20005

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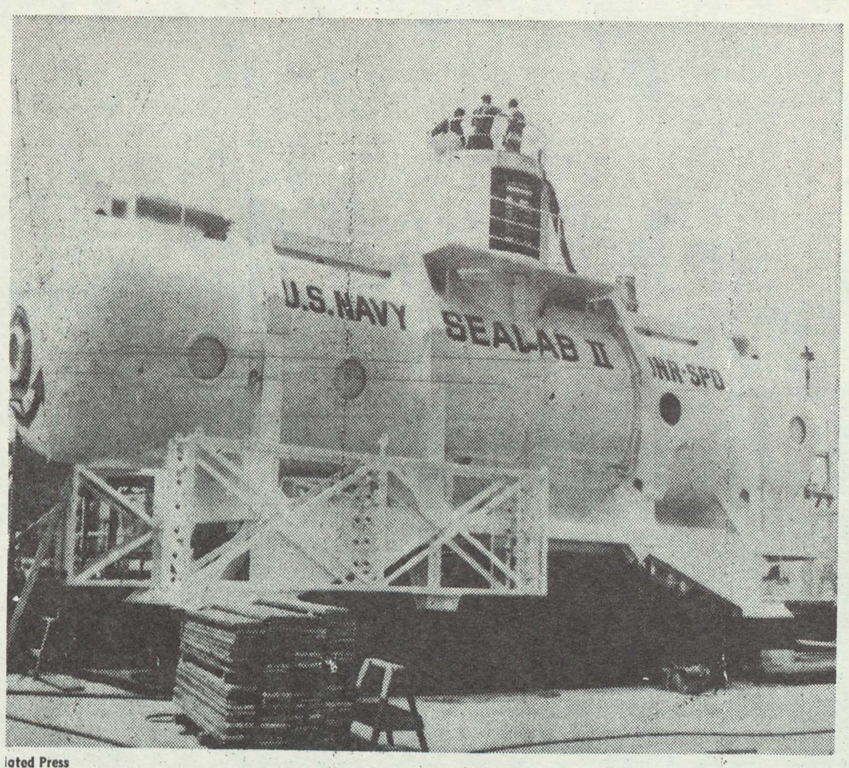
FURTHER TESTING INDICATED FOR AIRCRAFT-SALVAGE FOAM

The Navy's use of foaming plastic to salvage aircraft crashed at sea "was not 100% successful during project Sealab II in which 28 sailors lived up to 45 days in a capsule 205 ft. beneath the ocean. But bugs will probably be worked out in another experiment slated for 400 to 450 ft. next fall, Pentagon reporters were told at a briefing yesterday.

Officials said the foam did bring an aircraft section to the surface but it absorbed the water and sank shortly afterward. However, divers had no difficulty in working with the foam and it promi to be a good salvage tool, they added.

THE CHRISTIAN SCIENCE MONITOR Wednesday, October 27, 1965 ★

Chilly, wet 'walk' described in Sealab 2 report



Sealab 2 is the Navy's 12-by-57-foot steel cylinder which recently spent 45 days 210 feet beneath the Pacific off La Jolla, Calif.

Window under water

Special to The Christian Science Monitor

La Jolla, Calif.

What did Sealab 2 bring up from the depths of the Pacific off San Diego for the average citizen? Can we expect any broad implications from the results of Sealab's research?

Will it lead to any specific, practical developments? Did it serve simply to increase man's knowledge of the world beneath him? Was it mainly an exciting adventure of exploration?

I asked these questions of one of the five civilians who took part in the diving: marine biologist Arthur Flechsig of the famed Scripps Institute of Oceanography in La Jolla, Calif.

Mr. Flechsig—a genial, outspoken scientist—went down with the second contingent of divers and spent 15 days in Sealab. When I found him back in his laboratory at Scripps, he was morosely cleaning slime and other evidence of water damage off a microscope he'd left in Sealab.

The vehicle that had performed so nobly in the ocean's depths shipped water on its journey last week to San Francisco, soaking a number of instruments still inside.

"Assessing the results of Sealab 2, at least from our point of view," said Mr. Flechsig, "turns somewhat on the problem of what's fashionable in science today. What we were doing down there was mainly old-fashioned biology — like going on a nature walk. For that reason, it has been subject to technical criticism.

"But we were primarily interested in knowing what animals live at that depth and something about their habits. On this count, Sealab was both intriguing and useful. It also helped tell us what we can and can't do in designing a similar vehicle for Scripps."

Scripps participation in Sealab was something of an afterthought. The continuing Sealab program is a joint effort of the Office of Naval Research and the Special Projects Office of the Navy.

When the La Jolla location was selected, Scripps was offered five places on the diving team for Sealab 2. The two groups were, however, interested in quite different matters.

The Navy's primary interests were the physiological reactions of man to a prolonged undersea environment and the development of improved salvage and rescue techniques.

To this end, three new diving and decompression methods were tested, the science of underwater living was greatly improved through experimentation, and a porpoise was proved capable of running errands for undersea workers.

In addition, special tools and new means of salvaging sunken vessels were tried out, and much useful information gained on their effectiveness.

The Marine Defense Laboratory collected valuable data on the effects of water movements on mines and other means of undersea warfare.

Possibilities seen

Voluminous data was taken on the hour-by-hour physiological condition of the men who lived beneath the water.

And, of course, a great deal of knowledge was gathered whose cumulative effect may not be assessed for some years.

Capt. L. B. Nelson, second in command at Sealab 2, said that these experiments "will give man the abilities to develop new concepts that have not been and cannot be developed above the surface of the watery realm. . . . We will develop new industries based upon the knowledge obtained from these explorations, and we will give mankind a technique for further expansion."

Mr. Flechsig, a pragmatist all the way, is dubious about these well-rounded phrases.

Scripps' interest in Sealab was divided between geology and biology. As such, it was probably closer to the more practical applications of oceanography than the rather specialized interests of the Navy.

The geological work was concerned with the movements of water and sediment in and out of canyons that frequent the floor of the ocean.

"These canyons act as a sump," explained Mr. Flechsig, "collecting sediment from rivers and shore lines all across the Western continent. By examining them, we can determine in some detail the water movements around the canyons and the direction and quantity of sediment deposited."

Practical application

This information has a valuable application in harbor development and the proper location of breakwaters. It can help determine the reasons for homes being periodically flooded in beach communities along the Pacific coast. The seasonal patterns of deposit and erosion of sand can even be partially charted.

"We like to know," says Mr. Flechsig, "how these canyons operate. By examining deposits, we can usually tell where they came from, depending on how unique they are. Sealab helped us do this."

Biologically, the Scripps researchers were simply interested in knowing everything they could discover about the day-by-day marine life 215 feet below the surface of the ocean.

"Because the interior of Sealab was lighted," says Mr. Flechsig, "it attracted animals to us so that what we saw through the window wasn't altogether natural. But it was extremely interesting and useful nevertheless."

Mr. Flechsig is less sanguine about some of the other possible long-range results of Sealab and other undersea exploration.

He says that farming in the ocean will never be done at any depth below 100 feet because of the lack of photosynthesis needed to raise crops.

He also added dryly that ocean farming above 100 feet will be practical only "if people can be persuaded to eat what we can raise there."

Mineral deposits

Mr. Flechsig suggested that the most important practical results of such deep-sea explorations may come in the discovery of mineral deposits.

"Deep diving is of practical value, really, in four ways: mining oil or hard minerals, salvage, rescue, and to broaden the knowledge of scientists who simply want to find out what is going on down there. It's always possible that it may turn up something else of practical importance, but I just don't see it now."

Did Sealab 2 produce any mineral knowledge?

"No. It would have been pure chance if it had. Sealab was put down at a random spot. The chances of finding oil or minerals was about the same as if you would start digging at a random spot on earth."

What about his stay under water? Was the experience all he had hoped it might be?

"We got less time in the water than we had expected," he said. "I'd hoped we might get in three dives a day. That's possible diving from the surface as long as you rest in between.

"But we had two big problems with Sealab. There was no place to rest with our diving equipment on and no place to store extra breathing equipment. So we had to peel off our suits when we came in and send up the diving equipment for servicing. So we could usually make only one dive a day."

Temperature was also a nagging problem. Because the diving suits were thinner due to compression, the divers got colder faster. Even so, they were gradually able to build up their time outside Sealab from 20 to about 45 minutes.

"We used the buddy system," says Mr. Flechsig, "and I'm sure it saved the lives of each one of us at least once. One small mistake with our equipment could have been fatal, but we always had someone else to check us and watch out for us."

Mr. Flechsig thinks that divers suffer a slight mental impairment in the depths of the ocean, a point on which most of the other participants in Sealab don't agree with him.

Tests of mental agility conducted during Sealab 2 do not support his theory. But Mr. Flechsig insists the tests weren't sophisticated enough to detect the degree of mental impairment which—he grants—is slight but still serious enough to increase the possibility of mistakes on the part of the diver.

Plans for Sealab 3

Sealab, the undersea craft itself, now is in San Francisco, awaiting the next phase of the Navy's underwater research program —which, in many ways, resembles our space program. Both are empirical in nature, with each succeeding experiment building on the knowledge gained from those that went before.

Sealab 3, scheduled for next year, will conduct similar experiments at twice the depth of Sealab 2. Eventually, according to Sealab's project chief, Capt. George F. Bond, the Navy hopes to have men living and working at a depth of 800 feet for long periods of time.

Although it will be some months before they are assimilated, the preliminary results of Sealab 2 indicate this is not only possible but feasible.

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Ocean Holds Vast Reserve Of Vital Mineral Deposits

THE SAN DIEGO UNION
Fri., Oct. 22, 1965 ④ A12
SAN DIEGO, CALIFORNIA

(One of a series)

By BRYANT EVANS
The San Diego Union's Science Writer

Whenever the question of undersea mining is raised someone is certain to mention manganese nodules. They are agglomerations of minerals which lie over unbelievably great areas of the ocean floor and promise a reserve of metals to fulfill the needs of the human race for millenia to come, if not, indeed forever.

REPORTED IN 1870s

By far the most active and optimistic prophet of recovery of the minerals is Dr. John L. Mero, now a consultant on ocean exploitation living in San Diego. His views are set forth in a recently published book, "The Mineral Resources of the Sea." Its chief emphasis is on the so far untapped resource of manganese nodules.

The nodules were first reported as a result of the expedition of the HMS Challenger back in the 1870s and have been extensively observed and sampled by many expeditions since then.

RATE FACTOR

Dr. H. W. Menard of the Scripps Institution of Oceanography has estimated that they are found on the surface of 20 per cent of the Pacific Ocean bottom. Mero estimates the total Pacific supply as 1.7 trillion tons. He quotes a Russian estimate as about a twentieth of this amount.

The nodules vary in their mineral content. Mero says that in one large representative area of the Pacific they average 33.3 per cent manganese, 17.7 per cent cobalt; 0.39 per cent nickel, 1.13 per cent copper and 0.18 per cent lead.

They have grown very slowly through long ages. Several different estimates have been made of how long it took. Dr. E. D. Goldberg, now provost of Revelle College of UCSD, estimated that they would grow only one millimeter in a thousand years.

Nevertheless, Mero finds, that based on their wide extent, their present rate of formation would be faster than any conceivable human exploitation of them. Such a sea mining industry would be working a supply that outstripped depletion.

Although the nodules have been sampled for many years by the use of dredges on oceanographic ships, there has been no attempt harvest them for industry.

Mero argues that the nodules could be mined and smelted at a profit. By using a deep-sea hydraulic dredge moving 1.22 million tons of material a year, he estimates the mining cost at $3.55 a ton and the processing cost at $25 a ton. But, he says, the value of the elements in the nodules will vary from $40 to $100 a ton.

Before this can be done, he concedes, there would have to be a sizable investment in ships, machines and engineering.

In addition to manganese, nickel, cobalt and copper, Mero believes that other materials could be recovered as by-products. These include molybdenum, lead, zinc, zirconium and possibly iron, titanium, magnesium and vandium.

How soon undersea mining is expanded to obtain metals from the ocean is a question under considerable debate by experts in the fields of mining and oceanography. In general Mero's position is considered extremely optimistic. Many feel, however, that sooner or later extensive sea mining is bound to come. The unanswered question is, "When?"

OCEANOLOGY

Up from Success

Two record-breaking adventures in underwater living came to successful conclusions last week. Off the coast of Southern California, the last crew of aquanauts surfaced from the U.S. Navy's Sealab II (TIME, Sept. 17), and its 45-day mission at a depth of 205 ft. was declared an "unqualified success." Off Cap Ferrat on the French Riviera, a yellow and black checkerboard-patterned underwater house bobbed its round dome out of the water to the tooting of yacht whistles and the obvious satisfaction of Captain Jacques-Yves Cousteau, the pioneering French underwater explorer who had commanded the three-week mission of Con Shelf III (for Continental Shelf) from a lighthouse on shore. Allowing himself a thoroughly Gallic "ooh la-la," Cousteau turned to his colleagues: "It was neat, wasn't it?"

After descending significantly farther than their Sealab colleagues—living at a depth of 330 ft. and working even deeper—the six oceanauts of Con Shelf III had to remain in their two-story sphere four days after surfacing while the pressure in the cabin was slowly lowered. It was clear that Cousteau had reason to be elated. Never before had men survived so long at such depths. Moreover, they showed no signs of weakness or sickness, and had managed to do their assigned jobs efficiently.

Most of the equipment actually exceeded expectations. Cousteau's prototype breathing apparatus, which recycles a helium-based artificial atmosphere supplied from the sphere, enabled divers to work outside the capsule without any time limit. Inside, a miniaturized mass spectrograph, especially adapted for the experiment, monitored composition of the atmosphere, transmitting the results both to the oceanauts and to the surface so that any dangerous variations would be immediately detected.

Con Shelf's most practical experiment turned out to be its most spectacular success. To check on man's ability to work underwater, divers went down more than 375 ft. to set up a 16-ft. "Christmas tree," a complex of valves and connecting pipes by which the output of an oil well is controlled. While French petroleum experts watched on closed-circuit TV, two divers manipulated their tools with little difficulty, proved that they could hook up and operate valves and clean tubes as well as anyone working on land. In one test, they accomplished in an hour a tough assignment that normally takes half a day to do on land. The French underwater house, says Cousteau, is now ready for commercial use in offshore oil operations.

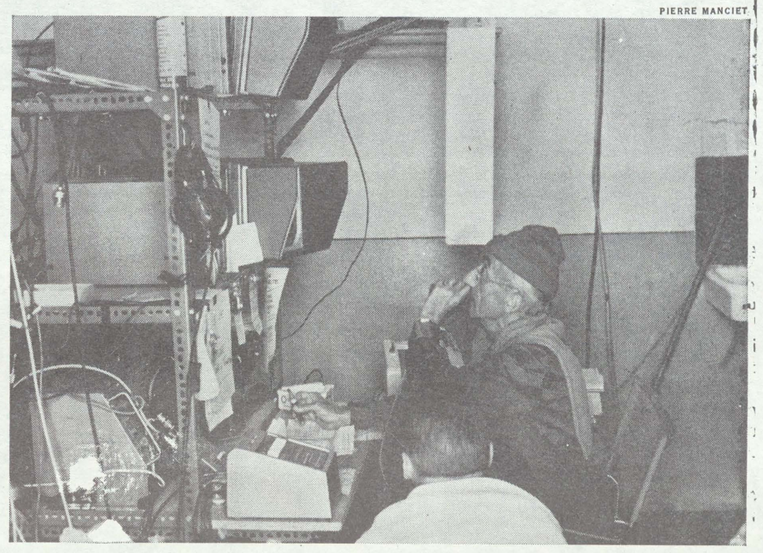
It will take months to evaluate many of the scientific experiments of both Con Shelf and Sealab. As in the past, the men of Con Shelf will compare notes with the men of Sealab, setting an example of friendly scientific cooperation between nations.

ASTRONOMY

Splendor in the Night

After sunset on Oct. 20, a strange and luminous object will rise above the western horizon and make a broad sweep across the darkening sky. Beginning as a fuzzy smear of light, it is expected to grow brighter and brighter until its 20 million-mile tail stretches

PIERRE MANCIET



COUSTEAU WATCHING CON SHELF III ON CLOSED-CIRCUIT TV
A Christmas tree below the sea.

TIME 10/22/65

Stars Of SeaLab Awarded Medals

By PAUL TSOMPANAS
Copley News Service

WASHINGTON — Navy aquanauts M. Scott Carpenter and Robert C. Sheats yesterday won the Legion of Merit for their leadership in the SeaLab II underwater living experiments off La Jolla.

Cmdr. Carpenter was unable to be on hand to accept his medal because fog grounded his flight here from Connecitcut. Carpenter, an astronaut-turned-aquanaut and Sheats, a master chief torpedoman, led the three teams of Navy divers in the 45-day undersea experiment.

NAVY OPTIMISTIC

Secretary of the Navy Paul Nitze presented Sheats with his medal at a Pentagon ceremony marked with Navy optimism that the next experiment, Sea Lab III, will be even more daring and fruitful.

Sheats, 30, headed the third team of aquanauts who lived and worked 205 feet under the sea for 15 days. He was the only one of the 28 divers to get the "bends" while surfacing but overcame the circulatory disorder by spending an extra 15 hours in a decompression chamber.

'FINEST DIVER'

In presenting the award, Nitze said that Sheats and Carpenter displayed "skill, courage and devotion which were in keeping with the highest traditions of the United States Navy.

Sheats, a native of El Paso, Tex., has spent most of his years in the Navy as a diver. In World War II, he was taken prisoner by the Japanese and used as a "slave" diver.

Capt. George F. Bond, a Navy doctor and SeaLab II project officer, said he believes that the short, muscular Sheats, a veteran of 20 years in the Navy, is "the finest diver in the world today."

Accepting his medal, Sheats said he considered SeaLab II "a team effort in which every man rates as much recognition as I have received today."

Bond said the Navy plans to continue its man-in-the-sea program until it reaches an operational capability, hopefully in 1971.

"We gathered more concrete data in the first 30 days of SeaLab II than we did in the previous seven years," he said. "We determined that man not only can survive underwater but can work efficiently undersea."

SAN DIEGO UN

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PROPELLER CLUB

Aquanaut Tells Life In SeaLab II

By TIM SHEPARD

It was impossible to whistle in SeaLab II, a sneeze sounded completely ridiculous and yod couldn't make yourself heard 57 feet away, an aquanaut related here last night.

Tom Clarke, a Scripps Institution of Oceanography graduate student and diver, related some of the peculiarities of living 205 feet below the surface to members of the San Diego Propeller Club. He was a member of the first team which occupied SeaLab II off the coast of La Jolla for two weeks.

HELIUM EFFECTS

"We all sounded like chipmunks," Clarke related. "The helium affects the vocal cords giving everyone a high, squeaky voice."

At a dinner meeting of the Propeller Club at the Point Loma Inn, Clarke said one of the effects of the helium atmosphere was that divers were unable to raise their voices in their sea bottom home.

"You couldn't make someone on the other end of the chamber — 57-feet away — turn around," he said. "Another effect was that it was impossible to whistle. We spent two weeks trying and didn't succeed until we were on our way back to the surface in 30 feet of water in the transfer chamber."

The aquanauts also experienced a loss of smell, a loss of taste, aches in their joints and ear difficulties.

PLUGGED EARS

"For the first several days, it seemed that our ears were plugged," he said. "The sensitivity to pressure change was very strong. We could feel every wave passing on the surface 200 feet above."

The density of the atmosphere was greater than they expected.

"We had trouble breathing because of the greater viscosity of the atmosphere," he said. "If you threw a paper wad at a wastebasket it moved in slow motion. Nobody could hit the basket."

SAN DIEGO UN

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AQUANAUT TO REVIEW SEALAB FOR VETERANS

Morgan Wells, a member of the third team of aquanauts in the Sealab II project, will be guest speaker at a meeting of the Cajon Valley Chapter of the Military Order of the World Wars.

Wells, who is a graduate student in marine biology at Scripps Institution of Oceanography, will discuss Sealab II at the 7:30 p.m. meeting Wednesday in the Singing Hills Golf and Country Club.

He was one of five Scripps personnel participating in Sealab II, where he researched physiological aspects of deep sea fish. As a member of the final team of divers, he lived for 15 days below the surface of the ocean off La Jolla.

SAN DIEGO EVENING TRIBUNE
OCT 2[illegible] 1965

Sealab Team Chief Gets Legion of Merit

COPLEY NEWS Service

WASHINGTON — Navy Secretary Paul Nitze presented the Legion of Merit to Robert C. Sheats, a master chief torpedoman, for his work as a team leader of the final 15-day stay in Sealab II in a ceremony in the Pentagon yesterday.

Cdr. Scott Carpenter, leader of the first two teams, was scheduled to receive the Legion of Merit at the same time, but was grounded by fog in Connecticut and couldn't make it.

In presenting the medal, Nitze praised the work of the Sealab II teams during their stay 205 feet deep off the Scripps Pier at La Jolla.

Sheats, 50, spent an extra 15 hours in the decompression chamber after the divers returned to the surface to overcome a case of bends, a painful circulatory condition.

Nitze referred to Sheats and Carpenter as men of "skill, courage and devotion which were in keeping with the highest traditions of the United States Navy."

Capt. George F. Bond, Navy physician who headed the Sealab II project, and himself a diver, said he believes Sheats is the "finest diver in the world today."

Sheats, a short, muscular native of El Paso, said he considered the Sealab II a team effort "in which every man rates as much recognition as I have received."

SAN DIEGO EVENING TRIBUNE
OCT 2[illegible] 1965

Way Of Tapping Sea's Oil Told

PARIS (Reuters)—Cmdr. Jacques-Ives Cousteau, French undersea explorer, said yesterday an experiment he made last month had demonstrated a new way of tapping the sea bed for oil.

He told reporters that divers could set up an oil rig deep underwater in conditions which had defeated other methods.

Cousteau was reporting on the three-week underwater sojourn of his 150-ton bathyscaph which went down 300 feet in the Mediterranean off Monaco at the end of September.

The bathyscaph carried a six-man team, who left their cabin for several hours a day. They managed to set up an oil rig on the sea bed at an atmospheric pressure 10 times that on the surface.

SAN DIEGO UN

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TIME 10/22/65

Sealab Success

The Navy's Sealab II, in which men lived under the ocean for 45 days, was a successful first step in eventual economic exploitation of the sea bottom, Secretary of the Navy Paul H. Nitze said. He spoke at ceremonies in which Robert C. Sheats, leader of one of three Sealab diving teams, received the Legion of Merit medal. Sheats is a master chief torpedoman's mate. Cmdr. Scott Carpenter, who led another team and spent a longer consecutive period under water than any other participant, was to have received the same medal, but fog heeld up his plane in Connecticut.

OCEANOGRAPHY UNIT OF NAVY SEEN HERE

Rep. Bob Wilson, R-San Diego, yesterday said the Navy has decided to open a branch of its Oceanographic Office in San Diego.

Wilson said he was informed of the decision by a reliable source in Washington, D.C., whom he was not at liberty to identify.

He said the location for the branch office had not been selected but the Navy Electronics Laboratory on Point Loma was under consideration.

"The official announcement will be made within a few days," Wilson said. "This new office will help focus Navy attention on oceanographic research in San Diego. I think it also constitutes a significant break for San Diego in the field."

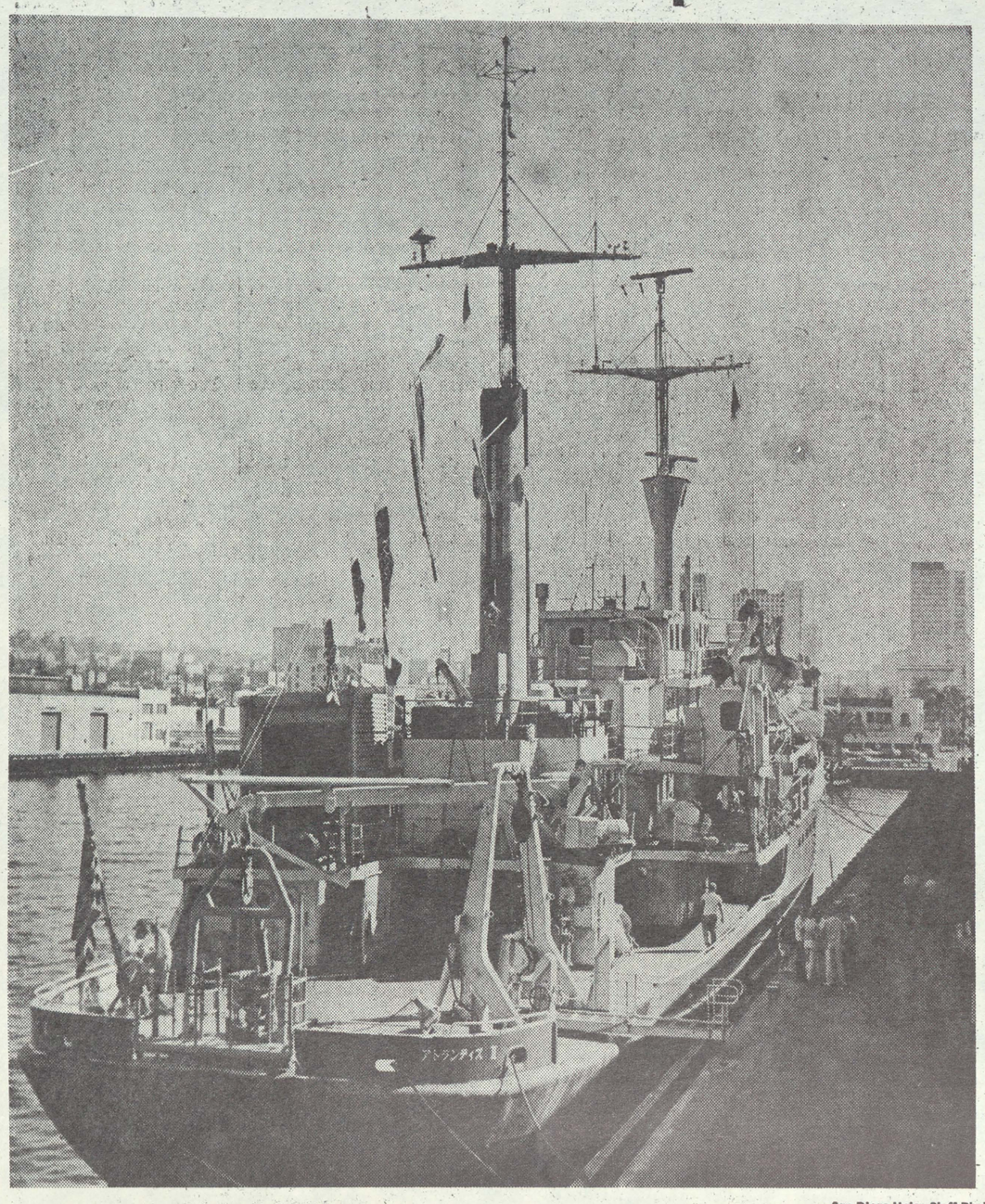
Wilson said he was told that the office would be staffed by at least 50 persons.

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Sea Research Ship Visits

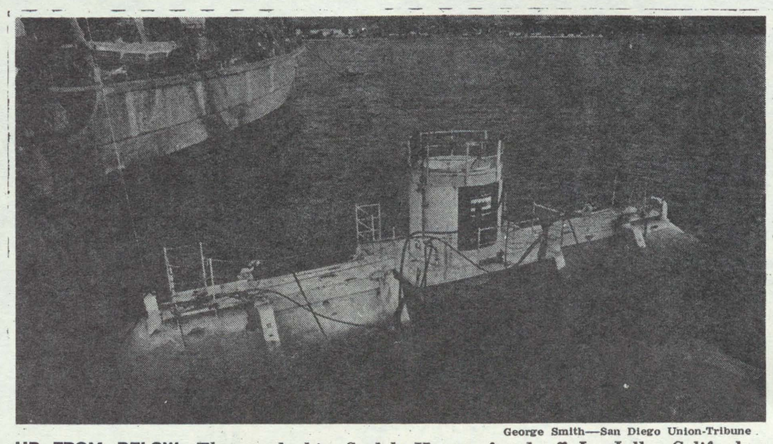


—San Diego Union Staff Photo

The oceanographic ship Atlantis II operated by Woods Hole Oceanographic Institute makes San Diego stop on a trip around the world. The 210-foot ship has four laboratories. (Story on Page a-22).

SAN DIEGO UN...

OCT 24 1965



George Smith—San Diego Union-Tribune

UP FROM BELOW: The good ship Sealab II resurfaced off La Jolla, Calif., last week and Dr. George Bond of the Navy pronounced its crew of aquanauts fit after a 45-day stay under the Pacific. The men reported skin sores (from the perpetual dampness in the lab) and aching muscles. Some found it difficult to think coherently, and some tensions developed as Navy men and scientific crew members got in each other's way. But the work the aquanauts did 205 feet down showed men can survive and perhaps thrive underwater. Next goal: 400 feet in Sealab III in 1966.

Newsweek, October 25, 1965

SAN DIEGO UNION

OCT 24 1965

SeaLab Scientist Will Address Military Order



Wells

Morgan Wells, a marine biologist who lived at the bottom of the sea for 15 days in the SeaLab II project, will speak at a dinner meeting next Wednesday of the Cajon Valley Chapter, Military Order of the World Wars.

The meeting will begin at 7:30 p.m. at the Singing Hills Golf and Country Club.

Wells, 25, is a graduate student at the Scripps Institution of Oceanography. He was a member of the third team of aquanauts who occupied SeaLab II in the final phase of the experiment in the ocean off La Jolla.

A native of Hopewell, Va., Wells is a graduate of Randolph-Macon College at Ashland, Va., and has done graduate work at the College of William and Mary, Williamsburg, Va., and at Scripps Institution.

SAN DIEGO UNION

OCT 24 1965

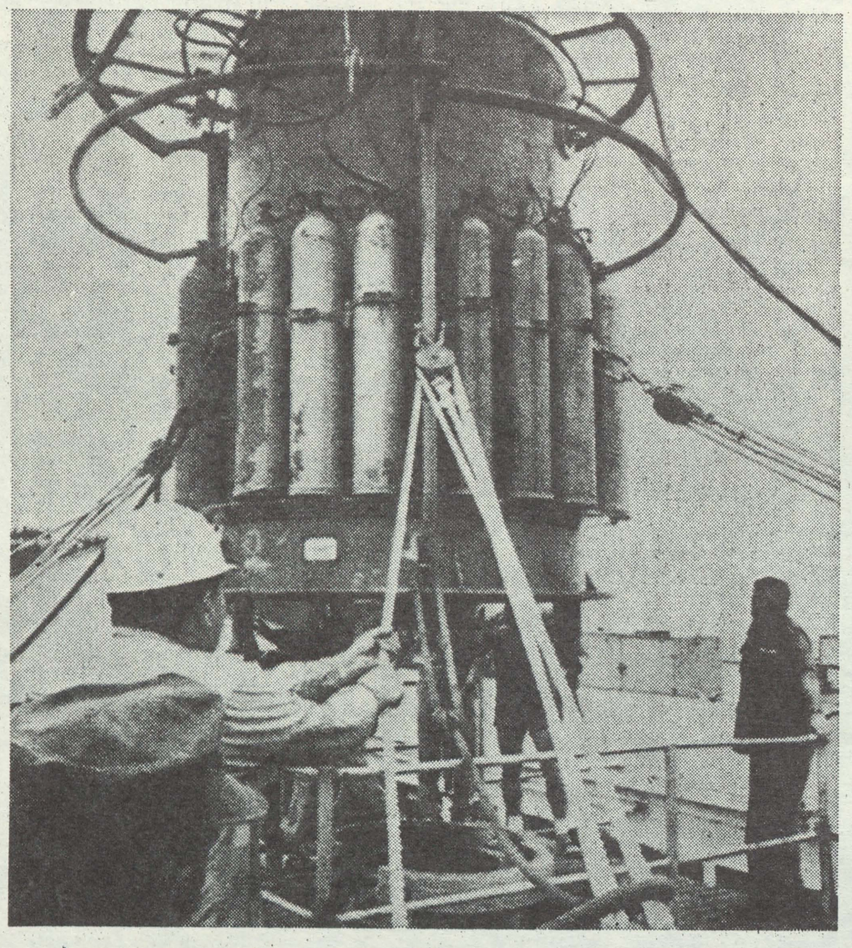
Carpenter Asks More Support For Aquanauts

LOS ANGELES (UPI) — Astronaut - Aquanaut Scott Carpenter, who spent 30 days submerged 205 feet below the ocean's surface in SeaLab II off La Jolla, said yesterday he thought such man-in-the-sea experiments should receive more support than they have so far.

"I am convinced that the effort is worth far more support," the Navy commander told a meeting of the governor's advisory commission on ocean resources. "In the space program, I have seen how very much can be accomplished when the nation gets behind a program."

Carpenter, the second U.S. astronaut to orbit the earth, said, "The SeaLab II mission proved that humans can live and perform well in the undersea environment."

He said that he thought diving called for more guts and motivation than any other pursuit, but that life in the hostile undersea environment produces a gentleness and concern by divers toward each other.



Aquanauts Decompress

Ten aquanauts, inside capsule, ascend from 205-foot-deep Sealab 2. Workers connect pressurized personnel transfer capsule to decompression chamber aboard support ship Berkone. They'll spend about 30 hours decompressing. The 45-day experiment off La Jolla ended today.

Experiment Ends Today

SAN DIEGO UNION

OCT 23 1965

Sealab Proves Long Work By Man on Sea Floor OK

Photo Page 3A

LA JOLLA (AP) — The Navy's Sealab 2 experiment officially ends today—proving, the Navy says, that man can work for long periods, at high pressures, on the bottom of the sea.

The project will end when 10 aquanauts wind up 31 hours in a decompression chamber, concluding the 45-day undersea experiment.

The men, members of the third and last team, transferred Sunday to a pressurized capsule which hoisted them to the Pacific Ocean surface.

The capsule was attached to the decompression chamber aboard the escort vessel Berkone and, gradually, the chamber's pressure was reduced to sea level.

At 5:30 p.m., the men are scheduled to emerge from the capsule. They are to hold a news conference at 9:30 a.m. tomorrow.

At 8:15 p.m. Thursday, four members of the Sealab teams will discuss the project at a public meeting in La Mesa Junior High School, 4200 Parks St., La Mesa, that city's Park and Recreation Dept. announced today. Skip Fenn of the department said that Bob Sheets, Group III team leader; Tuck Tuckfield and Wilbur Eaton of Team I and John Reeves of Team II will tell about the dive, answer questions and, if time permits, show uncut films and slides from Sealab. Admission will be free, Fenn said.

Three successive 10-man teams have spent 15 days below the surface, except for two men who were below 30 days.

Navy Cmdr. M. Scott Carpenter, a three-orbit astronaut, spent the first 30 days below. Lt. Robert Sonnenburg, 28, San Diego., a Medical Corps doctor, joined the first and third teams.

The last team of aquanauts spent their duty testing new salvage procedures which may eventually be applied in aircraft and ship disasters.

A wingless Navy Fit Cougar jet fighter was dropped to the ocean floor near Sealab 2. The aquanauts pumped into the fuselage a foam which hardened, became buoyant and raised the hulk to the surface.

Sealab 2, the 12-by-58-foot, cigar-shaped laboratory, will be towed Wednesday to Long Beach for examination, equipment removal and storage.

Said a Navy spokesman: "Sealab 2 has proved that man can successfully do work for extended periods of time at depths under high pressures at the bottom of the ocean. That is basically what we set out to prove."

SAN DIEGO UNION

OCT 23 1965

Oceanographic Ship To Dock Here Today

The Atlantic II, the largest in a fleet of five vessels operated by the Woods Hole Oceanographic Institution, will dock at the Broadway Pier at 11:30 a.m. today.

The ship is on the last leg of a 50,000 mile, round-the-world research cruise that included stops at Port Said, Aden, Bombay, Colombo, the Seychelles, Manila, Kobe and Tokyo.

Research included a two-week program with Japanese oceanographers surveying the lower reaches of the Kuroshio, a wester-bound current similar to the Atlantic's Gulf Stream, measurement of solar radiation and underwater sound velocities in the Indian Ocean.

The vessel left the East Coast in January on its year-long voyage. It will pass through the Panama Canal on its way home to Woods Hole, Mass. after leaving San Diego Monday night.

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American Engineer

OCEAN ENGINEERING: THE EXPLOITATION OF RESOURCES FOR HUMAN NEEDS

By SIGRID MARCZOCH,
Staff Writer, American Engineer

LAST month Astronaut Scott Carpenter turned into an aquanaut when he spent thirty days at the bottom of the Pacific 1000 yards off shore at La Jolla, California. He and nine other members of a Navy research team made a 57-foot long metal cylinder their home from which they emerged daily into the pitch darkness of the ocean floor to perform experiments, ranging from the setting up of a large underwater weather station to the collection of marine life.

By mid-September engineers and scientists of the Woods Hole Oceanographic Institution returned from an excursion during which they installed the first near-motionless reference point, a deep-sea structure at the depth of more than 2600 feet off the coast of South Carolina. The buoy offers the first means of stable support for scientific instruments.

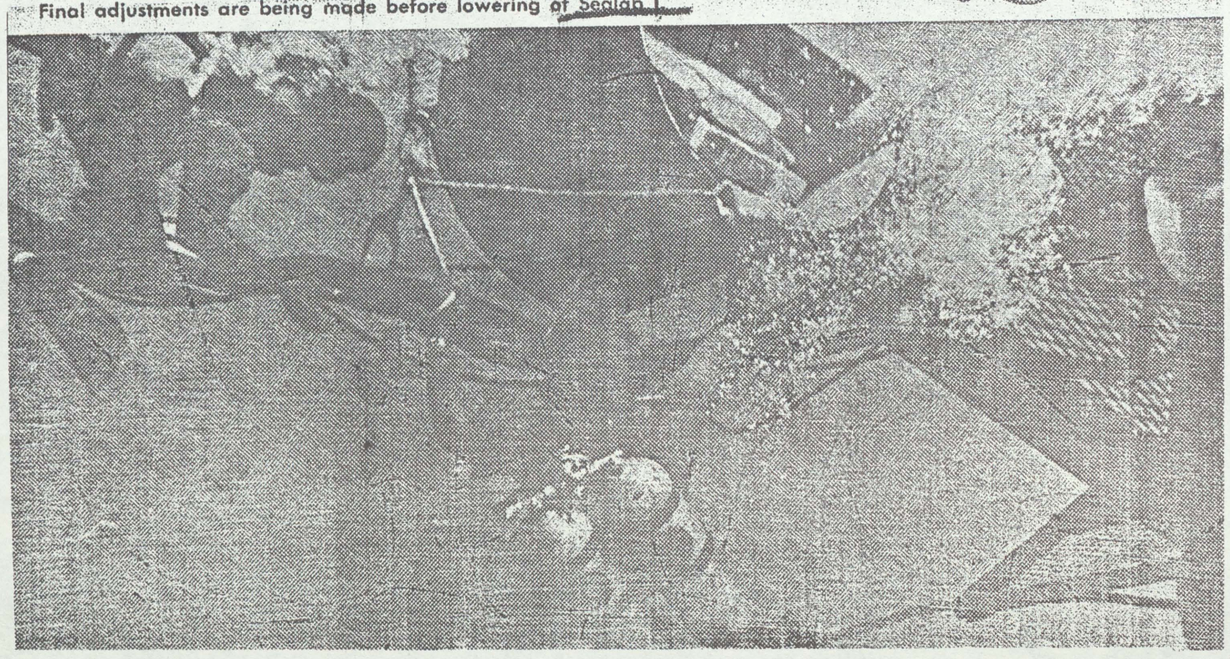
Later that month the Government gave the green light and the necessary $30 million for the construction of a seagoing drill platform for the Mohole project. The project involves sinking a metal drill pipe six miles through ocean and earth in the deepest penetration of the planet. Brown & Root, Inc., a Houston, Texas, engineering firm has been involved in design and construction phases of Mohole since 1962.

Right now the Sanitary Districts of Los Angeles County are completing the construction of a fourth major ocean outfall, ten feet in diameter and 12,000 feet long. Its peak flow capacity will be 360 million gallons per day. The new outfall not only promises a widely expanded capacity but also excellent water quality for a sanitation district that serves over 3.5 million people.

These are merely examples of the widespread effort to send man into the depths of the ocean. The deep seas are the last great frontier of our planet left for man to explore, and engineers will have a key role in discovering their secrets.

Approximately three-fourths of the earth is covered by water. In its vast darkness lie mountain ranges with peaks that rival Mount Everest in height and trenches

Final adjustments are being made before lowering of Sealab I.



that plunge miles into depths. There are rivers in the ocean twelve hundred times greater in size than the Mississippi. These vast regions of our planet hold potential sources of basic products: food, fuel, minerals, and energy, all vital to man's existence. Until recently these resources have been unattainable, for we lacked means of surviving in the hostile ocean environment.

Engineers have worked at sea and under the oceans for decades. Construction of ports, laying of transoccanic cables and the more recent building of bridge-tunnels have gone on for some time, but these were achieved without, or nearly without, the application of scientific findings. Only during the last decade have ocean sciences—broadly speaking oceanography—and engineering become related to each other. Oceanography is generally defined as the attempt to comprehend the world ocean, its boundaries, properties, and its processes. Ocean engineering, on the other hand, is defined as the application of technology for the exploitation of the seas. Oceanography is the collection of knowledge of the sea and ocean engineering is the effort of putting this knowledge to work. It is often very difficult to distinguish between the two, since both cut across several disciplines.

