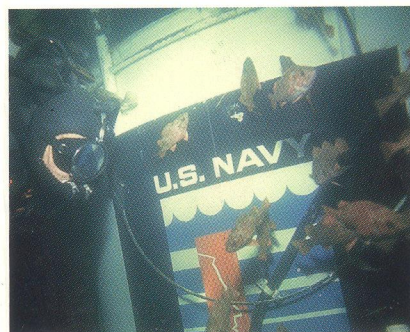
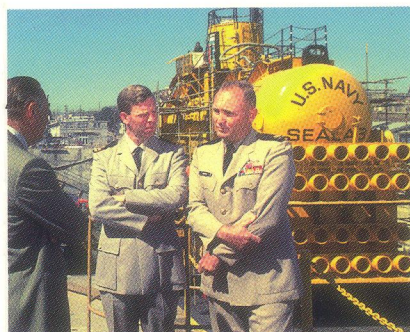
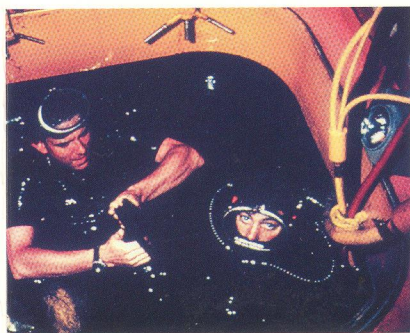


Sea Dwellers

*The Humor, Drama and
Tragedy of the U.S. Navy
SEALAB Programs*



BOB BARTH
Navy Diver

With foreword by Scott Carpenter

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Sea Dwellers

*The Humor, Drama and Tragedy of the
U.S. Navy SEALAB Programs*

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KEEP UP YOUR INTEREST IN
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BOB BARTH
Navy Diver

Bob Barth
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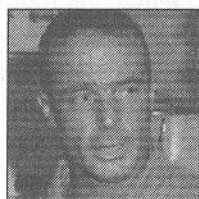
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Foreword

In 1963 I reported to Captain George Bond – “Papa Topside” everyone called him – for training with the SEALAB-1 crew in Panama City, Florida. “The Father of Saturation Diving” introduced me straight away to the four Navy divers I would be working with. We sat around for awhile and talked about the project and then he sent us off on our own to get to know each other. I remember it as a Friday night at around 7 p.m. We repaired to a local bar and they proceeded to investigate this non-diver Naval Officer, turned astronaut, and now trying to turn aquanaut, that they had been directed to train, care for and tolerate for the rest of the SEALAB-1 experiment. This all in the hope (1) that I didn’t drown in the process, and (2) that I could appear to them to have some chance of being a useful shipmate. Bob Barth was the clear leader of the inquisition that evening and of the indoctrination that was to follow in the ensuing months. Together they marked the beginning of one of the finest and most enduring friendships any man could ever ask for.

Bob Barth is a man of few words and, in a few words, he is the undisputed dean of the saturated diver. He was in the business before anyone ever knew it was a business, including Bob himself. Name any event or feat in the world of saturation diving and Bob Barth has been there and done that. His long underwater career has left him with an endless list of respectful shipmates for whom the mere mention of the

name "Barth" brings fond smiles. He doesn't talk about it very much though, and unless you ask him to tell you a story, you'll have no idea of his background or his accomplishments. It has taken a quarter of a century to get him to write this book because, he says, he can't write. The book itself proves him wrong.

George Bond and Bob Barth were the central figures and crucial participants in an experiment – ultimately called the SEALAB series – which proved that man could live and work with impunity for extended periods in deep water. Without the both of them, it wouldn't have been done. All the tales herein are factual and told with humor and humility not always found in the diver who made his way up the technology ladder from the hard hat to living underwater. This book is a good read for all and a must read for all those who love the ocean and diving it.

– SCOTT CARPENTER



Preface

This work will not become the definitive story of SEALAB in the annals of history. George F. Bond's own chronicles, as edited by Helen Siiteri, provide a more comprehensive and balanced view of the political, technical, and logistical hurdles that had to be crossed in making Genesis and SEALAB happen. Bond was a master story teller, and *Papa Topside* exists as his narrative history of events.

Yet Bob Barth's story must be told, as he was the only man, from start to finish, at the other end of the hose. That he is also a colorful story teller in his own right is icing on the cake. That his recollections contain the occasional reference to bathroom humor and off-color language is a reflection of the rough-hewn tenor of the men involved. That his recollections don't always jibe with Bond's in the finer details of what happened is only reflective of Barth's different vantage point... from the bottom.

Shelley said that history is "the essence of innumerable biographies." This is the gospel according to Bob Barth, a self-professed grunt and guinea pig who willingly gave his blood, sweat, tears (as well as other bodily substances), the prime years of his life, and even his heart and soul, to the U.S. Navy's Genesis and SEALAB programs in order to experience what most men can only dream of – life on the bottom of the ocean.

The dramatic, tragic end of the SEALAB saga is only made more so by the U.S. Navy's quick abandonment of the program. Death did not halt

space exploration. My personal belief is that man's ability to exist under the ocean, with the ocean, and to use the ocean, will prove to be even more important than our exploration of space.

Let history remember, then, our sudden abandonment of the SEALAB program, a decision made by an arbitrary political process, and one not involving the men in SEALAB.

The Genesis and SEALAB programs can be differentiated from Link's SPID and Cousteau's Conshelf habitats by the wealth of physiological data generated. Bond proved the viability of saturation diving. In so doing he handed the commercial diving community its most important tool in the exploitation of the offshore oil and gas market.

In Bob Barth's office at the U.S. Navy Experimental Diving Unit, there hangs a sign that says, "On ne pai qu'en sortant." Translated from the French, the phrase states, "You only pay on the way out."

The relevancy of this axiom, introduced to the diving world by eminent British physiologist Professor J.S. Haldane, to saturation diving is self-evident. The decompression penalty must be paid, regardless of the length of exposure.

In a different sense, this phrase speaks to the whole SEALAB program. Getting out exacted a very high price, not only in terms of human life, but in lost dreams, and lost opportunities. Many men will go to their graves "decompressing" from SEALAB.

Bob Barth, of course, prefers a lighter interpretation of the phrase on most days. After letting visitors to his office ponder the profundity of the phrase, and as they are on the way out the door, he is wont to reveal, through a thinly veiled grin, where Haldane discovered the phrase: "It was hanging on the wall of a French whorehouse."

You only pay on the way out.

— HOWIE DOYLE, PUBLISHER

Sea Dwellers

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Chronology

1957-62

Project Genesis

Phase A and B (Animal Phases)

1962-63

Project Genesis

Phase C, D and E (Human Phases)

July 20 to July 31, 1964

SEALAB-1

August 28 to October 14, 1965

SEALAB-2

February 16 and 17, 1969

SEALAB-3



Introduction

Man's interest in the ocean goes back further than history records. Long before glass bottom buckets or face masks, long before there was even glass, there surely must have been that keen desire by someone to see what was down there. History books tell of ancient attempts to find ways to get to those inaccessible depths. However, until just a few years ago man had been limited in achieving much penetration into "Inner Space." For years we were fascinated with rare photographs of deep regions in the sea brought back by makeshift contraptions or one atmosphere submarines. We can all remember those first pictures; it was somewhat like that of the first pictures from outer space. Pictures of the deep sea fascinated us as much as those from space. If you were a diver, probably more so. Not too long ago Bob Ballard presented us with some magnificent footage of the ocean liner Titanic sitting serenely on the bottom of the North Atlantic. I was glued to my seat when I first saw that film. Here I was looking at one of those mystical objects held secret by the ocean, and it was just a couple of miles below the surface which was a lot closer than the 238,000 miles to the moon or some other space object light years away.

A lot more is known today about distant planets than of the sea which surrounds us, but that's easily understood. Space had captured our imagination to the point that money was made available for exploration, and you

have to admit NASA has done some mighty good work with that money. However, right here on this planet are things and places that are just as exciting as space, and they aren't that far away. No one knows how many objects are sitting on the seabed. While watching television the other day, the subject was German submarines that were sunk during World War II. The narrator stated that something like 700 German U-boats were claimed by the war. That is just German subs. How about the ships those submarines sent to the bottom, and of course, there is also the Pacific. World War II sinkings are only a smidgen of the vast amount of stuff that has accumulated on the bottom. Things have been disappearing into the sea for literally thousands of years. Can you imagine what the oceans would reveal if we were to drain them and take a look? The tenants of this earth have always been depositing things in the oceans. That stuff is still down there, and only a fraction of it has ever been seen by those of us on the surface.

Every person on this earth depends on the sea in some way. My gosh, if only we could get folks interested in that part of our planet, the benefits could be unlimited. But first, someone has to notice.

Unfortunately, the oceans have long been looked upon as nothing more than a giant septic tank where we could pump our sewage, dispose of unwanted vessels, dump our garbage or put something there that we didn't want to see again. Out of sight, out of mind. I can remember large boats called garbage scows that chugged around various harbors in our world and filled up their innards with garbage, took it to sea and dumped it. Once an object disappeared from the surface, we had the tendency to think it no longer existed.

Can you imagine after centuries of sinkings what sits down there on the seabed? Men like Jacques Cousteau, Bob Ballard and Mel Fisher are just three of the many who have spent time to think about it, gone out to do something about it and pursued their dreams. Their vision and hard work rewarded us all with results that have shown us those rare sightings of objects beneath the surface of the sea. There's a whole world of its own down there, and few of us have been down to visit it.

As the years crept by the interest in deep water visits continued to grow, but at a slow pace. The need to rescue the crew of a sunken submarine or salvage that submarine, the requirement to get petroleum from unattainable depths, and lately the interest to save the sea from complete destruction has continued to create and perpetuate that interest. A few folks even showed a

bit of interest in going down to view some of that old stuff. However, generally speaking, deep water visits by man were still a mountain we could not climb.



Chapter One

Project Genesis

During the years 1957 through 1963, the United States Navy conducted a series of tests that eventually determined the means by which we could put men in deeper water and leave them there for extended periods of time. These tests were named Project Genesis and were followed by the SEALAB Programs which were the early days of what we know today as saturation diving. I was able to start with this group, which gave me the greatest experience of my life. Now that it is over and a part of diving history, I can look back and realize how fortunate I was to have been involved. Had I only known that one day I would sit down and write about it, I would have paid better attention and taken notes.

In preparing my thoughts about these contents, I spent a lot of time pondering how to tell the story. Would it be just my thoughts and experiences, or might I want to include the comments of others? The whole program from Genesis through Sealab was the work of a lot of good folks like Dr. George Bond, Walt Mazzone, Dr. Bob Workman and a wealth of other fine men and women. I felt that their thoughts, comments and any other tidbits might help me get the story told. Hence I have chosen to include, in particular, excerpts from the writings of my late friend and mentor, Dr. George F. Bond. He is the man who brought the saturation

diving program together. In a lot of ways, this is his story. I only wish he was here to tell it.

George Bond had taken his ideas on saturation diving and determined a program to develop his theories which would have a great impact on the future of Navy diving and diving in general. In Bond's words: "There is a beginning to each end product of man. In the case of our program of undersea living, the beginning was on a Friday evening in November, 1957. The week's work at the laboratory was complete and had gone well. So, in culmination of months of thought, I set pen to paper and wrote a narrative beneficial suggestion. It was entitled, 'A Proposal for Underwater Research.' This was the beginning word, and the thesis was simple. Since the decompression penalty for even short dives to a relatively shallow depth of 200 feet was so great, useful extension of man's capabilities under the sea would never be realized if conventional protocols of deep sea diving were followed. Clearly, a new concept of diving practice had to be developed. The new concept would hereafter be known as saturation diving. Yet, the problem of saturation diving and subsequent decompression calculation was but one face of the new coin. It would not be enough merely to give man a pressurized home on the ocean bottom, from which he could freely go out to explore and exploit the water and seabed environment. The second and greatest problem would be the calculation and control of the gases which he could safely breathe at great depths for virtually infinite periods of time."

These were Bond's words when he made his decision to embark on the project that would ultimately prove man was capable of living under pressure for long periods. Whether or not we could sustain life in this manner would have to be proven by a series of tests, and that was what he was about to do. As it turned out, this subsea fraternity has gone a lot deeper and stayed longer than was imagined in those early days.

The accomplishments by the diving fraternity with equipment, techniques, and man years of saturation diving in just over 30 years are indeed impressive. We have lived and worked at depths that for hundreds of years man had only dreamed about. I can't help but feel good about having been allowed to be part of that beginning.

Diving history records that the U.S. Navy commenced research on breathing gas in the 1920's. Helium was selected as the replacement for nitrogen (or air) when conducting dives at deeper depths. The use of nitrogen posed problems for a lot of divers due to its narcotic effect at deeper depths. Oxygen also was a problem as we went deeper. After years

of testing, helium was established as the gas of choice for deeper diving, and it is still our choice today. However, helium as a breathing gas did little to assist in extending bottom time, and decompression was still the monkey on the backs of divers.

Gas mixtures and time required for decompression continually presented the diver with obstacles to overcome, but by far, the biggest problem was that of decompression. Decompression in conventional diving generally meant the diver had to remain in the water during most of his long return to the surface. Lengthy bottom times at deeper depths still did not produce productivity, and the diver was punished at the end of his dive by hanging in the water literally for hours for those scant few minutes he was on the bottom. This was a procedure that certainly was unpopular with the diver. However, without decompression the diver becomes subject to the painful and sometimes fatal disease known as the "bends." This disorder is caused by too sudden a change from higher pressure to ordinary surface pressure. Too rapid a change in pressure will not allow the body to safely eliminate excess gases absorbed from the atmosphere at depth. The most common symptoms of decompression sickness are local pain and to a lesser extent, dizziness, fatigue, shortness of breath and paralysis. Death, also, can result in severe cases of bends.

Scores of divers and laborers working in tunnel construction were killed or maimed by decompression problems before the French physiologist, Paul Bert, discovered its causes in the 1870's. Bert advocated gradual decompression or recompression after exposure. This process provided for a gradual return to the surface. The first recompression chamber which simulated changes in air pressure for treating victims of the "bends" was installed to aid caisson laborers working on the first Hudson River tube (or tunnel) in New York City in 1893. Hence the term we all learned as fledgling divers, "Caisson Disease."

In the late 1930's the U.S. Navy established a depth of 380 feet for 30 minutes, breathing helium, as the limit for a dive in deeper water. That's not much time to get anything done, and a dive to that depth for those 30 minutes required over three hours of decompression. When you look at what we do today, 380 feet was peanuts. Back in 1938 divers at the Navy Experimental Diving Unit (NEDU) reached a simulated depth of 531 feet. That was a heck of an accomplishment in those days. However, it required a lot of fiddling with gas mixtures and some long and arduous decompression. This unfavorable ratio of decompression to bottom time just did not make for good constructive dives. Water decompression in

itself was a pain in the neck.

Just about any diving that was to be done in deep water required a lot of planning. The biggest obstacle was that of diver safety and productivity. With the time and depth restrictions facing the diver those few years ago and with so little known about getting him deeper to stay longer it was obvious that one day someone was going to get inquisitive and see if maybe they could come up with a better idea for staying on the job site until the job was done. With Bond's initiative and the Navy's approval, the time for Project Genesis had come.

Whether you were a commercial diver or one from the military, you knew from your training and experiences what new and mystical things would be achieved once man was to reach depths that few had been to before, and while there, maybe even gets to stay for a while. I doubt that there was one of us that at one time or another had not thought about what dives like this might be like. We were, after all, prisoners of the ever-present shallow depths and the many restrictions that those depths presented to us. The only time we were allowed to venture deeper and longer was in the movies that we saw about the underwater world or maybe too, in our imagination. I remember, years ago, working on the bottom of a submarine that was in need of diver help at sea. She was broken down and required a simple short dive to repair her problem. As I struggled with a wrench to open a water intake cover, the wrench slipped from my hands and started its one way journey to the dark depths of the Atlantic. It was odd and somewhat fascinating for me to watch that wrench disappear down to a place that I could not go to get it back. It's funny how things like that remain in your memory.

A lot of folks with a clear vision into the future probably knew that someday we would achieve deeper depths with longer durations, but no one in our Navy had succeeded in finding out what it would take to get there. In the beginning when permission had been given to try our luck at saturation, our goal was only 600 feet. How to start the process of saturation or even if it would work was going to be a slow methodical endeavor. The man for the effort was George Bond. His curiosity and his quest for answers were going to keep us busy for several years, but it was going to be a grand time.

An old friend of mine, Frank Scalli, has told me about a Boston Sea Rovers Convention that he attended back in '57. Frank said that both Bond and Jacques Cousteau were at this meeting and evidently spent a good deal of time exchanging ideas. Bond talked about this theory that would lead to

Genesis and Cousteau on his plans for the Conshelf program. It was soon after this meeting that Bond returned to New London and embarked on his Genesis studies. In the years that followed there were occasions when asked about his association with Bond, Cousteau would always give Bond credit for conducting the research that was needed to develop the saturation theory. It always pleased me when Captain Cousteau would make it a point to say that if it had not been for Bond's work, his Conshelf program would have been a lot harder. The two of them had a lot of mutual respect for each other, and it developed into a friendship that lasted for years.

January, 1960 found me with a set of orders in my hand, which directed me to report to the Escape Training Tank at the Submarine Base in New London for duty. Like all new and inexperienced tank instructors, my first few months there were consumed with trying to learn to hold my breath. However, with that finally achieved, I then had a bit of time to look around and see what other things were going on around me at the tank. For those that have never visited an Escape Training Tank, you probably would have found it to be an interesting place. Tanks were designed to teach submarine crews how to get out of their boat if it should sink. They are (or were) large cylindrical tanks that are roughly 120 feet tall, 18 feet in diameter, filled with 92 degree water, and as clear as any fresh water spring you would find anywhere. Instructors generally worked in that water about six hours a day. Most of the water work was conducted by breathholding, eventually giving the instructor the lung capacity and mental ability to dive down to the 120 foot level by just holding their breath. This was a great place to develop your breathholding capability and at the same time teach you what your body was really able to do. If you haven't been to a tank to see one in operation, forget it, they don't exist any more. As an instructor, your daily work at the tank consisted of submarine escape training for all students who were about to attend submarine school. Sometimes, a complete submarine crew would show up for their requalification training. These activities required a doctor on hand. The doctors came down from the submarine base Medical Research Laboratory. Bond, at that time, was assistant officer in charge and later, officer in charge.

I had met Bond a couple of years before when he and Cyril Tuckfield were in Key West getting ready for their record making escape from the submarine *Archerfish*. A classmate of mine from Underwater Swim School, Glenn (Tex) Brewer, was part of the support team that was put together for this escape attempt which would further develop the technique to escape from a disabled submarine. Brewer had introduced

me to Bond during this period. Bond and Tuckfield, using the buoyant ascent life jacket left *Archerfish* bottomed in over 300 feet of water. They traveled to the surface at about 375 feet a minute exhaling like hell all the way up. This open water escape had never been done before and set the standard for submarine escape until Harris Steinke developed the Steinke Hood a few years later.

My initial observations of Bond created a lasting impression. He was a man that would never ask you to do anything he wouldn't do himself. Half the time you had to fight him for the opportunity to do it. I know of no man I ever respected more.

Day to day activity at the training tank included helping the scientists at the medical research lab find solutions to their ever present curiosity. They showed up at the tank every few days to ask their favorite instructors if they had time to assist them. This assistance generally meant that somewhere along the line we were going to be asked to be guinea pigs on some thankless task. Maybe they would suggest that one of us descend to 100 feet, hold our breath until we turned a new color or maybe just sit in a chamber while they increased pressure until you turned goofy.

I remember once being asked to take a deep breath, descend to 120 feet holding my breath, and then suggesting that I try to exhale into a small balloon that I carried down there. Think about that for a minute. You're down at 120 feet holding the one breath you took on the surface, and some guy wants you to exhale hard into a balloon. Just how much air are you supposed to have left? I don't recall what was in that balloon when he examined it, but you can bet it contained remnants of yesterday's lunch and some hairs off my ass. Half the stuff they asked of us I never knew the human body was even capable of doing. There was a lot more to being a tank instructor than teaching submarine escape. At any rate, the tank instructors were viewed as willing subjects for all the inquiring minds at the research lab. One of their projects being conducted was Genesis; however, most of the earlier studies on Genesis had been performed in the research laboratory with smaller animals, and tank instructors were seldom involved. It was probably in early 1962, when Mazzone, Workman and Bond showed up at the tank with a batch of goats. You can't help but notice goats running around a Navy diving facility. My curiosity immediately got the best of me, and I asked the first question of many that would follow. "Whatcha gonna do with the goats?" Little did I know that in the years to follow, I was going to be doing the same things that they were planning to do with those goats. My willingness to show curiosity with their endeavors

and my ignorance to identify any harm in participation must have triggered an idea in their minds that maybe I might come in handy one day.

It so happens that the goat phase of Genesis was going to be the last of the animal testing. First these goats were to be pressurized and maintained at depth for an extended period of time breathing the helium/oxygen mixture that Bond, Workman and Mazzone had determined to be proper for this new concept. It is my belief, to this day, that those earlier decompression calculations were done on the back of a cocktail napkin while those three were at the officer's club having a long lunch. At any rate, all the divers accused them of it. With the chamber made ready and everything in order the goats did their dive. If memory serves me correctly, we had the goats at 200 feet for about two weeks. Obviously, during this period, someone was needed to tend those goats and to remove the goat pellets, the straw and other tidbits that you might find in a chamber full of live goats. Who else would you turn to but a sailor whose curiosity had gotten him involved in all of this in the first place? I don't know about the rest of the goat herders, but tending animals in a chamber was a first for me. I had never worked with animals before and in the beginning was somewhat skeptical about it. After hearing those terrible stories about what researchers did to animals I have to admit I thought a lot about not getting involved because of my dislike for people who hurt animals. But I never saw anyone mistreat an animal and was witness to several acts of kindness that I would have not expected. Actually, we all got quite attached to those damn goats. It was an interesting and rewarding experience. As a matter a fact, I found those goats easier to work with than some of the jerks I have been forced to share military life with.