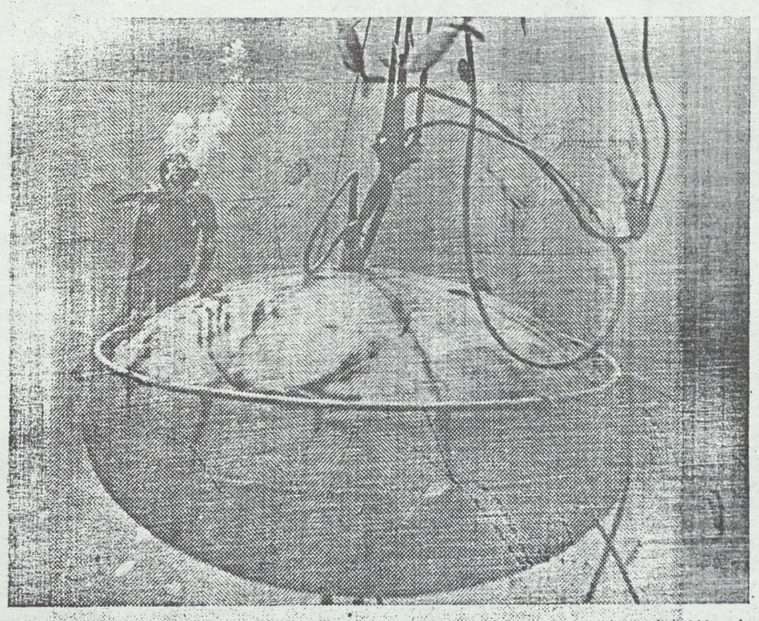
Government and industrial interest in the ocean are growing at a steady curve. Many trace this new interest mainly to the 1963 loss of the nuclear submarine U.S.S. Thresher and its crew. The inability to locate its wreckage and to rescue the 129 men aboard underscored the limited capabilities of deep-sea search and recovery systems and the state of ocean science and technology.

A few months after the Thresher catastrophe the Navy brought together two dozen top oceanographers, undersea engineers, and deep diving specialists to form the Deep Submergence Systems Review Group (DSSRG). This group under the direction of Admiral E. C. Stephan, P.E., made an intensive study of the needs in the field of manned submersibles and issued a classified report. One of the recommendations was that a submarine be built with a depth capability of 6000 feet. The design now contemplates a 25-ton craft, 42 to 44 feet long and about eight feet in diameter. It is designed to be carried "piggyback" on a nuclear combat submarine or to be transported by a C-141 jet cargo aircraft and to "mate" by a watertight fitting to a sunken submarine.

While the Navy has been studying submersibles for its purpose, private companies, including many that have made a name for themselves in aerospace, have gone ahead at full speed in efforts to build small submersibles with manipulators capable of research and engineering work at considerable depths. Most of these diving vehicles are different from any other submarine ever built and different from each other. Many employ new engineering techniques and all are heading deeper and deeper toward the undiscovered regions of the ocean.

Besides work on manned submersibles there also exists a great interest in robot subs linked to operators on the surface by control cables and closed-circuit television. They are outfitted with hooks, claws, or scoops and have been successfully used to maintain exploratory underwater oil wells and to recover torpedoes that have gone astray during target practice.

Once the means are established for man to live at certain depths for days, weeks, or months on end, engineers can go ahead and perform the many tasks that await them in the hydrosphere. Construction on the bottom of the deep ocean and on the continental shelves requires new techniques for designing, building, locating, and inspecting structures such as navigational beacons, communicaton facilities, research towers, repair and anchorage stations, instrument carriers, power stations, and anti-submarine warfare gear. For man to live below water he has to communicate with the surface as well as with other underwater locations. He has to develop dependable navigation and location systems. Man has known for many years about manganese and phosphorite nodules, diamonds, and iron in the seas and more recently marine geologists are sure that the sediments of the deep oceans contain potentially inexhaustible amounts of copper,



At 110-foot depth a diver inspects cables connecting the Woods Hole underwater sphere to telemetering buoy at surface.

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aluminum, calcium carbonate, and silica. Rapid advances in ocean engineering techniques might make the mining not only possible but also profitable. The ever restless waves are calculated to have about five times the energy of tidal waters and this energy could be converted into power when the need arises.

Pollution, Waste, and Water

The provision of fresh water for the country's need and its protection from pollution is another great problem for the engineer to solve. Nuclear wastes from power plants, laboratories, hospitals, and military installations only complicate the total problem. Modern detergents with indissoluble components have caused serious danger to marine life.

Fish have long been a source of food and other related products. It is already technically feasible, although costly at our present level of engineering, to control and improve marine plant life and growth and to develop improved fish varieties through selective breeding. The ocean's food resources have been estimated at twice the earth's total agricultural food production and it can be assumed that products from the seas will in the future fill the need for nourishment of still hungry nations and of the growing population everywhere. New search, detection, aggregation, and harvesting methods and advanced vessel design will help to make these resources available.

As the demand for protein rises to a point where it outstrips the capability for land to produce it in sufficient quantities, it is certain that the sea will also fill this demand.

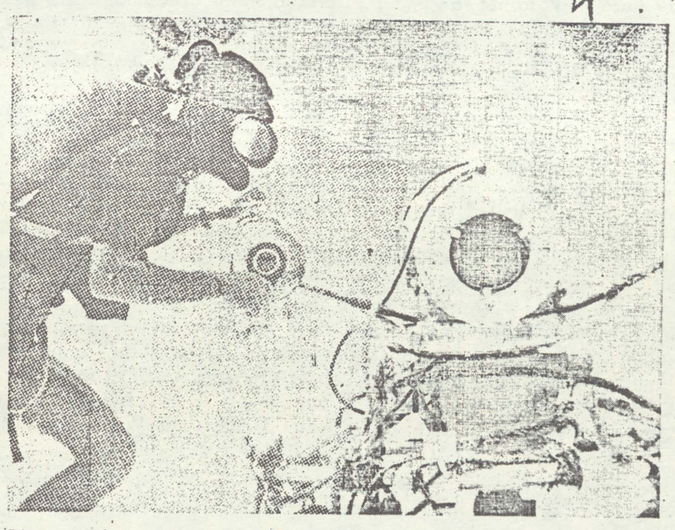
While there is still debate about the profitability of exploitation of many of the marine resources, the development of oil fields on the bottom of the ocean is well under way. Since the 1950's the industry has been moving seaward steadily, starting in the Gulf of Mexico and expanding along the California Coast and off the Northwest Coast of the United States and Alaska. The industry's rapid progress has been attributed largely to the amount of funds devoted to R&D, exploration, and new at-sea techniques. Engineering has helped considerably in exploration, drilling, and production.

Last but not least, the ocean attracts millions of people every year to its shores and the safety and protection of the coastal waters must be assured.



MANNED SUBMERSIBLES OF TODAY

NAME OF VEHICLE	OWNER/ OPERATOR	OPERATING DEPTH (FT.)	MANEUVERING CONTROL
ALUMINAUT	Reynolds International, Inc.	15,000	Vertical motor; rudder and control planes; variable H_2O trim tanks; puller-type propellers.
ALVIN I	Office of Naval Research/Woods Hole Oceonographic Institution	6,000	One-trainable stern and two rotatable reversible propellers, mercury trim system. Variable ballast system.
AMERICAN SUBMARINE MODEL 600	American Submarine Co.	600	Stick-type diving planes and rudder; mercury trim system; mineral oil trim tanks for vernier weight control.
BEAVER (UNDER CONSTRUCTION)	North American Aviation	1,000	Mercury trim system.
BENTHOS V	Lear Siegler, Inc.	600	Reversible propulsion motors trainable 180 degrees from horizontal. Variable H_2O trim system.
CUBMARINE PC3A	Perry Submarine Builders, Inc. Ocean Systems, Inc.	300	Rudder and bow planes; variable H_2O trim system.
CUBMARINE PC3B	Perry Submarine Builders, Inc. Ocean Systems, Inc.	600	Rudder and bow planes; variable H_2O trim system.
DEEP JEEP	Naval Ordnance Test Station, China Lake, Calif.	2,000	Rotatable motors aft.
DEEP STAR 4000 (UNDER CONSTRUCTION)	Westinghouse Electric Corp.	4,000	Ten small, floodable spheres outside hull. Mercury trim system. Reversible, variable speed motors. Two weights: 330-lb. for descent; 173-lb. for ascent.
DIVING SAUCER	Westinghouse Electric Corp.	1,000	Rotatable jets; 2-55 lb. weights for ascent and descent. Fine buoyancy control by internal ballast tank. Mercury trim system.
DOLPHIN AG (SS) 555 (UNDER CONSTRUCTION)	U. S. Navy	—	Water ballast, rudder, and diving planes; hovering control.
MORAY	U.S. Naval Ordnance Test Station, China Lake, Calif.	6,000	Tail-mounted control surfaces; mercury trim system; autopilot.
SPORTSMAN	U. S. Bureau of Sport Fisheries & Wildlife	300	Rudder and bow planes.
STAR I	Electric Boat Co. General Dynamics Corp.	200	Differential operation of rotatable motors with planes attached. Water ballast.
STAR II (ASHERAH)	Electric Boat Co. General Dynamics Corp.	600	Variable speed rotatable propulsion motors. Water ballast. Fixed stern stabilizers.
STAR III	Electric Boat Co. General Dynamics Corp.	2,000	Hovering and bow thrust motors. Servo-powered rudder. Mercury trim system. Variable ballast tanks.
SUBMARAY	Hydrotech Co., Long Beach, Calif.	300	Rudder and bow planes.
TRIESTE II	U. S. Navy/ COMSUBPAC	36,000	Two-shot ballast silos; float holds 47,000 gallons of gasoline. Drag rope. Gas maneuvering tank amidships.
TURTLE (IN PLANNING STAGE)	Lockheed Missiles & Space Co.	10,000	Nuclear propulsion proposed.
UNNAMED (IN PLANNING STAGE)	U. S. Navy	—	Nuclear-powered.



Diver works at University of Miami's sound and visual observation station located on the sea floor off Bimini in the Bahamas.

Oceanography in Government

Government activities in the fields of oceanography and ocean related business at present are parceled out among 22 different bureaus in nine departments or agencies and 37 committees of Congress, and the need for coordination of the various activities is recognized in the Senate as well as the House.

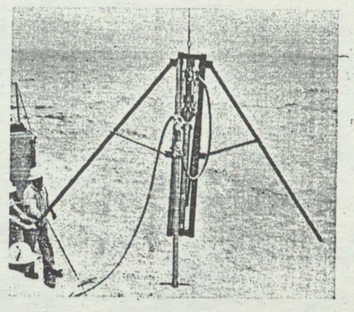
At present the Federal Council for Science and Technology through its Interagency Committee on Oceanography has the job of compiling findings and recommendations from the various agencies. The resulting National Oceanographic Program (NOP) comprises efforts amounting to about $140 million per year, of which one half comes from the Department of Defense and other major portions from the Departments of Commerce and Interior and the National Science Foundation. In addition to NOP, Navy programs for anti-submarine warfare and deep submergence system projects are running at a combined rate of about $500 million.

Interest in both the House and Senate has been running high on ocean related matters. Well over twenty bills on the subject have been discussed in the 89th Congress alone, with proposals ranging from creation of a cabinet-level Department of Marine and Atmospheric Affairs to the establishment of sea grant colleges which would do for the ocean what the land grant colleges have done for the farm.

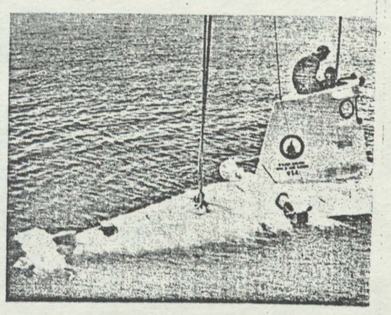
The Senate recently passed a bill calling for the creation of a National Council on Marine Resources and Engineering Development in the Executive Office of the President with the Vice President as chairman. The House, however, declared that it prefers a Commission on Marine Science, Engineering, and Resources rather than the National Council. The Commission would be composed of fifteen members drawn from industry, universities, laboratories, and other institutions as well as from Federal and state governments.

The important factor in the pending legislation is the fact that engineering is walking side by side with all the other branches of ocean sciences and is recognized as playing a major part in future developments. In stating its objectives, the above mentioned Senate bill lists the following eight points:

- The accelerated development of the physical, chemical, geological, and biological resources of marine environment.
- The expansion of human knowledge of the marine environment.
- The encouragement of private investment enterprise in exploration, technological development, marine commerce, and economic utilization of the resources of the marine environment.
- The preservation of the role of the United States as a leader in marine science and resource development.
- The advancement of education and training in marine science.
- The development and improvement of the capabilities, per-



Pneumatic core sampler, developed by the Naval Ordnance Laboratory, makes sediment tests.



Alvin, the world's first deep diving sub designed for research at depths below 6000 feet.

formance, use, and efficiency of vehicles, equipment, and instruments for use in exploration, research, surveys, the recovery of resources, and the transmission of energy in the marine environment.

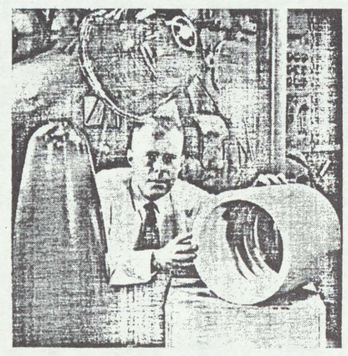
• The effective utilization of scientific and engineering resources of the nation, with close cooperation among all interested agencies, public and private, in order to avoid unnecessary duplication of effort, facilities, and equipment, or waste.

• The cooperation by the United States with other nations and groups of nations and international organizations in marine science activities when such cooperation is in the national interest.

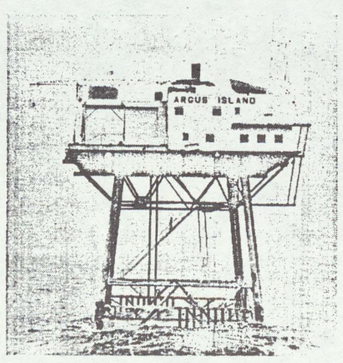
Requests for the recognition of ocean engineering have also been directed to the National Academy of Engineering. A committee of outstanding members from that body has been formed and will meet in New York City by the time this issue comes off the press. Under the chairmanship of Dr. Thomas C. Kavanagh, P.E., the group will examine "the present state of development and promise of new technologies looking toward manned exploration of the depths of the seas and effective utilization of the rich oceanic resources and food and minerals."

What the Experts Say

Enthusiasm, opposition, and imagination run equally high on the subject of ocean engineering. Said Dr. John Clark of Battelle Memorial Institute during the Ocean Science and Ocean Engineering Conference in Washington, D.C., last summer: "There is no technical reason why we couldn't build right now cities and towns on the continental shelf bottom as comfortable as any on land. Of course," he added, "the economics make such a project unfeasible right now." Woods Hole's Dr. Fye agrees on the technical possibility of such a project, but believes that habitation centers under water would be hardship stations where man would live for days or weeks at a time and then be rotated back to the surface and his home and family. Even more skeptical is John Mero, president of Ocean Resources, a consulting firm for minerals exploration in California. He sees no reason at all for man to live below the ocean. "So far we can do everything we want to do with machines from the surface and do it cheaper," he says. However, Dr. Clark thinks that oil companies will eventually need divers stationed underwater to drill, operate, and maintain their wells on the ocean bottom. "Indications are that oil prospects will rise as you approach the outer deepest edge of the continental shelf. The deeper the water the more expensive it is to get the oil. Here it is probably already cheaper to establish underwater stations than to build ever more elaborate surface islands as is now being done. . . . The notion of a permanent inhabited installation on the sea floor may appear quite fanciful and impractical," Dr. Clark concedes, but he explains that it would be considerably less fanciful than the effort of placing a man on the moon or of placing elaborately instrumented satellites into orbit.



Glassy materials get more and more attention for deep submergence since they do not fail under compressive loads. The picture shows parts of Benthos, Pennsylvania State University's research sub.



Argus Island is a tower installed as a relay point for hydrophones placed on the ocean floor. The deck house holds equipment, shops, maintenance facilities, storage, and living quarters for 16 men.

The embryonic stage in which ocean engineering still finds itself was outlined in a conversation with John I. Thompson, P.E., president of J. I. Thompson & Company in Washington, D.C. The development of ocean engineering is essential, he said, because some time in the future man will have to depend on the oceans to nourish a growing population. But he believes that the need is not yet urgent enough to stimulate wide interest. "Politically it will not be palatable for another 20 years to exploit the hydrosphere in the way we are attacking space today," Mr. Thompson said, but continued by stating that development of ocean engineering has to be guided nationally and with taxpayers' money.

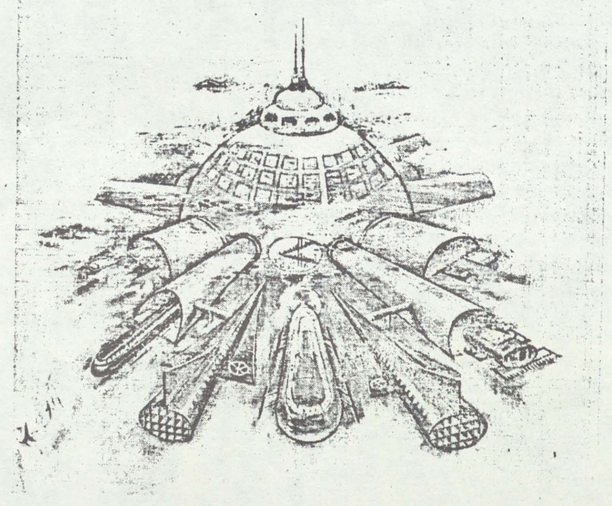
Federal expenditures for the development of the oceans are not sufficient, according to Dr. Edward Wenk, P.E., chief of the Science Policy Research Division of the Legislative Reference Service in the Library of Congress. Dr. Wenk was special assistant for oceanography in the Office of Science and Technology in the White House and one of the foremost experts on policy matters in the field. He points out that the adequacy of funding is being increasingly discussed, partly stimulated by comparison with funding from space exploration, partly by awareness that Federal budgets for oceanography have levelled off during the last few years. The 1966 appropriations, for example, are only four percent higher than the funds for 1965. Only a few individuals in the fishing industries have urged increased expenditures, but even those have remained quite modest, Dr. Wenk explains, and little encouragement has been heard from industrial leaders catering to the civilian sector of our economy.

Excluding the private exploration of oil, the nation's oceanographic program is 90 percent Federally funded. Fully half of this is given to R&D, performed mainly in private institutions such as universities and nonprofit laboratories.

Curricula in ocean engineering are showing up in a few college catalogs. The University of Miami and the University of Rhode Island, for example, are offering courses in the field at graduate level. Florida Atlantic University offers classes for undergraduate students also. Educators in the marine engineering fields feel that there is a definite need for students to be trained in these subjects to fill important positions in private industry, oceanographic centers, universities, and military and nonmilitary Government agencies.

Says Dean William C. Knopf, P.E., of the University of Miami: "There has been some progress in our state in the field of oceanographic engineering research and education, but still comparatively little. What work has been done has not been coordinated adequately among the different institutions or with industry, and has been poorly supported financially. State supported universities, for example, have not yet produced the first PhD in oceanography, although there is a critical shortage and need in this field."

What will the future bring? Oil seems to offer the most spectacular promise of all for the useful applications of ocean research. Experts see manned submarines that will tend the oil fields 2000 feet or so deep by 1990. They expect that crude oil will be stored in gigantic sea floor containers or in natural deep sea caverns.



"The Coming Atlantis" is for the International Nickel Company what "Sea City" is for Congressman Hosmer: a vision of the future that might become reality sooner than we think.

Private companies will go ahead and build submersibles that will go deeper and deeper and will eventually make use of atomic power for long durations under water and greater freedom in movement. Submarine transportation is another project that might well become reality. The possibility of travelling by passenger-cargo submarine at speeds of 100 to 200 knots, independent of storms, sea conditions, or other bad weather, is attractive indeed.

Others have visions of floating structures or even complete cities. Congressman Craig Hosmer of California saw the city of the future like this in a speech he presented a few months ago: "We will find entire cities anchored at sea, downtown areas, industrial complexes, apartment areas, airports, spaceports, suburban divisions, and shopping centers being added as the population grows.

"Sea City's wide smooth sea lanes are laced by sea gardens. A municipal hydrofoil mass transit system speeds workers and housewives to their destination places. The day of controlled fusion has come. The city extracts deuterium from the sea to use in its controlled thermonuclear reactors to produce abundant power. Their isotopic by-products are used to sterilize the city's sewage and keep the barnacles off its bottom. Desalting techniques provide all the fresh water. Effluence from the plants is combed and treated and from it are extracted the raw product chemicals, minerals, and metals required by Sea City's booming factories. Waste heat from its reactors is pumped deep into the ocean to boil up nutrient rich foods for feed at its cattle ranches and dairy farms. These nutrients also enrich the City's vast gardens which produce fresh vegetables and flowers.

"At the City's limit, educated dolphins herd schools of fish which are automatically harvested, prepared and whisked, ocean fresh, to Sea City's homes and restaurants.

"This is at a time in the future . . . when the population of the world has crowded beyond the limits of its continents," the Congressman explains.

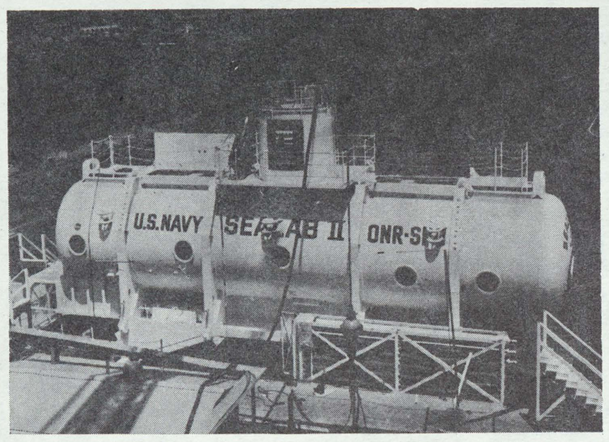
The world population is growing at a frightening speed and many peoples still go hungry today. There may come the day when man will have to turn to the ocean for his basic needs. Engineers are on their way in the exploitation to provide man with these products when the need arises.—**End.**



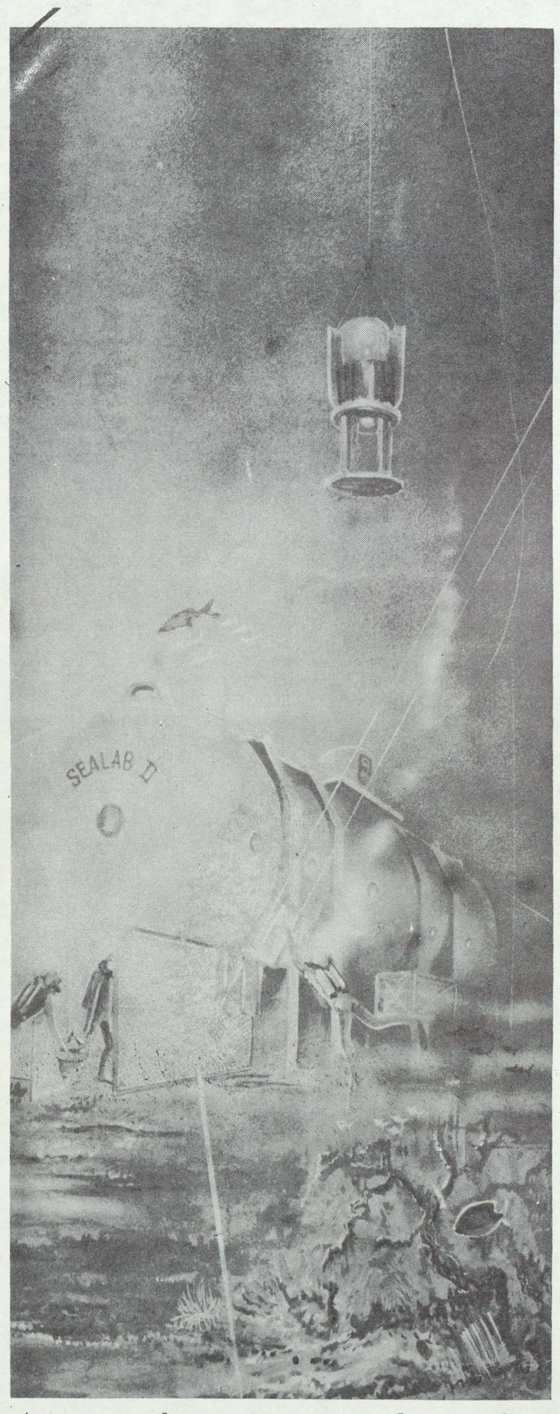
A Vitro Laboratories artist sees subs working on underwater cables.

OUR NAVY - 52
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Sealab II habitat on barge being outfitted at the Long Beach Naval Shipyard. Umbilical cord is seen at top of conning tower of Sealab.



Artist concept drawing of aquanauts working around Sealab habitat shark cage. Suspended above Sealab II is the personnel transfer chamber.

Sealab II

by Gerald Boling

While the civilian population of Southern Calif., went about its daily routine in late August, a group of Navymen and civilian scientists were involved in a project that was anything but routine.

This group was involved in the project of launching their newly built Navy craft. The unique vessel was not launched on the ocean's surface but 205 feet in the ocean's depths.

The craft is neither submarine nor surface craft. Nor does her crew wear the traditional blue or white Navy uniforms. In addition, its commanding officer is anything but typical Navy. He was a man who has lived for awhile among the stars and planets. He is a man from space.

The unusual crew was not content with merely sinking the craft. Two days later, on Aug. 28, its commander and blackclad crew of nine followed the vessel to the bottom. They have occupied the vehicle and the surrounding area for a 15 day period. A new nine man crew relieved them for another 15 days. Their commander would not give-up-the-ship and stayed to lead them.

However, at the end of 30 days, another crew of nine with a new commander, relieved them for still an additional 15 days. A total of 45 days of submerged operations were scheduled for personnel of this strange and unusual Navy craft.

No the people of which we speak are not mad scientists from the late, late show.

They are loyal Americans and exceptional Navymen. They'll prove the theory that man can live for extended periods of time at depths, in the ocean, of more than 200 feet.

Tomorrow, next month, next year, next decade—others will follow. They will prove, finally, that man can live and do useful work at perhaps as much as 1,000 feet below the ocean's surface in an artificial atmosphere. Further these future men will prove that man can accomplish meaningful work at this depth. Finally, they will unlock the ocean's secrets and untold wealth for future man.

Meanwhile, back to the present, the black-clad crew of which we speak are aquanauts. They are Navy divers, and civilian scientists involved in oceanography. They will spend a scheduled 45 days submerged in Sealab II.

Their commander-from-space is Navy Cdr. M. Scott Carpenter, astronaut turned aquanaut.

In the Sealab II project, Navy and civilian divers lived on the ocean bottom in 205 feet of water. The experiment was conducted about 3,000 yards off Scripps pier at La Jolla, Calif.

Navy Capt. Lewis B. Melson, military commander of Sealab II, explains the project and others like it.

"Scientists think they can send an unprotected diver 1,700 feet below the surface of the sea," he said.

"Beyond that depth, the pressure would cause the carbon dioxide in a diver's lungs to compress and he would freeze to death," Melson said.

The pressure might also compress and break the bones in a diver's ears, he continued.

The Navy will keep divers at deeper and deeper depths in future experimental tests such as Sealab II. This will be necessary to finally reach the 1,000 foot record.

"We will then give to the United States and to the world the knowhow it needs to take a look at the three-fourths of this planet which man has hardly seen," Melson said.

He was referring to the continental shelves, the unexplored areas off the coast of each continent. He acknowledged that the record depth reached by a diver is 1,000 feet. However, he said the diver remained on the bottom only 30 seconds.

"In Sealab II we are dealing with a different dimension. We want to put men down and keep them there for long periods," Melson said. "I predict that we will do that at 1,000 feet in the next five years."

Melson said that the exploding population of the world will need the area on the continental shelves for living space.

"I see no reason why cities can't expand into the ocean. It would give them a good place to put their large industrial plants. People could be trained to live and work there. Sealab II is one of the first steps in this direction," Melson said.

The Navy wants to know if men can function as a group under the sea.

To find out during the experiment, aquanauts have undergone extensive medical tests. In addition, various equipment was used to test their strength. Divers were tested in various ways before and after each swim into the ocean around them. The aquanauts were studied by TV cameras on the surface by medical personnel during the experiment.

Television cameras supplied direct broadcast of activities both in and outside the lab. In addition, a highly sophisticated and revolutionary communications system provided continual contact and data from the lab.

Aquanauts were also viewed by an underwater camera set up. The cameras, mounted on a steel framework tripod, could be turned in almost any direction. The purpose of the unit was to allow the men on the Berkone to watch the operations of divers within range of the unit and record their actions.

The underwater television camera, and the mechanism which turns cameras by remote control from the surface,

(*Continued on page 40*)

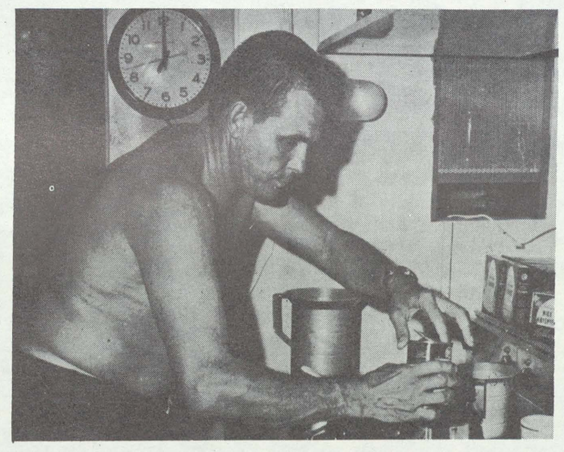
Aquanaut Kenneth Conda (left) gets a first introduction to Tuffy at Point Mugu, Calif. With Conda is Tuffy's trainer, Mr. Walley Ross.

Photo by the Author.



Aquanaut Cyril Tuckfield, ENC, has the cooking duties at the time this photo was made while submerged in Sealab. Aquanauts took turns with the cooking chores.

Photo by Jay D. Skidmore, PHC.



are of the same type as those used by the Navy in the hunt for the submarine Thrasher that was lost in the Atlantic.

Extensive schedules for the Sealab II subjects were laid out and they were allowed to plan projects for themselves. Then subjects were also given jobs which were not in the instructions.

The Navy wanted to challenge them to find out how well they took instructions from shore, and to find out how well they could think under the sea.

Sealab II Habitat

Sealab II is a gleaming, white-painted steel structure. It is explained by the Navy as a non-propelled sea-going craft, much like a submarine.

It was lowered into the ocean depths and emplaced on the ocean floor. It served as an underwater habitat. Aquanauts lived for an estimated 45 days in an artificial atmosphere.

Sealab II's living compartment had a pressurized atmosphere equal to sea water pressure. In effect, people lived in an "air" bubble contained beneath a dome.

The Sealab II habitat is a horizontal cylindrical steel structure 57 feet long by 12 feet in diameter. It resembles a car used by the railroad to haul petroleum products. The habitat was designed to enable the occupants to be self-supporting with respect to food, water and habitat breathing gas mixture.

The craft is designed along submarine principles. It has positive stability on the surface, while submerging, and while surfacing. It has variable water ballast tanks to attain positive or negative buoyancy.

The undersea lab is divided into three rooms, a scientific lab, a galley, and sleeping quarters.

The interior of the house is spacious, decorated with draperies, covers for couches and beds, and has wall-to-wall carpeting. There are fresh water showers, an electric stove, a refrigerator and other conveniences that kept the aquanauts comfortable on their long stay at the bottom of the sea.

The special atmosphere in Sealab was mostly helium. It contained some nitrogen, and only a tiny amount of oxygen by surface standards. The great pressure under which the aquanauts lived forced the oxygen into their tissues so it had the same effect as the larger amounts needed on the surface.

Capt. Lewis B. Melson, Sealab military commander and Capt. George Bond, medical director of the Man-in-the-Sea program and topside commander of the Sealab II project, explained that a special atmosphere containing only about 4 per cent oxygen was breathed by the aquanauts during their underwater stay.

Jay D. Skidmore, PHC, an aquanaut on the first team and also a member of the Pacific Fleet Mobile Photographic Unit, said the personnel had a little trouble at first understanding each other because the helium atmosphere distorted their voices.

"We had a lot of fun laughing at each other's speech," he said, "but after a while down there, we learned to talk so we could understand each other."

A helium unscrambler, an electronic device which restores the distorted voices nearly to normal, was used during the Sealab II experiment.

Electrical power and fresh water was provided by lines to shore, backed up with alternate sources from the surface support craft SS Berkone.

Small items, like various foods and mail, was delivered to bottom personnel by an air-tight "trolley" which acted as a surface to Sealab dumb waiter.

Standard wet suits, augmented by experimental suits, were provided to divers for their excursions into the ocean. Two principal types of breathing equipment were used; the mixed gas SCUBA—Mark VI, and the "Hookah," a closed circuit pumping system—extending from the habitat.

The Beginning

However, an idea or theory, years of research and testing were necessary before Sealab II was possible.

The longest, deepest dive that can be made now, under U.S. naval operational conditions, is 380 feet. And then only for brief minutes. This dive requires several hours for decompression. As an illustration of what such a ratio of working time to decompression time means, we cite the rescue and salvage operations for the submarine Squalus.

This submarine sank in 240 feet of water in 1939. The salvage effort required a total of 640 dives. Each dive provided an average working time, on the bottom, of 10 minutes.

Capt. George Bond, a Navy surgeon, proposed a new approach to salvage and rescue operations in 1957. His suggestion was the "saturation" dive.

This concept is based on the fact that during prolonged exposure at a specific fixed depth, the diver's tissues became completely saturated. This saturation with breathing gases is believed to be complete within about 24 hours.

Consequently after saturation occurs, the required decompression time remains fixed. The time is the same regardless of the time individuals stay down. So if divers' can be maintained in undersea quarters, in which the inside pressure equals the surrounding area, they can have free access to the outside water.

Only one decompression time is required and only on the return to the surface. This provision makes the ratio of working time, on the bottom to decompression time, far more favorable.

Sealab II Preparation

Success of past experiments, plus the urgent need for submarine salvage and rescue facilities operated by divers at great depths, gave impetus to the Navy's full-scale, long-range Man-in-the-Sea program. The immediate goal is to achieve a capability for men to perform salvage and rescue operations at a depth of 600 feet. It is believed that a depth of 1,000 feet, and perhaps even more, can be reached eventually. A major step toward that goal is Sealab II.

It is obvious that a number of physiological problems will require considerable research effort before the ultimate Man-in-the-Sea objectives can be reached.

The major areas of research are decompression sickness, oxygen toxicity, inert gas narcosis, carbon-dioxide retention, body heat loss and underwater acoustic biotelometry for transmitting physiological data from swimmers to the surface. Basic research on these problems is being conducted in laboratories outside of the Navy. Development is also underway in Navy labs.

It should be pointed out that this research is aimed primarily at saturation dives made in the Man-in-the-Sea program. But, at the same time, the work will improve the Navy's capabilities for making deeper, short-duration dives.

There always will be a number of underwater tasks that can be performed more efficiently by means of short, exploratory or working dives than by saturation dives, which require extensive preparation.

So before Sealab II could begin, qualified personnel had to be selected and trained.

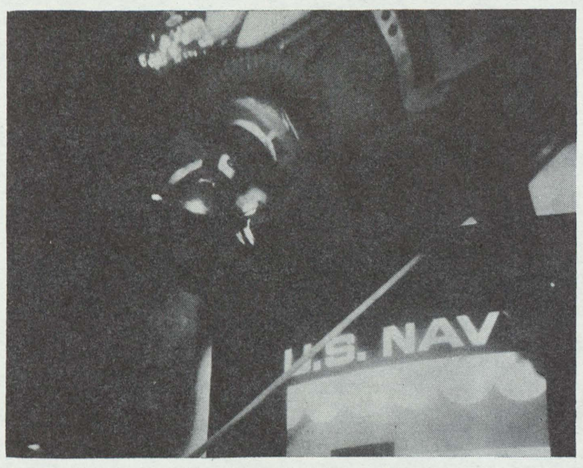
The three teams that occupied Sealab II consisted of mixed Navy and civilian personnel. The indivdiual members were not selected at random. They were composed of highly qualified professional Navy divers, specially selected officers, and civilian scientists.

Selections were made on the basis of undersea tasks to be accomplished. The man's ability to contribute, and his physiological and psychological base lines were also important considerations.

Scientific tasks required personnel experienced in undersea salvage tasks, marine and physical oceanographers, as well as biologists, geologists, and mechanical and electrical engineers.

All selected personnel completed three months of training in helium-oxygen breathing, wearing, and adjusting the Mark VI and "Hookah" equipment earlier this year. In addition, they participated in other tests that would be required to properly document the information to be collected on the swimmer abilities during the progress of the Sealab II operation.

This training, to prepare them for their Sealab II tour underwater, began at Panama City, Fla.



An aquanaut swims down near the Sealab's conning tower 205 feet beneath the Ocean's surface.

Photo by Jay D. Skidmore, PHC

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Other training included an hour's physical exercise program, beginning at 7 a.m. daily, took care of the physical fitness of individuals. In addition, the aquanauts were checked out in underwater navigation, communications, propulsion, and the operation of diving apparatus.

Because of his early training each individual knew the location of every valve, switch, fitting and was generally prepared for any emergency in his underwater home as a result of his training.

Training is over and the Sealab II underwater home is built and made ready.

Sealab II Construction and Outfitting

The laboratory was built in San Francisco, Calif., and transported to Long Beach, Calif. There the craft was outfitted for her trip below the sea.

The vessel has many of the characteristics of a submarine. It was especially designed from the bottom up for this experiment.

Sealab II was christened at the Long Beach Navy Shipyard July 23. The 57-foot long, 200-ton craft was christened by Miss Heidi Nitze, daughter of SECNAV.

At the ceremony the principal speaker, Assistant SECNAV, Robert W. Morse said: "Evenrtually the Navy wants to find the means to transfer men from one submarine to another, how to do search and rescue work down to 20,000 feet, and how to keep people on the ocean floor at depths of 600 feet for sustained periods.

"Sealab is thus at the threshold of an expanded military capability, useful on every continental shelf or reef where a U. S. military presence is required.

"Sealab presages a day when an excursion to an advanced sea habitation, 600 to 1,000 feet below the surface, will be an experience as commonplace as jet air travel is today," Morse said.

Morse compared the U. S. lands on the continental shelf with the Louisiana Purchase. He said this country is no better prepared today to explore and exploit these lands than it was to explore the Louisiana Purchase when it was made. However, he indicated such programs as Sealab II will make this possible.

Back to the final Sealab II preparations at Long Beach. Hectic hours and last minute installations and testing found the undersea lab on her way to La Jolla, Calif., in late August. She was towed behind a Navy ship and tied up to the mother ship SS **Berkone** when she arrived at her destination.

Final checks and preparations were made at La Jolla. Finally, Cdr. Carpenter, assisted by fellow Navymen, assured himself all was in readiness and he sealed all hatches to the lab. During the afternoon of Aug. 26 Sealab II was lowered to the ocean floor, 205 feet below the surface.

A close check was maintained on the bottom craft until noon Aug. 28. The aquanauts got the word to occupy their undersea quarters.

Team captain Carpenter, and Wilbur Eaton, GMG1(DV) were the first to leave the diving platform of the mother ship. The two aquanauts in black, wet diving suits opened the hatch to Sealab II at 1:53 p.m., Aug. 28. So started the most elaborate effort to test man's ability to work under the sea to date.

Eight other divers followed in short order. By 6 p.m., all 10 were aboard. Just eight minutes, however, after the first two divers disappeared off the fantail of the Berkone they were observed on the television camera, connected to Sealab, by personnel aboard the staging vessel.

Jay D. Skidmore, PHC(DV), explained what it was like under the sea during the experiment.

Skidmore said the aquanauts lived in a beautiful blue-green light which filtered down from the surface of the sea above them.

"I think the first dive I made outside of Sealab was my biggest thrill," he said. "All of us are particularly interested in the sea, and the oceanographers found things they did not know existed."

Skidmore said it was particularly interesting at night when the fish came up and peered through the window at the men inside Sealab. Skidmore's primary duty in Sealab II, with the first team, was to give photographic coverage underwater.

This started the first 15 days segment of Sealab II experiment. Inside the Sealab was an artificial atmosphere that kept personnel alive. It's impossible to light a cigarette inside Sealab, submerged, because the special atmosphere the aquanauts breathed won't support flames. You can't even strike a match, one aquanaut said.

Divers were required to undergo many complicated tests while swimming freely outside their steel underwater home. They measured their strength, the speed with which they could assemble simple mechanical structures, the quality of their sense of touch, their ability to understand words spoken underwater, and their abilities to work as a team in mechanical construction.

The divers were allowed to wander a considerable distance from the Sealab on the bottom. A rope fence of sorts was strung around the underwater area to prevent personnel getting lost in the dark water.



"SHOULDN'T WE TAKE A REST NOW, BILL?"

The Navy turned on photo flood lights, at the Sealab depth, for visibility checks of personnel. Recordings were made to show how far an aquanaut could see.

Other checks the divers completed while submerged were vision, distinguishing colors, hearing and determining sound direction. These tests were administered to personnel swimming freely outside Sealab. Inside they solved problems in arithmetic to determine if their watery world affects their mental efficiency.

During the experiment four of the first team aquanauts were wired for sound. All four had had electrode leads attached to their scalps before leaving the surface. By this method medical personnel were able to record their brain waves.

Working in the area around their undersea quarters, the aquanauts carried out an extensive program of salvage techniques, oceanographic and marine biological research, and completed a series of physiological performance tests.

The undersea experiment was conducted by the Office of Naval Research (ONR) in collaboration with the Navy's Special Projects Office (SPO).

The cold water, as well as the increased pressure, about six times that on the surface, and saturated diving conditions limited the effectiveness with which man could perform various jobs in the undersea environment. Special human engineering tests were devised for the aquanauts to test their capabilities under such conditions.

Physiological and diving safety for all subjects was paramount during the operation. A Naval physiological team from the Submarine Medical Center with assistance from the Physiological Research Laboratory, Scripps Institution of Oceanography, monitored the aquanaut team personnel constantly. Highly trained surface based swimmers were available for special purpose dives to the Sealab.

A porpoise named "Tuffy" also got in on the Sealab II experiment. One of his exercises consisted of carrying a line from the diver to another in the "lab" area. This ability, was considered handy if a man had been lost in the dark waters around the Sealab. Another test was to carry messages, by fish express, to Sealab 205 feet below.

Two men on the second team were given special training in handling Tuffy. They were John F. Reaves, PH1(DV), of the Pacific Fleet Mobile Photographic Unit and Kenneth J. Conda, TM1(DV), Submarine Medical Center.