Earlier Bond had decided that upon surfacing, the goats needed to be exercised. This exercise was accomplished by taking the goats on a leash and jogging with them in tow, down the wharfs where all the submarines were parked. If you had a willing candidate and volunteer tending goats in the chamber, surely this same volunteer would be more than willing to jog with goats down a wharf. The obvious embarrassment the goat runner would endure from the submarine crews was nothing to compare with the end results of research data that would be obtained. I hope that someone out there understood what the hell I was doing. From what I remember of the many unkind comments I heard from the submarine crews, it didn't appear anyone viewing this spectacle had any idea what we were up to. At the time, I am not sure that I did either. The verbal abuse from the submarine crews was bad enough, but I got stopped by the base police. They asked,

"What in the hell are you up to?" I couldn't come up with a reasonable answer, as I knew quite well that the truth would only confuse the situation. I can see it now. "Well officer, we were diving these goats." "You were what?" "Yessir, we had these goats at 200 feet." "200 feet? Where?" "In a chamber." "A chamber?" "Yes, we had these goats at 200 feet for two weeks, and my boss wanted me to run them up and down your dock on your base... etc, etc." No way in hell I was going to tell that story. After some embarrassing moments, I was allowed to accompany my goats back to the tank followed by some doubting base police officers.

It's important that you keep in mind that in the beginning no one was sure if saturation, as we know it today, was a feasible idea. A lot of very important questions had to be answered; mainly, if man was capable of these prolonged stays in this artificial atmosphere. This mixture had been an acceptable breathing mix for years in conventional diving, but those durations were always short and predicated on decompression at the end of each dive. What would happen if we stayed there? All the data that was collected during the earlier phases of testing on animals gave the investigators hope that they were on the right road. The completion of the goat studies also showed that no significant physiological or psychological changes had occurred in all the critters tested including the goats. But, how in hell do you know if goats suffered psychologically after sitting in a chamber for two weeks? If you have ever been around goats, you will agree that they are lovable animals ... but sane? I don't know. What the hell can you say about an animal that eats paper bags. Once when I was living in Dubai, I watched a goat eat an empty cement bag containing a lot of left over cement. I was awfully tempted to follow him that day to see the outcome of the digestive process. But I didn't.

The initial studies on animals, although not completely problem free, when completed had given Bond the justification and good reason to continue the experiments. After about five years of animal testing, the Secretary of the Navy granted permission for utilization of human dive subjects, and in late 1962 the first set of volunteers were to be exposed to an essentially nitrogen-free atmosphere for a total exposure of 144 hours. In this significant experiment, the average composition of the atmosphere was 21.6% oxygen, 4.0% nitrogen and 74.4% helium. Final plans for this next phase of Genesis were made. In November of 1962, we traveled down to the Naval Medical Research Institute at the Navy Hospital at Bethesda and started preparing an old chamber complex there for this which was to be the first human dive of the series to test Bonds theory.

Other answers were also needed before we could travel down this proposed route. Could humans tolerate the rapid body heat loss? Was his hearing going to be a problem? How about helium speech, would we end up talking strange the rest of our lives? In the case of animal experiments, all parameters of blood chemistries, morphologies, EKG's, EEG's, metabolic values, and a multitude of psycho-physiologic tests were to be obtained. There were a host of questions to be answered. The solutions were to be found in putting humans under pressure for a while and hoping they responded as well as the animals.

Once at the Navy Hospital at Bethesda, it was decided that we would not pressurize the chamber, but completely change its atmosphere to the desired helium/oxygen mix. Trying to maintain an artificial atmosphere in an old chamber wasn't easy. Since doors seal with pressure, trying to maintain any atmosphere without pressure was going to be quite difficult. Walt Mazzone and Bond had already decided that we didn't want much nitrogen, the "no pressure" concept had been decided earlier as a safety precaution. In the event that the chamber occupants had any problems, decompression would not be required.

Sound simple? Far from it, trying to maintain an artificial atmosphere in an old chamber "ain't easy." Doors seal with pressure, and the old dogs on those chambers didn't work all that well. In the absence of pressure, it was going to be quite difficult to keep the atmosphere like we wanted it. We were trying to determine the physiological effect on the body during a prolonged stay in the helium atmosphere. Dives under pressure would come later.

After several days of chamber modifications and other much needed alterations, we were ready to proceed. Diver subjects had been selected prior to leaving New London. A doctor was obviously required inside, but what if that doctor got sick? Then I guess they decided that a second doctor would be needed to look after that first guy. That's assumption on my part, but who is going to argue with me after all these years? The third individual, of course, didn't need a medical background but it might be important that he knew a bit about chambers. It also might help if the third individual wasn't the brightest sonofabitch on earth but seemed willing to undergo physical abuse. Of course these attributes plus my vast experience with goats in chambers immediately qualified me as the third team member. Someone should be along to look after the two doctors. It was determined after this dive that the two physicians had increased in their vocabulary. At least Bond had told someone later that his two doctors were a bit more

"earthy" after a week with this third individual.

Phase C of Genesis was ready to commence. Dr. John C. Bull, Dr. Albert P. Fisher and Chief Quartermaster Bob Barth climbed into that chamber and commenced a six day stay. Once inside, the fun began. To keep the atmosphere free of nitrogen, there was a constant effort to keep it from entering. This particular chamber had outer doors and a vacuum pump installed enabling the chamber to be "flown." To start the test, we flew the chamber to around 40,000 feet, breathing oxygen like an aviator as we ascended. Then, as planned, we brought the chamber back to the surface on the appropriate gas mixture. I lost track of how many times we had to try and locate the leaks that kept showing higher than wanted nitrogen on the instrumentation. It is surprising how easy it is for that unwanted air to creep into a chamber. Walt Mazzone could be seen through the ports running around outside with buckets of "goo" slapping it into places he thought might be leaking. In the end the outside of the chamber looked like a disaster zone. It took awhile to get all the kinks ironed out, but after a lot of additional modifications to the chamber to make it tight we settled down to a normal routine. Although I doubt if anyone could call this activity routine.

Like all experimental dives, there was an over-abundance of tests to perform. I found over the years that once you get a bunch of willing subjects locked into a chamber every kind of doctor in the world shows up to test you. Sort of like all your relations coming to visit when they find out you just won the lottery. If you weren't being asked to exhale everything you owned into a spirometer, you were reading ink blots or maybe giving a gallon or two of blood (a few CC's at a time) to vampires lurking outside. Actually, all the tests conducted were physiological in nature and obviously necessary. After all, these dives were done to answer the questions of feasibility and safety. A complete battery of these physiological tests were performed daily. In the ensuing years of medical testing I learned more about diving physiology than I could have learned in any school. Probably my biggest achievement was that of finally understanding what the doctors were trying to tell me. Shucks, for years I thought "Moby Dick" was a venereal disease.

Today's chamber operations are fairly easy to conduct. In those days, they had us trying to operate in old pressure vessels that were not designed for saturation soaks. To keep them working around the clock was not a routine operation. Life support systems that we take for granted today were nonexistent in the early days. Showers, toilets and the means to keep divers comfortable, plus all the other handy items we have grown accustomed to,

were yet to be built. Cripes, some hadn't even been thought of.

About halfway through this dive and after days of worrying about leaks, things seemed to be working okay. The outside tenders, including Bond and Mazzone, had found that monitoring our speech gave them an indication that there was in fact helium present in the chamber because the occupants spoke with helium distortion. Seems logical. As I sat there one day, somewhat bored, I happened to look up at the manifold which supplied pure oxygen to us when we were at altitude. I noticed that there was still oxygen pressure showing on the manifold gauges and I thought, if I took a few breaths of oxygen my speech would instantly become normal. I thought everyone would get a kick out of it (I knew I would). So I did it. Lo and behold, I spoke without a trace of helium distortion. I took a few breaths of oxygen and announced over the speaker with a helium free voice, "Hey topside, I think maybe we have an atmosphere problem in here." Walt Mazzone who was on watch had been worrying about the damn atmosphere since we started. He probably jumped two feet into the air when he heard me speak in a normal voice. His immediate thought must have been that all the work that had gone into keeping that chamber nitrogen free just went down the drain. In viewing the apparent chaos through the ports, the three of us inside thought it was funnier than hell. Walt somehow didn't share that view. As the years went on he was to get just as mad at me for other things as he did that day. He didn't stay upset too long because just before Bond was to relieve him, he told me to do the same thing to Bond. So I complied. After that the oxygen was promptly cut off to the chamber. The folks outside for some reason or other didn't seem to share in our glee.

This first dive conducted with humans was an important fact gathering operation, and there was a lot of effort put into assuring that what we were attempting to do was safe. A series of additional tests was also planned after the dive surfaced. As that day approached, each of the three dive subjects was briefed on procedures to leave the chamber. In my case, I was directed to go to the back of the chamber, take a single bottle scuba rig with the old double hose regulator, put on a nose clip, put the regulator mouthpiece in my mouth, and sit there until the other two left the chamber. Dr. Bond wanted to keep me on the chamber atmosphere of helium/oxygen until some point after we surfaced.

Dr. Charlie Aquadro, who was also on this project and a friend of mine from Key West was at Bethesda to assist. I was directed to exit the chamber, meet Charlie who would then take me to some magical place and conduct

whatever they were planning to do. I was told not to remove the nose clip or the mouthpiece, sit down in a wheelchair, shut up and do what I was told. With my mouth full of regulator and a scuba bottle in my lap, I had little choice.

Now here I am, sitting in a wheelchair with a single scuba bottle in my lap, a double hose regulator stuck in my mouth and a big nose clip hanging on my schnoz. I haven't shaved, bathed or changed clothes in a week, giving the obvious appearance of a skid row bum who had been sleeping on the sidewalks. I was worse looking than our goats and smelled a lot worse for sure. With Dr. Aquadro pushing the chair where did he take me? Right up to the hospital itself. He wheeled me down one hallway after another into one elevator after another from floor to floor. The Navy Hospital at Bethesda is about as big and spread out as the Pentagon, and that is big. Although our destination was still unknown to me what I was really concerned about was not where I was headed, but what people were thinking about when seeing this unsightly creature in the wheelchair. In the elevators they seemed to get as far away from me as possible. Do you think Dr. Aquadro would explain to the other occupants in the elevator just what it was they were looking at? Hell no, he just left it up to their imagination, and I had no recourse but to sit there trying to look normal as I drooled into the gurgling regulator. Dr. Charlie Aquadro is not a nice man.

A couple of years before this program, Dr. Aquadro and I were both stationed at the tank. Charlie had a pet monkey. He had a small diving helmet made for him and at times would bring this monkey up to the tank to "dive the monkey." We would hold the monkey in our hands and descend to 15 or 20 feet. Things worked okay, and it was fun. One day Charlie asked me if I would be interested in baby-sitting the monkey for the weekend. He wanted to go somewhere and had no one to watch it. I saw no reason not to. Friday afternoon rolls around, and I head home with one caged monkey. Earlier, Charlie told me not to let the monkey out of the cage as I might have a bit of trouble getting him back in. Things went well for the first two nights. On Sunday morning I got to thinking, what could it hurt to let this friendly, docile animal out for a while. My wife agreed. As soon as I opened the door to the cage it exploded, and out comes this hairy fur ball like a cannonball out of a deck gun bouncing off of everything in sight. It took me well into the wee hours of the morning to catch the little bastard, but not before he destroyed a couple hundred dollars worth of knickknacks and curtains. That sort of ended interest in monkey sitting at the Barth house.