The purpose of the experiments involving Tuffy was to see if porpoises could be trained to help divers at the bottom of the sea.

A team of psychologists of BUMED and the Office of Naval Research personnel conducted several tests on, and made extensive observations of, the teams before and during the experiments. This provided a great deal of information concerning the evaluation of human performance under test conditions.

In addition to the basic environmental tests, many new innovations in underwrater living and operations were tested during the project. A unique system for transferring personnel from great depths was introduced.

One of the salvage jobs aquanauts performed concerned the raising of a sunken plane. Divers from Sealab used a gun which combines a liquid and a gas to produce foam. This mixture was injected into the plane's fuselage and wings to make it buoyant. In this way the plane was lifted to the surface.

Another salvage test was to put a patch on a simulated submarine hull with an underwater stud driver. The plate was insulated with a rubber gasket. After the test the hull section was raised and tested at the Long Beach Naval Shipyard.

A top oceanography project was the installation of an underwater weather station. The station measured temperature, the speed and direction of the current and the change in pressure on the bottom and above the bottom.

The weather station was said to have been as tall as a six or seven-story building, 60 feet above the ocean floor rising from a concrete slab. The station was called the most important piece of scientific gear in the experiment.

The underwater weather station was used to measure and record weather details at two depths: 145 feet and 205 feet below the ocean's surface. Concealed instruments gave definitive information on the speed and direction of water currents, water pressure and temperature.

In addition to the weather station, the aquanauts installed other instruments to study the ocean floor, water and plant life.

Sealab personnel said they had more to look at, while submerged, than the eye could see. Oceanographic members were especially excited over the marine life. They said the Sealab portholes were crowded with fish. "We watched them and they watched us," a diver said.

The aquanauts set up a visibility-measuring range of lights and objects at measured distances from Sealab.

They set up a grid of stakes driven into the bottom to measure changes in the shape of the bottom induced by currents. They placed quantities of fluorescent sand for studying how currents move sand around.

Several projects to study fish and other sea animals were accomplished. Aquanauts assembled cages for the fish. They were prefabricated sections which the divers bolted together. The fish were experimental subjects.

During their submerged tour the divers were able to talk to their families by telephone. They were able to watch their favorite TV entertainment, also. There was a TV set inside Sealab II.

On Sunday's Capt. Bond led the aquanauts in religious services. This was accomplished by Bond from the control room aboard the mother ship Berkone.

There's the lighter side to any of the serious events in history and so it is with Sealab II. One of the aquanauts, LT Robert E. Sonnenburg, a Navy doctor of the first and third Sealab teams, forgot to sign enough blank checks so his wife could support the household during his stay in Sealab II.

Anyway Mrs. Patricia Ann Sonnenburg was delighted when the Navy came to her rescue and sent, the checks for signing, 205 feet to the aquanaut habitat. The checks were sent in an air-tight device and bounced back to the surface in short order signed, of course.

According to Dr. Bond the aquanauts sent back more data, in the first three or four days, about the sea and about their own reactions to their situation, than was recorded in the whole Sealab I experiment.

Bond explained the aquanauts during the Sealab II experiment as having high morale. He said they had no problems sleeping and eating well. They were happy and in good health.

Inner Space Compared With Outer Space

Experts say men in space and in the ocean's depth are likely to be equally lonesome.

The physical conditions of space and depth really offer the closest parallel or so say the experts. For instance, it is just as difficult to tighten a bolt under the water as it would be in space. In neither environment do you have any leverage. So you have a tough time with the job according to Navy officials.

Asked why an astronaut was chosen to become one of the aquanauts, Carpenter explained:

"There are many similarities between investigations of space and of ocean depths. Much scientific work needs to be done to determine man's capabilities to live and work in both hostile environments."

The inner space program was explained as similar to the Gemini flights in that it is designed to explore the ability of men, living in a completely alien environment, to accomplish useful work.

Carpenter was one of two men to spend 30 days in Sealab. LT Robert E. Sonnenburg, a Navy doctor, served with the first and third teams while Carpenter headed teams one and two.

Before diving to the Sealab Carpenter gave his version of contrasts between space and underwater.

He said the stress in space comes from weightlessness and in Sealab from the high atmospheric pressure under which men live.

It is possible that the high pressure may do more ultimate physical harm to a man than weightlessness, he said.

Carpenter made a bit of history shortly after his dive to Sealab II on the ocean bottom. The event concerned his conversation with Gordon Cooper, a fellow astronaut, orbiting the earth in Gemini 5 capsule, at the time.

The brief phone conversation was at 11:26 p.m., Aug. 29.

Why Sealab Experiments?

"We want to cut the umbilical cable that ties us to the land and to the surface," Capt. Melson said. "We want the ability to work for prolonged periods on the sea bottom with no dependence on the surface.

"We want to salvage a submarine or a downed aircraft and we want to explore the continental shelf.

"We want to be able to send a pipefitter into inner space if one is needed, or a geologist if one is needed. The Navy wants to be able to put Navymen under the sea for their time-tested practical experience, and scientists for their knowledge.

"The Man-in-the-Sea program is going to give us that capability," Melson said.

According to Dr. Bond, known as Poppa Topside at the Sealab II site, "The Navy will have 100 men living and working full-time under the sea within five years.

"The men will operate on the continental shelf in depths greater than 200 feet. This is one of the goals of the Navy's Man-in-the-Sea program," Bond said.

Bond said the areas of the continetal shelf produces enough protein in fish life, found there, to furnish 85 per cent of the world's requirements, and has at least as much petroleum and mineral products as dry land.

The shelves of the world form a land mass as big as the continent of Africa. The Man-in-the-Sea program is designed to allow men to operate anywhere on these shelves, according to Bond.

Capt. Melson said, "Sealab II personnel were able to work more than 2 hours a day. A regular diver can stay down there only brief minutes. And he can make only one dive a day. It would take 15 divers to do an hour's work.

"And then there is the danger. We think it is worse than outer space. The danger is in coming up, not going down and the last 10 feet is the worst.

"When the book says a diver must make his last decompression stop at 10 feet, it means 10 feet, not 9½ or 11. But when the waves start rolling in, how do you determine where 10 feet is?

"An aquanaut, on the other hand, just goes back into his quarters and stays on the bottom under pressure. He does all his decompressing in one session and it's a lot safer," Melson said.

The experts explained why a mixed gas breathing mixture was used instead of the conventional air method, in the Sealab experiment.

They said with the aid of air-diving equipment—helmeted deep-sea diving suits or SCUBA equipment—divers can work for relatively short periods at depths up to 200 feet without suffering ill effects from breathing compressed gas.

And, although divers have attained depths of 250 to 300 feet for short periods, the effects of compressed air at such depths produce physiological reactions which seriously limit their ability to function normally.

They'll tell you man cannot breathe air for any length of time even at moderate depths of 150 feet. Air is composed of nitrogen, oxygen, orgon and other gases.

But nitrogen, under pressure, has a strange narcotic effect sometimes called "rapture of the deep." It can cause halucinations and produce an effect similar to drunkenness.

Divers say that each 50 feet of depth while breathing air is equivalent to drinking one dry martini on an empty stomach.

Largely as a result of research, in this area, the mixed gas breathing mixture used by Sealab aquanauts was reveloped. Dr. Bond's early experiments indicated the new mixture would solve other problems as well.

By using the mixed helium mixture for the artificial atmosphere, and by keeping the men on the bottom instead of bringing them to the surface after dives, the men will avoid oxygen and nitrogen poisoning. With conventional air they would likely contact the sickness at great depths. In addition, only one decompression time is necessary.

However, the helium atmosphere makes the human voice sound "like a frightened chipmonk." An electronic unscrambler which changes the voice to an almost normal tone was developed to offset the problem.

Loss of body heat through the artificial atmosphere was also a problem for the Sealab II aquanauts. However, to offset this problem their undersea house was heated and the divers used heavy suits while operating outside the undersea house. In addition, the aquanauts tested experimental suits during their 45 days submerged.

The deeper man goes and the longer he stays down, up to a certain point, the more of the gas he breathes in dissolved in his body tissues. After a certain number of hours, said to be about 24-hours, the body tissues are completely saturated.

"A man in this condition is sort of like a capped bottle of beer that has been given a couple of shakes," an aquanaut explained.

Bringing a man up from a great depth is similar to opening a bottle of beer gradually and letting the gas escape slowly.

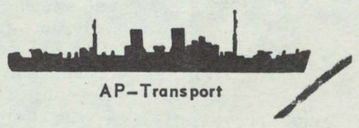
If a man is brought up too quickly, bubbles form in his tissues and he can get a case of the "bends," which may be extremely painful or even fatal. This creates the need for gradual decompression of a diver's body.

After the Sealab II diving teams completed their 15 days, each team, submerged in Sealab II they were brought to the surface immediately. This was accomplished by use of a personnel transfer chamber.

Personnel entered the chamber on the bottom near Sealab. The inside pressure was the same as that to which the aquanauts had been subjected for 15 days.

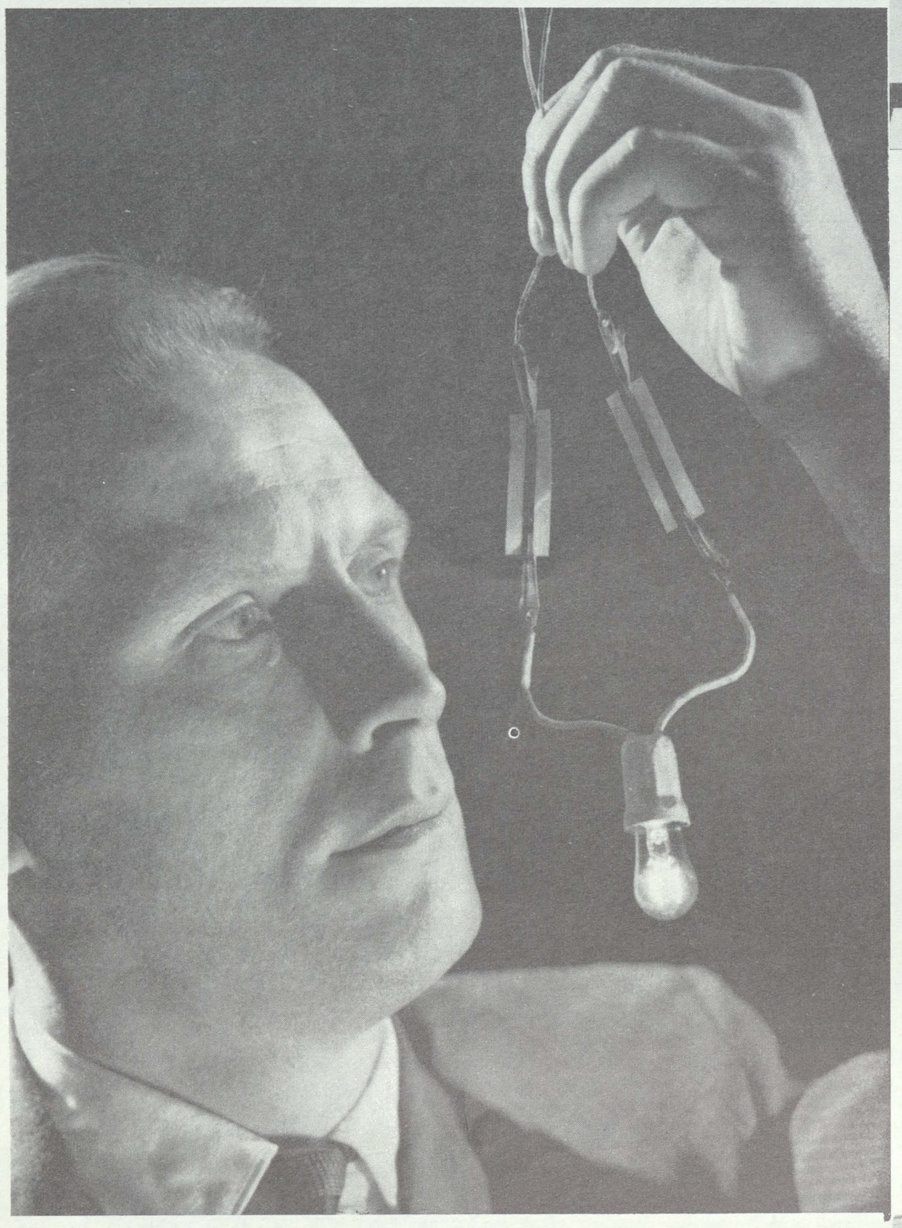
The transfer chamber was then raised immediately to the surface aboard the mother ship SS Berkone. It was mated to the deck decompression chamber. The aquanauts entered the decompression chamber. They stayed there for an estimated 36 hours, needed for decompression.

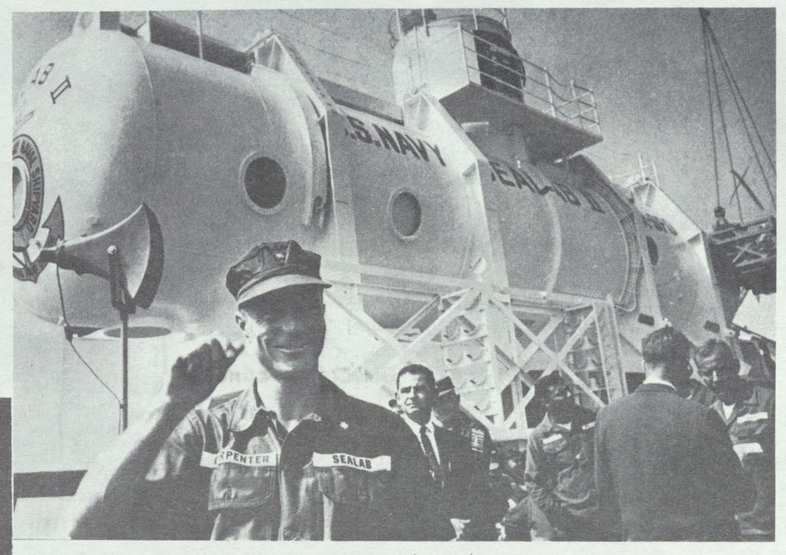
Melson said that after 24-hours in Sealab the men became "creatures of their environment" . . . bringing them to the surface without elaborate precautions, so that they could readjust to normal living, would have killed them.


AP—Transport

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A review of American scientific progress





Acquanaut Scott Carpenter, who spent 30 days submerged in the Pacific, stands in front of the Sealab II capsule

OCEANOLOGY

Sealab II – another advance in undersea living

IN the United States, inner space research is now being taken very seriously. The Federal Government is already spending about 150 million dollars a year on probing the mysteries of the ocean, and this is being increased to about 225 million dollars next year.

The deep-sea manned submersibles being built by American private firms to augment this government effort have already been described in *Science Horizons, June 1963*.

While these are being developed, man is learning to live and work under the sea in a continuing project in which the U.S. Navy and the Scripps Institution of Oceanography are working together.

As part of this project, the most ambitious experiment to date in underwater living has just been carried out off the coast of Southern California. It was accomplished with the aid of Sealab II, a 200-ton cylindrical steel capsule which served as a home and working base for three teams of aquanauts.

Sealab II was brought back to the surface off La Jolla, California, on October 12 after 45 days at the bottom of the sea, 205 feet down and about a mile offshore.

Sealab II was manned, while she lay under the cold, murky waters of the Pacific, by 30 men, divided into three teams. Each man spent 15 days living and working under the sea, except for two team leaders, who both stayed down for 30 days. Cmdr. Scott Carpenter, the astronaut turned aquanaut, did his leader stint with the first and second teams. Lieut. Robert Sonnenburg, a Navy doctor, was a member of teams 1 and 3.

The project accomplished all the objectives originally set for it, and many others were added while it was in progress, said Captain Lewis Nelson, on-site director of Sealab II. "We have been able to prove conclusively that men can work at great depths under water as members of a marine fraternity," he said.

All the members of this "marine fraternity" were put through physiological tests every day they spent under the sea. Blood and urine samples were taken and temperatures and blood pressures were recorded.

The aquanauts each spent an average of 39 minutes a day outside the capsule, swimming, working, filming, taking pictures and carrying out tests to evaluate their performance underwater.

The third team tested a new salvage technique known as "foam in" salvage. A hose lowered from the surface support ship was used to pump liquid plastic into the fuselage of a sunken fighter plane. The liquid foam hardened rapidly, displacing the water in the aircraft. This made the fighter buoyant and raised it to the surface.

Exploratory dives down to 266 feet were made by all the divers taking part in the project. A fish census was taken and a great number of fish were tagged. Some of the divers went down to 300 feet to photograph the walls of the Scripps Canyon. Coring and drilling equipment was tested and several barrels of sediment and fluorescent sand were raised to the surface.

Underwater experiments

They set up an underwater weather station, installed an optical measurement range to check on visibility on the ocean bed, and experimented with zero-buoyancy trailers to study the motion of water near the bottom.

The conditions in which they had to work were far more difficult than those experienced with Sealab I, a smaller steel cylinder in which four men spent 11 days 193 feet under the sea off Bermuda last year. There they had a visibility of 200 feet and a water temperature of 68 degrees.

Off La Jolla the water was cold—only 50 degrees—and visibility varied between six inches and 20 feet.

Capt. George Bond, director of the U.S. Navy's "man-in-the-sea" programmes, who personally looked after the aquanauts' welfare and kept in touch with them from the surface, deliberately planned the Sealab II experiment in these harsh conditions because much of the undersea exploration envisaged for the future will have to be carried out in such conditions.

"If men can survive and work here off La Jolla, they can do so pretty where anywhere else in the world," he said.

The aquanauts dined on plankton (which they described as "tasty—something like nuts"). They trained a dolphin named "Tuffy" to respond to a buzzer and to carry letters; and they were visited by a sea-lion which got a whiff of the high-pressure, helium-charged atmosphere of Sealab when she ventured inside the capsule.

The sea-lion, which they dubbed Samantha, apparently exhaled this atmosphere instinctively as she ascended to the surface. Had she not done so she would have died of embolism—air in the blood vessels. But as no dead sea lion was washed ashore in the vicinity, it was assumed that Samantha had survived her gulp of Sealab air.

The mass of information collected during the Sealab II mission is now being sorted and evaluated by a team of U.S. Navy and civilian scientists headed by Capt. Bond.

The information gained from this analysis will serve as the basis for the next step of the U.S. Navy's continuing "man-in-the-sea" project, which will be called Sealab III.

A progress report on the venture was received in London soon after Cmdr. Carpenter returned to the surface after his month under the sea. Over a telephone link set up by Capt. Frederic Lloyd, head of Public Information at the U.S. Navy Headquarters in London, Cmdr. Carpenter told a group of reporters that he felt fine and in good spirits.

He thought that the underwater environment was more hostile than space, but he'd had a lot of fun in Sealab. He would like to continue exploring both, he said.

An undersea house

Sealab II, 57 feet long and 12 feet in diameter, looks like a submarine, and is designed along submarine principles, with positive stability on the surface, while submerging and while surfacing.

But it is really an undersea house, and in its submerged state, the living compartment has a pressurised atmosphere equal to sea water pressure, which meant that the aquanauts lived, in effect, in an air bubble contained beneath a dome. Access to the capsule was through an anti-shark cage suspended below the hull, which meant that the aquanauts' front door was at the bottom of their craft. All they had to do to get inside was to swim into the cage, ascend into the access hatch, remove their diving gear, and climb up a ladder into the living compartment.

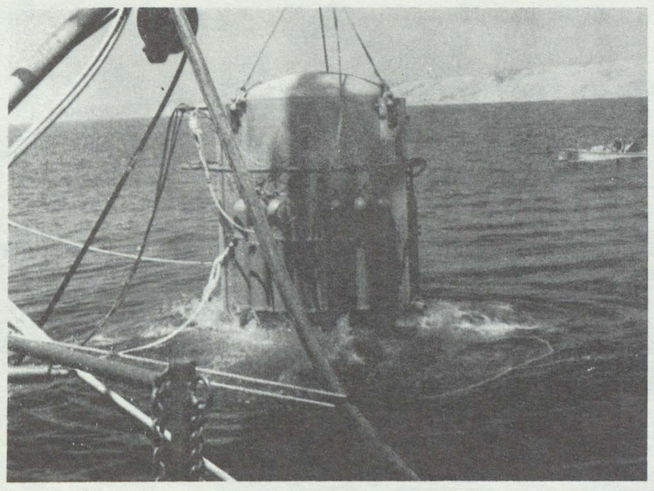
The Sealab II mission was supported from the surface by the support vessel *Berkone,* a craft made up of three barges welded together in a three-sided pattern and held in position by five mooring legs. From the vessel the divers were lowered to the bottom and brought back to the surface in a pressurised transport capsule by means of a crane. This operation went faultlessly until the ascent of the third team, when one of the crew—Master Diver Robert Skeats—developed the bends when he was about half way through the process of decompression. He had to be put into a separate part of the chamber, "taken down" to the equivalent depth of 60 feet, and then recompressed at the rate of four feet an hour. After he reached the surface, Skeats, along with all the other divers, reported that he was fit and in good spirits.

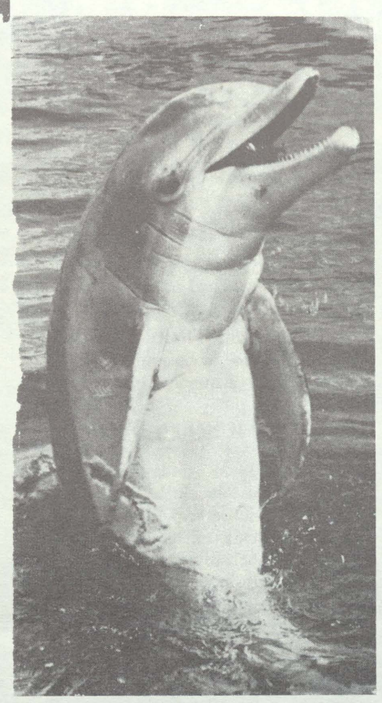
Telephone conversations

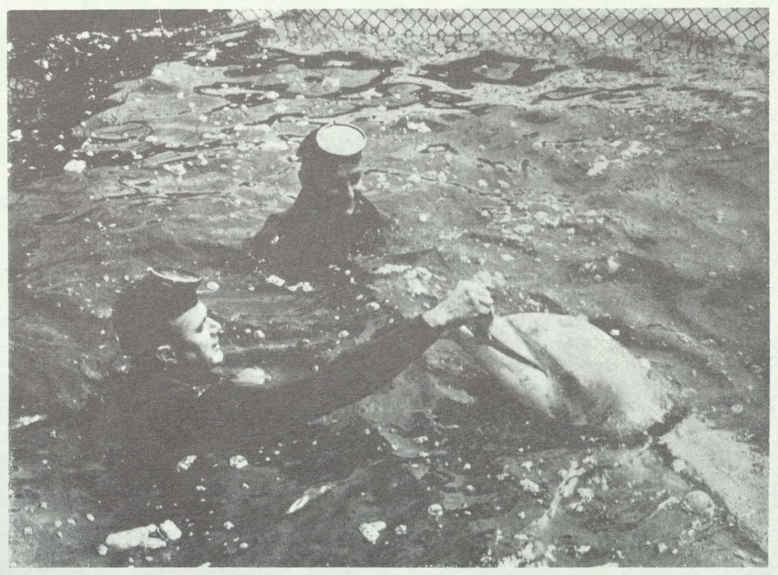
While Sealab II was submerged, its crew made contact with French divers in Conshelf III, the undersea vessel being used by Captain Jacques Cousteau in a 14-day experiment at a depth of 350 feet near Cape Ferrat in France. In the telephone conversation—the first ever to link speakers at the bottom of the Mediterranean and the bottom of the Pacific, the aquanauts exchanged information on visibility of the water, and the extent of the undersea life. They also proffered mutual congratulations on the success of their ventures.

Cmdr. Carpenter also talked from Sealab II to astronauts Gordon Cooper and Charles Conrad as they circled the earth on their eight-day Gemini-5 mission, and to President Johnson at the White House in Washington. The President summed up the Sealab mission when he told Scott Carpenter: "What you did has been very valuable to us and has advanced our knowledge of how humans can perform under these conditions."

Sealab acquanauts were lowered to the bottom of the ocean floor and brought back to the surface in this pressurised transport capsule which is attached to a crane









Tuffy the porpoise to the rescue

TUFFY, the porpoise which the Sealab II crew trained to take a guideline to a "lost" diver and to carry messages and small packages from the surface to the underwater house, was a vital part of the experiment.

His speed at learning to carry out his duties lends support to the view that porpoises can help men in the scientific exploration of the sea.

Cmdr. Scott Carpenter said Tuffy responded so well that he and other porpoises will be trained more intensively for rescue and messenger missions in future deep sea projects. He was certain that the porpoise would be more efficient than a human diver in such tasks.

Tuffy is a male bottleneck porpoise, seven feet long and about 10 years old. When he was captured in September 1962 he bore the scars of many encounters with sharks.

During his training for the Sealab experiment he made several dives to 300 feet and he responded to an underwater "whistle" from distances of up to 550 yards while working as far as two miles from the shore.

Before his work in the ocean began, Tuffy had been taught, at the U.S. Navy's Marine Biology Facility in California, to wear a harness to retrieve objects in open water, to swim through hoops while blindfolded, and to home on signal.

For the past two years American scientists have been investigating the possibility of training mammals to work with men under the sea. Their studies indicate that sea lions and seals, as well as porpoises, could be used in the exploration of the ocean.

At present the Marine Biology Facility maintains 10 porpoises, two seals and three sea-lions. This aquatic menagerie consumes about half a ton of frozen seafood every week, mostly mackerel and smelt.

Pictures at the top of the page show Tuffy, alone and with two members of the Sealab II team who helped to train him. Picture left shows a scorpion fish nosing around Sealab's tower. Several members of the crew, including Cmdr. Scott Carpenter, were stung by scorpion fish

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Sealab II Experiment Valuable To Oil Industry

BY LOUIS F. JOBST, JR.

Tomorrow's oilman may wear SCUBA gear and descend regularly into the murky deeps of the continental shelves.

Proof that men can live and work almost indefinitely in the twilight world of the shelves, ranging from 600 feet to 1,000 feet, was provided by Sealab II, a 45-day experiment in underwater living concluded in mid-October near San Diego.

Part of the Office of Navy Research Man-in-the-Sea Program, the project, dubbed Sealab II, saw three 10-man teams of military divers and civilian scientists spend two weeks each living on the ocean bottom more than 30 fathoms or 205 feet down.

Two of the group, astronaut-turned-aquanaut Scott Carpenter, 40, and Dr. Robert Eric Sonnenburg, 36, spent 30 days on the ocean bottom where pressures were 80 times those on the surface.

Former Garden Grove resident Carpenter, who orbitted the earth as a Mercury Project spaceman, did his time in one stint; Sonnenburg in two with 15 days on the surface in between.

The men lived in a 58-by-12-foot tank car shaped steel chamber that was filled with a breathing atmosphere of 85 per cent helium, 11 per cent nitrogen and only 4 per cent oxygen.

The chamber, built in San Francisco and outfitted at the Long Beach Naval Shipyard, was sunk on the edge of the precipitous 1,000 foot deep La Jolla Trench about 800 yards offshore of the famed Scripps Institution of Oceanography.

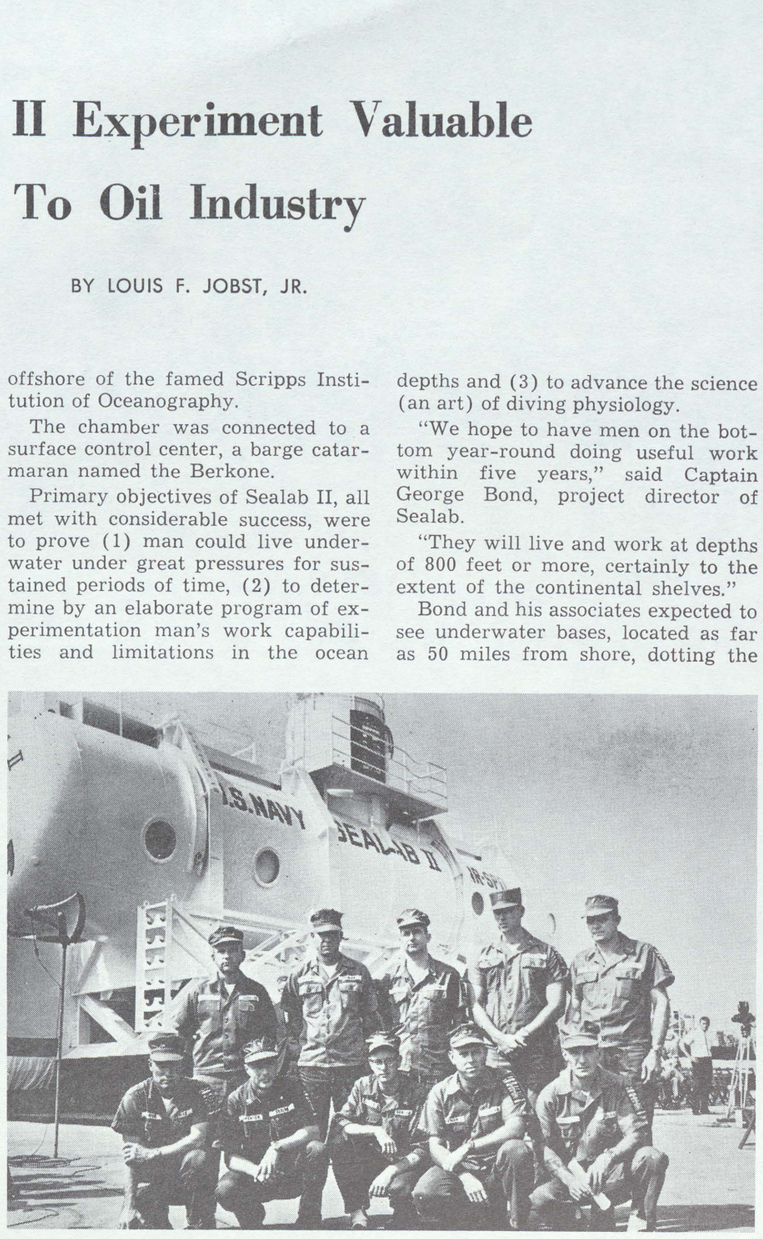
The chamber was connected to a surface control center, a barge catarmaran named the Berkone.

Primary objectives of Sealab II, all met with considerable success, were to prove (1) man could live underwater under great pressures for sustained periods of time, (2) to determine by an elaborate program of experimentation man's work capabilities and limitations in the ocean depths and (3) to advance the science (an art) of diving physiology.

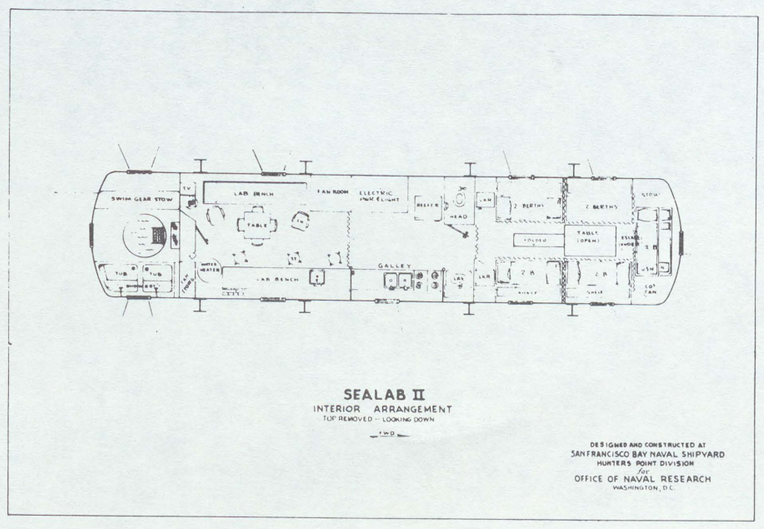
"We hope to have men on the bottom year-round doing useful work within five years," said Captain George Bond, project director of Sealab.

"They will live and work at depths of 800 feet or more, certainly to the extent of the continental shelves."

Bond and his associates expected to see underwater bases, located as far as 50 miles from shore, dotting the continental approaches in the not too distant future.



Members of the first team of Sealab II aquanauts pose in front of the steel underwater living chamber. Kneeling front row, second from left, is Scott Carpenter, team leader and former Mercury project astronaut.



Drawings show interior view of Sealab and layout. Three teams of 10 men each spent two weeks living in compartment on sea floor.

The work of Sealab has vast non-military ramifications, especially for the offshore oil industry.

The oceans of the earth, which comprise about 75 per cent of the total surface, are virtually unexplored, but are believed to contain vast untapped riches.

The continental shelves, which comprise more than one million additional miles of land in the United States alone, are known to hold great mineral resources including fields of magnesium nodules and large reservoirs of petroleum.

Exploration and development of these offshore oil fields have been hampered by man's inability to live and work on the ocean floor for any length of time.

"Once we understand the problems of inner space, why should we attempt mining and petroleum extraction from the surface, when underwater ore reduction and petroleum refining will be more economical?" asked Captain L. B. Melson, director of Naval Applications Group for the Office of Naval Research.

"Opening the oceanic world to mankind has vast implications. With the increases in population that we will see over the next few decades, and the demands for additional resources to support unborn billions of earth inhabitants of the future, we must learn to look at the world as an entirety, not as small, semi-isolated land masses."

While the chamber was only brought back up from the ocean bottom on October 13, it will take weeks and months to evaluate the scientific data gathered and to prepare Sealab III, a deeper (maybe 600 feet) and longer attempt at undersea habitation.

But much has already been learned.

The 30-day ordeal proved to Carpenter that the sea is a much tougher adversary than outer space and that life on the ocean floor is more demanding and hostile than flight outside the atmosphere.

But, said Carpenter, after emerging from 30 days on the ocean floor and 33½ hours in a decompressior chamber, man has an "incredible facility" to acclimate himself to this abusive and hostile environment.

Carpenter estimated that it requires about two weeks for the human to completely acclimate to the underwater environment.

The toughest thing to get used to is the bone-chilling cold (50 degrees at La Jolla) the divers experienced despite the use of experimental heated diving suits of several types.

Control of the amount of time spent in the water and hot showers in the chamber helped overcome this problem, he said.

The exotic breathing mixture which distorts the human voice (everyone sounds like a speeded-up version of Donald Duck) and causes communications problems appears to short circuit the human thermostat, too, explained Carpenter.

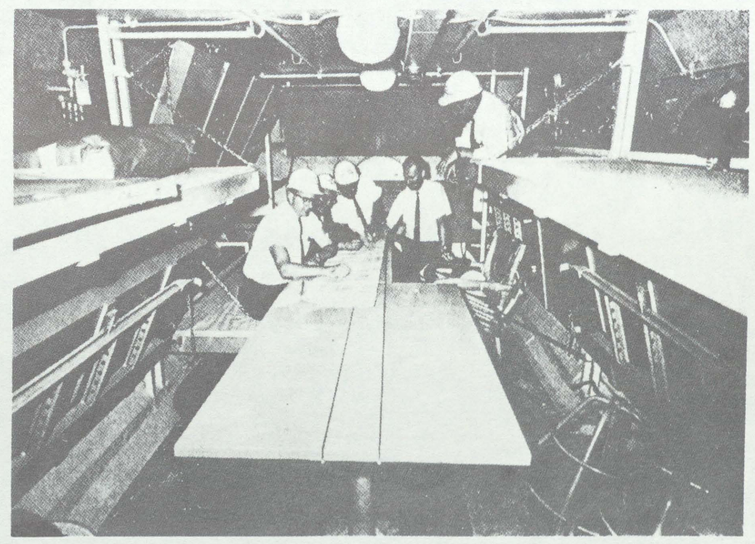
"We'd wake up feeling cold, but perspiring. We didn't know if we were hot or cold," he said.

Carpenter said the experiment also proved that almost every job, from tying knots to turning bolts, was much harder to do than had been anticipated.

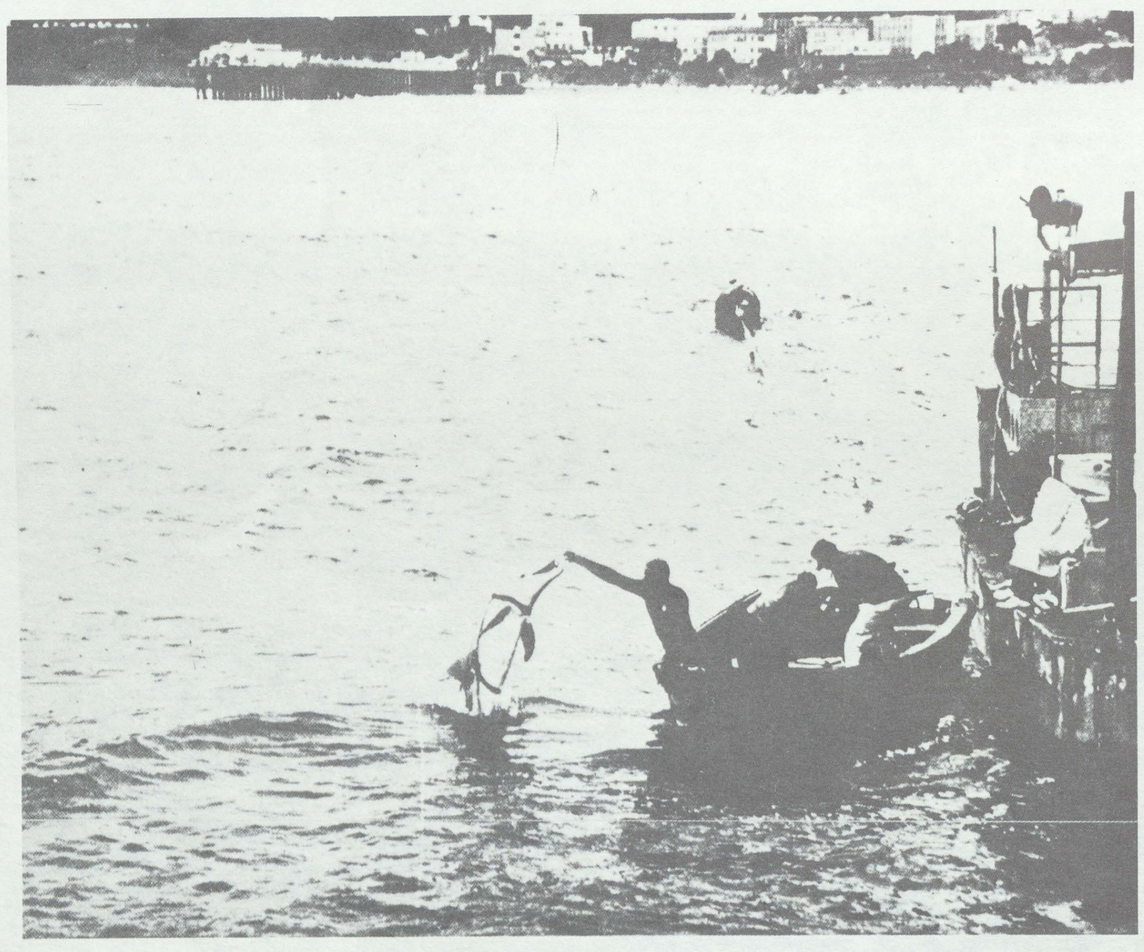
This, he said, is partly due to the fact that "you use up so much energy just trying to keep warm."

The Sealab leader also said much of the equipment due to pressure and corrosion caused by the dense seawater will have to be re-designed.

He called, too, for major modifications in Sealab including the construction of a larger dive room (the space where divers enter and leave the capsule through an open pool-like hatch).



Engineers look over drawing in main compartment of undersea chamber. Note the fold down bunks and table.



Tuffy, the Sealab porpoise, leaps high out of the water for a fish reward for work well done.

Carpenter, who was stung and bedridden for two days early in the experiment by a sting from a poisonous scorpion fish, said the men suffered from inexplicable morning headaches, and were plagued with ear infections and body rashes similar to those babies get from diapers.

Of import to the oil industry was an observation that techniques and equipment for handling bulky machinery or material will be needed.

Carpenter also found the transfer of a piece of equipment through the interface from water to air tedious and extremely difficult work.

All the aquanauts including Carpenter wrecked the commonly held theory that prolonged life underwater causes men to develop hostility toward each other and surface people and induces a nonchalance for their dangerous environment that is almost flambuoyant.

Developments in the Sealab I, a 11-day underwater stay by three men, tended to add credence to this theory, but Sealab II went off "without even a cross word."

This is the result, the experts agree, of the fact that the conditions at San Diego, where visibility was only a few feet, were more realistic and demanding than those found in the shallower, warmer depths of Sealab I off Bermuda.

Among the pysche measurements given were attitude and interests tests the same as those given to Mt. Everest Climbers to compare them with other groups living under stress.

No one believes that pyschological problems of any significance develop for underwater residents.

It is no worse, explained Carpenter, than life on the DEW (Distant Early Warning radar installation) or anywhere else in relative isolation.

During the experiment the divers daily left (in two-man teams) the chamber for up to periods of two hours at a time to explore the region and perform scientific research and other experiments.

Deepest dive was made Oct. 5 to 300 feet when the two men, Team 3 leader Robert Sheats and underwater photographer William Bunton, set a new time-depth record of 19 minutes.

The aquanauts, in 47 different experiments, operated the world's first undersea weather station, successfully performed a number of salvage operations including the raising of a sunken Navy cougar jet plane with foam.

The men also communicated, via earth satellite, with French aquanauts on the floor of the Mediterranean and made detailed studies of sea bottom life, underwater geology and climatology.

Numerous biological studies were accomplished including special physiological and pyschological tests of the men.

The crew worked with non-human aquanauts including Tuffy, a 200-pound specially trained porpoise who ran errands for the bottom dwellers and even delivered the mail to the capsule from the Berkone.

Tuffy performed a remarkable feat in locating two "lost" divers in a series of underwater games. Marine scientists believe porpoises may be used as submarine watchdogs to protect humans from shark attack. The porpoise is believed capable of killing sharks. Tuffy bears several large shark bite scars on his body.

In toto, Sealab aquanauts logged nearly 300 hours of actual work on the bottom. Team one set the best individual mark with a total time in the water for a single day of 732 minutes.