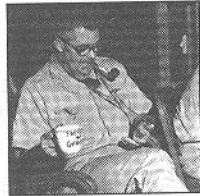
Back to Bethesda. What Bond wanted to do was leave me on the

helium, then place me on an EEG machine and record my brainwaves as I went off the mix. This would answer one of their many questions. I entered the lab and laid down on a table. This pretty girl hooked up the many probes to me for the test. She never asked me where I had been, or why I was so dirty and smelled so bad. I am generally friendly and pleasant to pretty girls, but in this case I was embarrassed to the hilt and just hoped that it soon might be over. I needed badly to go somewhere and take a bath.

Eventually these EEG results were obtained, and our participation in this dive was completed. We said thanks and goodbye to the nice folks at Bethesda, packed everything up and headed back to New London where the data collected on this dive could be analyzed and a determination made to continue with Genesis or put it to bed.

In Bond's words, "In this experiment, all major goals were achieved, and the human subjects completed the exposure with no measurable physiological decrement. Incomplete analysis of the test results, however, indicates a clear-cut stress response, a potential bacteriological problem, and a persuasive suggestion that inert gases of man's respirable atmosphere may exert a specific physiological effect on the exposed individual. There is scanty evidence that the sum total of these effects might be advantageous to human organism. In short, it is believed possible that ocean air is not the best of all possible atmospheres for human existence."

After the results were in on this dive, there was little doubt that saturation diving might well be the thing of the future, but further testing was necessary. We had yet to put man under pressure and leave him there. The next dive was scheduled for the spring of 1963 at the Navy Experimental Diving Unit (NEDU), Washington Navy Yard, Washington, D.C.



Chapter Two

Let's Add a Little Pressure

The plan was a dive for a week or so, but this time we would add a little pressure. Doctor Bond said, "Lets try 100 feet." Dates were set, plans were made, and participants were selected to conduct this first saturation dive for Uncle Sam's Navy. Saturation systems as we know them today were nonexistent in the early 60's. The nearest thing to a good operational chamber complex that would serve our needs was at NEDU. It was spring-time in 1963 and a handful of people showed up to put together Project Genesis, Phase D.

The chamber complex at NEDU, although not built for long term saturation diving, was still better than what we had anywhere else, but they were also older than dirt. Life support systems that maintain the atmosphere in chambers of today were practically unheard of in 1963. The chambers at NEDU contained little that would help much with trying to live in them for a week. Berthing to accommodate all the divers was not available. They slept where there was space. A small air conditioner, a portable carbon dioxide scrubber, a venturi or two to help circulate gas, and a few probes for gas analysis were about all there was for life support. Saturation systems and all their elaborate components had yet to be designed, proven, or built. At NEDU we had to make do with what we had. The antiquated chambers

had been there for years, and we often joked about them. "Those chambers leaked so much that the outside tenders spoke in helium speech," or "Even at 100 feet there was a trail of ants coming and going under the chamber door." The chambers were designed and installed back in the mid 1930's. In those days no one was thinking about saturation diving, and very little necessary equipment or creature comforts were available for folks to spend longer times in chambers. As a matter of fact, why would anyone want to do something like that anyway?

Medical locks found on some Navy chambers were not to be found in the ones at NEDU. Planning for this dive therefore, was designed around using the outer lock to transfer all equipment in or out of the chamber. Outer lock runs were to be kept at a minimum to conserve gas, so the transfer of hot meals was not to be frequent. We didn't even have a galley, so a lot of food came out of cans. A few years later we set a small hot plate and some other food related equipment in the scuba locker to prepare meals. Today there is a modern galley with a contract cook who prepares excellent meals for divers. NEDU is considered one of the top ten feeders in Florida.

Years later, there was an attempt to conserve helium by installing a helium reclaim system. As the chambers were being vented during decompression, the expelled gas was routed into a large rubber bag that had been installed in a false ceiling. During the decompression phase, the bag watcher forgot to watch the bag, and during the night, there was a big crash. The ceiling was now the new floor. A decision was made that same day that helium was cheaper to buy than repairing NEDU.

The methods of supporting the early saturation dives were very antiquated. Two hundred cubic foot bottles of gas lay all over the place. When you entered NEDU, you always had to climb over dozens of gas bottles. We mixed our own gas by continually rolling these bottles in a rack. Be thankful for gas mixers.

I work at NEDU today and have been around long enough to see a lot of changes take place in both the Navy and the commercial world. The one thing that you gain with age is the fact that you gather a helluva lot of memories. I can look back and compare the way things are done today with the way it was a few years ago. I'm not sure I agree with them all, but you must keep those thoughts to yourself as no one wants to hear about "how it was in my day." Nothing stays the same, and I wonder if it gets better or worse as the years go by. Having spent 16 years in the oil patch, working in the diving business, and being witness to good progress, I am often

critical of the Navy in the development of the equipment we use.

At NEDU in 1963, in order to make ready for a dive we loaded all the gear in the chamber. One very important and crucial item that we sometimes overlook is the toilet. It is a much cherished aid, both in its intended use and of course, a damn good place to read. The "john" consisted of a small folding aluminum frame contraption (similar to the old TV trays and not a heck of a lot stronger) which had a plastic bag attached to the underside of the seat. It was placed in the outer lock so the user could receive a little privacy. Hell, even today, some 33 years later there still isn't any privacy! The porto-pottie worked okay until the folding legs decided to give way. I think I was the first guy who suffered that misfortune, and the moment the porto-pottie folded, I invented a few new expletives in helium speech that reflected my sentiments! The first time we sent the plastic bag to the surface we forgot to vent it for the ascent. The only thing the guys topside saw when they opened the outer lock was a bulging bag of doodoo just before it exploded. We only did that once.

Some years later I recall the sense of real accomplishment by everyone at NEDU when a full blown, honest to goodness crapper was installed in that chamber! The new toilet helped but didn't do much for anyone who was modest. Privacy was completely unavailable because the "head" was installed right in the middle of the chamber igloo. It would be like you having a toilet sitting out in your living room. I recall Hyrum Mullikin having one in his house in Connecticut. It was the result of some home improvement project and was right in the middle of the room. It was the first thing you saw when you came through the door. He eventually removed it, but not before he got a lot of surprised looks from visitors when they rang the doorbell, and there he was, sitting with his pants down to his ankles. It was a great conversation piece and source of amusement for Mullikin.

We didn't have a wealth of modern day saturation designed equipment in those early years. However, the folks at NEDU were innovative and cunning enough to get things running, and we were able to learn as we went along. Lessons were not always learned easily. It sometimes took a bit of late night work to correct a mistake or make something work, but we did it. We didn't have reams of regulations to adhere to, and certification boards had not reared their ugly heads. It was a challenge to find ways to get the job done, and it was sure a helluva lot more fun. I sometimes feel we wouldn't have had a saturation program in this man's Navy if we had to go through all the certification loops that exist today. Divers in those days just

made it work and in most cases, made it work better.

Stationed at NEDU during this period were many of the men who later were to bring saturation into the commercial diving industry. The gent who was to be the driving force behind Taylor Diving's extensive saturation program was Ken Wallace. Ken was the senior master diver at NEDU when we assembled there the Spring of 1963. Along with Wallace at NEDU were men like Charlie Duff, John Harter, Fred Bigger, Jim Mullen, Jim Taylor, Bill Mesplay, Rocky Mandible and many of the others that ended up at Taylor Diving, McDermott and other offshore companies. Some of these men are still around today.

There was a good deal of doubt in the minds of the old timers who considered what Bond had on his mind, putting man on the ocean floor and leaving him there, was indeed nonsense and certainly not the way of diving that they had learned. Good friends of mine would often caution me that I should be careful when dealing with scientists. I remember one diving school friend of mine telling me, "They're gonna hurt you with experiments like that." Folks just had a hard time adjusting to the idea of doing Navy diving a different way, and saturation was certainly different. New concepts were not easily accepted by the Navy deep sea diver. After years and many hours of saturation diving the industry can be quite proud of their safety record. The bottom time that has been recorded versus the down time for accidents is indeed impressive.

When diving was done one way and had been done that way long before any of us entered Naval service, scuba equipment was introduced to the Navy diver. There were a lot of folks that refused to consider its use. Many of them were not great swimmers either. In 1954 the Navy established the Underwater Swimmers School in Key West to get the old time diver proficient in the use of this new fangled self contained junk. It was obvious that this brand new concept of diving we were to call saturation was certainly something that was going to take a while for some guys to digest. There was some suspicion then that Bond's troops were a pack of blockheads and would surely prove it, if given the time to make the mistakes that they expected us to make.

The attitude of doubt and skepticism was quite prevalent at NEDU in those early years. George Bond and his band were looked at as a bunch of misfits. Fortunately, Ken Wallace and a few of his hands showed a genuine interest in what we were trying to do which really helped to get our first pressurized dive underway. It was not a simple task with all of its unknowns.

To rig a chamber for a longer than normal dive was difficult, especially when we had so many things to learn. The individual who was the biggest help of all was Lester E. Anderson, Gunners Mate First Class, USN. Andy wanted to know what we were up to and was always there to help. If we couldn't find what we needed for the dive legitimately, then Andy would steal it for us. Anderson was eventually assigned as a bottom subject when the team was selected to do SEALAB-1. Many times Andy's sense of humor turned trying times into an acceptable incident. But best of all, Lester Anderson became my friend. The escapades of Lester Everett Anderson with some degree of censoring will follow in these pages.

After a period of time, it appeared that everything was in place to start the dive. Three divers had been selected to conduct this first experiment, Ray Lavoie, Chief Hospitalman, Sanders Manning, Senior Chief Hospitalman, and me. All were training tank instructors, and I wondered why I was always accompanied by representatives of the medical profession. In the first Genesis dive my companions were two doctors....what did this mean? Was something gonna happen that would require medical attention? Was Bond keeping something from us? There were these moments during the Genesis and Sealab era that I questioned the wisdom of volunteering. Someone had once told me, "Don't volunteer for nothin'." But looking back, I am certainly glad that I didn't heed that advice. I would have missed some of the greatest experiences of my life, and never would have met or worked with some mighty fine folks. The questions that may have been asked about the safety aspect of what we were doing were lost in the excitement of the pending dive. George Bond and Walt Mazzone had a way of instilling great confidence in all of us. I don't think we ever really worried much about being hurt in all the years we worked together. As far as I am concerned if both of them had said, "Lets go to the moon," we would have been ready right then and there, scratching and clawing our way to the spaceship.

With experimental work, you start out not knowing if everything you envision is going to actually happen. Are all the safeguards in place? In this dive, we were pretty sure that everything was in order, and we had followed all the safety guidelines. However, Bond had read somewhere about caisson workers of the past placing a canary in their tunnels. This bird would show signs of a potential atmosphere problem long before it was detected by a human. The day we were starting this dive someone walks in with a caged canary, explains why it's there, tells us how to take care of it and most importantly what we should look for in the bird if things begin to

turn to doodoo. During the course of the dive, every time the damn bird ruffled his feathers or wiggled his ass, all six eyeballs in that chamber snapped in his direction.

Ever heard a canary chirp on helium? That bird was both amusing and some company too. He and his three diving companions weathered the pending ordeal just fine. Canary participation in subsequent dives was determined to no longer be a requirement. I have always wondered if that bird had tried to fly in the thinner helium atmosphere, would he have been able to do it? Guess I'll never really know. I would ask someone who might have the answer, but chances are I would have to listen to a two hour lecture on physics, bird anatomy or some engineering BS on flight characteristics to get my answer. With everything we could think of in the chamber including the crew – one canary and three enlisted men – we were ready to go. We shook hands with all the topside guys, shut and dogged the door, and away we went.



Chapter Three *The Pressure is On*

At that time little was known about the pain of rapid saturation descent. In a few short minutes we were at our programmed depth of 100 feet. Things went well; the atmosphere of helium/oxygen seemed correct; the pressure was holding okay, and the folks topside were happy. The chamber temperature was comfortable with the small air conditioner running, and it was time to start the battery of tests that always accompany dives like this. In our first pressurized dive Bond needed a lot of data, and a heck of a lot of questions needed answers. We were going to be good and busy for the next week. I never saw the urge by so many to obtain the blood of so few. I am still at NEDU today and have noticed that blood letting isn't as big a requirement as it appeared to be 35 years ago. However, the divers who work here today still undergo rigid physiological testing in ways not always acceptable to the average man on the street.

Dr. Bob Workman who I knew from New London was part of our medical team at NEDU. He was a key figure in the development of the decompression tables we were to use in these initial experiments. Workman's contributions to the saturation program are unmatched. He was one of the medical pioneers who were responsible for the success of saturation diving. I am proud to call Bob Workman my friend.

Diving Doctors in today's Navy are a different breed of animal than I remember at the time of this first dive. In the years and tests that were to follow, doctors of assorted dimensions and styles were always lined up outside the chamber waiting for the chance to extract something of value to them and generally very personal to us. A shrink lurking behind a pole or under a rock brandishing Rorschach ink blot cards or a vampire hanging from the ceiling waiting for their drop of blood were two basic types. However, this first dive was unique primarily because no one knew for sure what the outcome would be. Many of the inquiring minds we were to encounter in the coming years had not yet joined our group so psychological data was not a big requirement. Right now Bond was happy enough to have convinced the dive crew just to get in the chamber and stay there. Whether or not we were psychologically sound was not yet important. Doing work like this should have been proof enough in the first place that we lacked good sense. Who cares if anyone involved was mentally competent or not? Hell, in those days divers had a reputation that their chest and hat size were generally much larger than the numbers defining their IQ.

The first realization that major changes were needed in chamber atmosphere equipment started when a couple of hours into the dive, the temperature started getting lower and lower, and we found ourselves shivering. With a request to topside to turn off the air conditioner, the temperature started to return to normal. Then much to our disappointment it continued to get warmer, and the humidity began to rise until the walls of the chamber started to sweat. With the humidity and temperature reaching unbearable heights another request to topside was made to again turn on the air conditioner. For the duration of the dive, we cycled from hot to cold. It was like going from winter to summer several times a day.

Progress was slow in the development of chamber life support equipment. We would try one new way of atmosphere control after another. It was four or maybe five years later that we installed a water driven squirrel cage scrubber under the chamber deck plates, hoping that we might solve the circulation problem. Jack Reedy, Jim Taylor, Dick Blackburn and I were making a dive when the scrubber broke, and Taylor tried to fix it. While Taylor and I were working in the bilges of the chamber, he told me about a strange sensation that he was having in his ears. We couldn't fix the scrubber so the dive was aborted. Close to the surface I was presented with a case of the bends while Taylor continued to experience these noises in his head. Upon reaching the surface he

couldn't hear a thing, and he is still that way today.

A welcome relief from the boredom and clammy chamber was found in being able to jump into the wet pot, the lower portion of the chamber complex that held about eight feet of water. The wet pot was the place that we made our water dives when wet equipment testing was necessary. After a few days however, the water which was not circulated became stagnant and started to look and act like a tub of home brew beer with foam and all. This made it necessary to bring the chamber back to the surface to be cleaned and refilled with fresh water. Having that water in there was mighty pleasant.

One particular study that intrigued Bond was that of holding your breath. With all on this project being tank instructors who did most of their work holding their breath, he was interested in finding out if there was an increase in breath holding capabilities at depth. Bond had us hyperventilate at our storage depth of 100 feet and see if there was a difference in how long we could hold it. There was! I don't recall any exact numbers, but I know that on this dive and subsequent ones, I was able to hold my breath a lot longer than I would have imagined. This increased capacity, coupled with the fact that I knew what my body was capable of doing, was to get me and others out of tough situations in later times.

During this particular Genesis dive we learned a great deal about chambers and what should be or should not be in them during a dive. Some of the routines and methods that we follow today were discovered in the process of doing this and other dives. It's kind of funny to remember the crazy and the dumb things we did. There was just so little we really knew that some mistakes happened, but no one was seriously hurt on any of the Genesis dives. With decompression calculations unknown on dives like this you might expect a case or two of bends, but that didn't happen either. That's a tribute to Dr. Bond, Walt Mazzone and Dr. Bob Workman. The fact that they did all their calculations on bar napkins at the Officers Club in no way diminishes the respect that I hold for them till this day.

In the igloo above the wet pot was a chain-fall that was used to lower divers in deep sea dress into the water. One day as Tiger Manning and I were sitting near by, Manning said "Isn't that smoke coming out of the chain-fall gear box?" Sure enough, as we watched, little puffs of smoke would appear from time to time. It was the grease in the gear box that didn't agree with the gas mixture in the chamber. That greasy gear box was later to be replaced along with a lot of other things that had no business in a sat chamber. Two years later a catastrophic fire occurred which resulted in the

loss of two NEDU divers. Fortunately, this particular dive ended up free of any major problems. We didn't know it at the time, but the future of saturation diving hung in the balance on the success of this first try. The last thing we needed was a safety problem.

After a week of saturation diving, blood letting and fixing broken porta-potties, we started decompression and arrived on the surface about a day later. The mere fact that we arrived free of any difficulties shows that everyone did their job properly including the bartender at the "O" club. That evening after we surfaced Bond and Walt Mazzone took the three of us out to a nice seafood restaurant over in Anacostia. We drove there in a Navy vehicle that had been assigned to us. It was a great meal after a week of not so great meals. While sitting there recounting experiences and exchanging stories with the topside management, a Shore Patrol team entered the restaurant and tried to arrest us for using the government vehicle to go out and eat. I guess that was a no-no in those days. There were a lot of opinions expressed in the minutes that followed the shore patrol's arrival, but the three of us who had made the dive just sat there and let those two fairly outspoken naval officers sort out the problem. While this took place, we ordered another round of drinks not really giving a damn if the shore patrol was happy or not. After a somewhat heated discussion with Bond and Mazzone, they left, and we stayed. I don't remember a night out that I enjoyed more.

With the dive completed and Bond happy with the results, we packed up all our gear, thanked everyone at NEDU for their cooperation and headed back home to New London. We were to return to the Navy Experimental Diving Unit many times in the next few years, but I don't think that we ever again shared the feeling of accomplishment that we had on the completion of this first dive. Things had gone well, and the chances of continuing the project looked good. It appeared that saturation diving might well be a new way to visit the seabed, and the concept was here to stay.

The skeptics were starting to take notice. It was just possible that old George Bond knew what the hell he was doing after all. It would be at least two more years before the Navy acknowledged that Bond's idea had merit. Later in the SEALAB program after he was able to put men on the ocean floor and keep them there, the skepticism seemed to fade, and then everyone wanted to be part of the program. They came out of the woodwork like termites.

Upon returning to New London the data generated from the dive was

analyzed by the team at the Submarine Medical Center. Everyone must have been happy with the results because the next thing I remember is that we started talking about the final dive of Project Genesis, and optimism was all over the place. If the same degree of success could be achieved on the final test, then Bond would consider the theory of saturation diving as having been successfully demonstrated, and those skeptical heads would nod in approval saying forevermore how they had been part of it all.

The next and final test of Project Genesis would be conducted at the Submarine Medical Center in the new chamber being installed there. The depth of the dive was planned for 200 feet for a duration of two weeks.



Chapter Four

The Finishing Touch for Project Genesis

The Submarine Medical Center at the Submarine Base, New London, Connecticut is where Project Genesis got its start. The initial years of research and animal studies were all conducted there, but the human tests had to be done elsewhere because there was no adequate chamber that would suffice for a saturation dive on the base. Things were going to be different in the summer of '63, because a brand new Bethlehem chamber was being installed at the medical center when we would conduct the final dive of Project Genesis. Six years had elapsed since the studies had began, and we were eager to get this dive behind us. Testing was necessary, but the real goal was to get this idea out into the ocean where it belonged.

With all the folks that had participated in the project stationed and living in New London, we looked forward to being able to conduct this final dive there and not have to travel out of town. The new chamber arrived in the late spring, and as summer approached its installation was about completed. Planning was centered around all the details of this last dive and the need to learn the new systems in the chamber. It was not nearly as sophisticated as the ones around today, but it was mighty big and fancy for 1963.

The three divers selected to conduct this dive had been on all or some

of the two previous Genesis tests and were eager to get this two hundred footer out of the way. We had hopes of putting the saturation idea to practical use by doing a dive in the ocean. However, with so many folks out there needing to be convinced that we knew what we were doing, the only logical action was to take one step at a time and hope the steps were right ones. I don't think the Navy was all that eager to pursue this new idea. Although some heads nodded in approval, no promises were made that we had a future.

Then one day in early 1963 the nuclear fast attack submarine *Thresher* was lost at sea, taking the whole crew to meet their maker. After that, the Navy formed a special group to look at its salvage and rescue capabilities. Evidently, after their review, the group decided that what Bond had been harping about these past years might well be one of the useful tools in furthering the Navy's diving and salvage techniques. The Navy knew of course that we were not able to attain the depth that *Thresher* was in, but certainly we could enhance our current capabilities.

Little had been accomplished in the previous thirty years that assisted divers getting to and working in deeper water. The loss of *Thresher* gave saturation diving its green light. There are those who might have attended meetings in smoke filled rooms in Washington that will tell you that I'm full of malarkey. I will readily agree that as a mere Chief Petty Officer USN, distantly related to anyone who makes major decisions, I probably didn't have any idea what was really going on. However, I was in the submarine Navy, taught submarine escape, was a Navy diver, knew a little about what happens in deep water, was damn interested in what George Bond was trying to accomplish and had some insight from my special viewpoint as a worker bee. The day *Thresher* went down I received a call from Bond telling me to get the emergency team's diving gear together because there had been a submarine sinking. Many of us were on this team for emergency work. Expecting that maybe this boat had gone down in shallow water, I went to the dive locker to get the gear together as the Escape and Rescue crew would be asked to assist if escape from *Thresher* was possible. Later Bond called and said that she was down in over 8,000 feet of water. Our Submarine Escape and Rescue Department was not going to be much help on this accident.

Thresher had taken five of my old shipmates with her. We read about airplanes going down and ships sinking with the loss of many lives. However, when it happens to guys you have served with aboard submarines, you can easily visualize what those last terror-filled minutes

must have been like as the boat plunged to her death. It's then that the incident gets kinda personal. Knowing some of the crew and their families also justified a moment of deep thought. As a matter of fact I had taken the *Thresher* crew through training tank requals just a few weeks before.