Most of the men agreed that 25 days bottomtime, with work such as oilmen might have to do to keep them from becoming bored, would be a comfortable tour of duty.

The men found the terrain at the capsule site barren and empty, but a journey of 50 to 75 feet down the steep incline uncovered a world of underwater beauty including a completely different sea life population.

Fish became so friendly and gathered around the lighted capsule in such swarms that they often interfered with work.

The aquanauts were visited by several sea lions including Samantha, a trained seal, they brought inside the chamber to breathe the dense 200 pound per square inch atmosphere.

Simple jobs some times became nightmares of arduous labor.

Divers Billie Coffman and Dr. Sonnenburg dragged a nylon line to a submerged anchor, threaded it through the shackle and tied a simple knot, but the job took 2 hours, 44 minutes and left the men absolutely exhausted.

Outside such inconveniences as "no smoking," the aquanauts found life in the undersea habitat comfortable.

The interior of Sealab is divided into a laboratory, galley, bunkroom and diving station. It has 11 viewing ports and is imbedded in a concrete deck.

Interior temperatures ranged up to 80 to 90 degrees despite air conditioning which kept the humidity down to 60 per cent.

You enter Sealab through a hatch on the bottom of the forward compartment. This section contains two 3½ 2½ 2 foot bathtub showers and a storage space for SCUBA diving equipment.

The middle section is the galley and working area and the after section is the sleeping area, lined with 10 bunks.

The men were kept under constant television surveillance from the surface and were in constant voice communication with topside.

The aquanauts descended to the capsule by diving with SCUBA gear, but returned to the surface in a special sealed transport capsule.

The capsule, maintained at the bottom pressure, was connected to a decompression chamber on the deck of the Berkone and the divers passed into the chamber through a transfer lock.

This enabled the day and one-half decompression, elimination of gases in the blood stream and body tissues, to take place on the surface rather than staying at the bottom.

The personnel transport vessel also could serve as an emergency escape craft in case of an emergency.

Enthusiastic about the project Capt. Bond said he expects some day to see the development of a mobile laboratory capable of carrying a crew of 35.

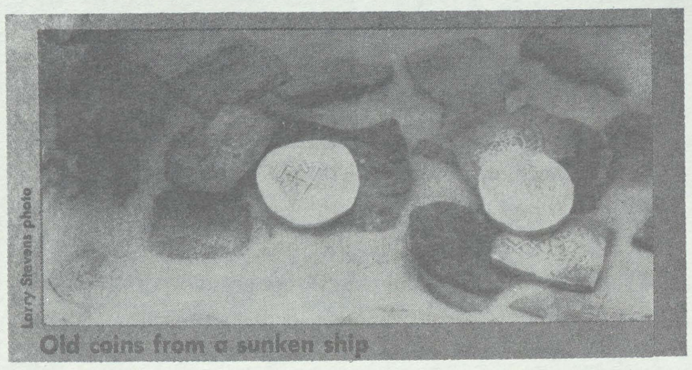
Such a lab, he said, could go anywhere in the world and do any underwater job.

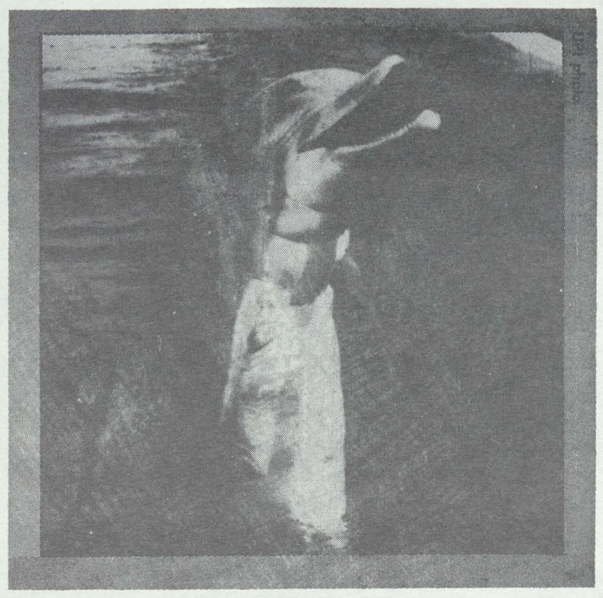
The men, who might be oilmen, could return to the surface by decompressing on the way.

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NOV 19 '65


Larry Stevens photo
Old coins from a sunken ship


Peter Pugh

UNDERSEA STUDIES

Some men dive for sport. Some dive for science. There is much to see and learn in the world beneath the sea. There are strange plants and animals, mountains and valleys. To learn more, men are finding ways to live and work in the sea.

This summer, the U.S. Navy made a test. It sent a long metal building to the bottom of the sea, near California. The building was called Sealab II. (See drawing at left.) Three groups of men lived in it for 15 days each. It was warm and dry inside.

Each day, some of the men left Sealab. They explored the sea nearby. Then they returned and wrote down what they saw.

Doctors checked the men during and after the test. Underwater living had not hurt them.

The divers talked to people above the sea by radio. They also had a helper named Tuffy. (See photo at left.) Tuffy carried written messages from the divers to the men above the sea.

Tuffy is a sea animal called a dolphin. Dolphins are among the smartest of animals. Scientists think dolphins can learn to help men in their undersea work.

Why do men study the seas? The seas have treasures. There are sunken ships, minerals, food—and things to learn.

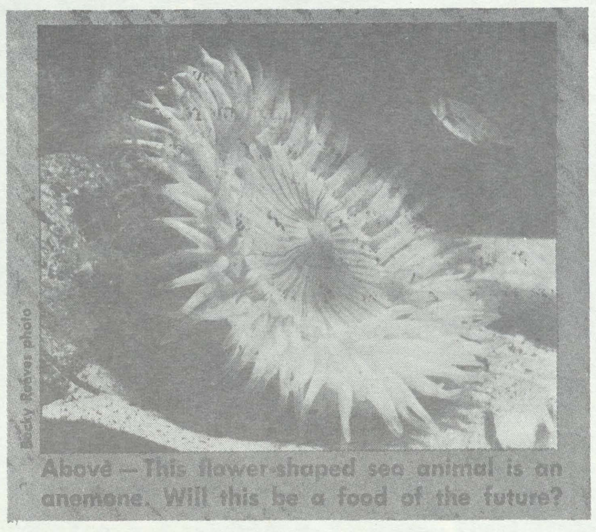
• Scientists study the waves and other ocean forces. This information helps them to learn more about the weather. Sealab II had many weather instruments.

• Men have found diamonds, gold, and other minerals under the sea. Someday there may be many underwater mines. There are already many oil wells near the shores of parts of the U.S. The wells pump oil from the land underneath the sea.

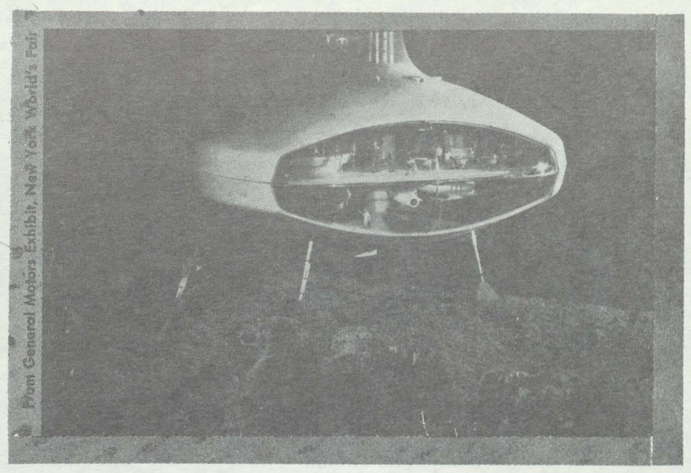
• Divers search for sunken ships. Some of these ships carried coins, jewels, and other treasures. The treasures may still be there for anyone who can find them.

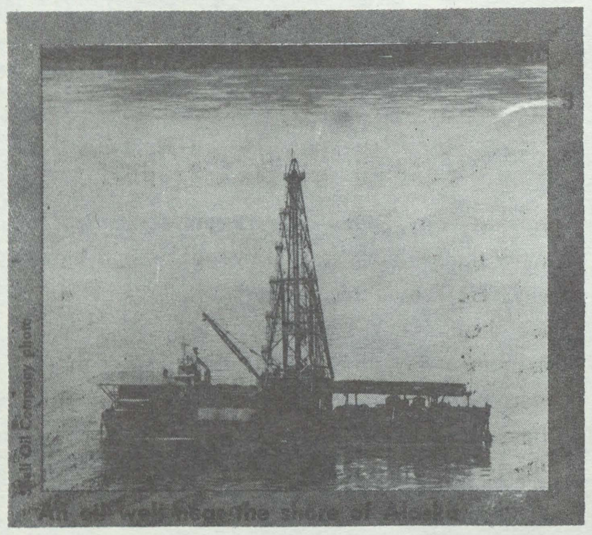
• Each year, more and more people are born. We will need more and more food to feed them all. We may find it in the sea. Men are looking for better places to fish. They also want new ways to use sea animals and plants for food.

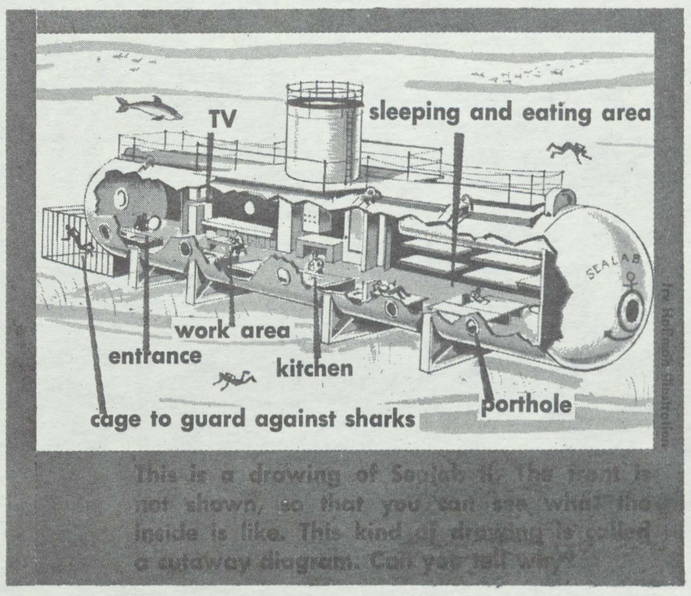
• More and more people will need more and more places to live. Who knows? Perhaps someday people will live in houses under the sea. (See model at right.)


Eddy Bolves photo
Above — This flower-shaped sea animal is an anemone. Will this be a food of the future?


Wide World photo
This is Scott Carpenter. He was the second U.S. astronaut to orbit Earth. Now he is an aquanaut. That's the word for a deep-sea explorer. He was on Sealab II. (See story.)


From General Motors Exhibit, New York World's Fair


Gulf Oil Company photo
An oil well near the shore of Alaska



The Kendall Company
This is a drawing of Sealab II. The front is not shown, so that you can see what the inside is like. This kind of drawing is called a cutaway diagram. Can you tell why?

Aquanauts' Assistant

By CHARLES SHERMAN of the PICTURES Staff

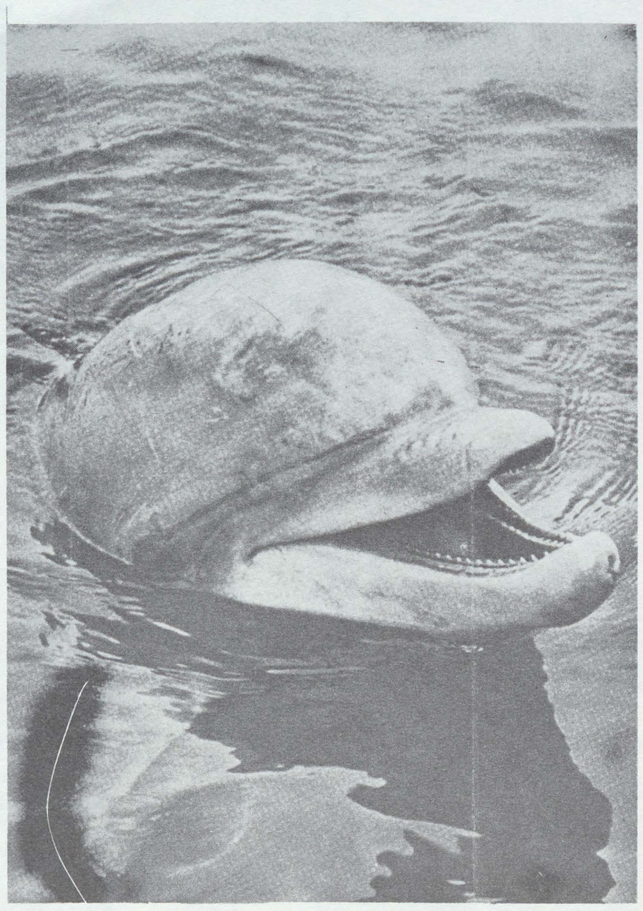
The Navy Sealab II experiment off La Jolla, Calif., not only proved that man can work for long periods on the bottom of the sea, but also that porpoises can be trained to be of great assistance in these deep-sea explorations. An Atlantic bottlenose porpoise named Tuffy distinguished himself in the experiment with his ability to work with men underwater.

The 10-year-old Tuffy, who is 7 feet long and weighs 270 pounds, was trained to carry watertight packages of everything from tools to letters to the men 205 feet below the ocean surface. He could make the trip in 30 seconds. The errand boy porpoise would go from surface vessel to diving bell in response to a high frequency transmitter.

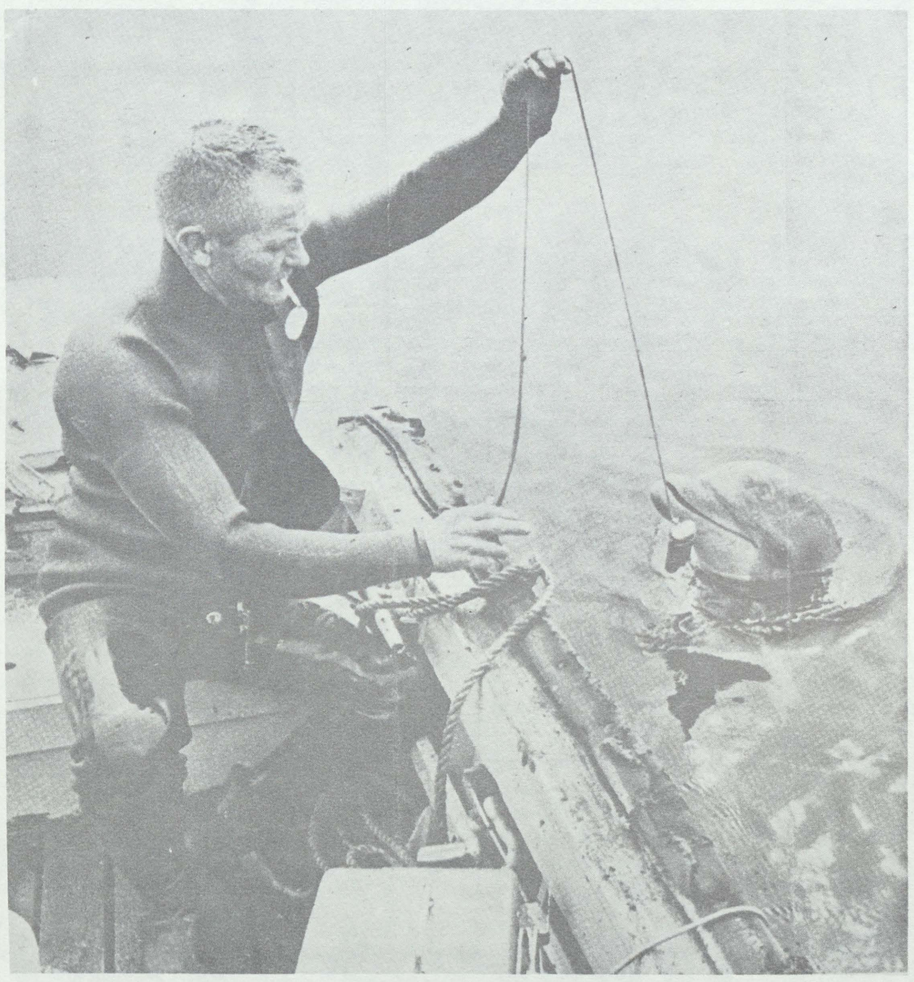
The porpoise was so well schooled that if the need arose he could tap a lost diver on the shoulder and hand him a life line. Tuffy, who bears scars from encounters with sharks, was also expected to fight off dangerous fish if they threatened divers. Porpoises have been known to kill sharks by ramming them.

Tuffy's ability to get through with the mail was recognized by the St. Louis Letter Carriers Union, which named the porpoise an honorary member of its organization.

Sunday Group Photos



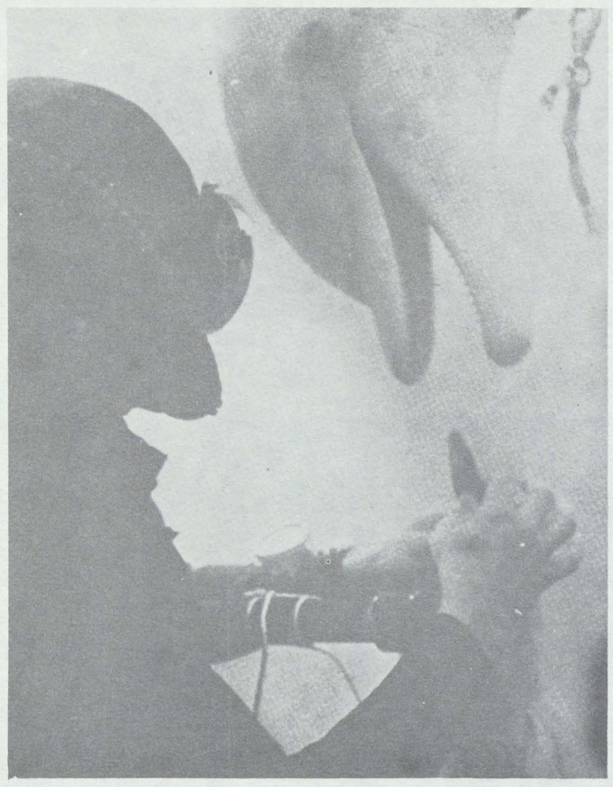
The porpoise surfaces with its built-in smile after a trip below. Porpoises, which are mammals, prefer bays, estuaries and coastal waters to the open sea.



Ross used an acoustic homing device that emitted a high frequency sound to summon Tuffy back to the boat. He followed the sound like a beacon.



Tuffy leaps out of the water to snatch a mackerel from trainer Walter Ross, his reward for completing a mission



Tuffy hovers over diver Ken Conda after delivering a letter to the aquanaut. The porpoise delivered personal messages because radio communications were reserved for scientific data.



Trainer Ross prepares to snap a watertight package to Tuffy's harness for delivery to the aquanauts in the ocean-bottom laboratory. Tuffy carried the mail in sealed containers and took tools down in a special bag.

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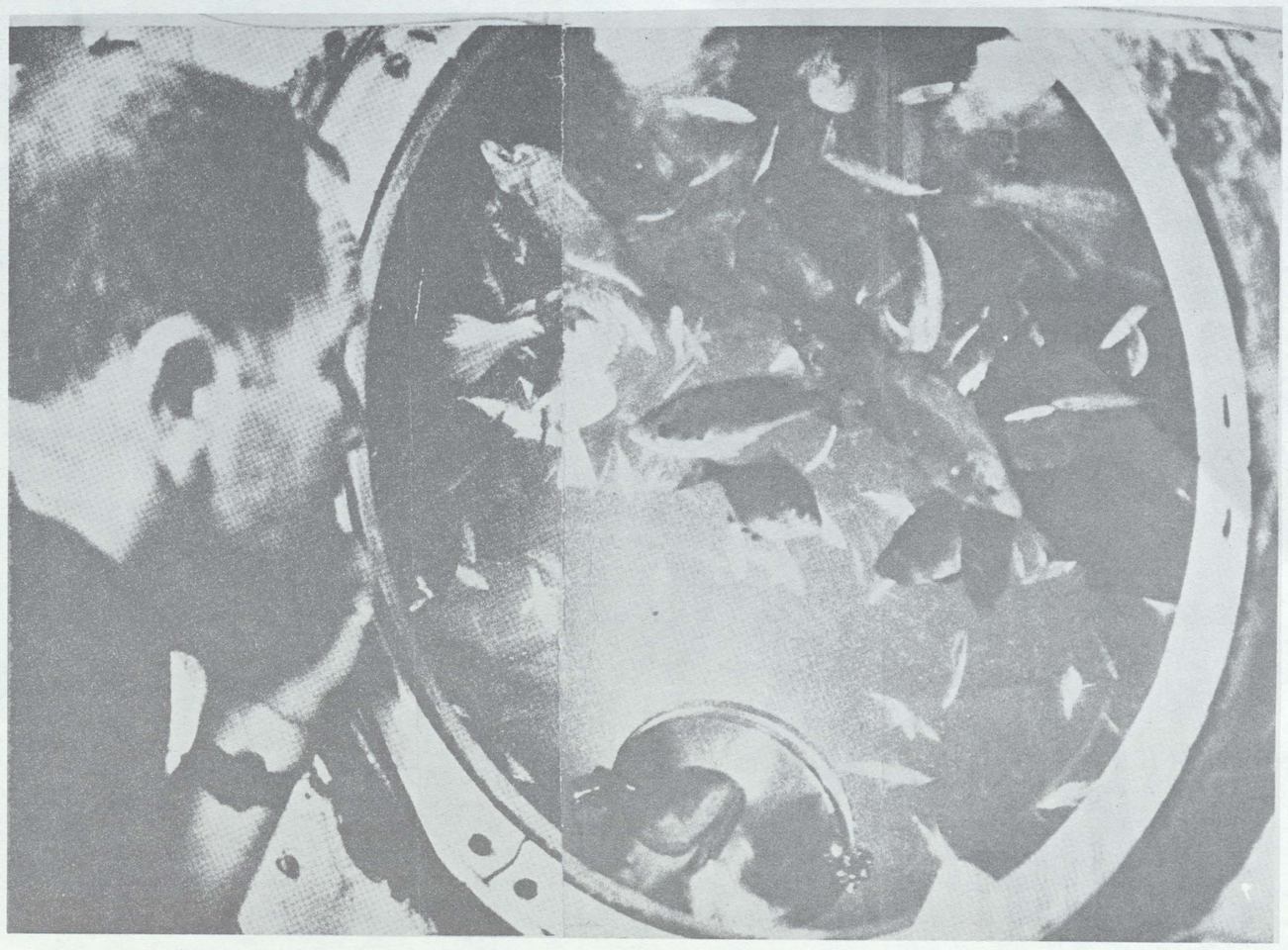
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NOV '65



ASTRONAUT TAKES TO THE DEPTHS. M. Scott Carpenter, an astronaut from the days of the Mercury flights, went down instead of up. With nine other aquanauts, he descended (above) into the Pacific off La Jolla, Calif., to test man's ability to withstand prolonged stays underwater. Their home: a three-room apartment in the shape of a stubby cylinder 205 feet beneath the surface. Sealab II's interior had a pressure a little higher than the water pressure outside, so that the aquanauts' home had an open four-foot hatch in its floor, through which they came and went at will, without fear of Sealab's flooding. Their air: 85 p.c. helium, 11 p.c. nitrogen, 4 p.c. oxygen. After two weeks, nine came up, weary but well. Carpenter stayed on for a scheduled two weeks more of aquanauting.

Minneapolis (Minn) Sunday Tribune
SUNDAY, NOVEMBER 28, 1965

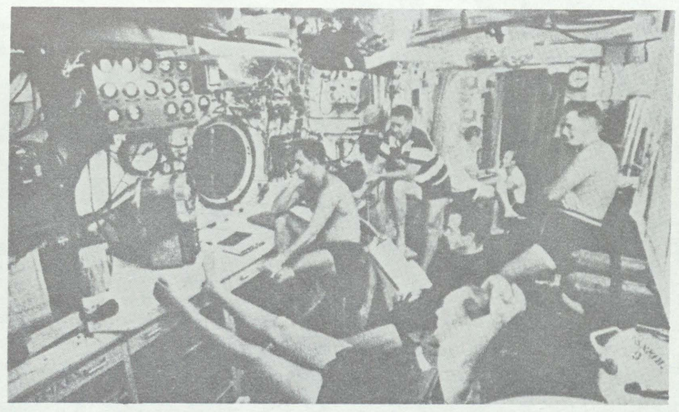


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Fish-watching was the favorite underwater diversion of Navy divers aboard Sealab II. The lab was located half a mile off the coast of California and some 215 feet under the surface.

At the Bottom of the Sea

ANCHORED MORE than 200 feet down in the green gloom of the Pacific Ocean off La Jolla, Calif., was a 57-foot-long undersea capsule, Sealab II. Recently it was the center of the U.S. Navy's 45-day experiment to seek better understanding of man's reaction to prolonged exposure to pressure, isolation and cold water. For almost 30 days it was humid but not-too-uncomfortable home of the project's leader, Cmdr. M. Scott Carpenter, America's first astronaut-aquanaut. One group of divers stayed down with Carpenter for 15 days before a second team took over. A third team stayed after Carpenter left. The men conducted many experiments both outside and inside the lab.



This is a general view of the interior of Sealab. Six of 10 Navy divers relax with Cmdr. M. Scott Carpenter (foreground) to watch marine life outside. The synthetic atmosphere was about 85 per cent helium.

CURRENT SCIENCE - 78
1250 Fairwood Ave. W
Columbus, Ohio 43216

JAN 12 '66

DAVY JONES'S (FOOD) LOCKER

CHICAGO—The third team of aquanauts that lived in SEALAB 2 demonstrated that man can live off the ocean while submerged. Living under 205 feet of water, the aquanauts caught about half of their food.

Most of the food was fish. Although the first two aquanaut teams were forbidden to kill fish, the third team speared many juicy specimens. The fish were eaten Japanese style—raw. The raw fish were garnished with a sauce called sashini.

Sashini is made from soya sauce, lemon juice, and Tabasco sauce. The aquanauts caught such fish as the scorpion fish, the rubber-lipped perch, and the vermillion grouper. They said that, with the sauce, the fish were delicious.

From NOV 12 '65
DAILY NEWS
New York, N. Y.

Aquanaut Gets Medal

Washington, Nov. 16 (UPI) — Astronaut-aquanaut, M. Scott Carpenter today received the Legion of Merit at the Pentagon for his work as team captain of the recent Project Sealab 2 — a two-week underwater living venture. The Navy commander later told a National Press Club luncheon the nation will reap more immediate practical gains from underwater research than from space projects, "such as the assault on the moon." He called the space effort a "glamorous effort (which) ranks currently between God and motherhood" in the minds of the public and government officials.



Carpenter

To Explore the Undersea

The Navy is justly proud of Sealab II, the 45-day underwater experiment in which teams of aquanauts lived and worked on the ocean floor some 200 feet below the surface of the Pacific. Several of the aquanauts appeared at a National Press Club luncheon last week to describe their adventures and make an impressive plea for more research funds and better equipment.

Comparisons with the manned space program are natural. The space program has caught the public fancy both for its accomplishments and because of the space race with the Russians. Yet if it succeeds to the extent that man can harvest the wealth of the continental shelves that make up 14 per cent of the earth's surface, the undersea program will provide more immediate and more tangible benefits. Cmdr. Scott Carpenter, the astronaut turned aquanaut, told the audience that the explorers of the ocean, like the explorers of space, deserve "only the best." This would mean higher priorities and a sizable increase in funds, but based on the success of Sealab II, the investment appears to be a sound one.

WASHINGTON POST 22 NOV 65

SURFER - 80
Box 1028 Bi-M
Dana Point, Calif. 92629
Circ. 48,700

NOV '65
BA

ORBITING SURFER

Astronaut Scott Carpenter, the second American to orbit in space, is now an enthusiastic surfer. The 40-year old space rider began surfing a few months ago while working at La Jolla, California on an underwater project called Sealab II. Carpenter reports he's really stoked about surfing and he and his 12-year old son have joined the Windansea Surf Club.

Chemical & Engineering News-15
American Chemical Society
1155 16 St., N.W. W
Washington, D.C. Circ. 106,870

NOV 22 '65

AQUANAUT REPORT THE WASHINGTON DAILY NEWS, WEDNESDAY, JANUARY 12, 1966—9

Weight Problem? Take a Deep Dive

By MILTON BERLINER

A new way of losing weight has turned up, but it too isn't easy. First you have to become an Aquanaut.

Comdr. M. Scott Caprenter, who first achieved fame as an Astronaut, told a symposium at the Statler-Hilton that he and his fellow crew members lost an average of 5 pounds in the 15 days they were submerged in Sealab II, even tho they ate "two or three times as much as on land."

FIRST

He spoke at the opening session of a two-day discussion of "Man's Extension Into the Sea," focusing on crew selection, training and daily operations aboard Sealab II 205 feet down off the shore of La Jolla, Calif.

Three teams of 10 Aquanauts each last summer took turns living 15 days on the Sealab II and exploring the ocean bottom sometimes down to 300 feet.

Comdr. Carpenter said the Aquanauts suffered no illnesses beyond ear infections easily controlled by medication.

HARD WORDS

There was no particular loss of hearing, he said, but they did have trouble talking with each other the first few days.

The helium in Sealab's air affected their voices and, said Comdr. Carpenter, "the hard syllables seem to disappear. You had to speak directly to a person because you lost a sense of directionality.

"The first two or three days we didn't pay attention to what was being said. We were too busy laughing at the talker because he sounded so silly."

Lt. Comdr. Malcolm MacKinnon, superintendent of design and construction for the project, reported that time was so short that design and construction of Sealab II proceeded simultaneously.

"This," he said, "is not accepted practice, and I became known as some kind of a nut. But we progressed. Sometimes we make a sketch on the back of a paper napkin and handed it directly to the construction foreman."

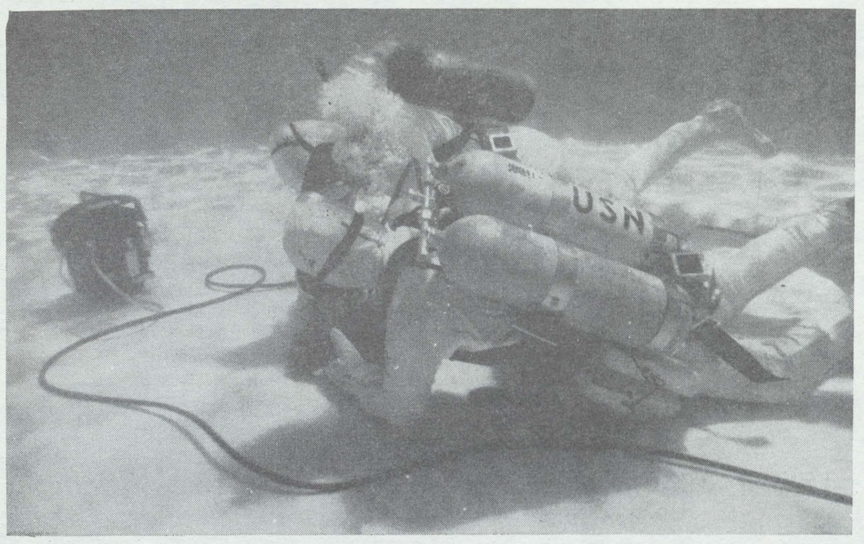
To properly seal the massive caps of Sealab II, which became known as the Tittin' Hilton, a new underwater explosive method was used to form the large steel sections.

"For anything this size (12 feet wide and weighing 60 tons, with the concrete mass needed to keep it from shattering) this was a major breakthru," Comdr. MacKinnon reported.

CLIP

That was last April. A news clipping dated Nov. 18, which he read, described how a Denver research firm was experimenting with the same method using small ash trays "under a $1 million Government grant and taking three years to prove or disprove the process."

"We got a letter from the company which in effect asked, 'Did you?'" Comdr. Mackinnon said. "We replied in effect, 'Yes.'"



Aquanauts

Two Navy aquanauts recover underwater objects as part of the Navy's Sealab II project to test whether man can live and work 200 feet below the surface. U.S. Rubber developed the electrically heated diving suits used in this project

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NAVAL RESEARCH
REVIEWS
NOVEMBER 1965

SeaLab II: A Summary Report

SeaLab II, the longest and most ambitious deep-diving experiment ever conducted, came to an end on October 12, 1965. On that day, the final 10-man team of a three-team relay system of divers—28 men in all—emerged from a decompression chamber off the coast of southern California. The divers, representing both Navy and civilian scientific interests, had lived for a total of 45 days inside and outside of a 57-foot-long chamber that had been placed on the ocean bottom at a depth of 205 feet. The experiment was conducted and directed by the Office of Naval Research in collaboration with the Special Projects Office as part of the Navy's Man-in-the-Sea program.

This undertaking and its predecessor—SeaLab I, which was conducted last summer in the Atlantic Ocean near Bermuda—were made possible by the conception, about 10 years ago, of the so-called "saturation dive." According to this technique, the diver is supplied with breathing gas at a pressure equal to that of the surrounding ocean water, which causes his body tissues to become completely saturated with the gas after approximately 24 hours. As long as the diver remains at a pressure level no lower than the saturation pressure level, he does not experience ill effects. Before returning to surface pressure, however, he must undergo gradual decompression—over a period of 31 hours in the case of the SeaLab II divers—in order to accommodate the naturally slow escape of the high-pressure gas from his tissues.

Conceivably, by means of the saturation dive and the new equipment that is being developed to facilitate it, man will be able to remain deep beneath the ocean surface indefinitely and accomplish a variety of tasks that would be difficult or impossible to accomplish by repeated dives from the surface. The basic intent of SeaLab II was to measure human performance in cold water (46-52°F) of low visibility (5-20 feet) during long-period saturation dives. While the divers lived and worked on the ocean bottom, scientists representing many fields monitored their performance and that of their supporting equipment, accumulating much information that is needed to plan undersea-living projects of the future. Although these data have not yet been analyzed fully, some of the highlights of the effort can be given. They are summarized below:

- For the first time, numerical data on human performance in accomplishing work in cold, dark water were obtained. For example, tests were given to measure the force that divers can exert on a wrench and to assess such factors as two-hand coordination, manipulative skill, tactile sensitivity, speech intelligibility, arithmetical ability, and visual and auditory acuity. Knowledge of these capacities is essential to the design of tools and equipment required for undersea operations of the future and in establishing the performance limits of diver activities.

- An intensive study of diver physiology was carried out, by means of which a large amount of data was gathered on all of man's vital functions. At intervals, while the divers worked inside of their habitat and before, after, or during the periods they worked outside, electrocardiograms were taken and measurements were made of such conditions as blood pressure, body temperature, pulse, and respiration. This information will be related to the performance and behavior of the divers as determined by other tests in order to delineate an appropriate framework of activity for divers of the future.

- By means of written questionnaires and TV monitoring, close attention was paid to diver behavior. Contrary to some opinions held previously, the observations revealed that small groups of highly motivated men can live together in the ocean depths under hazardous conditions for long periods of time without friction occurring between them.

- One of the primary interests of the Navy in adapting man, techniques, and equipment to the performance of tasks underwater is the salvage of ships, aircraft, and other objects from the ocean floor. During SeaLab II, a special foam was used to salvage an aircraft hulk, and explosive tools were used to attach plates and lifting surfaces to a portion of a submarine hull. The success of these and other experiments indicates that man is capable of performing complicated salvage tasks while living in the underwater environment.

- All of the members of team three made short-period excursions to a depth of 300 feet. These dives demonstrate that men can make brief dives to significantly greater depths than that of the habitat without undergoing decompression as they return.

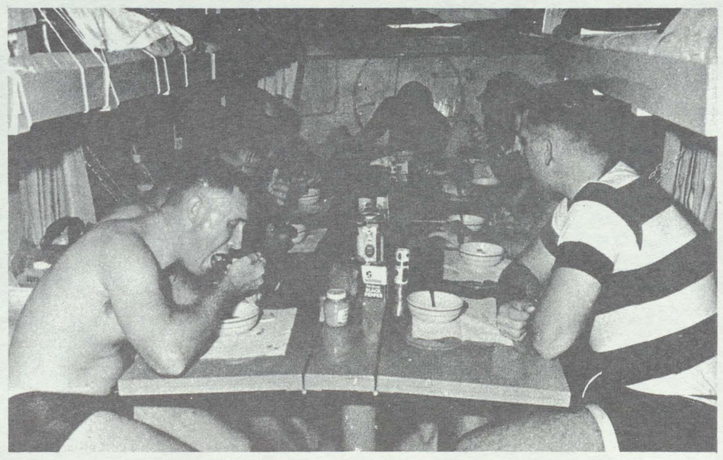
- Scientific and commercial explorations of the continental shelves of the world will be important objectives of many of the saturation dives to be made in the years ahead. During SeaLab II, investigations were carried out which demonstrated the feasibility of such projects. Experiments conducted by scientist-divers included physiological monitoring of marine organisms in their natural environment, observations of sediment transport and currents, and scale-model undersea mining.

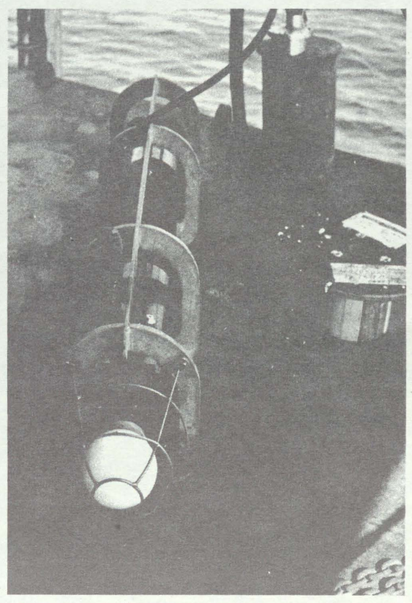
- Porpoises are noted for their ability to locate targets in dark waters by means of a natural sonar system. In order to determine the qualifications of this animal for membership in a team of aquanauts, a trained porpoise was sent below to join the SeaLab II divers. The porpoise responded instantly and unerringly to acoustic signals given by divers stationed at locations beyond his range of sight. On some occasions, he was given messages to deliver, and on others, life lines to carry to divers "in distress." The animal passed the tests with high marks and thus may have earned a place beside man in the exploration and exploitation of the undersea world.

In a congratulatory message sent to the SeaLab II aquanauts at the end of the experiment, Secretary of the Navy, Paul H. Nitze, stated the following:

"Thanks to the teamwork and dedicated efforts of the scientific community, aquanauts, and support personnel, SeaLab II has accomplished its mission. You have proved that man can live and do useful work under the sea. Your accomplishments during the past 45 days have set one of the cornerstones for our future exploitation of the continental shelf."

With their heads bent forward to avoid upper bunks, aquanauts partake of a meal.

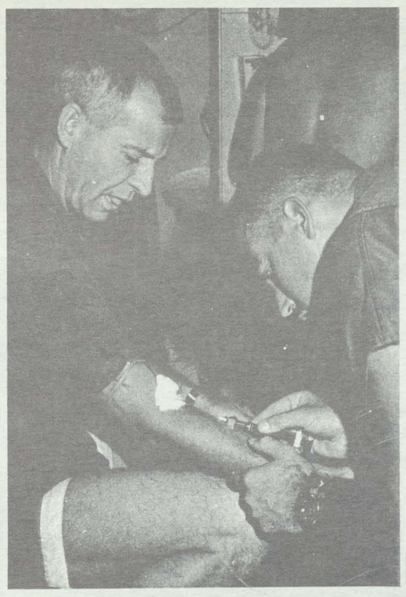




An instrument used to measure the clarity of the water lies on support craft before lowering to SeaLab II.

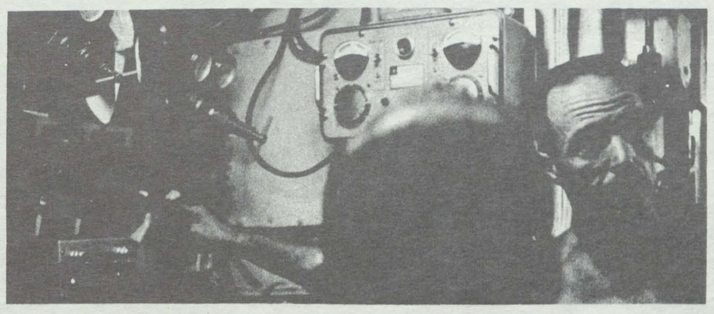


Aquanaut Paul Wells sprays foam into an aircraft hulk to provide buoyance required to raise the object to the ocean surface.



Aquanaut Dr. Robert Sonnenburg takes a blood sample from teammate Earl A. Murry of the Scripps Institution of Oceanography.

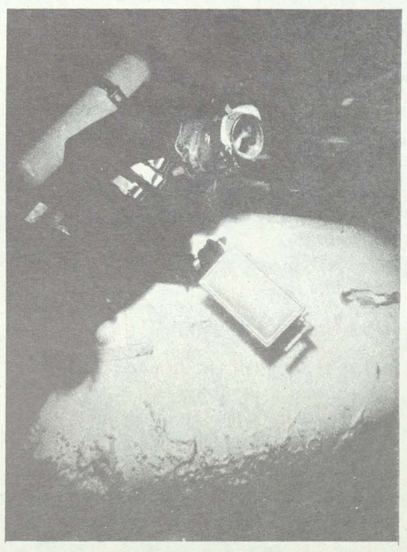
CDR M. Scott Carpenter, USN, team leader during 30 days of undersea activity, explains life-support system of the SeaLab habitat.



Diver Ken Conda, TM1, warily eyes a scorpion fish near the conning tower of SeaLab II.



Aquanaut Paul Wells holds scraper used to remove excess foam from aircraft hulk during salvage operation.





SeaLab II diver John Reaves rewards an experimental porpoise with a fish during training for the recent undersea-residence experiment.