In the brief history of Genesis one thing was always known; we needed a deep and long dive to prove our point. The people that one day would give us permission to go to sea for a saturation dive were going to have to be convinced that divers could stay in deep water safely. This last dive would hopefully do just that. The new chamber at the Submarine Medical Center was labeled as a Climate-Altitude chamber which could simulate pressures ranging from a depth of 250 feet to an altitude of 200,000 feet with controlled temperatures. We were pleased with that as past dives had always been either too cold or too hot.

The chamber had one characteristic that we weren't too crazy about. That was the ability for it to go from depth to the surface instantaneously via a very large exhaust system which could activate if power was lost during a dive. After studying the chamber we finally figured out what we had to do to keep the damn thing from surfacing on us.

In mid August of 1963, Dr. John Bull, Senior Chief Sanders Manning and I were ready to start this, the last dive of Genesis. The three of us smiled at the outside crew, shook Walt Mazzone's hand and then shut the door to embark on the dive.

My recollections of the things I did in the Navy are those that are humorous, of exciting times I was privileged to have been part of and of many fine people I was able to spend time with. I have attempted to describe the fun things that happened while avoiding the mundane, valve twisting, ear popping, blood letting crap that the research diver had to endure. I have not attempted to talk about the medical aspect of experimental diving. I rarely had an idea of what they were doing, much less why they were doing it.

I have now had the pleasure of diving a shipboard sat system at sea and have experienced the thrill of visiting the ocean floor, I know that sitting in chambers day in and day out without ever seeing water was worth it as I have been able to reap the benefits of the years of our efforts. Little did we know how much fun we were going to have with deep ocean and long duration diving.

With this chamber run being conducted at the Submarine Medical Center, we were assured that there would be dozens of doctors, Ph.D.s, shrinks, and research gurus hanging around, insisting that the captive divers

help them in their respective research projects. Every time we looked out the port, we saw a new scientist with a "toy" under his arm trying to talk Bond into having us try it, or letting him try it out on us! We gave blood until our complexion changed, stared at Rorschach ink blots until they all looked alike, blew into spirometers until we got dizzy, inserted assorted medical paraphernalia into all our bodily orifices, read passages from ancient medical journals and hated those who insisted on making our world miserable.

I have come to a determination about the ever present psychologist you find in this Navy. As a member of the staff at the Navy Experimental Diving Unit today and still having the ability to remember past events, I can only say that progress in the world of the mind would be better served if our friends in psychology would study each other. They are the ones that need the attention.

Little of the testing we did with Genesis started by just getting into a chamber and going under pressure. There were always a series of tests and "things" that had to take place first. Dive subjects generally were required to establish some sort of baseline so the investigators knew what your body was doing before you started the dive. I equate this to the preoperative testing that many hospitals and doctors do today.

Of all the things that we had to do I remember well one particular function that I was requested to accomplish. Bond had told me that he wanted me to retain all the urine that I passed for three days prior to the dive. I asked, "How the hell am I gonna do that? Sir?" You always say "Sir" when you are going to be disrespectful. He replies, "I have here a glass gallon jug. Just carry it around with you and use it when you need to." "Okay," said I. The last days before we were to start the dive I went everywhere carrying my gallon jug like a moonshiner. I had to visit various offices on the base with secretaries who were too polite to ask what the hell I was carrying around. I even went drinking with the guys at their favorite bar with it. Mighty handy when you are drinking beer and not having once to visit the head. Convenient, yes. However, it sure raised disapproving eyebrows when I unscrewed the bottle cap to use it discreetly, never once having to leave my spot at the bar. The more beers you drank the funnier it got, and the bolder you became. I don't recall any girls taking too active an interest in me that night. When the three days were up, I had two gallon jugs to return to the good Doctor.

As our program generated public interest, the press came to visit and maybe find something to uncover and exploit. During one such visit I was

asked to talk to them and explain the tests from the diver's point of view. One lady from a local newspaper inquired about helium speech. I said that I would be glad to demonstrate as there were bottles of the stuff all over the place. I walked with the reporters to the side of the room and said that I would soon give them a classic example of chipmunk speech by breathing directly from a bottle. I leaned over, put my lips next to the bottle valve, opened it, took a few deep breaths and immediately fell on my ass. I had failed to look at the mixture and after recovering from the embarrassing ordeal, I realized that it was pure helium. The reporters did say that as I crumpled to the floor the noise I made was truly in chipmunk. They were quite impressed. I, of course, tried to make it look like a sacrifice I had made for their benefit.

Some years later, Bond had Cyril Tuckfield and me come to New London to do a dive for a few days. The goal appeared to be how much blood they could pull out of us in the shortest time. We had so many holes in us; they even ran out of room on our arms and shifted to taking it out of the tops of our feet. When it was over and we left, I took a note with me explaining to anyone who might notice that I was a research diver, had been subjected to medical abuse, and was not a hard core dope addict.

During this particular dive a young hospital corpsman named John "The Grape" Kleckner, so named because he had been known to have a certain fondness for wine, was standing one of his first watches with the saturation diving community. Standing watch with John was a young doctor to be, an Ensign doing his summer reserve time. As with all these young fellows, the only military education they got before coming into the Navy as a full time doctor was these short stints at a Navy Hospital or some other Navy facility for the summer. This young Ensign had evidently been well lectured in that he was not to let enlisted men call him "Doc" or get personal. After all, it did breed contempt. He was directed to address Chief Petty Officers as "Chief," and by God he would look and act like a Naval Officer come hell or high water. Now this young doctor to be was a classic example of a Naval Officer, he looked and acted like a Junior Officer on the bridge of a Navy battleship. A more military bearing you would never find. You just couldn't help but want to see to it that his day was a respectable one. I watched his magnificent performance for several days through the port, and by golly, I have to admit he was the picture of perfection. However, one day I was a bit bored and decided to get to know this guy. We'll call him "Mr. Thompson." I said, "Where are you from Mr. Thompson?" "New York," he said hesitantly. I said, "New York City?" He

said, "Yes, Chief." We then had a brief but very formal conversation, and it ended with me saying, "What's your first name, Mr. Thompson." Before he could identify any harm by replying, "Marvin," I said, "Fuck you, Marvin."

Nowhere in his brief Navy training had he been instructed on what to do in such a situation. He stood there dumbfounded. Tuckfield let out a loud groan, and I think he fell out of his bunk. John Kleckner had an instant look of dismay and an immediate urge to be elsewhere. He got very busy with his instruments. I, of course, was content. The good Ensign must have realized that the whole scene was done to break the tension and relax the crew so he said nothing. Before it was over, Marvin and I were pals. I doubt that the remainder of his Navy career was very heavily impregnated with formalities. As a matter of fact, Tuck and I took Marvin out and got him drunk after the dive. I hope that we somehow got him started on the right military track. Wherever you are today, Marvin, I apologize.

One day during this last dive, Bond tells us that Commander Submarine Force Atlantic (COMSUBLANT), an Admiral whose name was Red Ramage was going to be in the area and had expressed a desire to visit the facility. Now Doctor Bond who lived in fear that we, his loyal followers, would ultimately destroy all his efforts by our antics told us in no uncertain terms that we were to address the Admiral correctly and show him the proper respect. And above all else, we were not to do anything that would shed bad light on the project. "Of course," we said, as he sternly discussed our conduct. "We'll be good." Moments later after his lecture was over, the three of us got into deep planning for the Admiral's "show and tell." Doctor John Bull, our on board physician, Tiger Manning, our on board diving corpsman and Bob Barth, the selectee of the planned exhibition decided that with our limited access to good quality demonstration material we would have to do with what we had. There was a lot of bandages and assorted medical stuff in the chamber with us.

When SUBLANT showed up he was given a brief tour of the facility and taken to the chamber where a thorough explanation was given to him about the divers and the great things they were doing for Navy diving, etc., etc. As with most visitors, the Admiral asked if we were going to be okay and not suffer any ill from this test. Doctor Bond was quite adamant in his guarantees that everybody was safe and out of harm's way. What the good Admiral saw when he peered into that port was yours truly sitting on the bunk covered with bandages, blood and more bandages. With my right arm in a hastily made sling, I was looking sick, forlorn and nothing like a diver who was safe and happy. Fortunately, the good Admiral had a sense of

humor, and happily, we had many days left before we reached the surface where Bond could get hold of us. For you submarine historians Admiral Red Ramage was a famous WW II submarine skipper who was awarded the Medal Of Honor when he commanded a submarine during the war. I truly hope that the Admiral didn't believe all that nonsense. We were just having fun, honest! Opportunities for amusement are hard to come by locked up in a chamber. You got to make do with what you have, Admirals or otherwise.

A couple of days later I was sitting at a port casually watching the outside world, a view that changed little as the dive went on. Thinking that if I were to swing a big internal door out of the way I might be able to view this outside world from a different unused port (like a few feet would make a big difference). The view from port number one painted a picture of peace and tranquility with everyone doing their respective jobs in a slow methodical manner, but when I was to observe the same people doing the same job from port number two all hell had let loose. Everyone out there was running around in what appeared to be sheer terror and confusion. I commented that this new view was a helluva lot more interesting than the other. In a moment Walt Mazzone gets on the speaker and in a not so calm voice asked if we were doing anything different in the chamber than we had been doing before. "No sir," I said, but "What's going on out there?" He said, "We got an alarm going off out here, and we don't know what the hell it is." As I backed away from the port I noticed a big red alarm button just below the port which was placed there for some unexplained reason. We just hadn't noticed it before with the door covering it. I evidently had been leaning against it while looking out. It was a while before I had the courage to tell them that I had been their problem.

Walt failed to see any humor in it, but evidently realized it was an honest mistake and not another Barth effort to drive him nuts. That evening when Bond came in to relieve Walt, he whispered to me to wait for an ideal moment and spring that loud alarm on Bond. A bit later Bond tells us he is going to visit the boy's room and will be right back. My calculations were pretty accurate. I gave him just enough time to get his drawers down to his ankles before I hit the button. Bond heard this screeching alarm go off. As I watched from port number two, Bond raced back towards the dive station with his pants half on and half off, probably thinking that all of his divers had just perished. For me it certainly made for another interlude of humor, but not for Bond who immediately pulled the power to the red button. It's a wonder that he didn't kill me when we surfaced. God love him; he put up with a lot of nonsense from his crew during those years. It's a wonder that

Walt Mazzone still calls me a friend today. It took years for him to remove that look of distrust that he had when we worked together. I sometimes had the impression that he was thinking, "What's that sonofabitch gonna do next?"

My old friend, Tiger Manning, had been on a previous Genesis dive with me and eventually would do SEALAB-1. Even later, we would work at Taylor Diving. Sometimes we amused ourselves by annoying the third member of the group, John Bull. John had graduated from the Naval Academy, was a well schooled Naval Officer but had decided early in his career that he wanted to be a doctor. Therefore, with him along we got two for the price of one. With this dive being the grand finale to Genesis, coupled with it being held at the Submarine Medical Center there were a wealth of physiological tests that had to be performed. After all, Bond was going to be presenting his case to the Navy seeking funds and their blessing to get in the water with this new idea. Dr. Bull was the man in the chamber that directed the daily internal medical research efforts. This didn't always create harmony with the other chamber occupants. However, John had to undergo just as much testing as we did, and his ordeal was just as bad as ours. The routine inside was grueling to say the least. Of all the studies that we had performed in previous work I remember this dive as the one that was chockablock full of dastardly gut wrenching physiological tests.

One particular test day finds Manning with a fairly large rectal probe inserted where rectal probes are inserted, a temperature probe in his ear (up against his ear drum), a rubber hose shoved down his nose into his stomach with a balloon on the end of it and a fourth wire going into his arm someplace. He was miserable, and his disposition showed it. The test took some time, and during this period he was having to sit very still while they energized and took readings on all this paraphernalia. When he moved, those probes would create a lot of discomfort and one hell of a high degree of nausea. We, therefore, tried to sit as still as we could and certainly didn't feel like getting into many conversations. We all had to do it but I always liked it better when the other guys had that stuff in them. I took advantage of Tiger's immobility and picked on him because he would have done it to me had it been my turn. I attempted to get him to talk to me, but no amount of effort on my part would bring him into a conversation. He would just ignore me and concentrate on those wires and tubes leading to his body. I was determined to get him into a conversation mainly because I knew he didn't want any part of it. I was able to get his attention when I wanted it by reaching over and jiggling all the wires that were attached to him. He

would groan, retch and gag a bit, but it always got his attention. Manning was capable of some of the meanest looks I have ever seen. Had he not been incapacitated Manning would have probably taken a swing at me. As it was, being called a sonofabitch in helium speech gurgling by a rubber hose was about all he could do. I too hoped he might forget about the whole incident before we surfaced.

You're probably going to think that the only thing we did during Genesis was to aggravate each other, but that isn't so. There was a heck of a lot of work accomplished and a heck of a lot of needed data collected. The many days that we spent in that research project were not always pleasant days. However, when we sit around nowadays and talk of old times, we remember mostly the funny things. The only other worthy incident that took place on this final dive was my 33rd birthday which was celebrated by a cake sent into the chamber by Walt Mazzone and Dr. Bond.

In writing about these early years, George Bond said, "During the course of many months of underwater trials and adventures, I gradually assembled a team of support divers of truly superlative skills. Over the years of experimental escapes and regular sessions as training tank instructors, we developed ties of mutual dependence and deep friendship rarely encountered in any walk of life.

"As a class, Navy divers tend to be remarkably clannish, and for good reason; most people regard professional deep sea divers as a little bit daft. Individually, perhaps, a Navy diver may cut an appealing profile, but, in general, we are shunned as a group. Divers, in turn, recognize the necessity for total loyalty within our small fraternity and cling together literally, for dear life. Even so, my little coterie of fewer than a score of professionals was almost unique in our fierce loyalty. We worked together in almost perfect harmony, socialized as a team, and made up our own special squad for recovery of bodies from water, under ice or within caves, as well as for unusual salvage jobs, or search of submarine hulls for suspected saboteur devices, and even simulation of weightless training for flights of the Project Mercury crew. In near-defiance of Navy regulations, we fraternized in good will and fellowship.

"I called on my courageous crew, first to assist in the animal phases as research technicians, then at last to serve as human test subjects. We deliberately set out to prove the revolutionary concept of saturation diving".

Bond then talks of the divers who must speak for days in helium. "It was evident that after the first few hours of exposure to the heliox mixture, the men made conscious efforts to correct the chipmunk quality of their

spoken words. They did this by deliberately lowering the frequencies of the speech formats by almost a full octave and by slowing the rate of speech delivery. In addition, they learned to eliminate from their vocabulary those words that were most distorted by the helium. As a matter of passing interest, all the socially unacceptable four-letter words came through loud and clear. This prompted one of my linguist consultants to remark that, since the men were Navy divers whose vocabularies were largely confined to such words, it was of little concern. I had to concede his point."

Of the last Genesis dive, Bond said of his divers, "Inside the chamber, the aquanauts continued to perform admirably, reeling off yards of valuable data, and enlivening the action with practical jokes nicely calculated to advance the physiological age of the two investigators. 'Channel fever' was the certain diagnosis, but there was also a need to vent emotionally before commencing the dangerous phase of decompression. This reaction was understandable, but as outside operators, Walt and I had lost our sense of humor.

"At last it was time to commence decompression. On the basis of some scant animal work and deep personal conviction, Walt and I had agreed to attempt a schedule of continuous decompression in a gradual, continuous rise to the surface, predetermined at a rate of 12 feet per hour. This schedule calculated that a human's slowest tissue would require 180 minutes to achieve 50 percent desaturation. In retrospect, we know that this was a dangerous schedule. I must have sensed this, since I halted the continuous decompression twice, on pretext of checking all valves of our external system. It may well be that these pauses, totaling 2 hours, averted catastrophe.

"During the decompression, Walt and I worked with stop watch synchronism. The decompression was calculated for about 26 hours, with the two of us sitting side by side, save for rare departures to satisfy any urgent call of nature. Less than a day later, we completed decompressing the aquanauts. After an additional 24 hours of observation and physiological testing, Genesis was complete. Our data indicated that we were ready for open sea application of an idea that had germinated some six years before. Our next step: SEALAB-1."

Dr. George Bond passed away in 1983. They don't make men like Bond anymore. His loyal crew never went a day without somehow trying to show him our love and respect. I miss George Foote Bond. I miss his

humor. I miss his unique way of dealing with all of us, but most of all, I miss his friendship. He was a hell of a man.



Chapter Five

On to SEALAB-1

With the successful completion of the last Genesis experiment Bond's crew waited anxiously for word on what we might do next. In this interim, Walt Mazzone and I acquired an escape capsule from an offshore Texas Tower. Texas Towers were radar platforms that existed out at sea as early warning devices. Each tower had these escape spheres on them that the crew could get into in the event of a storm or if the tower was in danger of capsizing. They were designed in a fashion that we thought might be good for an underwater house. When they put these towers out of commission we scrounged the escape module and had it at the submarine base where we attempted our conversion into an underwater habitat. None of us knew what the hell an underwater house ought to be like, but we worked on that thing in our spare time thinking we were going to end up with something worthwhile. As it worked out we butchered that hunk of steel so badly that it was only good for junk. We finally gave up. As much as we hated to admit it, we needed to get an engineer.

Everyone knows that I sometimes have a difference of opinion with our friends the engineers, but as fast as I am to criticize their actions, I will also say to the world that without you damn engineers we would have never gotten our houses built and placed on the bottom. In the initial unsuccessful

full effort to build our own habitat we were only to develop an appetite for what eventually would be the SEALAB program. These habitats were designed and built by engineers. The engineers were mighty good ones too as long as they were properly guided by divers, of course.

In the early sixties the Navy lacked the knowledge and equipment required to place man on the seabed and leave him there. We had early on focused our attention to actually living 24 hours a day down there instead of traveling back and forth in a bell as we do today. I am sure that Cousteau had a lot to do with Bond's decision to go with a habitat. Cousteau was in the middle of a very impressive program called Conshelf, and we saw and learned from him about the utilization of a house on the bottom. We wanted to build that house and were going to call it SEALAB.

What does a diver find intriguing about venturing into the sea? Is it the descent through the water? The coaxing of a sometimes slow equalizing ear? The view on the way down? Or could it be the fun of dressing out in all that junk a diver has to wear? Hell no, it's the thrill of what you find when you get to the bottom. In some cases it's the salary he receives for the work which is a driving factor in all that we do. However, there's not a diver out there that hasn't stood in awe at the sights he saw when he got to a location on the seabed that he had never been to before. That's what it's all about. With the sometimes terrible things we divers are asked to do it's mighty nice to accomplish something that gives us that long overdue thrill of adventure and accomplishment. Cripes, that's why most of us started all this diving stuff in the first place. Diver's equipment is designed to get us to new and exciting places and allow us to behold some of the greatest views on this planet. Most of the time however, we were always too damn busy and short of time to enjoy what was down there.

When pilots get new airplanes that take them to greater speeds and heights, they are elated. Any new development or advance in technology has always excited the user. Can you imagine how a pilot who has always flown propeller driven airplanes must have felt the first time he flew a jet? I can well imagine the thrill of that transition. The thing that my good friend, Scott Carpenter, who was the second American to orbit this earth, remembers about the trip was what he saw when he got out there. New gadgets and ideas that get us to places we have never been able to go before can only give us the thrill of our life and memories we won't soon forget.

Divers have always wanted to get deeper and stay longer. From the very first day he put his head underwater he wanted to see more. However, there were always limits to his ability. These limitations were primarily

those of physiological restraints, primarily lack of proper equipment and the knowledge to use that equipment when it was available. Therefore, the advent of scuba gear was a welcome tool for the diver. It soon became about as popular as the automobile. Scuba made diving simpler and available to folks who normally would never have had the chance to dive. However, it brought with it the same restrictions on time at depth as other diving equipment. With this new self contained apparatus, we now had to manage our dive a bit better and save enough air for any decompression that might be required. Running out of air at the twenty foot stop can be embarrassing and sometimes painful.

Initially, self contained diving was not popular with the old deep sea diver who was accustomed to the unlimited air supply delivered through a hose. Although a youngster when scuba first came into the Navy, I can well remember master divers who said, "Put that junk in storage." Just because the Navy had issued brand new scuba equipment to him, it didn't mean he was going to use it. If you talk to old timers, I bet they will tell you about the same story. It was a hell of a shock not to be attached to the surface by a hose. The reluctance to use those new fangled steel bottles with long rubber hoses was prevalent around the fleet. My gosh, many Navy deep sea divers in those days couldn't even swim. It probably was the primary reason the Navy School of Underwater Swimmers was established in Key West in the early fifties. Divers were told they would attend this school come hell or high water. Hyrum Mullikin, Glenn Brewer and I went through swim school in 1958. Half of our class was there to learn how to get by without that damn hose. Now look at us, scuba is about all anyone uses anymore in day to day diving. Now a Navy doctor comes along who tells us that he has an idea which may let divers visit the seabed and not come back up until they want to. In addition, he tells us that we can go a heck of a lot deeper. You can imagine the raised eyebrows on that one. What kind of wild man was this doctor? No one did that kind of thing. Any diver surely would have to get excited about the prospect of living on the ocean floor. You might well think this particular doctor was nuts, but you must agree, his subject sounded mighty interesting.

George Bond's Genesis Project had proven man could exist for extended periods at deeper depths. Bond received permission from the Navy to take his concept to sea. In 1963 the Navy didn't have anything that could provide divers a living space on the ocean floor. We had after all, just found out that this method of diving was actually possible. What equipment did we need to get our divers to the bottom and let them stay? Saturation

systems were yet to be built and underwater habitats were not available in the USA. Captain Cousteau had his Conshelf habitats in France, but they would be of little help to the U.S. Navy. There was nothing existing that divers could use to set up housekeeping on the ocean floor.