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UNDERSEA TECHNOLOGY

THE MAGAZINE OF OCEANOGRAPHY, MARINE SCIENCES, AND UNDERWATER DEFENSE

DECEMBER 1965

45 Days On The Bottom With Sealab II

■ LARRY L. BOODA

When the Office of Naval Research Representative for Project Sealab II sent his final situation report (Sitrep) Oct. 12, from La Jolla, Calif. he stated, "This marked the end of the longest invasion of man into the strange and hostile environment of the ocean and paves the way for fuller understanding and exploration of the benthic region."

"Sealab shore control headquarters and CIB will be closed effective noon 13th. Nostalgic symptons present. Channel fever is mild in comparison. Lonesome Sam and Suzy are watching from buoy with regret. Refused transfer to Naval Missile Center and promotion."

Lonesome Sam and Suzy were the two wild sea lions who had made many visits to the Sealab at 205 ft. (Suzy had entered the shark cage and put her head into the habitat atmosphere and took a breath on two different occasions, apparently without ill effects.) The Naval Missile Center is where Tuffy the porpoise had been trained to work with the aquanauts.

As a fitting conclusion to the project Undersea Technology here presents a narrative of the day-by-day events. Beginning last March when many details of Sealab II were revealed in print exclusively for the first time, UST has kept its readers informed on the Navy's man-in-the-sea project ever since along with other commercial and non-profit diving projects. But this isn't the end, for Sealab III plans are already being formed as a continuation of a five year effort.

The Sealab habitat is now back at the Long Beach Naval Shipyard. It arrived back with a foot of water in it because the hatch had been jammed partly open when it was depressurized. Fortunately, the jam was relieved by a diver in time to prevent more flooding and serious trouble.

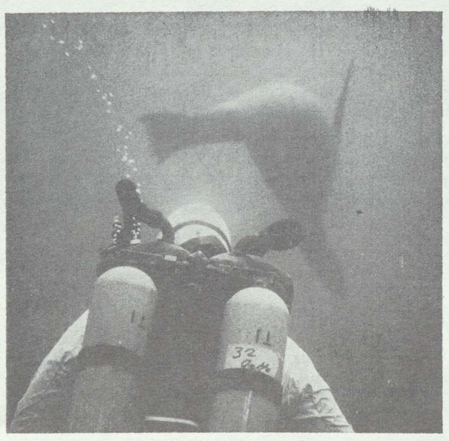
Operations Began in August

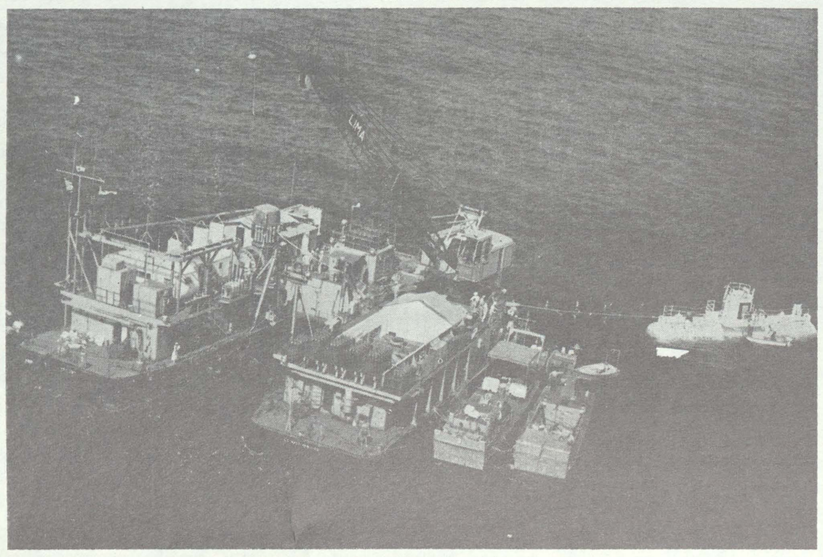
After a hectic Spring and summer of getting the equipment ready and the divers trained, Capt. Lewis B. Melson, ONR's project director issued Sitrep 1 Aug. 18. He reported that the Sealab would be taken from Long Beach (See UST September cover). The benthic laboratory was to be placed 60 ft. from the habitat.

The tow of Sealab II began at 9:35 p.m. on the 19th. The staging vessel, a catamaran barge unofficially named the Berkone, was placed in its permanent moor. Sealab II arrived off the Scripps pier at 7:30 a.m.

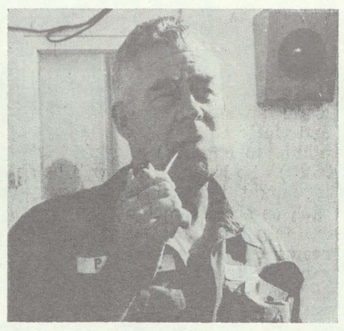
On the 22nd. a new site some 200 ft. from the original one was chosen and the Berkone shifted. The underwater transformer case leaked and was found to be broken, probably from hitting the bottom during a sea surge. A new case was manufactured.

By Sitreps five and six minor difficulties had been remedied, cables and water lines had been connected. The Personnel Transfer Chamber (PTC) was tested and a slight helium leak in a regulator valve discovered due to a scored teflon seal. Helium leaks were also discovered around three viewports in Sealab and corrected.

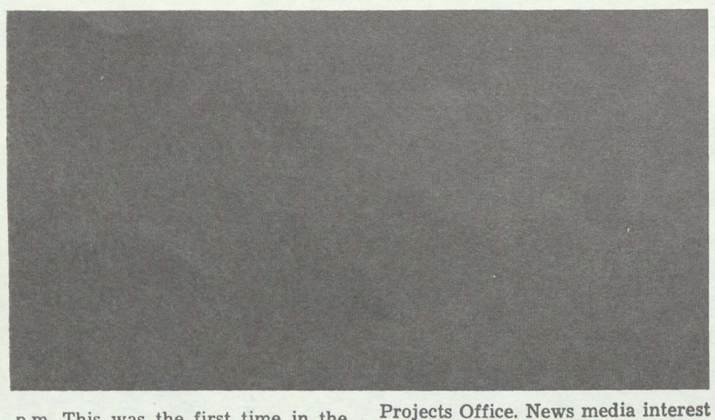




At top Suzy the wild pet sea lion shows her swimming ability to Sealab II diver. She poked her nose twice into the helium atmosphere but suffered no ill effects. She slept on a surface buoy nearby. Her stays below were 4-6 min. Above is the catamaran barge Berkone with Sealab moored nearby before lowering. Below is "Papa Topside", Capt. George Bond, Medical Deputy and spiritual leader of the divers.



Sealab was lowered to the bottom at 3:03 p.m. Aug. 26 and leveling process was begun. Even though it was rotated to the best position it was still up 6° by the bow and listed 3° to port. Thus it received the nickname "The Tiltin' Hilton." (See picture)



p.m. This was the first time in the Navy that a transfer in a submersible capsule had been made under pressure.

The remaining team two men descended. They were: Kenneth Conda, TM1; John Reaves, PH1 (photographer); George Dowling, research physicist; William Tolbert, Jr., oceanographer; Wally Jenkins, equipment specialist, all of the Navy Mine Defense Laboratory; Arthur Flechsig, oceanographer from Scripps. This was the so-called "scientific" team. They were briefed by Carpenter. Due to the first day elation many stayed up late and as a result were a little reluctant at reveille the next morning. Carpenter arm swelling went down. The guilt fish was a west coast sculpin, not the deadly tropical variety.

Sept. 13.

Team one was due to emerge from the DDC at midnight.

Sept. 14.

Surface controlled TV near the shark cage is working excellently. Press conference held for first team. The Sealab press room was established by Lt. Cdr. High Golightly and Russ Greenbaum of ONR and aided by Ronald Sweig, Master Chief Journalist. Golightly was relieved midway in the project by Lt. Wes Larson of the Special Projects Office. News media interest was heavy.

Sept. 15.

Oxygen reduced in Sealab to 3.5% from 4.25%. Team two adapted more rapidly due to preparations of first team. Humidity in the DDC was reported to have been too high for comfort.

Sept. 16.

Tuffy the porpoise swam down to Sealab when called by Conda, remaining there four minutes. Television cameras fail in a helium atmosphere. Camera flashbulbs burn holes in the tubes also. Remedial action being taken.

Sept. 17.

Tuffy made seven trips down, carrying mail and other items. He carried a line to another aquanaut 60 ft. away.

Sept. 18, 19.

Work day and rest day.

Sept. 20, 21, 22.

Special tools developed by the Battelle Memorial Institute tested. Training of one sea lion begun. Capts. Bond and Mazzone visited team two.

Sept. 23, 24.

Jenkins and Carpenter completed an excursion to 253 ft. The PTC was pulled up for checking and repair of a communications wire.

Sept. 25.

All men made excursion dives to the Scripps canyon rim at 266 ft. Sea lion that had been called Sam found to be female. Name changed to Samantha.

Robert Sheats, TMC, third team leader; William Meeks, BM1; William Bunton, scientist, Navy Electronics Laboratory; descended.

Sept. 26.

Team two brought up in PTC. Remainder to team three went down: Lt. Sonnenburg, for his second stay; Charles Coggeshell, GMC; John Lyons, EN1; Lavern Meisky, SFC; Paul Wells, MNC; Rick Grigg and John Morgan Wells, both scientist-divers of Scripps.

Sept. 27.

Team two emerged to a press bedlam due to presence of Carpenter. UST was present. Sea lions visited regularly, staying 4-6 minutes. Aquanauts impressed by their swimming ability. Carpenter thinks they may have some kind of boundary layer control.

Sept. 28.

Press conference lasted 1 hr. 35 min. for some kind of record. Team three salvage projects begin.

Sept. 29.

Aircraft fuselage lowered. Foamed and moved 100 ft. to stay there another two days.

Sealab II Organization

Project Director: Capt. L. B. Melson
ONR Sealab Program Manager: H. A. O'Neal
Ass't. Mgr. & Deputy for Physical Science & Engineering: D. C. Pauli
Deputy for Medical Affairs: Capt. G. Bond
Physiological Control: Capt. W. Mazzone
Deputy for Surface Support: Cdr. T. Blockwick & Capt. Ray Spencer
Diving Officer: Lt. H. W. Smith
Log'stics & Staging Vessel: Joseph Berkich
Work Performance Monitor, Dr. Miller
Public Information: Lt. Wes Larson, Russ Greenbaum & Ronald Sweig, JMC, USN
Construction Engineer: Lt. Cdr. M. Mackinnon
Design Supervisor: Lawrence Joe
Administrative Assistant: Lt. G. Clapper
Aquanaut Training: Lt. James Bladh
Engineering Consultant: William Culpepper & William Frost
Consultant (Experimental Diving Unit). Cdr. C. H. Hedgepeth
Counterbalance Lowering System: Edward Carpenter

Sealab III

Next step in the Navy's program for man's extension into the sea will be Sealab III. Duration hasn't been definitely set — it will be in the 45 day ballpark of Sealab II — but the depth has. It will be 400 ft. or more.

A site has yet to be chosen. However, several have been surveyed, including San Clemente Island off southern California where substantial facilities for support exist. The water there is clearer than at La Jolla, but it is just as cold (48-52°F.)

It has been hinted that Sealab III could go to warmer water. Tremors (exaggerated shivers) have been experienced in several recent man-in-the-sea projects.

The 400 ft. depth will preclude excursion visit dives from persons on the surface.

The chances are good that the Sealab II habitat will be used for Sealab III.

On Aug. 28 hard hat divers cleared excess lines from Sealab and reported its bow resting on hard bottom and the stern on softer material. Without lights it could be seen from the 100 ft. level. On the 29th. the water was blown from the skirt.

The day-by-day account follows:

Aug. 28

Cdr. Scott Carpenter, team leader; Wilbur Eaton, GM1 USN: Cyril Tuckfield, ENC USN; Berry Cannon, civilian engineer, Navy Mine Defense Laboratory; went down first. Carpenter opened the hatch and found Sealab in excellent condition. The remaining members descended in pairs. They were: Lt. Robert Sonnenburg, the diver-doctor; Billie Coffman, TM1; J. D. Skidmore, PHC (photographer); Fred Johler, ENCS; Earl Murray and Thomas Clark, Scripps Institution of Oceanography.

Two television cameras began monitoring activities inside the Sealab. Cdr. Carpenter talked with fellow astronaut Gordon Cooper in Gemini 5 in orbit at 11:26 p.m. Everyone stayed up for the event. A helium speech unscrambler was used.

Large numbers of fish were observed. The men took psychomotor tests.

Aug. 29.

Regular sleeping habits established. Each man spent more than three hours outside.

Aug. 30.

Capt. George F. Bond, and Capt. Walter Mazzone, physiological control officer, swam down for reenlistment ceremony of Coffman.

Aug. 31.

Outside lights setup and benthic laboratory being installed.

Sept. 1.

Benthic laboratory installed and connected. Area mapped.

Sept. 2.

Underwater weather station being installed. A bottom mounted TV camera of the Naval Ordnance Test Station was lowered. Dr. John Craven, Chief Scientist of the Navy's Special Projects Office, visited.

Sept. 3.

Fish census begun by Clark and Murray on trip 200 ft. away. All in good health and spirits.

Sept. 4.

Underwater weather station installed. Instrumentation to show strain on each moor leg of the Berkone installed and tested.

Sept. 5. (Sunday)

Holiday routine.

Sept. 6.

Five teams worked outside for further outfitting of the weather station with current meters, photography and aquasonic intelligibility testing and initial evaluation of U.S. Rubber wet suits.

Sept. 7, 8.

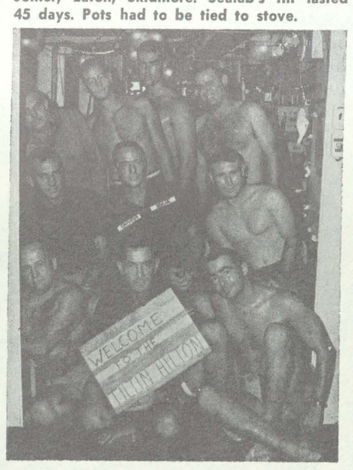
Weather station completed. Average time outside for first 10 days was 39 min. per man per day. Average humidity 75%, range 60 to 90%; temperature average 87°F, range 81 to 103°F.

Sept. 9.

Continuing biological and oceanographic studies. Contrary to press reports there were no ear infections; treatment was only precautionary.

Below: So near and yet so far. Mrs. June Buckner whose husband Howard was in team two peers through viewport of decompression chamber as pressure meter indicates about one atmosphere (two hours) to go before the ten men emerge. At right, team one, living with 6° up bow and 3° list to port chose a nickname for their abode. Top, l to r, Tuckfield, Clarke, Sonnenburg, Coffman; middle, Murray, Carpenter, Cannon; bottom, Johler, Eaton, Skidmore. Sealab's tilt lasted 45 days. Pots had to be tied to stove.







Berry Cannon performs repair work at Sealab II bench as fish, attracted by lights, look on through port. Fish in turn attracted wild sea lions, two of which became tame.

Sept. 10.

More oceanographic measuring devices planted. PTC raised for cleaning and testing.

Sept. 11.

Supplies replenished and personal gear of teams one and two members exchanged.

Sept. 12.

A helium tank truck was used to recharge the Deck Decompression Chamber (DDC) to save bottled on board supplies. Robert Barth, QMC, Howard Buckner, SWC; Glen Iley, HMC (who served as medical man for team two) descended to begin exchange. Carpenter stayed down. He was stung at 12:31 p.m. on the left index finger by a scorpion fish. His arm swelled up to his elbow. He described the pain as "exquisite." Dr. Sonnenburg gave treatment.

By 2:35 the nine men from team one had entered the PTC parked 15 ft. away. The mating of the PTC to the DDC was completed at 3:29

Sept. 30, 31, Oct. 1.

Experimental salvage operations. High velocity tools. Submarine hull section worked on. Aircraft raised to surface. Sheats and Grigg on Oct. 1 talked with Capt. Jacques-Yves Cousteau's Oceannauts Andre Laban and Phillippe Cousteau at 300 ft. off Cap Ferrat in the Mediterranean.

Carbon monoxide presence noted and work begun on effects of CO under partial pressure conditions.

Oct. 2, 3, 4.

Work day, rest day, work day.

Oct. 5.

Sheats and Bunton made an excursion to 300 ft.

Oct. 6.

Four teams of two men each swam to 300 ft. for photo and biological surveys. The aquanauts dined on plankton, saying it tasted like nuts.

Oct. 6, 7, 8.

PTC raised for checking and plans made for bringing up team three.

Oct. 9.

PTC raised with men and mated with DDC at 11 a.m.

Oct. 10.

When the DDC was at 28 ft. pressure Sheats developed the bends. The other nine men were moved to the outer chamber of the DDC and Sheats pressurized to 80 ft. for treatment.

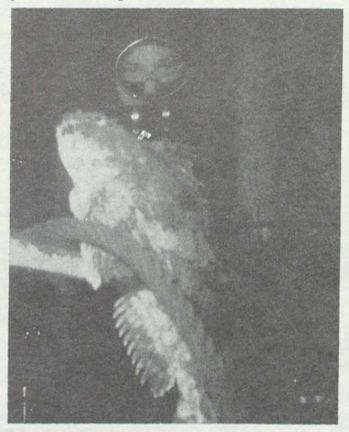
Oct. 11.

Sheats completes decompression.

Capt. Mazzone said later that the decompression tables are established for men of 35 or under. Sheats is 50.

Capt. Bond said that he is in remarkable physical condition and that his difficulty was not a serious one. ●

Ken Conda warily eyes a sculpin or scorpion of the type which bit two aquanauts, causing painful swelling.





Oceanographer Bill Tolbert feeds his plants in botany experiment to determine how growth is affected by low oxygen but high pressure atmosphere.

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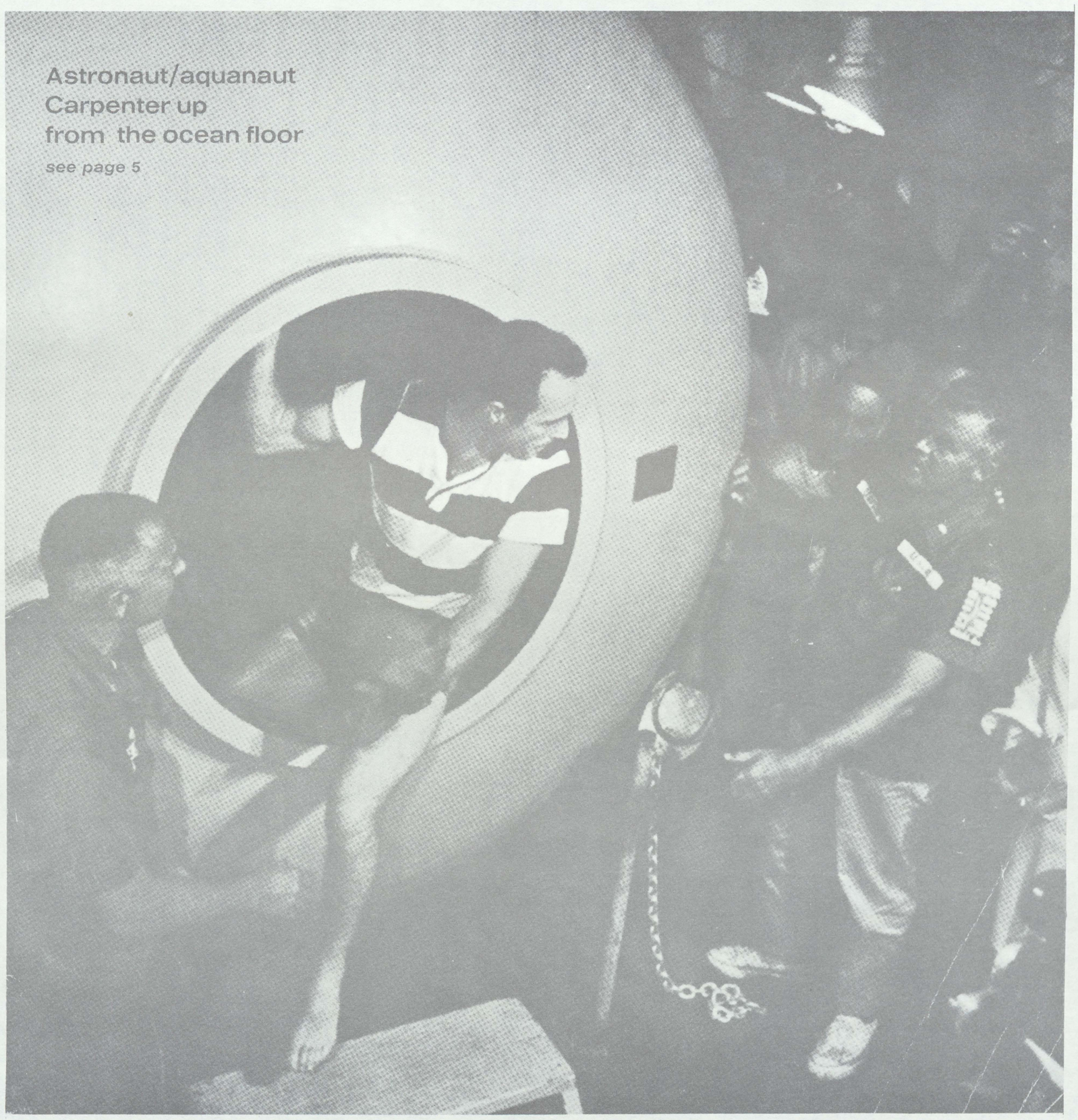
ROCHE MEDICAL

Image

DECEMBER, 1965

Astronaut/aquanaut Carpenter up from the ocean floor

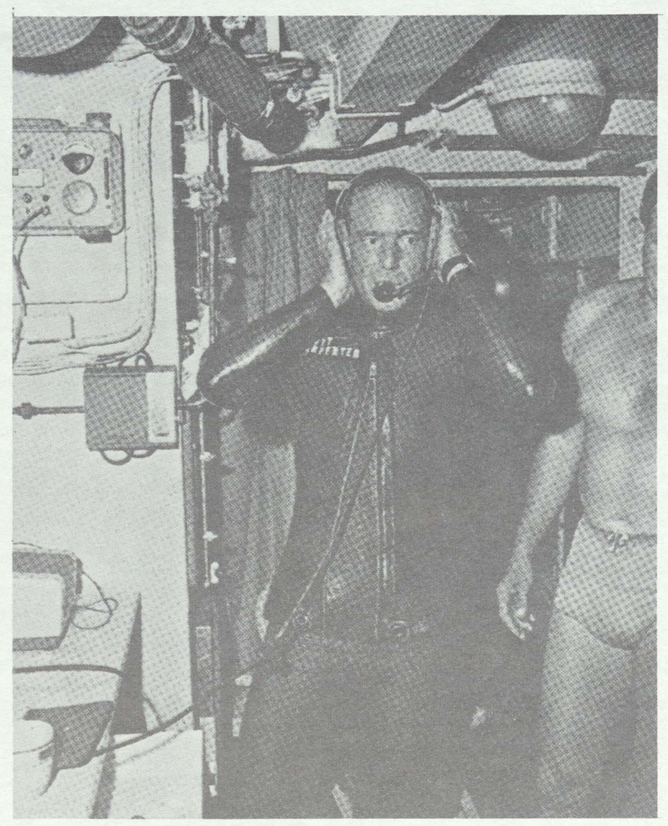
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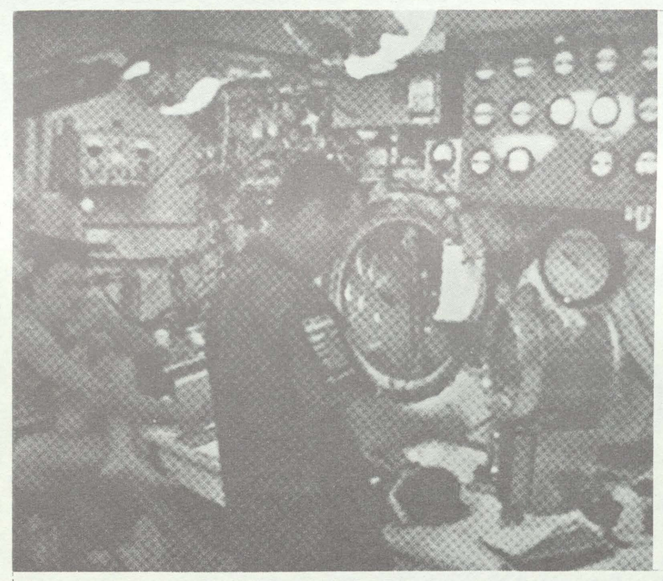


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"PAPA TOPSIDE," *known in more formal circles as Capt. George F. Bond, Navy surgeon in charge of Operation Sealab II, monitors aquanauts who are 205 feet below surface ship.*





DEEP-SEA LIVING: *Comdr. M. Scott Carpenter (top) talks to surface and (bottom) checks radio next to scenic porthole.*

No more the voiceless deep

THE VOICE OF Lieut. Robert E. Sonnenburg, M.D., high-pitched and squeaky, was speaking from inside a helium-filled steel capsule called Sealab II, 205 feet below the churning surface of the Pacific Ocean. "We've had some headaches and ear infections, but we've run into no serious problems," he said in an exclusive telephone interview with IMAGE. "I don't think there are any effects of narcosis down here; if there are, I am also experiencing them and cannot objectively evaluate them."

Dr. Sonnenburg's unusual report from beneath the sea dramatically pointed up the Navy's program to put man on the bottom of the ocean, enclose him in an artificial atmosphere and keep him there for prolonged periods so that he can tap the world's underwater resources. As Sealab's only resident physician, Dr. Sonnenburg was one of 28 divers who manned the 12-by-57-foot Sealab II in the most ambitious underwater endurance test ever attempted.

For 45 days this autumn, three teams of divers took turns living and working in the hostile world under the sea, half a mile off the coast of La Jolla, Calif. Outside Sealab II, visibility frequently dropped to only a few feet and the water was a numbing 50°F., so cold that swimming excursions rarely lasted more than an hour and electrically heated suits were a necessity. Stinging scorpion fish were a constant threat and the divers dared not swim more than 30 feet above Sealab's depth at the risk of suffering the bends.

Inside the capsule, the divers lived in a pressurized atmosphere composed largely of helium. Matches would not burn in it; the men could not smoke; water boiled at 300°F. instead of

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ROCHE MEDICAL IMAGE

212°; and eggs were taboo because toxic hydrogen sulfide from the yokes could not be eliminated from the atmosphere. Because this helium atmosphere is seven times more thermally conductive than air, it sometimes made the divers shiver while they were simultaneously perspiring from Sealab's 88-degree temperature; and because of the high concentration of helium, the crew's voices sounded like the sound track of a Donald Duck film.

Medical scientists have long questioned man's ability to conquer the underwater world, a vast unexplored frontier that lies only a few hundred yards beneath him. Could man mentally endure such a hostile environment, constantly aware that he was held captive by great pressures, knowing that his lungs would explode if he should float to the surface? Would the increased densities of gases adversely affect his respiration? Could the cardiovascular system function unimpaired under such great pressures?

Anticipating that the adverse effects of long submergence may be subtle, the physicians directing the underwater project set up 125 physiologic base lines. Once inside Sealab, the men were kept under constant surveillance over closed-circuit television and given a wide variety of medical and psychologic tests to detect any insidious environmental effects. Three divers from each team underwent cold tolerance tests to see if they could be acclimatized to the 50° temperature under deep diving conditions. Blood, urine and saliva samples, as well as throat, nose and ear cultures, were taken daily. Returning to the surface, the men underwent more medical tests and psychological debriefings to determine how their minds and bodies had withstood the unusual demands made upon them.

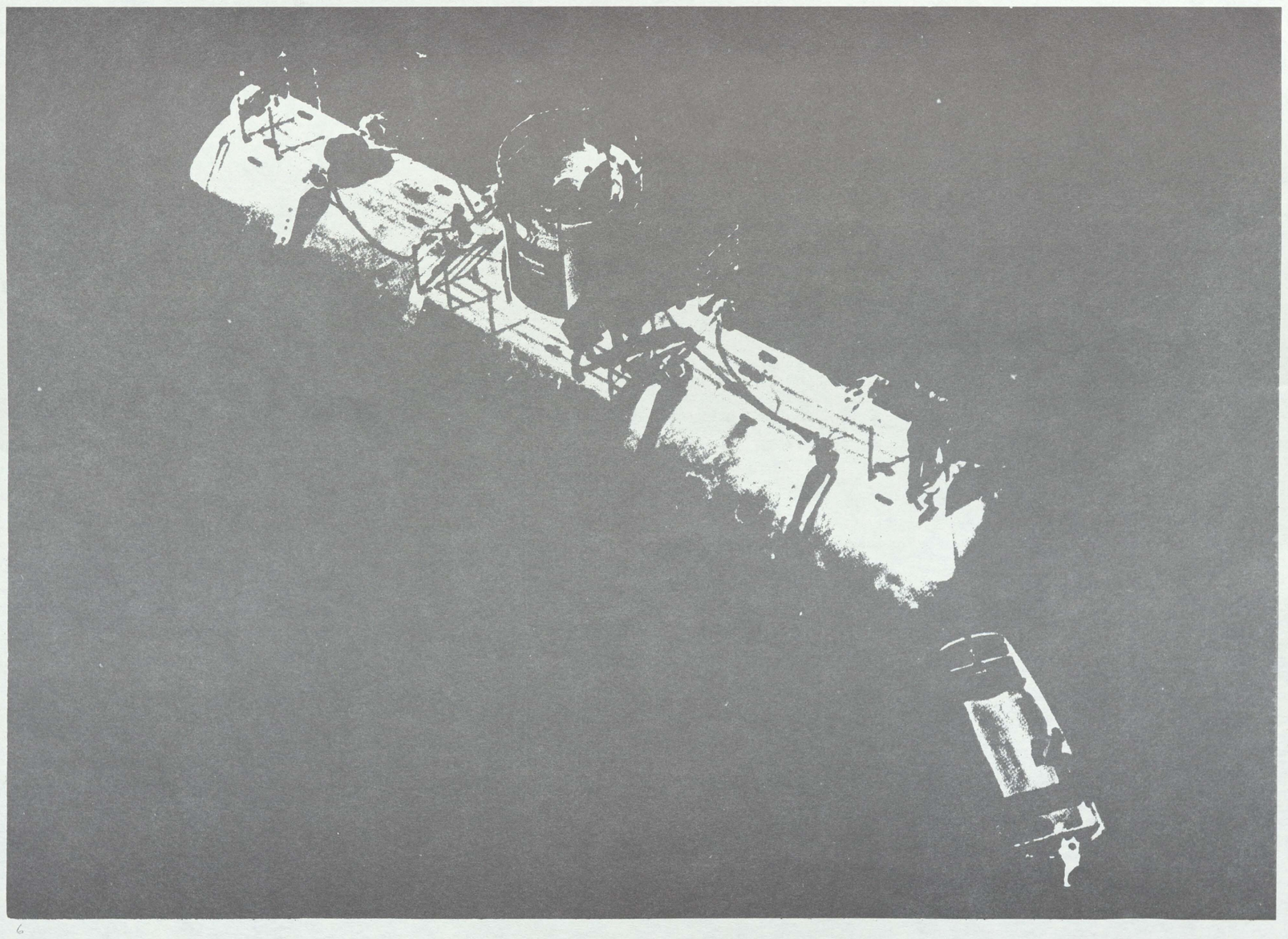
Though final evaluation of these tests must await the processing of 18,000 computer punch cards, Capt. George F. Bond, the Navy surgeon in charge of the program, was optimistic. "We've made some particularly interesting observations that we must investigate further," said the physician, who is known to his underwater charges as "Papa Topside," "but even now I think we can say that Sealab II has been a success. It has proved not only that man can stay under for long periods, but also that he can work while he's down there."

Morale was unexpectedly high and the men, who referred to themselves as the "aquanuts," managed to maintain their sense of humor. Surface communication monitors often heard outbursts of laughter in the capsule, as if a deep sea party were taking place. Much of the gaiety was attributed by Sealab's chief psychologist, Dr. James W. Miller, to the strange effect of helium on the male voice. "It's hard not to laugh," he said, "when someone like Dr. Sonnenburg, a six-foot, four-inch, 240-pounder starts talking like Donald Duck."

Role of gases in human system

Even more encouraging to Dr. Bond were the results of studies indicating that man could thrive on Sealab's exotic gas mixture for at least 30 days under pressure 7.2 times that of sea level. Since helium is nontoxic and only one-fifteenth as narcotic as nitrogen, it was used to replace 75 per cent of the nitrogen found in surface air and 80 per cent of the oxygen. Even though the concentrations of the two gases were greatly reduced, Dr. Bond pointed out, the partial pressures of oxygen and nitrogen breathed by the divers at Sealab pressures were actually greater than that of normal air on the surface. EEG readings and other neurologic tests indicated, however, that Sealab's oxygen was not toxic, and mental acuity tests failed to reveal any evidence of nitrogen narcosis.

DIVERS PREPARE SEALAB II FOR DIVE (LEFT) AND LATER, AFTER CAPSULE HAS BEEN LOWERED, COMDR. CARPENTER (RIGHT) SECURES BREATHING HOSES



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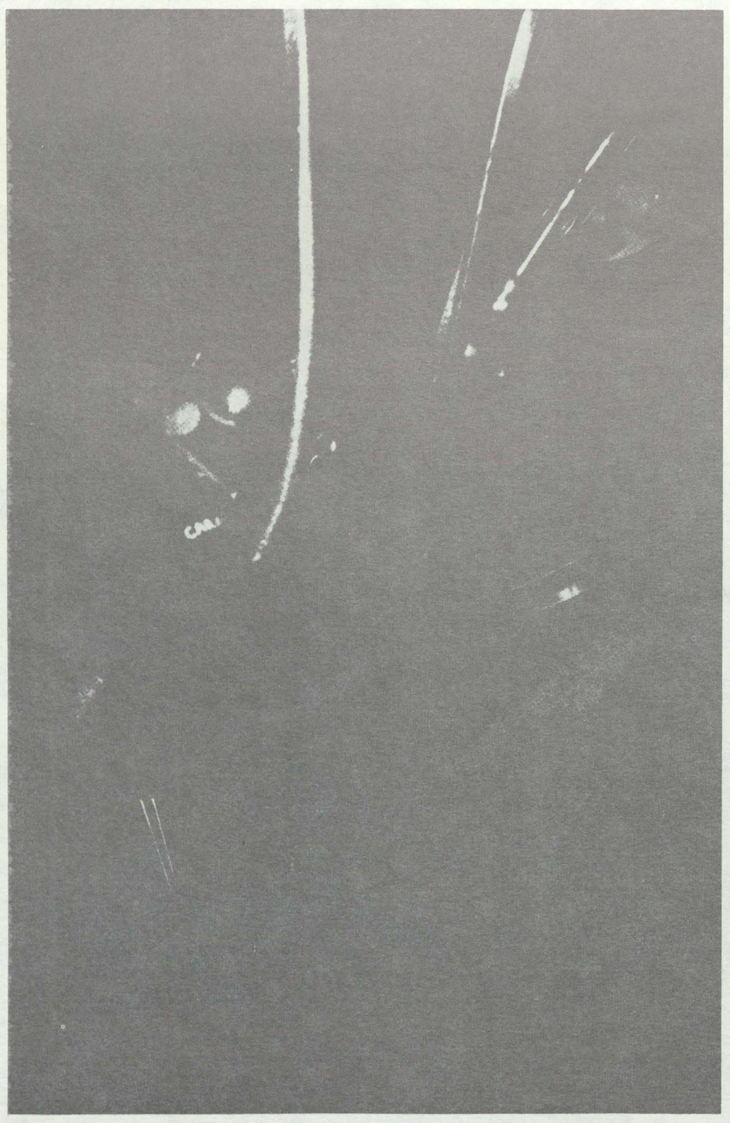
"Since man undoubtedly is more a reflection of what he breathes than of what he drinks or eats," reports Dr. Bond, "it is essential that we gain a better understanding of the role gases play in the human system. The Sealab project is helping to clarify this area."

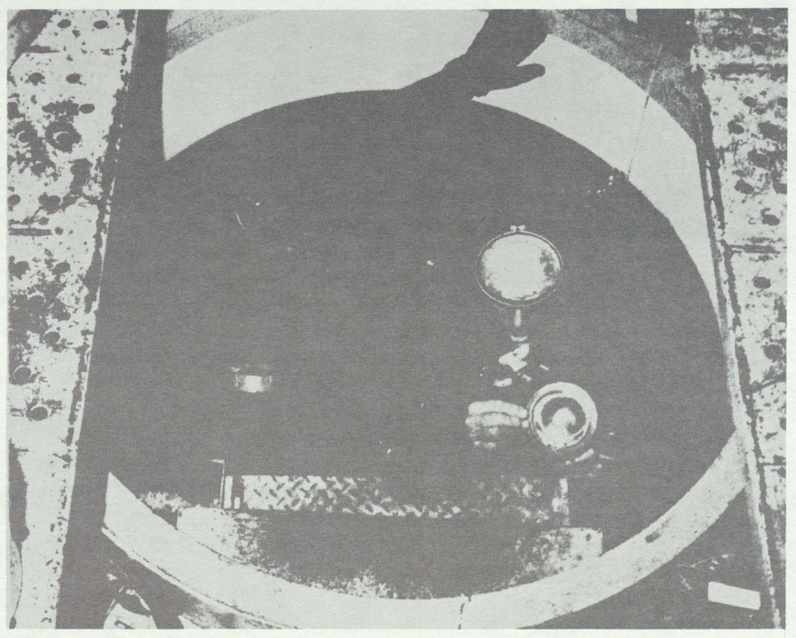
Convinced that modern civilization has an urgent need to understand the biologic effects of gases, Dr. Bond observes: "Our society is moving into many atmospherically-closed ecologic systems, such as sealed, air-conditioned buildings, pressurized planes and industrial plants that discharge production impurities into the air the workers breathe." The most immediate clinical application of such information, Dr. Bond believes, is in the expanding field of hyperbaric surgery, where it is essential to know if long-term exposure to compressed air might reduce the skill of operating room personnel. Surgeons, he says, experience mild narcosis from the nitrogen in hyperbaric chamber air that sometimes has four times the pressure of air at sea level. "To avoid this narcotic effect, of which surgeons are often not aware," says Dr. Bond, "the compressed air in hyperbaric operating rooms may one day be replaced for long operations by mixtures similar to that used in the Sealab."

Though Sealab II has gone a long way toward answering questions about the effects of long-term underwater submergence on man, Dr. Bond believes much work still remains to be done. He is particularly anxious to know why seven out of 10 of the divers tested with a wedge spirometer experienced decreases in pulmonary ventilation.

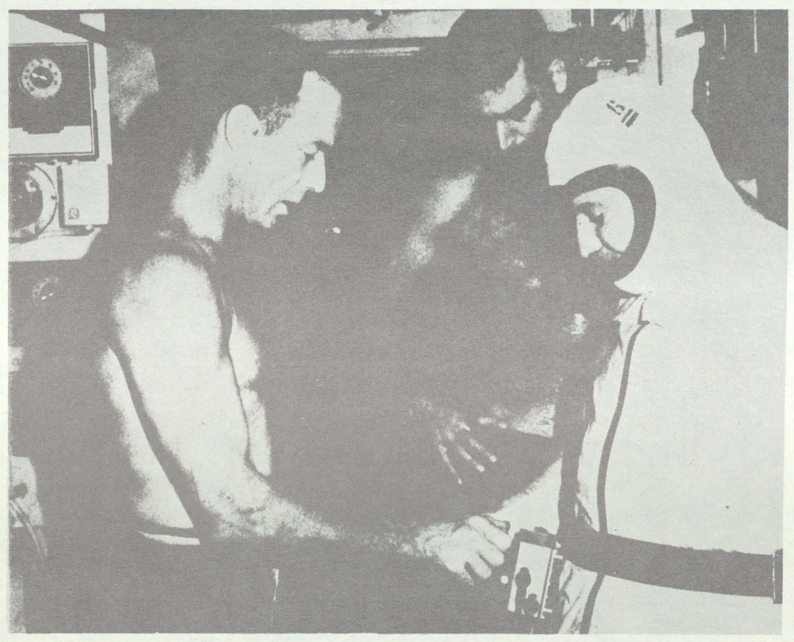
"This may account for the fatigue felt by some of the men," said Capt. Walter F. Mazzone, Sealab's chief physiologist. "After a week or so they had to force themselves to get out of the sack in the morning to go to work." The expiratory flow rate was

THAT WERE USED IN SOME EXPERIMENTS TO REPLACE THE HEAVY SCUBA TANKS





SEALAB'S FRONT DOOR, *which is hatch in the floor, is used by Comdr. Carpenter and other diver (top). Air pressure keeps water out. Below, Comdr. Carpenter and Lieut. Robert E. Sonnenburg check suit of diver.*



SEALAB II TO GEMINI V. *Comdr. Carpenter makes historic telephone call to old space colleague, astronaut L. Gordon Cooper, during Gemini V orbit.*



ROCHE MEDICAL IMAGE

down, the mean reading for tidal volume was 175 cc. below normal and vital capacity was down by 800 cc. "It's going to take months to determine the reasons for these readings," predicts Capt. Mazzone. Gas density, which was 1.6 times greater than surface air, was cited as a possible cause. "If the density is responsible, it might mean that divers would need some type of device to aid respiration when they go to deeper depths, where the density would be even greater," Capt. Mazzone suggests.

Significance of stresses unknown

Stress in another area also requires further examination by Capts. Mazzone and Bond. Urine and blood findings disclose that lactic dehydrogenase levels were elevated and stress indicators, such as the catecholamines and the corticosteroids, rose to three times normal values during the first three days of submergence, after which they usually reverted to normal. Until these findings are correlated with base-line and other measurements, their significance cannot be determined.

Headaches, apparently caused by atmospheric contaminants, and bacterial ear infections, partly resulting from the high humidity and a build-up of perspiration under the hoods worn by the divers, were the most frequent medical problems. Women's hair dryers and an alcohol-acetic acid mixture were used to dry the men's ears in an effort to reduce infections. These measures reduced the number of infections from nine in the first team of 10 men to one in the third team.

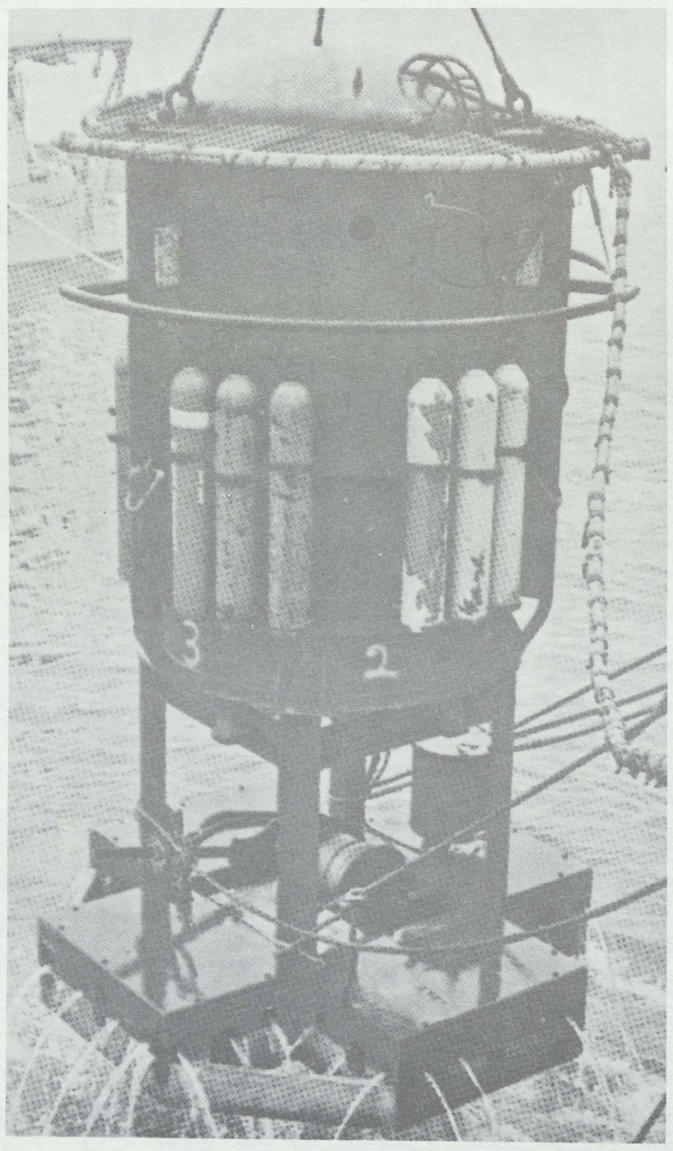
Improved ventilation and a change in the chemical composition of the atmosphere scrubbers helped solve the headache problem. "We attribute the headaches," says Dr. Sonnenburg, "to the build-up of atmosphere contaminants but we're not altogether sure." At one time the carbon monoxide level rose to 21.5 parts per million, which, under Sealab pressures, is equivalent to 100 p.p.m. on the surface, a heavy concentration but not considered dangerous.

The most famous patient treated by Dr. Sonnenburg during the experiment was Comdr. M. Scott Carpenter, astronaut turned aquanaut, who shared with the physician the distinction of being the only men to remain underwater for 30 days. "He was stung by a scorpion fish," relates Dr. Sonnenburg, "an animal with which I have had very little experience. I treated him as I would for the sting of any other venomous marine creature. I gave him diphenhydramine hydrochloride, together with some cortisone acetate and meperidine hydrochloride, which was the therapy recommended by Dr. Bond. He responded well within 24 hours."

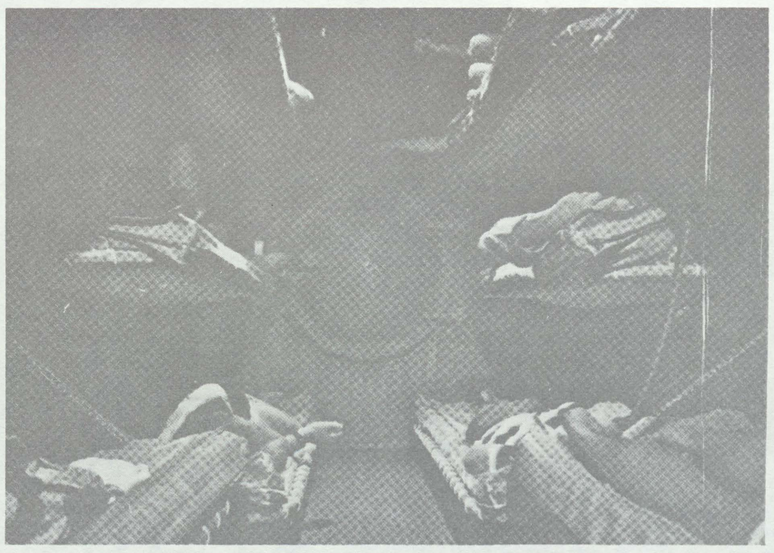
"Getting more physicians interested in this type of work is a problem," Dr. Sonnenburg concedes. "Even in the Navy, among the submarine and diving corps, there is not much interest. Inner space lacks the glamour of outer space, even though the practical benefits to mankind in the near future are far greater." Nevertheless, he foresees the day when doctors will be making house calls or rounds on the ocean floor, visiting underwater bases built to mine minerals, tend off-shore oil rigs or pursue other functions vital to the feeding and well-being of mankind.

Numbing cold is the major problem to be solved before such advances can be made, Dr. Bond believes. Even though the Sealab tests showed that the men became sufficiently accli-

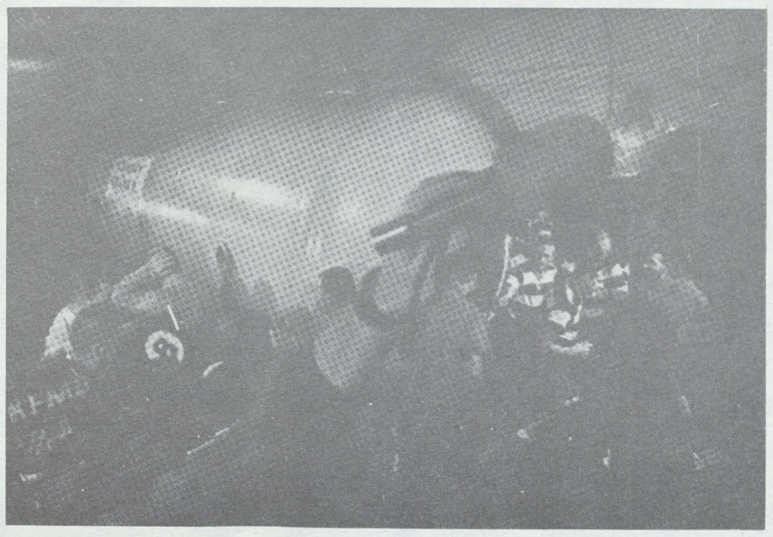
COMING UP *in personnel capsule, divers transfer to decompression tank without being exposed to normal atmosphere.*

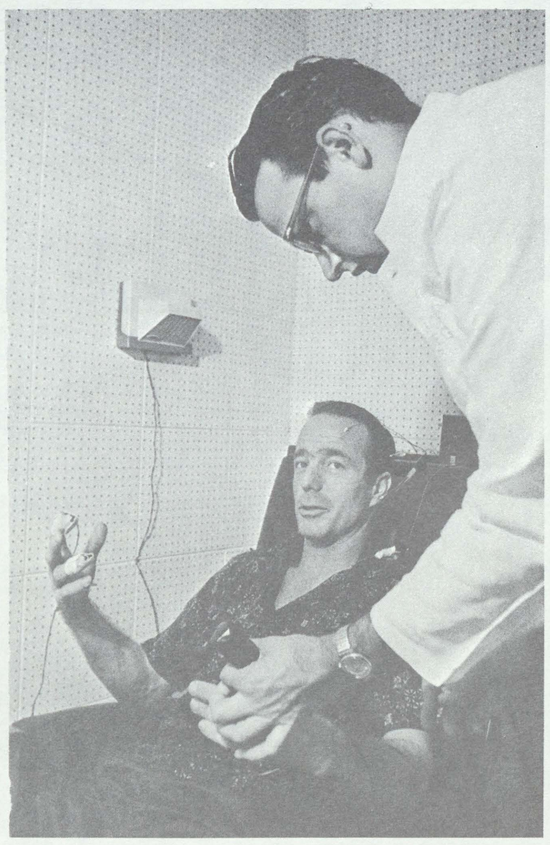


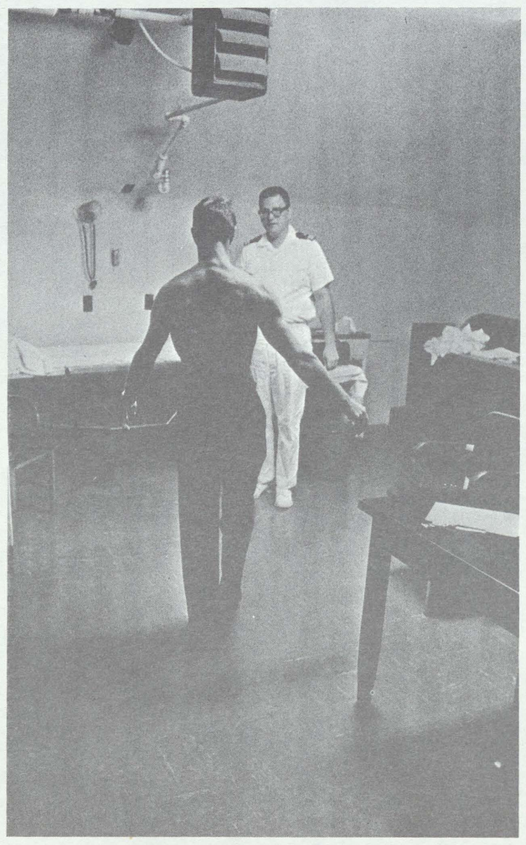
THE LONG WAIT *in decompression tank begins as divers nap on cots. The men had to remain here for 36 hours as pressure, more than seven times that of sea level, was reduced.*

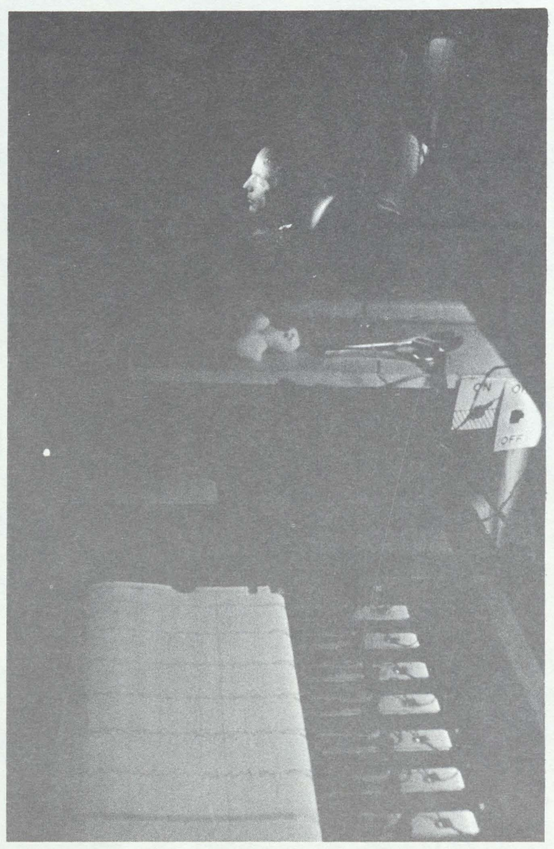


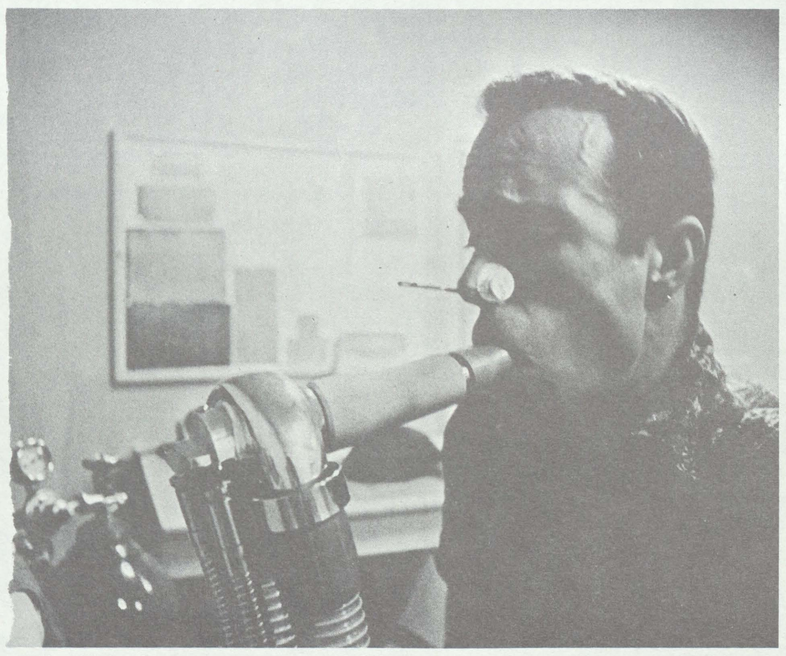
AQUANAUTS' RETURN: *Comdr. Carpenter and other divers in striped shirts are mobbed by photographers, newsmen and Navy personnel after they emerge from decompression.*

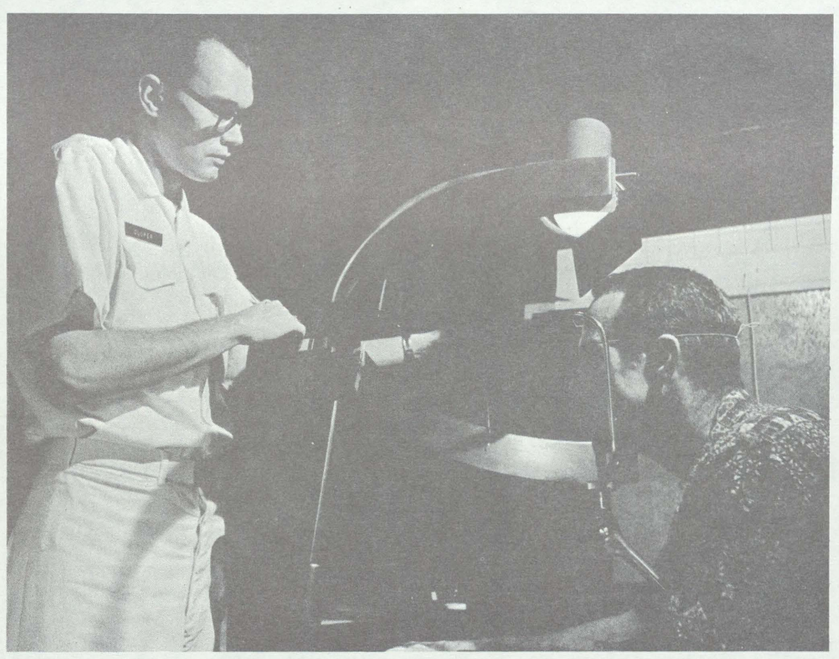












MEDICAL DEBRIEFING *completes the mission. Comdr. Carpenter is given finger plethysmographic and galvanic skin resistance tests (top left), heel-to-toe balance test (by Dr. Michael T. Long), EEG photosensitivity test, as well as pulmonary ventilation and peripheral vision tests. The findings, many of which were recorded simultaneously on polygraph (top right), indicated the aquanaut was in excellent condition after 30-day-long mission.*

matized after several days underwater to record an average increase of 25 per cent in work efficiency, the cold limited swimming excursions to an hour. Electrically heated suits appeared to be the most promising swim clothes tested during the mission. Thus protected, the divers were able to carry out such varied assignments as raising a purposely-sunk Navy jet fighter by pumping buoyant polyurethane foam into the hull, setting up an underwater weather station to measure temperatures and currents and using power tools. Altogether they performed about 100 marine and oceanography tasks, including some mining, tagging fish and building concrete-block fish houses for habitation studies.

Buoyed by the success of the work experiments, Dr. Bond foresees the day when such jobs will be done routinely by scientists, commercial firms and the Navy. "The continental shelves are the next great frontier," predicts Dr. Bond. "This land mass, which is no more than 600 feet below the surface, comprises 14 per cent of the ocean's bottom, an area equivalent to the whole African continent. Here are to be found 85 per cent of the petroleum, mineral and edible protein requirements of future generations." To reap these resources, man must be able to live on the bottom for long periods, Dr. Bond insists. Too much time is wasted by decompression after short dives.

Last year, with Sealab I, Dr. Bond set out to confirm his belief in the feasibility of long-duration, saturation dives, when four men remained submerged 192 feet down in the warm waters off Bermuda for nine days. This year, in a much more ambitious 45-day project, the 28 divers of Sealab II endured the frigid waters of the Pacific at even greater depths. Next year, Sealab III will be lowered to a depth of 450 feet, where more formidable pressures and problems must be overcome if man is to conquer earth's last frontier.

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ADVANCE COPY

PACIFIC TELEPHONE SOUTHERN COUNTIES AREA VOL. 9 NO. 13 SEPTEMBER 15, 1965

TELE-DIGEST

From SeaLab To Soaring Gemini Phone Call Links Ocean To Outer Space

An historic telephone call was made from the Southern Counties Area on August 28 at 11:28 p.m. It was placed from SeaLab II, a 57-foot, 200-ton steel laboratory resting 200 feet down on the floor of the Pacific Ocean, off the SoCo town of La Jolla, to Gemini 5 orbiting high over the Pacific Ocean.

The call was the first time in history that a man at the bottom of the sea talked with a man in space.

Installation Foreman Dave Fountain of San Diego's Mobile and TV group who supervised the connection and balancing of the special circuit at SeaLab's on-shore communications laboratory said, "The entire procedure of setting up the telephone equipment was most interesting. And, to have the conversation go so well was real satisfying."

PBX Installer George Alexander and Dave witnessed the conversation over closed circuit television from SeaLab's on-shore communication laboratory.

"Of course, we couldn't see the astronauts," Dave added, "but we could watch Aquanaut Scott Carpenter on the closed circuit TV while he talked with his friend 'up in heaven.'"

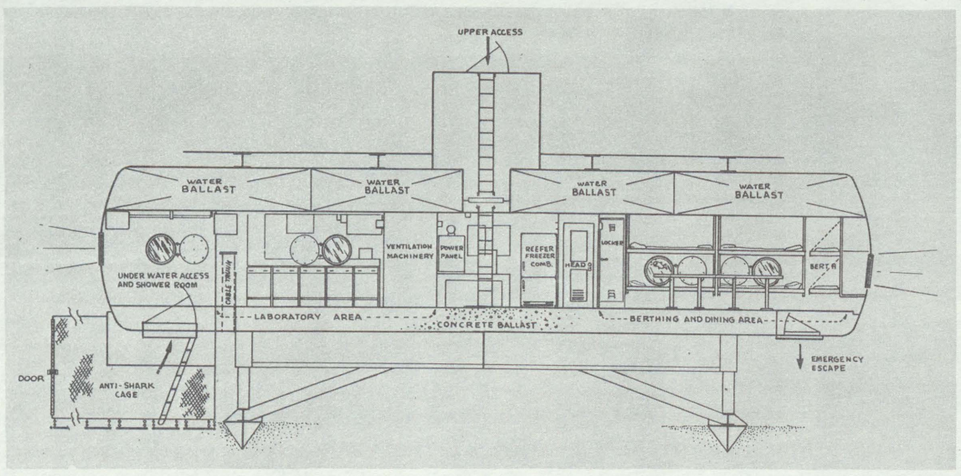
"Carpenter was dressed in a bathrobe, wearing headphones and a microphone," George said. "Both Carpenter's and Astronaut Cooper's voices came through fine."

"Except perhaps," Dave interjected, "for a slight distortion in Carpenter's voice because of the helium-rich atmosphere in SeaLab. Helium was used to replace most of the nitrogen in the air to prevent a fatal sleep that attacks divers breathing nitrogen under pressure," Dave explained. "Consequently, all voices in a helium atmosphere suffer a sharp rise in pitch. To counteract the high voice, Carpenter spoke through an unscrambling device which lowered the pitch of his voice.

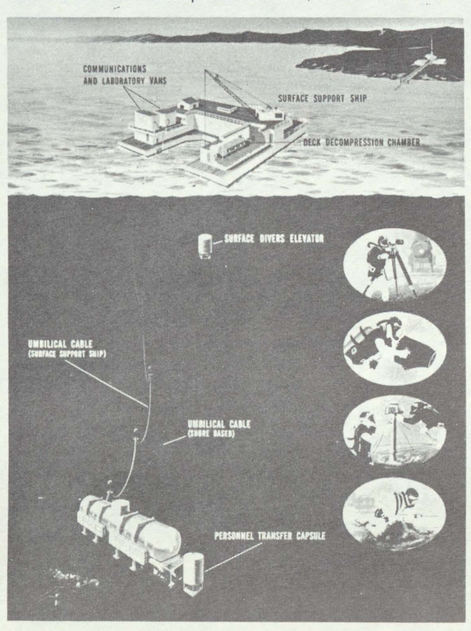
"When you think about that call," Dave said, "it's kind of weird, a telephone hookup that enables a man to speak almost from infinity, with another man deep on the bottom of the ocean."

Dave took a lingering look out over the blue ocean to where a cluster of barges and boats marked the location of SeaLab II.

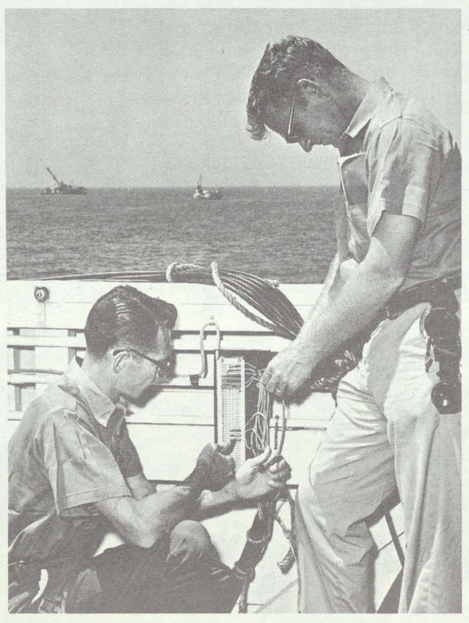
"I suppose," he said, "that in a few years this'll all be kind of ordinary. Then we'll be putting in connections so men on the moon can talk to people on the bottom of the sea anytime, and maybe even from other planets. I've got to admit, this kind of work sure makes a job interesting."



The aquanauts' living compartment is divided into a laboratory, galley and bunkroom. Eleven viewing ports are provided in the hull. Air conditioning equipment maintains the humidity at about 60°. Installed in the vessel's solid concrete deck is radiant heating cable which will maintain the interior temperature at 80-90 degrees fahrenheit. The outside water temperature will vary between 50-55 degrees. Hot, fresh water showers and special heaters are available to enable the divers returning from the ocean to regain normal body temperature.



The 57-foot long, 12-foot diameter cylinder that is SeaLab, will be home for two separate diving teams participating in the largest and most elaborate effort ever tried to test the ability of man to work and live under the sea.



San Diego PBX Installers Gary Bowles, left, and George Alexander make last terminations on the NASA circuit that carried the first conversation from a man at the bottom of the sea to a man in space.

Navy divers aboard SeaLab II are shown making a final check of the vessel's exterior before it was lowered into 200 feet of water off Scripps Institution of Oceanography at La Jolla.
Photos courtesy of U.S. Navy

"Hello up there!" Commander W. Scott Carpenter, the astronaut turned aquanaut in the Navy's SeaLab II program, talks from the bottom of the sea to fellow astronaut Gordon Cooper, orbiting high in the heavens.



Aquanaut Tuckfield, Navy Chief Engineman, on the bottom of the Pacific Ocean views one of the video monitors in the Galley-Laboratory area aboard his home away from home, SeaLab II.

Tuffy Adds New Duties—Brings Friend

POINT MUGU, Calif. — Tuffy, the Naval Missile Center's trained porpoise — and a veteran of the Sealab II operation — saved the Navy $4700 here recenly. And during the next few months Tuffy and another porpoise, Buzz Buzz, may run the savings total to more than $70,000.

The latest exploit of Tuffy involved the recovery of a cradle used in launching the Regulus II missile target. The cradle, which costs $4700, is used to attach the booster motor to the Regulus II during launch.

Target, booster and cradle are launched together. The cradle and booster fall into the ocean seconds after the firing. The target continues on its mission.

* * *

SINCE THE Regulus II program began in 1958, all attempts to salvage the cradles have failed. The murky water and shifting mud on the ocean bottom have made delayed recovery impossible.

Tuffy's success in Sealab II prompted program officials of Guided Missile Unit 55 to give him a chance to locate the cradles on future launches.

For the next operation, a $2.95 buzzer to summon Tuffy was attached to the cradle. But when the cradle hit the water it broke up. The buzzer evidentally broke up too. Tuffy never got the signal.

For the next attempt, technicians added a drogue parachute to the cradle to slow its fall to the surface. The chute slowed the cradle satisfactorily. The buzzer buzzed, and Tuffy streaked to the bottom where he nuzzled against the buzzer with his educated nose. 50 feet below the surface.

* * *

BY FOLLOWING Tuffy, divers from the Pacific Missile Range explosive demolition team and the missile unit located the cradle with the booster case still attached. It was hauled aboard.

"We have three Regulus II targets left," Lt. James W. Brooks, unit officer in charge, said. "We expect to get as many as 15 flights from these three birds."

But there are only nine boosters and five cradles left. This leaves the recovery team — Tuffy, Buzz Buzz and humans — with plenty of work.



TUFFY RESPONDS to the acoustical device handled by trainer Wally Ross. Now Tuffy, of Sealab II fame, will have a partner, Buzz Buzz.

December 1, 1965 NAVY TIMES

Carpenter Urges More Ocean Work

By BILL KREH

WASHINGTON — A Navy officer who's been a pioneer in both of today's unexplored frontiers has urged the nation to give as much emphasis and support to underseas research as it does to the conquering of space.

Comdr. M. Scott Carpenter, the world's only astronaut-aquanaut, told the National Press Club here that the nation — and the world — stand to get "much more immediate gains from underwater research than from some space projects such as the assault on the moon, for example."

Carpenter is one of the seven original Project Mercury astronauts and orbited the earth three times in his Aurora 7 space capsule on May 24, 1962. More recently he has been participating in the Navy's man-in-the-sea program and spent 30 days in Sealab II off the San Diego coast.

* * *

HE WAS one of the four participants in the Sealab program who were guests at the Press Club luncheon. Others were Capt. G. S. Bond (MC) who headed the experiment; Robert G. Sheets, master chief torpedoman, and Robert A. Barth, chief quartermaster.

Carpenter told his audience that financial and other support for undersea research is but a fraction of that given to the space program, which he described as a "glamorous effort" which now "ranks currently between God and motherhood" in the minds of the public and government officials.

In contrast to this "superbly sophisticated" space effort, he said, our research into making the ocean bottom a habitat for man is at present only a "newly legitimized child represented by a nucleus of 50 dedicated men working with mail order equipment, in marginal conditions using outmoded techniques."

He called Navy divers a "very special breed of men with more guts and courage than any other profession I know," but indicated that it would take more than just these attributes to make man's assault on the sea a successful one. Better equipment, more research and more public support are needed, he said.

* * *

CAPT. BOND said the Navy's man-in-the-sea program "is well on its way" and, given the necessary support, will in another five years result in naval personnel "doing useful work for extremely long times" along the 600-foot depths of the country's continental shelf. He predicted this might be done in an "underseas mobile home" completely independent of surface support and in which decompression could take place as it returned to the surface.

The two CPO divers described some of their experiences during their undersea living. Part of their work was in salvage and repair projects, such as using foam for salvaging sunken aircraft, using special tools to simulate installing plates on a sunken submarine, and experimenting with air impact drilling and cutting large holes in steel plates.

WORLD PROGRESS - 94A
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Oceanography. Sealab II, a 12-by-57-foot steel cylinder, was lowered on August 26 to 205 feet below the surface of the Pacific Ocean, 1,000 yards off the shore of La Jolla, California. Two days later it became the underwater home of a team of aquanauts who began a 45-day exploration of the ocean's depths. The project was sponsored by the U.S. Navy and the Scripps Institution of Oceanography.

Sealab II thus became the nation's most ambitious effort to explore and eventually exploit the ocean's resources. In Sealab I, which submerged in 1964 off Bermuda, four Navy men lived in a cylinder 192 feet below sea level for nine days. Sealab II's three separate 10-man teams were scheduled to stay underwater for 15 days at a stretch, with team leader Scott Carpenter (a 1962 orbital astronaut) remaining a whole month. Like the Sealab I project, Sealab II's purpose was to determine how well man could live, labor, and learn within the depths of the sea.

Standing by on the surface of the Pacific was a support barge linked to Sealab by an umbilical cable for power and communications. Supplies were lowered to Sealab in a small pressurized capsule. In case of emergency, the men could get power and fresh water from a tube linking them to shore, and they could surface in a 14-foot capsule anchored outside the Sealab.

Life in Sealab. Sealab contained well-equipped scientific and medical laboratories, a compact galley, and a dining area. There also were hot showers, comfortable bunks, as well as cooking facilities, TV, and a well-stocked refrigerator.

But, in the pressurized artificial atmosphere of the capsule, matches would not burn and water boiled only at temperatures above 300 degrees. Fried foods were forbidden because of the greasy fumes. Fresh eggs could be dangerous: the toxic hydrogen sulfide given off by their yokes could not be "scrubbed" out of the air with Sealab's purifying gear.

The atmosphere had to be rigidly controlled. Because ordinary concentrations of oxygen become toxic when breathed under pressure for a long period (causing convulsions and pulmonary disease) and nitrogen has a narcotic effect, the aquanauts breathed a special mixture of gases: 4.3% oxygen, 18% nitrogen, and the rest helium. Even this mixture caused minor difficulties. Helium is so much lighter and less dense than nitrogen that the human voice resounds at a higher pitch than normal and words tumble out rapidly, producing a Donald Duck falsetto. Therefore, to make themselves understood, the men had to speak an octave lower and much slower than usual.



WIDE WORLD

Sealab II. This 12-by-57-foot steel cylinder was sunk off La Jolla, California to 205 feet below sea level in order to provide an underwater home for 20 divers investigating the sea depths.

Underwater Tasks. The aquanaut team, composed of navy divers and scientists from the Scripps Institution of Oceanography, had rigorous duties to perform. They emerged periodically from Sealab II in rubber diving suits and Mark VI breathing apparatus to map the ocean floor and perform about 100 marine biology and oceanography experiments. They set up an outdoor station to measure ocean currents. They also tested themselves, measuring vision, perception, and strength. Reactions were watched very carefully topside.

The aquanauts got some help from a 7-foot, 270-pound porpoise named Tuffy, whom the Navy had trained to come swimming at the sound of a buzzer. A residence was established for Tuffy in a pen near the support barge, and when called, he carried messages and cables between the lab, divers, and topside.

On September 14 the first team left Sealab II after 15 days of life in the ocean. They were in top physical shape except for minor ear infections common to divers who use hooded swimsuits. Scientists discovered that while in Sealab II the efficiency of the men had begun to fall off. As time went on there was a reluctance on the part of the aquanauts to leave the warmth of Sealab II and go back outside into the sea's extreme cold, darkness, and dangers. Further information was expected before the project ended in October.

CALIFORNIA
MAGAZINE OF COMMERCE, AGRICULTURE & INDUSTRY



SEALAB leads the way to new environment for man

ALTHOUGH HE HAS LIVED ON EARTH for more than a million years, man has barely dipped into what is probably this planet's richest resource.

Covering three-quarters of the earth's surface, the sea holds in its vastness enough protein in fish and plankton to nourish half the world's people. Huge reserves of oil and gas lie beneath the ocean floors. And littered about these murky floors are pure nodules of manganese, nickel, cobalt, and copper. What else awaits man's discovery, no one yet knows.

But now, science has teamed with technology and plunged into the sea in a determined effort to unlock the mysteries and harvest the resources held in its depths.

Just weeks ago, on October 10, a milestone in this effort was reached when the last crew of the U. S. Navy's Sealab II surfaced in the Pacific off the coast of La Jolla, ending a 45-day undersea experiment. Sealab II marked the second stage of the Navy's "Man-in-the-Sea" program which aims to determine man's capacity to live comfortably and work effectively at great depths. This new voyage of discovery to inner space is the U. S.'s most ambitious effort to explore the sea with the aim of eventually exploiting its enormous store of food, oil, and mineral resources.

The Navy launched "Man-in-the-Sea" last year 30 miles off Bermuda with Sealab I, wherein four Navy divers lived and worked comfortably at a depth of 193 feet for 11 days.

Sealab II probed deeper, 205 feet, and longer, 45 days. Last August 29, the first of three 10-man crews descended to their ocean home-laboratory on the bottom of the Pacific half-a-mile out from La Jolla. The first two crews were led by Aurora 7 Astronaut Scott Carpenter, who remained down for 30 consecutive days. With one other exception the Sealab II aquanauts stayed down for 15-day periods. Lt. Robert E. Sonnenburg, a Navy doctor and specialist in submarine medicine, accompanied the first and third crews.

Cooperating with the Navy for the entire Sealab program is Scripps Institution of Oceanography, whose scientists were among the divers.

Built at San Francisco Naval Shipyard, Sealab II is a 12-by-57-foot steel cylinder containing a well-equipped scientific and medical laboratory, a compact galley, and reasonably comfortable bunkroom. Eleven viewing ports are placed along its sides. Imbedded in the surface of the solid concrete deck are radiant heating cables to maintain interior temperature at 80 to 90 degrees F., and air conditioning to keep the humidity at about 60 per cent. Atmosphere in the vessel was kept at 98 pounds-per-square-inch to equal the outside water pressure so that watertight hatches were unnecessary. Thus Sealab was open to the sea through ports at either end of its concrete floor, giving the aquanauts greater freedom in leaving and entering their habitat. Main access is through an anti-shark cage suspended below the hull.

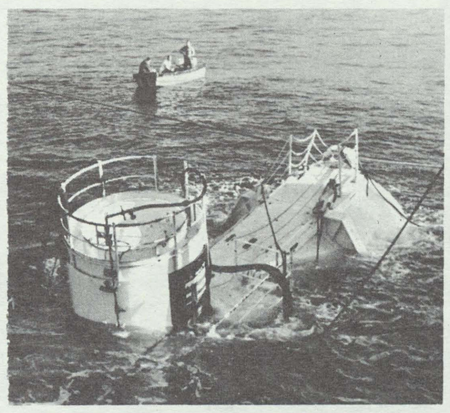
Because of the 98 pounds-per-square-inch pressure within the vessel—six times greater than at sea level—a special air mix had to be provided that was low in nitrogen. Under such high pressures, nitrogen is forced into a diver's bloodstream causing "rapture of the deep," a giddy state wherein divers have been known to remove their air-intake mouthpiece and offer it to passing fish. So Sealab's air was an exotic mixture of roughly 85% helium, 11% nitrogen, and 4% oxygen.

One amusing result of this "light air" was that it made the burly aquanauts sound like choir boys, the air in Sealab being too light to make vocal chords resonate fully. A special speech unscrambler had to be used to deepen the pitch and make the undersea voices intelligible.

A dazzling array of sophisticated equipment was put to use in this project. An example was the Benthic Laboratory. A concrete beehive structure six feet in diameter, it was located on the ocean floor about 100 feet from Sealab II and served as the central switchboard for communications and data sampling channels linking the vessel to the support barge. Benthic Laboratory provided four television channels which allowed constant monitoring from the barge of the aquanauts' activities in and around Sealab. It also contained 20 channels for audio communications and 120 data channels.

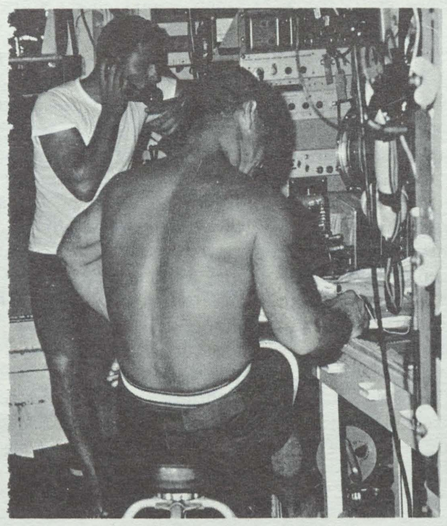
Sealab II got its primary electrical power and fresh water (for refreshing hot showers) through connections from shore. An umbilical from the support barge provided cables for secondary power and communications, an atmospheric gas supply hose, gas sampling hose, and a compressed air hose for power tools.

The aquanauts were given a rigorous routine to follow. From the support barge Navy Capt. George F. Bond, director of the project, kept close watch over activities by closed-circuit television, talking frequently with the men below. Each morning the doctor on board Sealab took samples of the aquanauts' blood, saliva, and urine; checking their heartbeats, brain waves, and blood pressures. They were tested for sight and hearing, strength and coordination. At the end of the day each man sat down to an Electrowriter and filed a confidential report to Capt. Bond on how he felt.



SEALAB comes to the surface.

Aquanauts in the team of ten men who lived and worked at 205 feet below the surface of the Pacific in the Navy's Sealab II project are shown in the undersea laboratory area.



During the day, although it was dark as pitch 205 feet down in the 50-degree water, the aquanauts ventured out in their rubber wet suits on two-hour sorties with specific jobs to do within a 225-foot perimeter surrounding the vessel.

They installed a weather station which measured temperature, speed and direction of underwater currents, and variations in pressure. An optical measurement range was set up to determine visibilities on the ocean bottom. A standard underwater light source was tested to find out at what distances it could be seen at different times of day and night. Color and form visibility tests were also conducted.

The aquanauts built two pyramid fish houses of concrete block for fish experiments and observation, took a census of the fish population in the area of Sealab, tagged fish, crabs, starfish and other such sea life to record their movements and abundance. Measurements were made of the gas pressure in the swimbladders of rockfish and the gas composition was sampled. Plankton migration was studied, and the aquanauts ate plankton with their meals.

One of the most successful tests involved the raising of a Navy jet plane, purposely sunk near Sealab to try out new salvage techniques. The aquanauts pumped a lightweight plastic form into the plane's fuselage which made it buoyant and raised it to the surface.

Since the extremely cold water as well as the increased pressure and saturated diving conditions were expected to limit the aquanauts' effectiveness in performing their tasks, a number of special human engineering tests were devised. Divers applied a recording torque wrench to a point outside the Sealab using several different body positions and hand grip combinations to determine how much force they could exert against a tool handle. Two-hand coordination and touch tests were conducted.

In sonic experiments, one diver would read a prepared word list to another. The second diver noted what he heard and later compared it with the list. And a group of four divers was supplied with bags containing components and a plan of a simple three-dimensional structure which they had to assemble. Observers recorded the time it took them to complete the job and noted how the divers solved the problem as a team.

Very close observation was made of the aquanauts' behavior inside Sealab itself, how they reacted to their unusual environment and to each other. Factors tending to affect behavior were, for example, the capsule's restricted space; the high pressure and exotic gas mix of the atmosphere; the cold, dark, wet outside ocean world. And although a manageable 215 feet from the surface, each man was two or more days removed from his normal environment owing to decompression requirements.

Psychologists observed the aquanauts as they ate, slept, worked in the capsule, used their free time, and socialized. Aquanaut behavior will be compared with that of small groups in other unusual environments, such as the American Mt. Everest team of 1963 and Antarctic wintering-over parties.

It will be months before the mass of data is analyzed and correlated and conclusions can be drawn about the aquanauts' overall performance from Sealab II. The vessel itself was hoisted from the bottom two days after the last crew came up and towed to Long Beach Naval Shipyard for a thorough inspection and probable modification for future use.

Navy spokesmen have been cautiously optimistic when questioned about results, but indications suggest a highly successful venture.

What next? Sealab III. Sometime next year aquanauts will descend to 400 feet to live and work. "Our ultimate goal," says Capt. Bond, "is to learn if men can work and live and be productive at 600 feet."

It is possible America is on the watery pathway to a bountiful new world. Meanwhile, the by-product is discovery and adaptation—to a fantastic new environment.

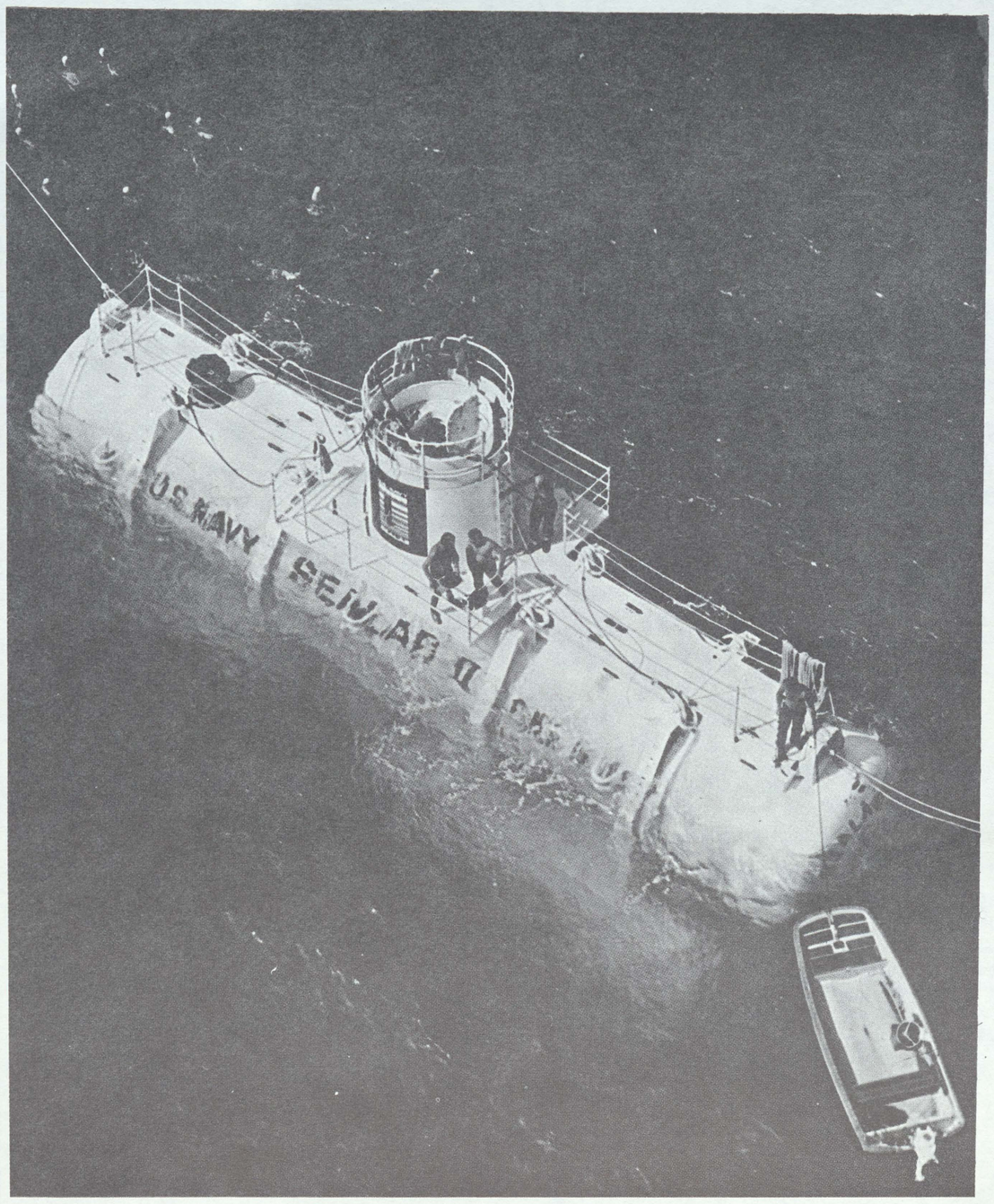
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METALWORKING EDITION

STEEL

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The Metalworking Weekly



U. S. Navy's Sealab tests man's ability to live under the sea for long periods

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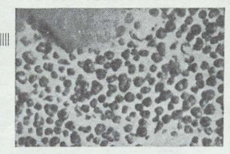
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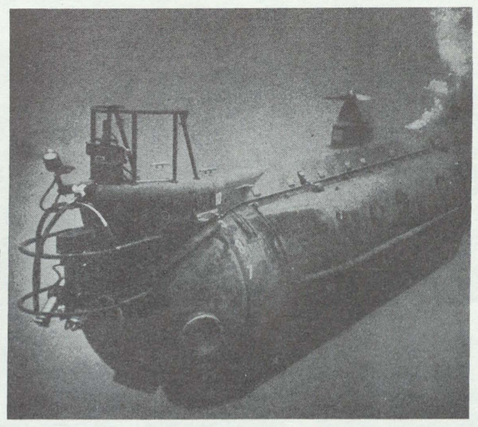
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DECEMBER 20, 1965

STEEL FEATURES

Probing New Markets In Aquaspace





Manganese nodules like those at left are among treasures being found on ocean's floor. Reynolds' Aluminaut is an example of vehicles that are exploring aquaspace

IN 1820, a group of New England shipowners commissioned Nathaniel Palmer to search for the sea's untapped resources in his 45 ton sloop, the *Hero*. He gave them a handsome return by discovering rich seal rookeries off the southern coast of South America; and he discovered Antarctica, but didn't know it.

TODAY, we're at the same point in our exploration of aquaspace, the vast uncharted frontier under the sea. We're onto something big, but we don't know "how big."

"When" we'll know is also subject to conjecture. As Roger Lewis, president, General Dynamics Corp. told the Navy League in New York: "Experience has shown us that, in the fields of science and exploration at least, we are constantly overestimating what we can do in five years, and vastly underestimating what we can do in 30 . . . but our thinking has to start somewhere. . ."

Adds Bob Abel, executive secretary, Interagency Committee on Oceanography (ICO), Washington: "We haven't finished with R&D, but it's certainly time to start some strong engineering programs."

Adds Paul Zinner, Bureau of Mines, who heads up the marine minerals technology program: "We'd like to get somebody doing something practical in five years, but we really think in terms of ten years before an identifiable industry develops."

One thing is certain: The rate of progress will hinge largely on developments in materials and manufacturing methods.

Where To Look

To understand what's needed in terms of materials and manufacturing methods, it's helpful to think of undersea projects in two categories: Those for exploration and those for exploitation.

As a nation, we want to explore the deepest (35,000 ft) ocean floor. It means, for example, that we must build vessels that withstand 15,000 psi. The Navy's bathyscaphe, *Trieste*, can handle the depth, but it's cumbersome; and its submergence time isn't long enough.

Commercially, most oceanologists think in terms of exploiting resources on our Continental Shelf—an undersea area off our coastlines which is 10 to 300 miles wide. Its deepest point is about 650 ft.

By international agreement, the U. S. has acquired the right to explore Continental Shelf lands for "economic exploitation." It's our most extensive territorial acquisition since the Louisiana Purchase.

● **How To Tap It**—Systems under development are broadly categorized as fixed or self-propelled. In some cases, a combination approach is used.

Fixed systems include drilling platforms, ships with undersea equipment, and Edwin Link's *Igloo*, an inflatable rubber chamber that rests on the ocean's floor—it's a workshop, rest area, and portable decompression tank. The Navy's *Sealab* (see cover) is one of the best known fixed systems. It's being used to test man's ability to live and work under the sea for extended periods. Project Mohole—a drilling platform—is another example. The National Science Foundation will anchor it to the ocean's floor (at a depth of 14,000 ft) off Hawaii. The assignment: Drill a hole through 17,000 ft of the earth's crust to explore its wonders.

Many development dollars have been poured into self-propelled systems. Designated as deep submersible vessels (DSVs), they're generally self-sustaining and can be outfitted with machinery for a variety of tasks. Most of them have positive buoyancy (they float to the surface). To improve the buoyancy factor, fuel tanks and machinery are being placed outside the pressure hull in new designs. Researchers are testing buoyancy foams to improve the failsafe factor.

Through research on such vehicles, the Navy is getting an idea of the designs and materials it needs for submarine defense and its deep submergence program, which includes systems for the recovery of survivors in submarine tragedies, to determine man's ability to live in the sea, to recover large and small objects under the seas, and to investigate the ocean's floor. A nuclear powered research vehicle, its latest project, can operate under the seas for weeks vs. the "normal" hours. The Navy is also developing technology for undersea mining.

Bill Of Materials

Several hull and pressure vessel materials are under evaluation, including: High strength steels; nickel, chromium, and molybdenum steel alloys; titanium and aluminum alloys; glass reinforced plastics (GRP); glass and glass-ceramic systems; wood and prestressed concrete.

Hull sections are 2 to 8 in. thick. Critical factors include strength-to-weight ratios (which affect displacement), corrosion resistance, stress relief, and ease of fabrication.

Here's a status report from George Sorkin, head of the ship materials and structures branch of the Navy's Bureau of Ships: "We're using 80,000 and 100,000 psi yield strength steels (quenched and tempered HY-80 and HY-100). We're researching steels (such as HY-140) with yield strengths of 130,000 to 150,000 psi. The next step will be (maraging) steels in the 180,000 to 210,000 psi range." One problem with maraging steels, plastic deformation, must be licked. Stable austenitic steels will be considered if they can be precipitation hardened.

Titanium alloys with yield strengths up to 150,000 psi are being considered for the Navy's next search and rescue vehicle. Its lightness is an attractive feature, but its high cost will tend to restrict its application to government projects, says Mr. Sorkin.

Several titanium alloys are being evaluated. The most promising include 7Al-2Cb-1Ta, 6Al-4V, and 6Al-6V-2Sn. Some alloys appear to exhibit less than normal stress corrosion cracking (for titanium) under submerged pressures and temperatures. Navy metallurgists indicate that resistance to stress corrosion cracking and the amount of weld contamination are key factors in selecting a material.

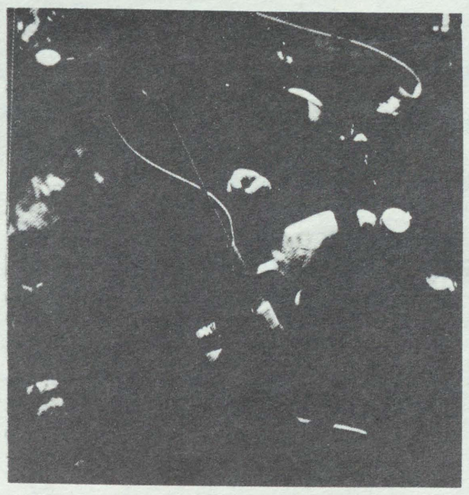
Reynolds' *Aluminaut* has proved that aluminum is feasible for hull structures—however, the craft has not been taken down to its design depth of 15,000 ft. The metal has advantages and disadvantages. Its lightness means more range and payload; but it isn't easy to weld, and a special coating is needed for corrosion protection. Mr. Sorkin feels that the thickness required to get strength makes aluminum less attractive than other hull materials being studied.

● **Glass** — Mr. Sorkin thinks that GRP will have to be used at greater depths. Pressure cylinders made of filament wound glass fibers are under test. They're light, strong, corrosion resistant, and easy to fabricate — although large structures require stiffener rings. Sealing is also a problem.

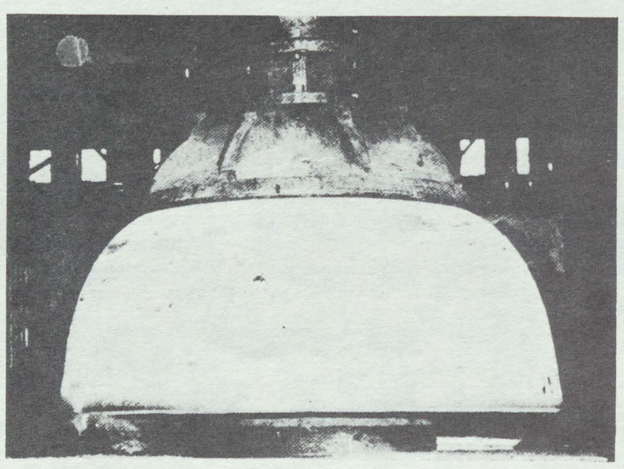
Test models have withstood pressures of 13,000 psi (the equivalent of 30,000 ft). Glass fiber structures with thin metal reinforcing shields are under development. Several researchers think they might be the best cost-performance solution in the 10,000 to 20,000 ft range.

Cast glass spheres and glass-ceramic systems could get the nod for deeper work. The materials are low in density, have a high modulus, and great compressive strength. They are brittle, but they have the unusual property of becoming more impact resistant at greater depths. Researchers are working with surface treatments (such as chill tempering and ion exchange reactions) to put glass surfaces in permanent compression. Protection can be added by coating or cladding glass with high impact plastics. Hopefully, this can be done without damage to one of its chief assets—visibility. By com-

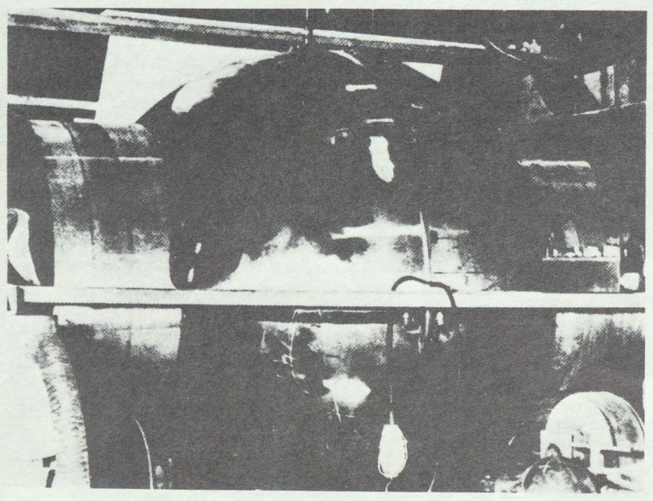
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Underwater electronic splice being applied to ship mooring cable at General Motors Corp.'s Defense Research Laboratories, Santa Barbara, Calif.



HY-100 is hot spun into pressure spheres (they weigh 8861 lb each, are 84 in. in diameter by 2 5/16 in. thick) for Navy's Alvin by Lukens Steel Co.



Deepstar pressure sphere is machined, welded, and annealed in fixture developed by Westinghouse's Marine Div. Sphere halves were machined down to ½ in.

bining glass and ceramics, researchers expect to gain optimum strength and ductility. They're after 120,000 psi tensile strengths.

● **Outlook**—At this stage of development, it's difficult to get agreement on the performance limits of materials. These generalizations appear to be realistic:

● To 6000 ft—Steels up to 140,000 psi in yield strength appear to have the edge from a cost-performance standpoint. Aluminum may be used in specialized applications.

● At 15,000 ft—Titanium is leading. Glass reinforced plastics might be feasible. Maraging steels with buoyancy foams are costly but will probably work. This is the practical strength-weight limit of aluminum.

● Below 15,000 ft—GRP reinforced with clad metals looks like the best bet. Glass and glass-ceramic systems will be used in bathyspheres. Metals can be used in vehicles with negative buoyancy, but less expensive materials will probably be available.

How To Fabricate

Forging and welding continue to be the commonplace fabricating methods for most structures. Castings can be used for housings—not for hulls. Because of their thickness, plates must be machined all over. The work requires rugged equipment and specialized fixturing similar to those used in aerospace projects. Numerical control doesn't appear to be necessary.

Mr. Sorkin reports that spin forming is gaining favor in making end sections. Explosive forming has been tried; and roll forging of titanium ring structures is under study.

TIG and MIG welding are commonly used. Dip transfer welding works on newer materials. Electron beam welding has been tried and will be used more. Adhesive bonding won't be needed until nonmetallic materials come into play. The Navy is still seeking stick electrodes that provide adequate tensile strength above 130,000 psi. Air Reduction Co. Inc., New York, thinks it has the answer—AX-140 wire designed for welding the Navy's newest high strength steel, HY-140. "We also need a good, nondestructive weld test. We'd like a nondestructive method for detecting interstitial contamination in titanium welds too," says Mr. Sorkin.

Understanding the ocean environment is perhaps the biggest problem. "Corrosion is such a big factor, reliability is entirely different from that in aerospace. We want these vessels to last ten years," asserts Mr. Sorkin.

Is It Worthwhile?

Nobody really knows the market potential beneath the sea, but some logical guesses have been made.

Dr. A. S. Turner, director, production operations, Northrop Corp.'s Norair Div., Hawthorne, Calif., says: "About 40 million square miles of ocean bottom consist of clays containing enough copper and aluminum to supply man for a million years at present rates of consumption. And manganese nodules and other minerals have a potential value of $10 million per square mile. Potentially, the sea is more productive than the land—yet the oceans now supply only 1 or 2 per cent of man's food."

Hints of potentials are beginning to appear. The Japanese are producing 20 per cent of their coal from mines nearly 3000 ft beneath the sea. The Russians have more than 1000 oceanographers working on new mining and fish gathering techniques and on sea level control. (Some Caspian Sea ports are drying up.) We are starting commercial sand and gravel mining off the East Coast.

The DeBeers Group bought out an undersea diamond mining operation (off the West African Coast), which was pioneered by Texas millionaire, Sam Collins. Through its Consolidated Diamond Mines of South Africa, DeBeers is drilling, dragging, and sucking up (through a rubber hose) 700 tons of diamond gravel daily. Average recovery is 5 carats per ton vs. 1 carat per ton in normal dry land mining. The daily dollar take exceeds $700,000. DeBeers' plans are to boost production to 400,000 carats ($80 million) per month.

● **Need More R&D** — Other fields being studied are pollution control, salvage, food production, weather forecasting, and recreation.

Federal R&D budgets for oceanography have climbed from $24 million in fiscal 1954 to $142 million in fiscal 1966. Not included are the billions the Navy has spent on underwater defense programs.

For every dollar the government puts into research, private industry is anteing at least $3. More than 400 companies are directly involved, and several thousand suppliers are participating.

The need for new technology is virtually limitless. Hydronautics Inc., Laurel, Md., is investigating gilled systems that will extract oxygen from sea water for use in fuel cell powerplants. Gill systems for people are the subject of several funded medical projects. And the Navy is talking seriously about a submersible seaplane.

Both exotic and mundane projects require solutions to thousands of simpler problems. Here are a few of the needs:

● Portable computers that can be transferred from ship to shore.

● Ultrasonic inspection systems for checking pipe and welds.

● Automatic brazing techniques for piping alloys.

● Mechanical components and controls for underwater manipulators.

● A 1 hp, thermoelectric outboard motor.

● Methods for cooling tungsten by metal infiltration.

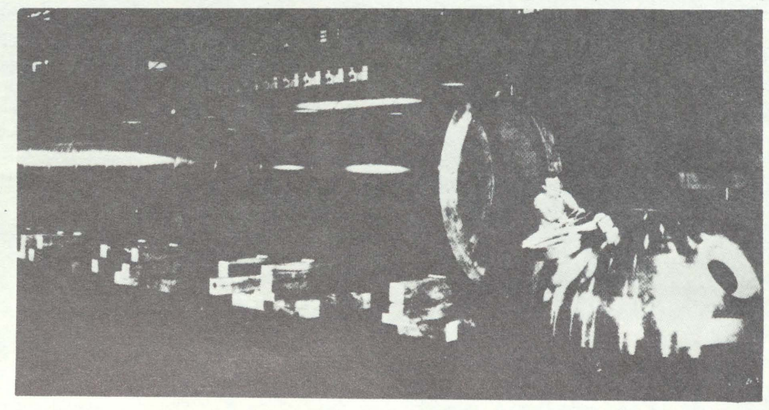
● An ocean depth gage accurate to 0.1 per cent at 20,000 ft.

● Systems for precisely placing and retrieving a 155 ton nuclear reactor at 20,000 ft.

Those needs stem from Navy projects. Twenty other federal agencies have similar lists. The Interagency Committee on Oceanography is acting as a clearinghouse. Mr. Abel concedes that limited funds restrict progress. He urges more direct involvement by private industry.

Materials For Aquaspace

Properties	Alloy Steels HY-80	Alloy Steels HY-100	Aluminum 7079	Titanium (typical)	Filament Wound Plastic (HighMod)	Glass	Glass-Ceramic
Compr Str 1000 psi	80	150	70	150	150	300+	300+
Density (ρ), lb/cu in.	0.283	0.283	0.100	1.160	0.080	0.081	0.094
Stiffness Index $E^{1/3}/\rho$	1,100	1,100	2,200	0.590	2,690	2,580	2,740



Hull rings were match drilled to insure perfect alignments.

The World's Fleet Of Aquaspace Vehicles

Name of Vehicle	Owner/Operator	Rated Operating Depth (ft)	Cruise Speed (knots)	Dimensions Length (ft)	Dimensions Beam (ft)	Dimensions Height (ft)	Weight (T = tons) (lb = pounds)	Payload (lb)	Energy Source	Pressure Hull Type
Aluminaut	Reynolds International Inc. (1965)	15,000	3	51	8	14.25	73.2T	6,000	4, 77 cell, 32,500 amp-hr, silver-zinc (internal)	11 forged 40 in. cylinders; 2 hemispherical heads of aluminum alloy 7079-T6; 6.5 in. thick; bolted construction
Alvin I	Office of Naval Research, Woods Hole Oceanographic Institution (1965)	6,000	2.5	22	8	13	13T	1,200	3 external, oil-encased, lead-acid pressure comp	7 ft (OD) sphere HY-100 steel, 1.33 in. thick
American Submarine Model 300	American Submarine Co. (1961)	300	1	13	4.2	4.75	2,200 lb	450	4, 6 v, lead-acid	Welded dimetcoted A-36 steel, 0.75 in. thick
American Submarine Model 600	American Submarine Co. (1963)	600	1	13	5.5	5.2	3,500 lb	750	4, 6 v, nickel-cadmium	Welded dimetcoted, 0.5 in. thick, A-36 steel
Archimede	French Navy (1961)	36,000	3	69	13	26.5	61T (less ballast & hexane)	4,000	2, 110 v, 860 amp/hr, oil-encased, alkaline battery (outside pressure hull)	Ni-Cr-Mo forged steel sphere; 7.87 in. (OD), 6.9 (ID); 5.9 in. thick
Auguste Piccard	Swiss National Exposition Corp. (1964)	2,500	1-2	93.5	19.7	24	164.37T	20,000	2, 2000 amp-hr, 110 v, lead-acid batteries	Steel cylinder, capped by steel hemispheres
Benthos V	Lear Siegler Inc. (1963)	600	2	11.3	6.1	6	4,200 lb	400	1 silver-cadmium	6 ft (OD) mild steel sphere, 0.625 in. thick fiber glass fairing
Cubmarine PC3A	Perry Submarine Builders Inc. Ocean Systems Inc. (1965)	300	3	18.5	3.5	6	4,790 lb	750	6, 6 v, 210 amp/hr, lead-acid	A285 steel
Cubmarine PC3B	Perry Submarine Builders Inc. Ocean Systems Inc. (1964)	600	2	22	3.5	6	5,500 lb	750	50, 1.5 v, 250 amp/hr, silver-zinc	0.5 in. A212 steel
Deep Jeep	Naval Ordnance Test Station China Lake, Calif. (1964)	2,000	2	10	8.5	8	8,000 lb	200	8, 6900 WH lead-acid	5 ft (OD) HY-50 sphere
Deep Star 4000	Westinghouse Electric Corp. (under construction)	4,000	1	18	11.5	7	19,000 lb	100 (min)	3 lead-acid, 400 amp/hr in 62, 2 v cells (inverter)	6.5 ft (OD) 1.2 in. HY-80 sphere
Diving Saucer	Westinghouse Electric Corp. (1959)	1,000	1	9.5	9.5	5.5	8,500 lb	100 (min)	3, 104 amp/hr, lead-acid batteries	0.75 in. thick mild steel ellipsoidal. 6.5 ft (major diam) 4.9 ft (min diam)
Dolphin AG (SS) 555	U. S. Navy (under construction)	....	..	162	19	..	....	....	3 silver-zinc batteries; 2 diesel/electric generators	HY-80 cylinder, hemispheric ends
Kuroshio II	Hokkaido University Japan (1960)	650	2	36.7	7.15	10.4	11.5T	....	Surface power electric through cable	Mild steel plate
Moray	Naval Ordnance Test Station China Lake, Calif. (1964)	6,000	6	33	5.3	5.3	10T	150-200	Bank of 240 silver zinc secondary cells	2-5 ft (OD) cast aluminum (A-356-T6) bolted spheres (1 for crew, 1 for inst.)
Severyanka	USSR/All-Union Institute of Marine Fishery & Oceanography (VNRIO) (1958)	550	15	240	22	15	....	....	Diesel-snorkel; lead-acid batteries	
Star I	Electric Boat Co. Div., General Dynamics Corp. (1963)	200	0.75	10.1	6	5.8	2,750	200	2 external, 18 v dc, lead-acid	A212 Grade B steel; 0.375 in. thick
Star II (Asherah)	Electric Boat Co. Div., General Dynamics Corp. (1964)	600	1	17	7.7	7.6	8,500	250	External, 24 v, lead-acid	A212 Grade B steel; 0.625 in. thick
Star III	Electric Boat Co. Div., General Dynamics Corp. (under construction)	2,000	1	24.5	6	8	10T	1,000	115 v, 30 kw-hr, oil immersed, lead-acid	5.5 ft HY-100, 0.5 in. thick
Trieste II	U. S. Navy/COMSUBPAC	20,000	2	67	15	18	50T (less ballast & avgas)	20,000 (with Terni sphere)	External, 145 kw-hr, lead-acid	Terni-sphere-6 ft (OD) 4 in. thick Ni-Cr-Mo forged steel
Yomiuri	Yomiuri Shimbun (Newspaper), Tokyo, Japan (1964)	1,000	4	48	8.2	9.2	....	....	Diesel/electric auxiliary diesel for battery charging; alternator for ac power	High tensile strength steel cylinder



The business end of an airlift mining system that retrieves ore bearing muck from the ocean's floor. It's a Bureau of Mines Project

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Oceanographer, Aquanaut on Hyperbaric Panel



Famed French oceanographer Capt. Jacques-Yves Cousteau (left) and Cmdr. M. Scott Carpenter, U.S. astronaut now chief aquanaut with the Sealab II project, participated in discussion on undersea living and exploration at hyperbaric medicine conference.

Hyperbaric Therapy Conference—II

Clostridial Infections Respond To Treatment in Most Cases

This is the second in a series of reports on the third International Conference on Hyperbaric Medicine held at the Duke University Medical Center and sponsored jointly by Duke and the National Academy of Sciences–National Research Council. Subsequent articles will report further on clinical applications of hyperbaric therapy and will point up problems attending its use, such as oxygen toxicity.

Dutch Investigator Warns Value Must Be Checked

Medical Tribune—World Wide Report

DURHAM, N.C.—The first clinical success of hyperbaric oxygen therapy—and to date reportedly still the area of its brightest promise—came with its use as an adjunct to the surgical treatment of extensive gas gangrene by the Netherlands group led by Dr. Ite Boerema, of the University of Amsterdam.

Dr. W. H. Brummelkamp, who with Dr. Boerema pioneered hybaroxic treatment of gas gangrene starting back in 1956, was among several participants in the recent third International Conference on Hyperbaric Medicine who testified to the salutary results of this form of therapy in these often-fatal anaerobic infections.

A word of caution, however, was voiced at the conference: although hyperbaric oxygen therapy appears highly effective against gas gangrene, its value as compared with other treatment methods still must be determined more precisely.

Dr. Brummelkamp reported that thus far 55 patients with active Clostridium welchii infection, the majority with clostridial myositis, have been treated in the Amsterdam hyperbaric chamber.

In the regimen followed, the air is compressed to 3 atm. absolute within 10 minutes. The patient inhales oxygen for about 90 minutes and is then decompressed. There are usually seven treatment sessions of two hours each.

Ten of the 55 patients died. However, only two deaths were directly due to the infection, and two others were "probably" due to infection. The unrelated deaths were from uremia, toxic shock, pulmonary embolism, heart failure, or sepsis due to Escherichia coli infection. The remaining 45 patients recovered.

"It is clear that hyperbaric oxygen therapy cannot revive already necrotic tissue," Dr. Brummelkamp observed. "However, what is most impressive is the immediate favorable reaction and inhibition of the toxic process."

Surgery, if necessary, can be deferred until the patient is in better condition, and the operation can be confined to removal of necrotic tissue.

Seventeen of the patients in the Amsterdam series required corrective surgery, he noted.

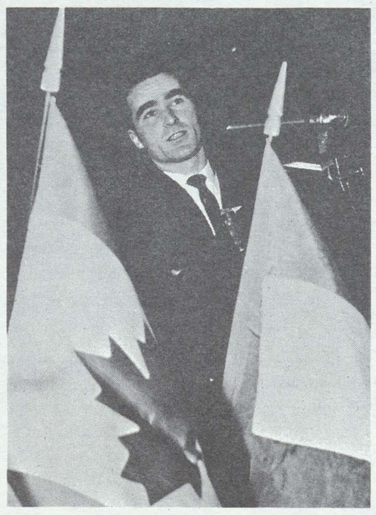
Dr. Brummelkamp advanced the view that hyperbaric oxygenation acts by inhibiting production of alpha toxin by clostridia.

Also at the same session, a U.S. team headed by Dr. Claude R. Hitchcock, of Hennepin County Hospital, Minneapolis, reported on hyperbaric treatment of 16 patients with Clostridium welchii infection, 10 of them "critically ill." Two of the patients died, but only one before the infection could be brought under control.

The report, presented by Dr. Orn Arnar, said that therapy is usually provided in six sessions, with oxygen at 3 atm. absolute, over a three-day period. The patient is at the 3-atm. depth for two hours, and is decompressed in about 37 minutes. Hyperbaric oxygenation must of course be combined with other therapy, including antibiotics, fluid and blood replacement, and careful clinical examination, Dr. Arnar emphasized. "Hyperbaric oxygenation is only a powerful adjunct," he said.

Commenting on the Minneapolis experience, Dr. Hitchcock noted that one of the patients who recovered following hyperbaric therapy had been infected with both Clostridium welchii and Peptococcus (an anaerobic staphylococcus). "I don't think it would have otherwise been possible to salvage this patient," he said.

"I would say that hyperbaric therapy for gas gangrene infection has been truly lifesaving."



Speaker from Scotland, Dr. Iain McA. Ledingham of Western Infirmary, Glasgow, is framed by flags of two of the 18 nations represented at the third International Conference on Hyperbaric Medicine.

Dr. Jack Van Elk, principal investigator in hyperbaric medicine at Lutheran General Hospital, Park Ridge, Ill., cited the "seemingly excellent" results of hyperbaric oxygen therapy in 22 patients with gas gangrene. Most had become infected following compound fractures of an arm or leg or following amputation of a leg because of ischemic disease.

They were treated in up to 29 sessions of 90 minutes to two hours with 100 per cent oxygen at 3 atm. absolute.

There were five deaths, all unrelated to the infection: due to gastrointestinal hemorrhage, uremia, hepatic coma, irreversible shock, or "other cause" a few days following treatment. The other patients recovered. In a few cases, late amputation was required, Dr. Van Elk said, but in several others, amputation was clearly averted by the oxygen therapy.

Another participant, Dr. W. K. Slack, of Whipps Cross Hospital in London, said that hyperbaric therapy had been effective in 13 of 15 patients with clostridial infections. Two of the patients died in renal failure.

Dr. Slack and his associate Dr. D. A. Thomas treated 10 of the patients at 2.5 atm. absolute and the other five at 2.0 atm. Most of the other spokesmen referred to treatment at 3 atm. Dr. Slack suggested that treatment at the lower pressure might be equally efficient.

In discussion following these reports, Dr. Hitchcock questioned Dr. William A. Altmeier, of the University of Cincinnati, concerning mortality without hyperbaric therapy for patients with clostridial myositis. Dr. Altmeier, who is Professor of Surgery, had opened the session with a paper on diagnosis, classification, and management of gas-producing infection.

He replied that the "over-all mortality for true, rapidly fulminating clostridial infection is usually reported to be about 40 per cent." However, in his own experience, in a series of 43 cases, mortality was kept to 11 per cent "with vigorous attention to diagnosis, early surgical intervention as indicated, and intensive antibiotic and supportive therapy." Hyperbaric oxygenation was not used, he said.

"We do not yet know how effective hyperbaric oxygen therapy is in clostridial infections," Dr. Altmeier commented later in an interview. "It may indeed be very useful, but it is important to determine its usefulness and limitations as compared with other methods of treatment."

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S.D. HAD PLENTY OF RAIN, TOO

SeaLab, Stadium Top Stories Of '65

San Diegans were "high" on a major league sports stadium and some Navy scientists were down in the depths aboard SeaLab II.

Buildings went up in downtown San Diego but La Jollans played it down, close to the ground, on the subject of tall buildings.

These were among the top area developments of 1965, as selected by a board of editors of The San Diego Union, and they illustrate the contrasts which marked the news of the year.

Even the weather, usually mild and comfortable, was alternately hot and wet.

And there was violence — a four-hour gun-battle on a rainy day. There was tragedy — 84 Marines and crewmen died in a fiery crash near El Toro Marine Air Station.

BONDS APPROVED

There were fast-breaking news events covered in rapid-fire order and there were events that developed over days and months.

One of the latter was the passage Nov. 2 of a $27-million bond-issue for construction of a large sports stadium in Mission Valley.

The enthusiasm for the 50,000-seat, multi-purpose facility began building early in the summer as more and more individuals and organizations voiced unqualified support.

When the votes were counted, San Diegans had given the city administration an overwhelming mandate in favor of the stadium.

City fathers and sports boosters now are talking about major league baseball here in three years and the fulfillment of San Diego as a major league community.

ALTERNATE SHIFTS

The far-reaching importance of a new stadium for the city could be compared with the Navy's man-in-the-sea project and it's impact on the future of underwater experimentation.

For a month and a half starting in late August, 28 men alternated 15-day stints in SeaLab II which rested on the depths of the Pacific, a few hundred yards off the coast at Scripps Institution of Oceanography.

The Aquanauts, including Cmdr. Scott Carpenter, learned to live and work in cramped quarters and then left their cubicle-sized temporary home to conduct experiments away from SeaLab. And Carpenter, who also is an astronaut, found that living under the sea is similar to working in space.

TWO ENTERTAINED

A dinner engagement kept by two members of the State Alcoholic Beverage Control appeal board, at the La Mesa Bowl, was brought to light by The San Diego Union.

The liquor license for the bowl was up for revocation because of alleged irregularities, and investigation revealed the two liquor officials were entertained at the bowl on the eve of a hearing concerning the revocation.

The result was resignations by the two liquor officials, Arthur Belcher and Robert Haden. At a subsequent hearing the license revocation was upheld.

Early in December the bowl, operated by Joseph and Frank Matranga, went into bankruptcy.

It was a banner year for construction in San Diego. Several major buildings, including the 25-level First National Bank and the Fifth Avenue Financial Centre, were completed during 1965.

The San Diego Gas & Electric Co. and the Pacific Telephone Co. were among firms which announced they will add to the downtown skyline with large buildings.

In La Jolla, the 14-story Seville Apartments and the 18-level Nine-Three-Nine Coast Boulevard building were completed but La Jolla residents sought to ban further high-rise construction in their community. They achieved some measure of success at year's end. The Planning Commission has recommended a 50-foot height limitation, subject to approval by the City Council.

AUDITS HELD

The files of a Castro Valley tax consultant touched off a statewide investigation of irregularities in tax assessment procedures and San Diego appeared to be right in the middle.

Audits revealed several large firms were underassessed here and the County Grand Jury investigated. During the investigation, County Assessor John McQuilken died. In December he was replaced by E. C. Williams, a former FBI man and once the FBI agent-in-charge in San Diego.

Finally, in December, an 11-point program of improvements for the tax assessor's office was recommended by the Grand Jury.

Weather affected everyone. Tourists and long-time residents grew a bit tired of the scorching Santa Ana conditions of October. The mercury was 80 degrees or above for 13 straight days and hit 104 on Oct. 22.

While the city sizzled, the brush in the back country became tinder-dry and, as the burning sun shone, fires started.

There were three big fires at the height of the heat wave — at Camp Pendleton, near Tecate Mountain, and in the community of La Cresta east of El Cajon.

HEAT WAVE ENDS

There were also blazes in city canyons, one of which destroyed or damaged several homes in the North Park area.

The most destructive fire in the county was at La Cresta where a dozen homes were singed or burned to the ground.

But the blazes were all controlled by Oct. 23 — which also marked the end of the heat wave.

The weather story was far from over as the temperatures lowered and fall leaves began turning.

In late November, the first of a series of lingering storms arrived. It was followed by a downpour Dec. 10 that caused the worst flooding in half a century and snarled traffic during the morning rush.

There were few sunny days in December as one storm seemed to follow another to the county. Streams that had not flowed for years were gurgling steadily down canyons. And the mountains enjoyed a white Christmas for the first time in years.

By year's end the city was seeking flood relief money from the federal government. The Weather Bureau already had recorded well over the 10.4 annual rainfall average. And some hillside residents of Santee feared their homes were going to slide into the valley.

POLICE IN BATTLE

Fifth Avenue and F Street became a notorious intersection April 9 when the police fought a battle with Robert P. Anderson, 28, a laborer. It also became a sightseeing attraction.

As officers maneuvered to capture Anderson in the bullet-scarred Hub Jewelry and Loan Co. office, thousands gathered to watch, to comment, to get in the way.

When it all ended, four hours after it began, Anderson was wounded and in custody, and Louis Richards, the manager of the store, was dead. The gun battle, one of the most spectacular in history, began as a holdup attempt.

Anderson was sentenced to death in the San Quentin Gas chamber and, when he learned of the penalty, he was quoted by a probation officer as saying he was "bitter." He said he wished he had killed some more people.

On a foggy morning of June 25, an Air Force C-135 jet transport took off from El Toro Marine Corps Air Station. A few moments later it crashed into the side of a hill 10 miles southeast of Santa Ana.

The 72 Camp Pendleton Marines and the 12 crewmen aboard were killed, their bodies strewn over a hillside and intermingled with parts of the plane.

One of the most unusual stories of the year was COMBO, which stands for Combined Arts of San Diego.

It represents a movement toward enhancing the cultural pursuits of a growing city and last year it raised more than $230,000 for enterprises like the Old Globe Theater, San Diego Opera Company and the San Diego Symphony Orchestra.

The money came from a gala auction, where prominent citizens bought things like paintings, a rare breed of dog, a race horse and 40 gallons of shrimp.

'Flying' Device To Train Men In Sub Rescue

WASHINGTON—The Navy soon will have a training device for teaching its men the intricacies of maneuvering submarine rescue craft which it is only now beginning to develop under the Special Project Office's Deep Submergence Systems Project.

Demonstrated at the plant of its developer, Hydronautics Inc., Laurel, Md., was the new Light Airborne Submarine Simulator, which is called LASS I. The odd vehicle, designed to simulate the operations of future submersible rescue craft, is helium filled, with a nylon skin hull.

Despite the fact that it is lighter than air and therefore flies rather than "swims" as will the rescue craft it simulates, officials describe it as "dynamically similar." This means that it behaves in a manner similar to that of an undersea craft, reacting to outside air currents much as the actual rescue craft would react to sea currents.

LASS I has a conventional propeller aft, surrounded by a movable ring stabilizer, and has two internal-ducted thrusters forward, one horizontal and one vertical, and two aft. Electric power is supplied to the simulator by an umbilical cord which is supported above the craft during flight.

* * *

THE DISPLACEMENT of LASS I in air prohibits putting the pilot on board. So the pilot sits in a modified Link Trainer nearby, actually "flying" the vehicle, feeling the sensations of pitch, roll and yaw, and viewing the results by TV monitor.

A quonset hut with a submarine sail and diving planes plus escape hatches are installed in the roof of the hut. The simulator is flown over the simulated damaged submarine and the pilot must attempt to land on the escape hatch.

Under such limited conditions of fair, calm weather the Special Projects Office expects to be able to simulate the underwater performance of the rescue vehicle by evaluating the in-air response under similar conditions of outside pressure.

Navy officials say that, by suitably instrumenting LASS I, they will also be able to evaluate the propulsion control forces needed to perform the underwater mating operations even under difficult current conditions.

First Full Report Due On Sea Lab II Journey

By BILL HICKMAN
Fairchild News Service®

WASHINGTON.—Detailed reports on results of the Navy's Sea Lab II experiment will be spotlighted here this week, at a symposium on "Man's Extension Into the Sea."

More than 1000 are expected to attend the conference tomorrow and Wednesday in the Statler Hilton Hotel. The meeting is being billed as the "first fullscale technical meeting reporting on all aspects of Sea Lab II."

Robert H. Baldwin, Under Secretary of the Navy, and Dr. John P. Cravens, chief scientist for the Navy Special Projects Office, will head the list of speakers.

Others will include the famous French underwater explorer Capt. Jacques Y. Cousteau and United States astronaut/aquanaut Cdr. Scott Carpenter.

Sponsors of the symposium include the Marine Technology Society, American Society of Mechanical Engineers; Society of Naval Architects and Marine Engineers; American Institute of Aeronautics and Astronautics; American Society of Naval Engineers, and American Geophysical Union, in cooperation with the Special Projects Office and the Office of Naval Research.

Sea Lab Talks.

Mr. Baldwin and Dr. Craven will address the session tomorrow morning. Other speakers will be Henry A. O'Neal, Office of Naval Research, on "An Overview of Sea Lab II;" Lt. Cdr. Malcom MacKinnon, San Francisco Naval Shipyard, "Design, Construction and Outfitting of the Sea Lab II"; and Edward P. Carpenter, Naval Ordnance Test Station, "Sea Lab II Logistic Problems."

The program for tomorrow afternoon's session: J. Edward Snyder, Jr., Office of the Assistant Secretary of the Navy (R&D), chairman; Commander Carpenter, W. Miller, Office of Naval Research, "Measures of Human Performance."

The final session Wednesday afternoon will have Capt. Lewis B. Melson, Office of Naval Research, as chairman, speakers will include Arthur O. Flechsig, Scripps, "Value of Extended Diving Capability to the Scientific Community"; Keatinge Keays and J. Vincent Harrington, General Dynamics, and Edward A. Wardwell, Ocean Systems, "Division and Salvage Operations on the Continental Shelf"; "Crew Selection, Training and Daily Operations"; Robert Taggart, Robert Taggart, Inc., "Propulsive Efficiency of Man in the Sea"; Joseph J. Hromadik, Naval Civil Engineering Laboratory, "Ocean Engineering for Human Exploration," and William J. Bunton, Navy Electronics Laboratory, "Problems of Deep Underwater Photography."

Human Physiology.

Victor C. Anderson, Scripps Institution of Oceanography will be chairman of the Wednesday morning session. Speakers will include Capt. Walter F. Mazzone, Submarine Medical Center, "Human Physiology"; James G. Wenzel and William Helvey, Lockheed Missiles & Space Co., "Manned Aspects of Deep Submersibles," Douglas Inman, Scripps, "Sea Lab II Underwater Weather Station"; and James Edward A. Link, Ocean Systems, "Pressure Equalized Flexible Structures for Manned Dwellings"; and Barry L. Cannon, Navy Mine Defense Laboratory, "Unusual Engineering Problems of Undersea Living."

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JAN '66

SDM STAFF FEATURE BY BILL BARADA

the dawn of a new concept of diving

"We are in the dawn of a whole new concept of diving — it is the most significant step in underwater advancement in many, many years." The words are those of Captain Walter F. Mazzone, MSC, USN, and they express the importance of Sea Lab II better than any I have heard.

The aquanauts of Sea Lab II paved the way for man's invasion of the deep water covering the earth's continental shelves, and insured his eventual conquest and exploitation of the vast resources of this submerged world. The success of the Sea Lab II experiment proved beyond a shadow of a doubt that such a program is feasible, and the coming population explosion with its demand for the mineral resources of the ocean floor make its continuation imperative. But Sea Lab also opened a Pandora's Box, unleashing equipment, technological, and engineering problems which must be solved before the conquest of deep water becomes a reality. The riches of the earth's submarine plains and the future of diving may belong to those solving these problems.

Each of the three teams of aquanauts of Sea Lab II lived and worked for periods of 15 to 30 days, 205 feet beneath the surface of the ocean, in the cold waters of the Pacific. Their station was located at the edge of Scripps Canyon off La Jolla, California. Their "home" was a 57 foot long cylinder, 12 feet in diameter, in which they breathed an artificial atmosphere of 80% helium, 16% nitrogen, and 4% oxygen. This strange mixture of gases was necessary since the atmosphere inside their home was at the same pressure as the water outside. At this depth, ordinary air is poisonous if breathed over long periods of time. Divers inside Sea Lab, their bodies saturated with gas at this pressure, could enter the ocean at a depth of 200 feet with the same ease they would enter a swimming pool on the surface. They spent hours working outside the chamber when, normally, this time is limited to a very few minutes. They returned to Sea Lab, their artificial surface, without bothering with the problems of decompression or concern for the bends. The base of the Sea Lab entrance well was, in effect, a new water surface, 205 feet beneath the true surface of the Pacific.

This new-found freedom at this great depth was not without its penalties. Under no circumstances could they swim up to the surface on their own, and they must always be able to find their way back to Sea Lab. Getting lost or swimming to the surface meant certain death.

The three teams of 10 aquanauts each worked in phases of 15 days with fresh aquanauts replacing the preceding team. Two men, astronaut Scott Carpenter and Lt. Robert Sonnenburg, Medical Corps, USN, spent a total of 30 days in the chamber. Scott Carpenter, leader of Teams I and II, was the first man to ever spend 30 consecutive days at this depth. Dr. Sonnenburg spent time with Teams I and III and was the first to return for a prolonged immersion after only 15 days on the surface. The 10 divers of each team were made up of civilian scientists from Scripps Institution of Oceanography and U.S. Navy divers. The average age of the 28 participating men was 36.

When the aquanauts told of their experiences and gave their opinions of the project, two very basic facts stood out above all others. The first was that men can adapt to living in an underwater environment as readily as they can adapt to living in the arctic, in the tropics, in outer space, or any hostile and isolated area. The problems of the future will not be with the men but with the tools they are given to work with. This was the second fact, that present equipment is primitive and inadequate for long immersions in deep water, especially if the water is cold. Future work on the bottom will depend upon the development of equipment that will enable men to perform efficiently in the liquid medium of inner space.

The aquanauts had no time to play. The three teams were given a total of 47 different experiments to complete. They were asked to assemble way stations, construct a weather station to measure currents, temperatures, and changing conditions on the bottom in an effort to learn if these were affected by surface weather, and to set up a Benthic communications center underwater whereby all communications with Sea Lab and the surface would be routed — an undertaking of the Scripps scientists. There was a foam-in salvage project to raise the hulk of a jet aircraft to the surface, the patching of a simulated hull of a submarine and attaching a lift pad to it, and a physical and biological oceanography program. The projects and tests assigned were far more than they could accomplish, and they never worked harder in their lives. The purpose of these experiments was to determine man's capabilities in saturation diving and what problems were involved in their execution. A wealth of information collected from these tests is still being evaluated, but our aquanauts disclosed some of the more obvious successes and discoveries.

Chief Bob Sheats, 50-year-old leader of Team II and the oldest aquanaut of the group, (Master of the Master Divers, Sept. '65 SDM) states that the semi-closed circuit breathing equipment used is far too complicated and dangerous for normal civilian use. It should only be used under strictly controlled conditions and with adequate surface support such as that they were given by Navy operations. The danger of oxygen and CO_2 poisoning and anoxia is greatly increased if a malfunction of the equipment occurs. A short, deep dive on helium-oxygen requires more decompression than on air, and the helium-oxygen decompression tables are far more complicated. Because of the narcotic effects of nitrogen that would occur in Sea Lab's saturation dives, the helium-oxygen mixtures are essential.

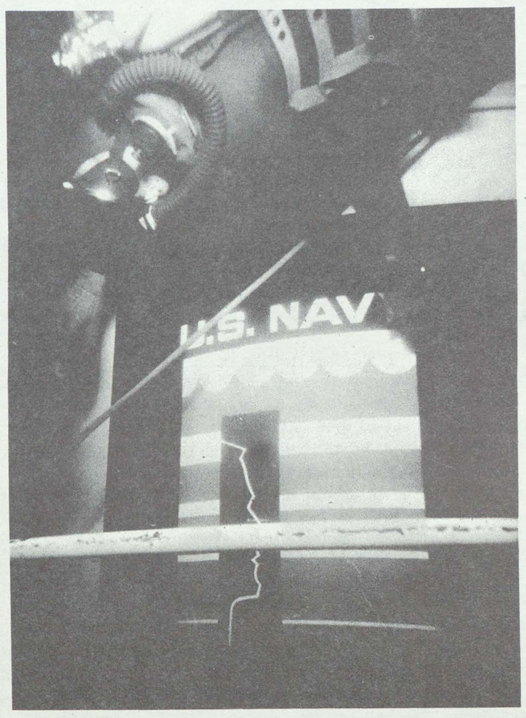
Helium is not only lighter than air, it is a good heat conductor and a diver loses body heat six times faster than when breathing air. The temperature of the water surrounding Sea Lab averaged 50 degrees and it was expected that keeping warm would present the most serious problem of the experiment. Anticipating this, some of the divers were equipped with 3/8 inch thick wet suits and others with experimental, electrically heated suits.

Jay Skidmore and Billie Coffman, Navy photographers with Team I, spent 2 hours and 45 minutes in the water on a single dive, the longest period for their group. Both said they did not suffer from the cold as long as they were working and moving in the water. Coffman said he could easily have stayed longer but returned to the Lab only because the job was finished. But both men also stated that as soon as they stopped working or exerting themselves, they became chilled within 2 or 3 minutes and had to return to the chamber to warm up. The interesting thing about this was that, once they became chilled, they could not warm up again in the water, no matter how hard they worked. Cyril Tuckfield, a Navy diver on the first team, also said that the cold didn't bother him while he was work-

(Continued on Page 23)

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Sea Lab II floats on the surface off the coast of Southern California prior to the 45-day underwater stay at a depth of 205 feet. Ron Church photo. Berry L. Cannon is shown on an underwater sortie outside Sea Lab. Howard Buckner acts as aquanaut host to two visitors from topside, Capt. Walter Mazzone, center, and Capt. George F. Bond. Both officers traveled to the vicinity of Sea Lab in a special diving bell, visited with members of Team Two and returned to the surface after a 10 minute stay, via a 70 minute decompression route.

(Continued from Page 21)

ing on the weather station until he slowed to adjust the guy wires. Then he got cold, fast, and a hard swim 65 feet back to the Sea Lab didn't help him a bit.

But then a strange phenomena occurred toward the end of the 15 day period. All of the men said that the longer they were down, the less the cold bothered them. Skidmore said that during the last few days some of the divers were going into the water in bathing suits for short jobs rather than taking the trouble to suit-up. Frederick Johler, ENCS, USN, who was also with the first group of aquanauts, said that the tests given to the men before and after Sea Lab verified this adjustment to the cold. He said the "ice box" test before the dive was "murder" and he was freezing when he came out. After Sea Lab, he didn't mind this test and said he could have stayed in the box an extra hour. Johler also said that he did better on the treadmill test after the project than he did before. His stamina had actually increased while he was underwater.

George B. Dowling, civilian diver and a Research Physicist at the USN Mine Defense Lab was with Team III. He was one of the lucky ones to wear an experimental and electrically heated suit. It kept him warm, but was so difficult to get on and off that he made the mistake of wearing it all day. As a result, he broke out with a skin rash and had to be treated for this infection. Dowling said that he is now convinced that wet suits are no good for all day wear. However, comments of his buddies led me to suspect that he fell so much in love with the suit he might have tried to sleep in it.

Commander Scott Carpenter, the astronaut turned aquanaut, said he is convinced that helium confused the human thermostat until they could adjust to the strange atmosphere. He compared the acclimation time required for adjustment to living in the chamber to any unusual climatic conformation needed in high altitudes, the tropics, and the arctic. The normal period for a human to become acclimatized to a new environment is about 15 days, and in his opinion, Sea Lab demonstrated this same requirement. He said that at first the men would wake up at night feeling cold, although they were, at the same time, perspiring from the heat. Carpenter is convinced that heated suits will be an absolute necessity in future operations of this type and that the design for these suits has to be improved and perfected if they are to have unlimited working time on the bottom. He felt the cold definitely restricted this time and decreased their efficiency.

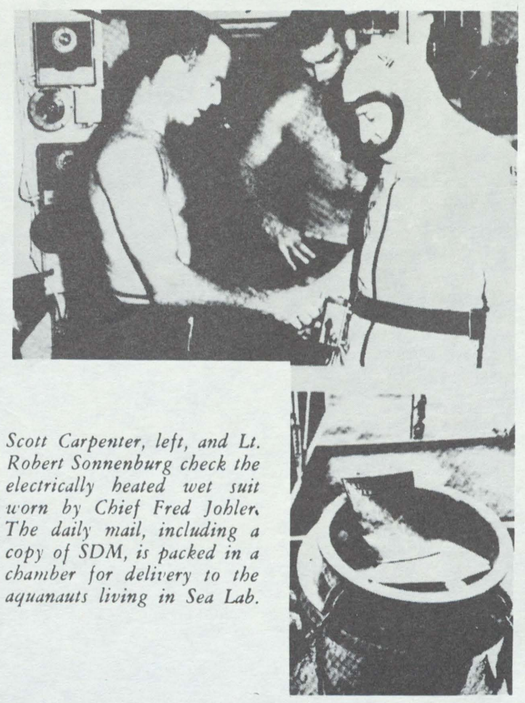
Physical strength and dexterity tests were given before and after each dive to determine the loss of efficiency. A number of divers implied that the time they were most aware of the cold was during the tests they were required to perform before re-entering the Sea Lab after a dive, while they were still shivering and shaking from the cold. One test in particular caused some discomfort. This was a triangle made of various sizes of bolts and nuts, which like a puzzle, could only be put together in one way. Trying to fit this intricate contraption properly in the water, while freezing was a real chore. Their fingers wouldn't flex because of loss of feeling, and they often dropped small pieces into the sand which they had to find. All of this had to be finished before they could enter the chamber to get warm. My guess is that this tested a man's psychology and good nature as much as his dexterity.

Another property of helium which caused problems for the divers was its effect on the human voice and on communications. In a helium atmosphere a person's voice takes on a "Donald Duck" quality and is extremely difficult to understand. During the first few days in Sea Lab, the men could not understand each other, could not recognize each others voices, or tell where the voice was coming from. This caused tremendous difficulties and delays when attempting to coordinate work projects. But here again, their ability to adapt proved to be at least a partial answer to the problem. After a few days, the men unconsciously lowered their voice tones and adapted to the new atmosphere. Toward the end of the 15 day period, they could not only understand each other, they could recognize and know who was talking even though they couldn't be seen. This acclimation was most striking when Glenn Iley, HMC, USN, and Howard Buckner, SWC, USN, of Team II, swam to Sea Lab to join the first team as relief divers. Iley and Buckner could understand the old timers, but the old timers could not understand them. And Iley and Buckner could not understand each other.

However, helium will continue to cause communications problems in underwater work until someone discovers a solution. None of the equipment now available could accommodate the breathing apparatus used by the aquanauts, and they had absolutely no voice communication while they were swimming. The answer to this problem will require clear, intelligent voice transmission through the water, at great depths, and with the voices originating in a helium atmosphere. Underwater communication is probably the greatest and most difficult of all problems facing the future advancement of diving. But the rewards to those who come up with the answer will be fantastic. Communication is as vital underwater as it is on land, possibly more so, and the race to conquer inner space may well be won by the country first to solve this perplexing problem.

The amazing penetrating power of helium also affects underwater functions. It penetrates seven times more readily than air, and raises havoc with insulating materials. Cork, foam plastic, rubber, are all easily permeated by helium. This caused some weird reactions under pressure. One example of this reaction was with the wet suits worn by the divers. As they swam down to enter Sea Lab, the air in the cells of foam rubber was compressed. At 200 feet the material was under seven times the surface pressure and a ¼ inch thick suit was squeezed to a thickness of about 1/16. But in Sea Lab, helium gradually seeped into the cells of

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Scott Carpenter, left, and Lt. Robert Sonnenburg check the electrically heated wet suit worn by Chief Fred Johler. The daily mail, including a copy of SDM, is packed in a chamber for delivery to the aquanauts living in Sea Lab.

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the rubber, and the suits returned to their normal shape. Consequently, the aquanauts used suits at 200 feet that appeared and fitted exactly as they did on the surface. However, the helium added little to their protection against cold because of its poor insulating quality. While the aquanauts of Team I were decompressing at the end of the 15 days, relief divers tied their suits in bundles, took them out of Sea Lab, and released them. When the suits hit the surface, they practically exploded. Expanding gas in the cells blew them to several times their normal size. The giant sizes and grotesque shapes of these expanded suits were the strangest I have ever seen. Suits normally ¼ inch thick swelled to 1 inch thick. The ⅜ inch suits swelled to 1¼ inches. And the expansion was as great in length as in width. A suit tailored to fit a diver 5′ 11″ tall and weighing 200 pounds would have fit a giant after it hit the surface. The pants alone extended above a diver's head. Some of the material

SEA LAB III



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had internal ruptures which looked exactly like a human hernia. Nylon-lined suits expanded the same as unlined suits in most cases. One nylon-lined suit did not increase as much in thickness as it did linearly and was stretched to monstrous dimensions.

The suits provided a graphic illustration of the need for decompresson. An aquanaut returning directly to the surface would have suffered a similar expansion of gas in his system. This almost happened to a sea lion.

A female sea lion joined the aquanauts of Team III, playfully cavorting around the divers near the Lab. After a day or two, she became so friendly that she tried to follow the divers back into the pressure chamber. The sea lion got inside the entrance well, stuck her head up into the helium air of the Lab, took several breaths — and tried to bark. It was probably the most unusual sound ever emitted by an animal. Can you imagine a sea lion barking in a Donald Duck voice?

For awhile, Sea Lab personnel were concerned over the consequences of the helium on the animal. She was no doubt the first sea lion in history to take a breath of fresh air at a depth of 200 feet. If she were to swim to the surface without expelling the expanding gas from her lungs, the result would be an embolism similar to the effect on the wet suits. Radio and television stations on the mainland alerted the population to be on the lookout for a sick sea lion. If she survived and could be treated in a recompression chamber quickly, she might be saved.

But the concern proved to be unwarranted. The sea lion returned to Sea Lab the next day, apparently unharmed. The sea lion so enjoyed the activity and company of the aquanauts that she practically became a part of the experiment. All doubt as to her identity was removed when the surface divers caught her one day and painted her stomach white. From then on it was no problem to distinguish their pet from stray sea lions wandering into the area. The aquanauts even tried to train the animal to respond to underwater signals in the same way their pet porpoise "Tuffy" has been taught. The sea lion responded to the signals readily, but without advance training, it was obvious she didn't understand what was expected of her and her antics were unpredictable.

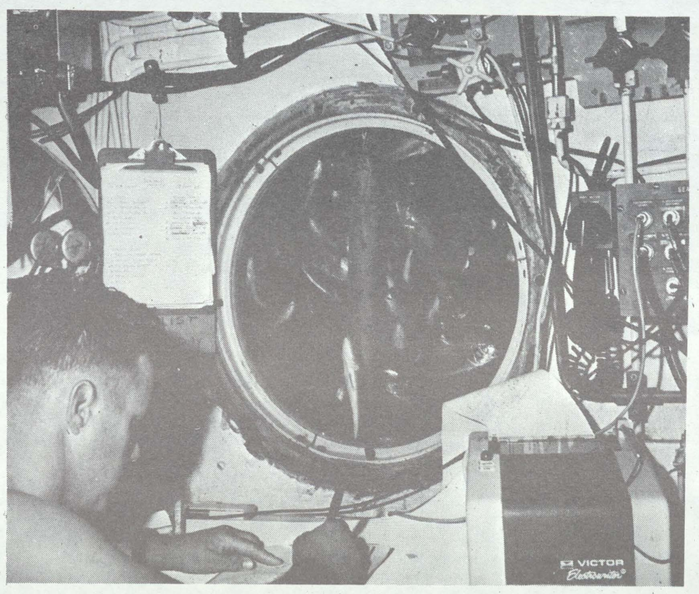
"Tuffy" the porpoise was specifically trained for the Sea Lab experiment by Dr. Ridgeway, Wallace Ross, and Bill Sexty at Point Mugu, California. Aquanauts John F. Reaves, PHI, USN, and Kenneth J. Conda, TMI, USN, worked with Tuffy during the second phase of Sea Lab. Reaves said that Tuffy was great fun to work with and he enjoyed her very much, but the work had a deadly serious purpose. One of the greatest dangers facing the aquanaut is getting lost. In dark, murky water, a diver loses his sense of direction very quickly. An ordinary diver is in less danger because he can always return to the surface but the aquanaut must find Sea Lab or die. Elaborate safety precautions were taken to prevent this from happening. These included hand-held sonar, trails blazed from Sea Lab to the various work projects, tight buddy system controls, and similar measures. All of these were time consuming and restricted and hampered the divers in their work. Also, there was always the chance of a slip-up or an accident which might cause the loss of a diver. The experiment with the porpoise was an attempt to find a better and more dependable answer which would permit greater freedom of action.

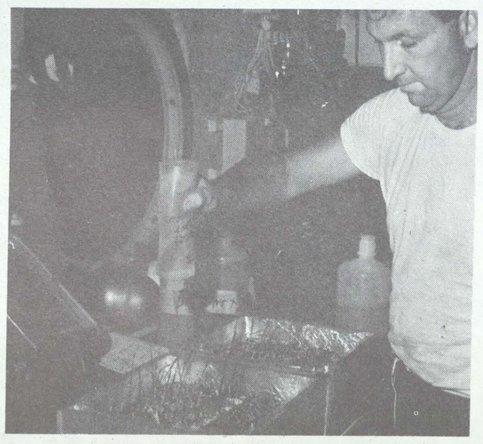
Tuffy was trained to respond to a special signaling device carried by the aquanauts, in this case, Reaves and Conda. The signal was a unique sound combined with a blinking light. Tuffy carried a harness on his back in which was placed several hundred feet of nylon life line. At Sea Lab, he lived in a cage on the surface until he was called to duty. When an aquanaut signaled that he was in trouble, the signal was received by the surface support vessel and Tuffy was released. The porpoise swam straight for the signal, approached the diver, and placed his chin on the diver's wrist. The aquanaut removed the end of the safety line from Tuffy's harness and the porpoise streaked back to the surface trailing the line from the lost diver as he went. This gave the diver a line to the surface. Then a second signal placed near the entrance to Sea Lab was actuated and Tuffy, with the line from the lost diver still attached to his harness, dived to Sea Lab, establishing a life line from the diver to his underwater home. In practice sessions Tuffy made the complete round trip at 200 feet and back down to Sea Lab in one minute and ten seconds, an amazing performance. The aquanauts claim that Tuffy proved more effective at locating a diver than the expensive, hand-held sonar equipment. He performed so beautifully that future Sea Lab experiments are sure to utilize porpoises for greater safety insurance. Tuffy became so popular that he was used for carrying mail, messages, and small items from the surface to the aquanauts and back. He won the universal affection of every member on the team. In fact, his popularity spread across the country. The message he received from the National Association of Letter Carriers is typical of the reaction to his performance.

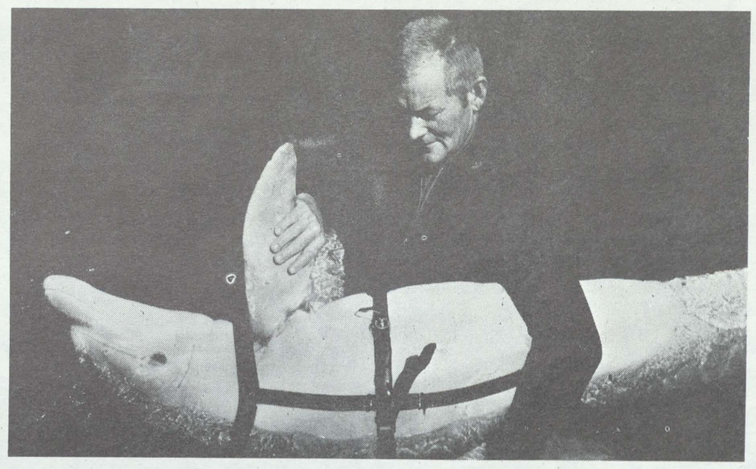
"Dear Brother Tuffy: We have noted in the news that you were authorized to deliver the mail to the Sea Lab II habitat deep in the ocean, and that you successfully completed delivery on your first two trips without a flaw. Because of this remarkable feat for a new letter carrier, we have hereby designated you as an honorary member of Branch 343, National Association of Letter Carriers, St. Louis, Mo. Enclosed you shall find your lapel pin and we hope you will wear it with pride for you are a member of one of the greatest organizations in the world. You will also note that your dues card is enclosed. In case you have any grievances, this card will entitle you to representation. We hope that you have been provided with a can of halt-dog spray for use on any sea dogs you might encounter as you make your deliveries. I suppose the post office motto 'neither rain, nor snow, nor heat, nor gloom of night can sway these carriers from the swift completion of their rounds,' will have to be altered to include 'nor ocean depths.' Wish you luck on your future deliveries, I am fraternally yours, /s/Gene C. Hacker, Secretary, St. Louis Branch."

Tuffy is an Atlantic porpoise, not conditioned to diving

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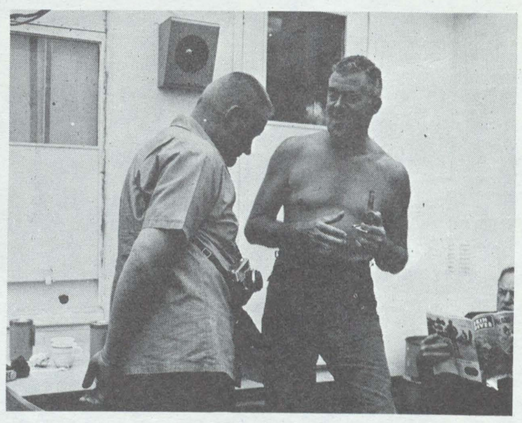






John Reaves fills out one of the many logs kept by aquanauts inside Sea Lab and is oblivious of the finny copyreaders checking his work through the portholes. Bill Tolbert uses special plant nutrients to feed his experimental plant study in the Sea Lab atmosphere. The barley seedlings did well, but the marigold sets produced only one sprout. Trainer Wally Ross attaches a special harness to Tuffy during training at the Naval Missile Center at Point Mugu. Instruments attached to the harness are designed to measure Tuffy's heartbeat, respiration, and temperature. Jim Auxier discusses Sea Lab with its chief, Capt. George Bond, in front of the control shack on the surface support vessel. Members of Sea Lab read about themselves in SDM.





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below depths of 300 feet. For future, deeper Sea Lab experiments, the Navy at Point Mugu is training porpoises from the West Coast capable of diving to 1,000 feet. Of the dozen or so porpoises in training, the rare Dall's porpoise, the only one in captivity, is the deepest diving of all, and is planned for use in Sea Lab III.

The first team reported that it required two weeks to set-up housekeeping in Sea Lab. They made it clear that more time is needed to get things done under the water than on the surface since the estimated time for this job was to have been three days. The reason for the discrepancy was a series of problems which plagued each of the crews. The men were deliberately assigned more work than they could possibly accomplish in order to test their performance. This was compounded by problems with equipment, design of work areas, and techniques employed. As an example, Tom Clarke, aquanaut with the first team who is a graduate marine biology student at Scripps, said he was disappointed that he could not accomplish more on his biology studies. In Tom's opinion, there were so many projects going at once, with so many men participating, that there was just not enough time in the water. The confusion of scheduling dives was his main complaint. The diving quarters were so small and the entrance so crowded that a tremendous amount of time was consumed in just getting men in and out of the water. Storage space for diving equipment was crowded so that the men got in each other's way while gearing-up. Tom said that filling the entrance well with two men leaving, two men coming, and a safety man checking them in and out, made getting into and out of the water quite an event. His opinion on the crowded diving compartment was supported by practically all of the aquanauts.

Bob Barth, QMC, USN, who has more hours under high pressure than any man alive, agreed with Tom Clarke. Barth participated in Project Genesis (the preliminary pressure test to Sea Lab I and Sea Lab II). He said that they enlarged the diving compartment in Sea Lab II over the first one, but they then put ten men in it instead of four which effectively made the compartment smaller as far as work was concerned.

However, in spite of the conditions, Tom said he was proud to have taken part in the experiment and would gladly volunteer to join another for an even longer period. He said he saw a tremendous quantity of fish around the Lab, but not a wide variety of species. Sculpin, small octopus, perch, and sardines seemed to be attracted by the lights and the activity and moved into the area in great numbers. However, normal bottom fish such as halibut, angel sharks, shovel-nose sharks and flounder were evidently repelled by the confusion and moved out to a safe distance.

William Tolbert, a civilian at the Navy Marine Defense Lab in Florida, was given a simple detail with the second team which illustrates the problems of underwater living as well as anything that occurred. Tolbert joined Sea Lab at night and as he swam down from the surface and got his first sight of the chamber, he was enthralled by the spectacle. Powerful lights illuminated the area with an eerie glow reflecting off the bioluminescence of marine organisms in moving, living clouds of light. Thick schools of fish swarmed over the chamber, circling and darting through the lights in clouds of silvery reflection. He swam to the entrance, still enraptured and excited at greeting his buddies already in the Lab, and was handed a package of garbage and told, "Here, get rid of this."

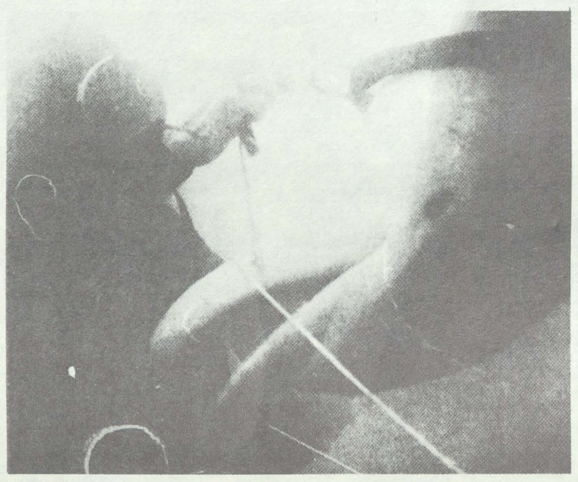
But Tolbert says there wasn't a garbage detail in the whole world like the one with Sea Lab. He had to swim with it out of the shark cage and send it to the surface so the aquanauts would not be guilty of fouling their own nest. This meant that, at garbage time, Tolbert had the choice of suiting-up with complete gear, or making it in the cold water in a bathing suit. Even throwing the garbage out was an interesting chore according to him.

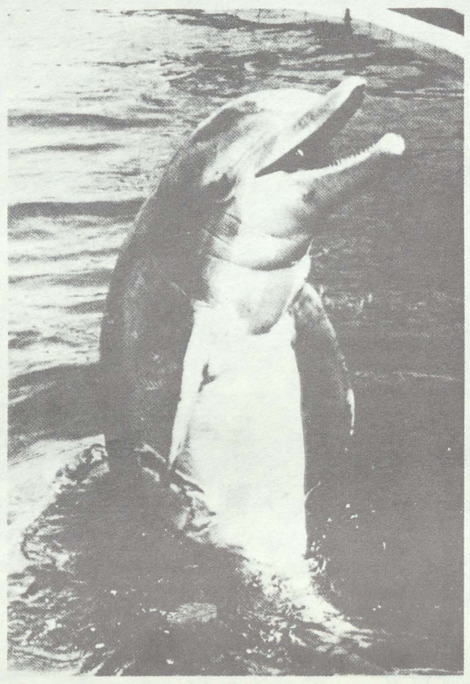
Scott Carpenter emphasized the difficulty and time re-

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SEA LAB III





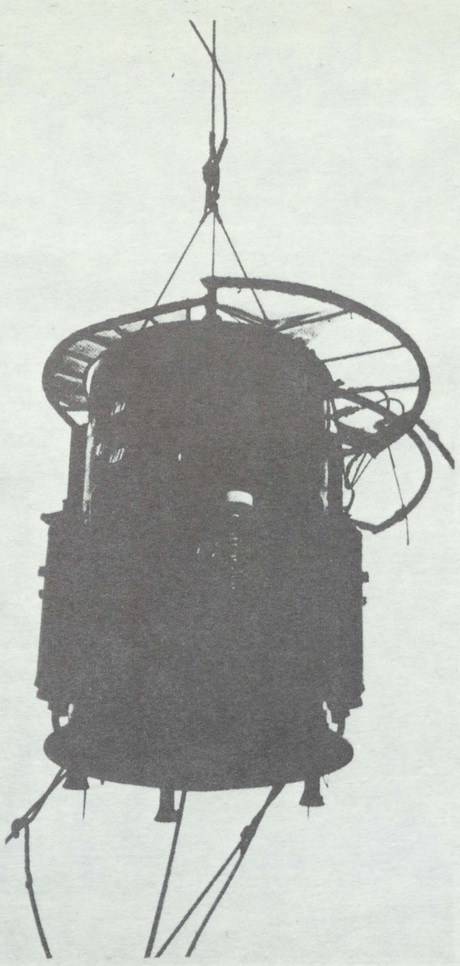
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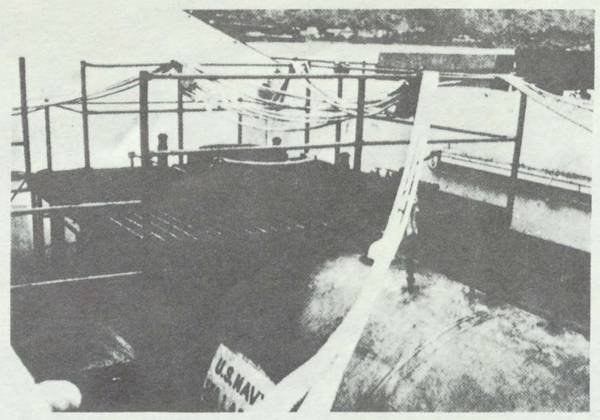
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quired in just getting equipment and supplies back and forth from the surface. For example, each day the breathing equipment for every diver had to be sent top-side for service and refilling, and then returned. This same procedure was standards for most of their tools, machinery, and other equipment used on the bottom. Anyone who has worked underwater, in poor visibility, and with no communication, can appreciate the difficulty of even these small and simple tasks. A forgotten wrench, bolt, or screw meant a swim to Sea Lab, a message to the surface, surface support sending the item to the bottom, and a swim back to the project. Under these conditions logistics become of major importance.

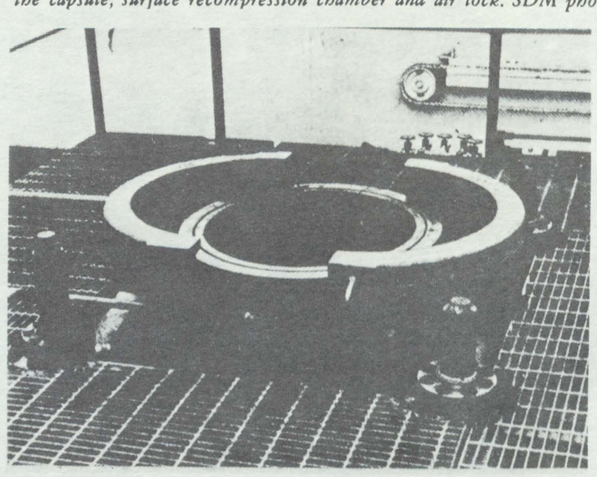
It was anticipated that morale would be a problem with the aquanauts. Never before had ten men been cooped-up together under similar circumstances. The quarters were cramped, the atmosphere unnatural, communication difficult, the work extremely hard and hazardous, and physical discomfort often acute. But not one cross word was spoken during the entire time. Jay Skidmore, in talking about it, said that he believes the men's attitude and even their personality changed while they were underwater. He is sure his did. He explained that he looked at things that happened in a different light. Often in the crowded quarters he would have his camera bumped or knocked over after spending a lot of time in setting up a shot. But instead of "blowing his stack" which would have been a normal reaction, he thought, "Oh, well. The guy didn't mean to do it, and he's trying to get his own job done."

This attitude was typical of every aquanaut participating in Sea Lab II, and it is the same as that reported by the aquanauts of Sea Lab I. Perhaps men become better individuals while they are diving, or perhaps divers are a unique breed of men. Captain George Bond, originator of the Sea Lab concept and Medical Officer with the Navy Man-in-Sea program, stated that the men selected for Sea Lab were carefully screened before they were accepted. But such a wide variety of personalities and characters could never be put together with such complete harmony without something extra going for them. Two comments give an indication of what this something is. The first came while I was talking to a group of 15 aquanauts at the Long Beach Naval Station during preparation for Sea Lab II. Cyril "Tuck" Tuckfield, in answer to a question about his apprehensions in anticipation of diving with Sea Lab, said he had





Members of the three Sea Lab II teams traveled via a personnel transfer capsule to the surface recompression chamber. These pictures show the capsule, surface recompression chamber and air lock. SDM photos.



no fears, primarily because of his complete confidence in Captain Bond and Captain Mazzone. Tucker's words were, "I would gladly go through hell if those men said it was O.K." His opinion was unanimously supported by every man in the group. They also said they could speak for all the aquanauts in the experiment — they all felt the same way.

Astronaut Scott Carpenter gave the second comment during a press conference after his 30 day stay in Sea Lab. Scott said it was a privilege to know and work with divers as a group. He also said he felt sorry for those who don't know these superb men and who must remain outside the whole of undersea environment and experience. I believe every skin diver shares this feeling of pity for those who do not know the submarine world.

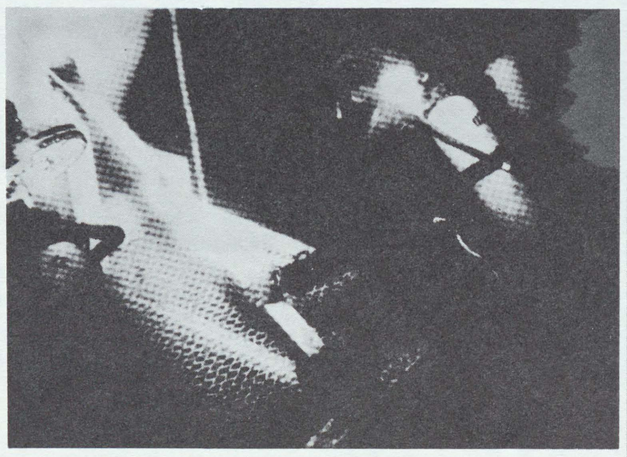
At the same conference, Captain Bond put the problems facing not only the aquanauts, but manufacturers, engineers, and scientists in one short, terse phrase. He said, "We hope that you (industry and science) will give us back four of the five senses men lose when they go underwater."

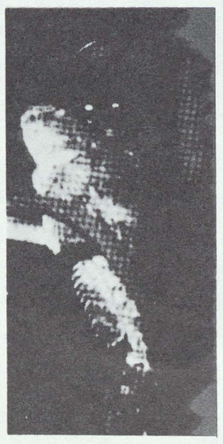
The two statements complement each other. A major difficulty in dealing with design and development of equipment for underwater use is, as Scott Carpenter put it, that scientists and engineers are often outside the undersea environment and experience and their designs often overlook the conditions under which the equipment is being used. Captain Bond put the problem in a nutshell. Underwater equipment must be used by men who have essentially lost their sense of taste and smell. Hearing, for all practical purposes, is non-existent. The sense of sight is drastically reduced and, in some cases, is completely lost. The sense of touch is reduced, especially in cold water when gloves must be worn. Under these conditions it is a marvel that divers accomplish any work at all. They also help to explain to the unitiated why Scott Carpenter, in comparing his Sea Lab experience with that of outer space, says that the underwater environment is, in his opinion, more hostile than space. He said that man is weightless in both mediums, but that in space weightlessness was easy and effortless, while underwater it required great effort and exertion to move from one place to another. Also, in Carpenter's opinion, underwater living presented more problems than space. But in spite of all of the problems and hard work in the more hostile inner space, every aquanaut in Sea Lab II was emphatic in expressing his desire to "do it again." Only next time they all would like to stay longer and accomplish more.

It could be more fun, too. Tolbert said that because of the success they had in growing barley in Sea Lab, the experiment in aquaculture, the men could be assured of bread and booze. Unfortunately, there was not much encouragement for women; they failed to grow marigolds.

This pioneering experiment of Sea Lab II was only at a depth of 200 feet, and for a total of 45 days. The area explored and investigated was equivalent to 30 city blocks. The continental shelf extends underwater from the earth's land mass at an average depth of 600 feet and equal in area to the continent of Africa. This vast undersea terrain is where mineral resources, eroded from the land areas over eons of time, are deposited. The recovery of these minerals is vital to future advancement of civilization. Many critical minerals are already showing signs of depletion and the demand is accelerating. Future aquanauts will work in 400, 600, and 1,000 feet of water, expanding man's invasion to the edge of the continental shelf where it drops into the abyss. They will be followed by industry exploiting the resources of the new world. Then will follow the workers who will colonize and inhabit the area. Who knows, perhaps we will see underwater cities where the inhabitants take vacations to the surface.

All of this being made possible by the vision and persistence of the men who pioneered Sea Lab, and the aquanauts who manned it.

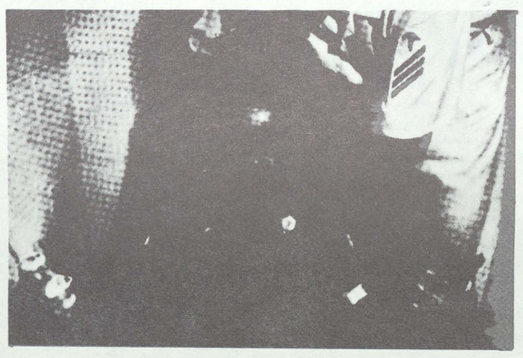




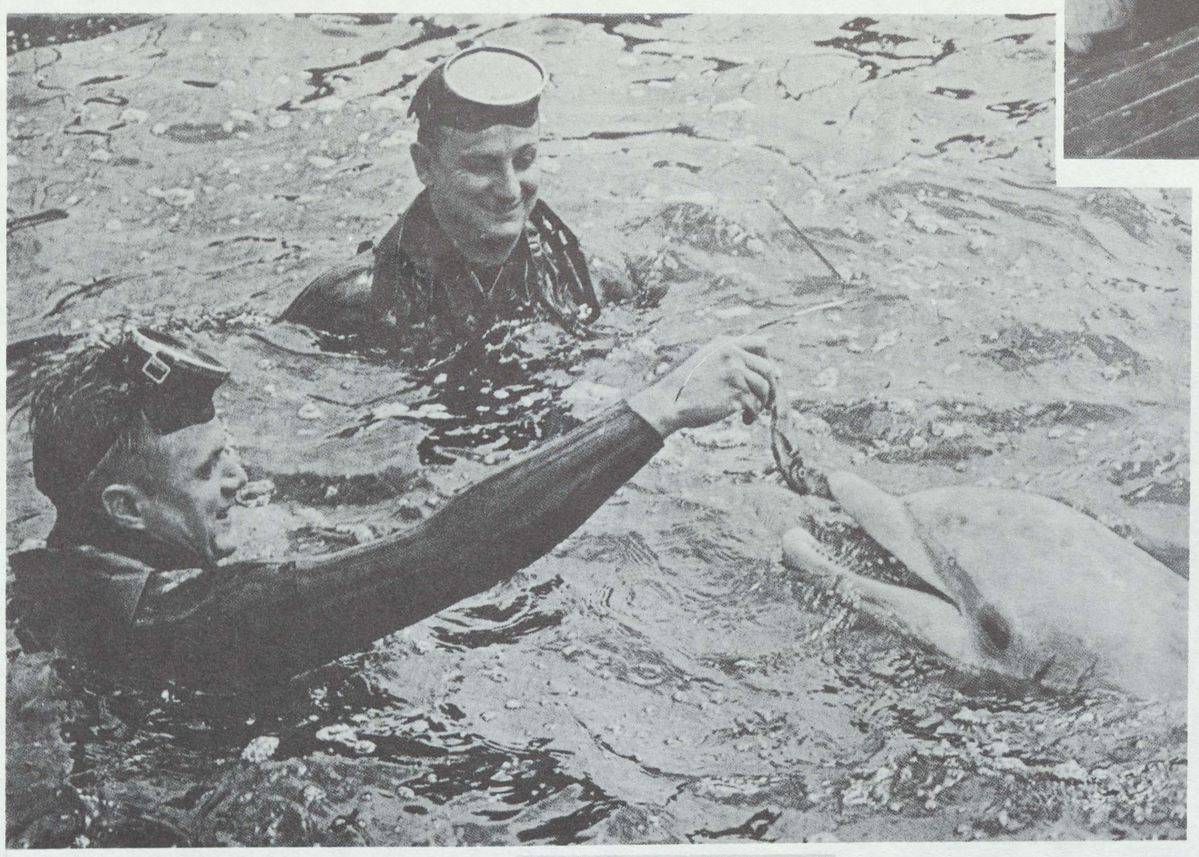
Scott Carpenter and Wilbur Eaton approach Sea Lab as the first of the ten man team to enter the undersea habitat. Ken Conda, at left, warily eyes a sculpin near the conning tower of Sea Lab. Eaton returns through the watery door of the undersea house. Below right Bob Barth and Howard Buckner have just completed a 266 foot excursion dive. In the bottom photo J. D. Skidmore is wired for an electroencephalograph at Balboa Naval Hospital during medical debriefing of the aquanauts.











PHOTOS BY U.S. NAVY, RON CHURCH, SDM



Tuffy, an Atlantic bottle-nose porpoise trained at the U.S. Naval Missile Center, Point Mugu, held an important role in tests to determine how a porpoise can help man in his undersea operations. Tuffy worked with Sea Lab II divers. Above John Reaves and Ken Conda reward Tuffy with a fish in his surface floating pen at the Sea Lab site. Below Tuffy responds to a signal from a diver during an underwater working session. On the facing page Conda detaches a rescue line from the mammal. Some of the scars Tuffy earned during encounters with sharks early in his life are visible along his right side.

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