The office of Naval Research and a few other organizations thought about it for awhile and then told Doctor Bond to take a look at the Navy base in Panama City, Florida. Those folks just might have something down there that could be made into a habitat. The term "habitat" was to signify our home on the ocean floor. The small base at this panhandle city was and still is a focal point for the diving Navy. They seemed to be the kind of people that could provide the help we needed. Even today the base houses the Naval Diving and Salvage Training Center (NDSTC) and the Navy Experimental Diving Unit (NEDU) plus several other groups that develop and test equipment for the Navy diver.

In December, 1963 Dr. Bond asked me to meet him at the Navy Base in Panama City to look at some old floats that had been used on a minesweeping project several years earlier. I had been visiting my parents who retired in Apalachicola, a small town a few miles down the road, so going to the base didn't prove to be a big problem. I made the 60 mile trip and met Bond at the Mine Defense Laboratory. The base personnel were eager to help and excited about the project. God knows we were too. Here were some guys that said they could build us our long dreamed of house, and we even had someone in Washington who was going to pay the bill. What more could a bunch of guys hell bent on living at the bottom of the sea ask for?

In the salvage yard at the base were a couple of large steel cylindrical floats that were 57 feet long. They looked kind of like giant cigars. The engineers who eventually designed the habitat figured that they could cut these floats up and piece together a workable house for bottom occupancy. After spending a day with the future builders of SEALAB-1, Bond and I were as excited as we had ever been about the future of the program. Walt Mazzone and Bond with a few of their loyal followers had been thinking about this undersea house for the past six years, and now it looked like we might well achieve that goal. By golly, in a short time these guys had our habitat built.

Our initial concept with the SEALAB program was to put men on the bottom in a house where they would remain around the clock. Today saturation diving is being conducted from a system on the surface with the bottom work being done out of a bell. It is much easier than handling a big bulky

habitat but nowhere near as handy for the diver. However, in 1963 we chose the habitat idea and placed the house where we wanted to dive. If you intended to explore the Grand Canyon the best way to do it is to get down in the canyon and reside there. Why ride a jackass up and down the canyon trails everyday? Saturation Diving has indeed changed the way we look at "bottom time."

The advantage in diving from a habitat is that one is always on the bottom. Trips back and forth to the surface are not necessary and physiologically impossible. To work you need only to don a diving apparatus and jump into the ever present hole in the floor. A lot of time you just went out holding your breath. It might be hard for the average person to understand the value of living on the seabed for weeks at a time. However, it is without a doubt, one hell of a way to chalk up time actually on the bottom. In that situation, the term "Sea Dweller" certainly fits. Today's divers conducting their saturation diving in diving bells are far too busy to enjoy what is down there. There is a distinct difference in camping out right on the ocean floor. Even in your leisure hours you can look outside and watch the world around you. After awhile you don't even consider yourself a visitor anymore but become part of the scenery. I once went ice fishing on a lake in the winter. My host had a comfortable shack on top of the frozen lake containing all the comforts you could ask for. Right smack in the middle of this portable building was a hole in the ice that provided the spot to fish. I often thought of that ice house when I sat in the habitat and looked at the hole leading outside, full of water and fish, but fortunately, no ice. We often joked about taking a fishing pole down with us and then sitting comfortably around the hatch to catch fish.

In the habitat at the end of a busy day looking out a port is in itself a pleasure. There's a lot to see down there if you just have the time. It was like a reversed fish bowl. You get where you recognize fish and other critters. I can remember giving all our fish names and even wondering where they were on days when we failed to see them. It's an incredible experience. Guys in the SEALAB program would sit around and dream up ideas about ways that we could use the habitat in operations less mundane and a hell of a lot more fun than what the Navy had planned. Picture if you will, a wreck at 1,000 feet that contained all sorts of treasures or other things of interest.

Although they didn't use a habitat on the dive, I have envied Ric Wharton's divers who went to the wreck of the British cruiser *Edinburgh* at well over 800 feet. They found a great deal of gold and recovered most of

it. My gosh, what an experience! Put me in a habitat alongside that cruiser to spend some very exciting weeks just going through it. That would be better than Christmas. It would take a month to wipe the smile off my face. I can't imagine a dive that could have produced more satisfaction to those divers than the *Edinburgh* job. I suspect that a couple of tons of gold helped too.

It has always saddened me that more Navy divers didn't get to occupy the SEALAB habitats. In particular all those that trained so long but never made it down to live in and work out of SEALAB-3. They trained for three years and worked hard at it. The Navy lost the opportunity to put a lot of good hands on the seabed for a two week stay and give them a first hand experience of real saturation diving. The true definition of bottom time is when you are, in fact, on the bottom.

Sat diving has also given us the chance to go to depths that were previously unavailable to the average diver. I remember some 28 years ago during the failed attempt of SEALAB-3, traveling to the seabed in a MK II deep dive system bell and arriving at a depth of over six hundred feet. I stepped outside with my dive buddy Berry Cannon. We both stopped what we were doing without even a gesture between us and stood there looking around in complete amazement that we were actually on the bottom at that depth. We didn't have to return for two weeks, and there wasn't a soul around with a stopwatch keeping track of our time. Neither Berry or I had been in the open sea to that depth before. Nor had we, at the beginning of our underwater career, had the slightest idea that we ever would. I will never forget the view; it was so clear you might have thought the water just wasn't there. The word eerie also comes to mind. In a brief conversation after returning to the chamber topside, Cannon and I talked about the things we saw while down there and how it felt to be in a place that for years had been out of bounds. Berry mentioned that it could be described almost as a religious experience. Maybe it was. It sure as hell beat anything I had ever seen before. That happy and exciting event turned into chaos a few hours later. Berry was to lose his life on our second attempt to enter SEALAB. It was in that same serene area that we both thought was so beautiful. That was 16 February 1969, not remembered as one of my favorite days.

1969 was the same year that Astronauts visited the moon for the first time. I sat up all night in front of the television awaiting the results of their trip and shared with the rest of the country that excitement. I truly envied those pilots. What a trip they made, and what a view they had. However, in all candor, they couldn't have been any more thrilled to find themselves on

the moon than we were when we got to the ocean's bottom. There was a joke going around at the time that it was just as exciting to get to the ocean's bottom as it was to get to the moon's behind. Not a helluva lot of us had been to 600 feet in the ocean in those days. It was something we had all thought about and worked so hard for.

Cousteau's Conshelf project probably had a lot to do with our decision on how we were to put Navy saturation diving into practical application. Captain Cousteau and Doctor Bond had been sharing ideas on the saturation concept since 1957 and Bond agreed that Cousteau's ideas of underwater habitats were good sound ones. It worked for him, and there was no reason it wouldn't work for us. In the years that followed I got to know Cousteau and learned a lot from him. In particular I learned his concepts of how to look at the sea and exist in it. There wasn't a hell of a lot of deep diving equipment around in those early days and not a lot of folks had heard the term "saturation diving." The philosophy of Bond and Cousteau made a hell of a change in my life. I am certainly glad that I was there and a witness to progress. I wonder sometimes today where that progress went.

As Bond and I were driving back to the hotel talking a mile a minute about all the new things that were about to happen, I remembered an incident that had taken place in my life many years earlier. It had never amounted to much years ago but now, had immense relevancy with what we were about to do. I felt compelled to tell him about it, but in thinking back, I probably should have kept it to myself.

Growing up in the 30's near the water in Manila Bay I spent a lot of time swimming and fooling around the waterfront. There was a small band of us, mostly American kids whose parents worked in the Philippines. We hung out at the Army and Navy Club which was a prominent and popular watering hole for the Americans who lived in Manila. The club was at the edge of the Bay, just north of what is now the American Embassy. Like so many places in the tropics the pool was the center of attraction with tables all around it where you could have a cold drink, eat peanuts and socialize. This band of kids would spend our leisure hours at the swimming pool generally getting into mischief by stealing peanuts off the tables of folks who were there having a drink. Our primary interest was that of thinking up new and interesting things to do that had ties to the water. Everyone was a good swimmer. You almost had to be to live out there, but life got kind of boring just staying on the surface, so we decided to figure out some water activities that got us below that surface. As we did not really know a hell of a lot about diving, it sometimes got us into trouble.

I had acquired a pair of handmade goggles made from bamboo that had glass eyepieces. Another boy whose dad was in the Army showed up with an old gas mask. We were always looking for interesting gadgets that helped in our quest to look under water. I have vivid memories of the first time I was to look at the water from below the surface. I was hooked. As the days went on we assembled a wealth of assorted junk that would meet our needs. Little doubt existed in our minds that we had the drive but needed the gear to all become hairy chested deep sea divers. Getting into the ocean seemed to be all we thought about.

We worked on that damn gas mask for weeks trying to figure out how to develop it into a sure enough diving apparatus. Finally, we rigged a hose to the mask and went down the ladder at the deep end of the pool. We wondered why in hell our lungs would hurt as we tried to inhale or exhale. We overcame some of these physiological problems that this rig presented by having one of the gang blow down the hose to the idiot at the other end. Somehow, it didn't work as well as we had hoped. We probably inhaled as much water as air. Inhalation and exhalation did not work very well, but as kids without any idea of what we were doing, we just kept trying. Years later when I attended diving school, we discussed the subject of lung squeeze. I knew immediately what they were talking about.

Bond's polite interest in my yarn continued as I explained that we boys had been asked to depart the swimming pool by the manager. He was probably concerned about the liability aspect of what we were trying to do with that gas mask. Therefore, we just moved down to the officers' boat landing a stone's throw from the pool. That landing was near where the Pan Am clipper flying boats would anchor when they landed in Manila Bay after their long flights to the Orient.

Bond listened and nodded his head from time to time, not necessarily in approval as I'm sure he doubted my mental state as a boy. However, George Bond was a gentleman who would never tell you he thought you were nuts. I went on to tell him that this gang of youths had also invented an underwater habitat during this period (circa 1941). One day two of the kids showed up paddling an old bath tub they had found someplace. It was our first sure enough vessel. The tub with its large ornate feet was not designed to float especially with kids in it. After a few minutes it sank alongside the dock. The rubber cork that was designed to hold water in the tub would implode with more than two kids in it. We could never find a three kid cork. Water depth at the dock was about 10 feet. There was no way in hell that we could get the tub back to the surface. "Aha!" said I. We shall

turn it upside down, fill it up with air and float it to the surface. Then we shall swim it over to the nearby sandy beach, flip it over and be back in the boat business in no time at all. I went on to tell Bond that I also was the brains behind the habitat idea, and that fact surely should qualify me as a team member on his SEALAB project. He had already told me that I would be going to the bottom in SEALAB-1, but I wanted to tell him this story so he would know that he had made the right choice.

The salvage of our "vessel" didn't go as well as we had hoped. As air was pumped down to it via a bicycle pump which didn't put out a lot a volume, it would begin to get light and immediately flip upside down. All of the air would escape in a loud belch, and the tub would settle back to the bottom in an unsalvageable condition. Then came my stroke of genius that we might forget about the tub as a boat and turn it into an underwater habitat. Hell, it was already down there. The grand idea was to set the tub on some rocks, put more rocks on top of it to hold it down and pump air into it. Then we could sit inside with our heads in an air-pocket. "Aha! An underwater habitat, yes?" Wrong! We didn't know it then, but it takes a heck of a lot of rocks to hold down a bathtub of air and a helluva lot of breath holding to get the rocks in place. As far as I know, that tub is still on the bottom of Manila Bay. It never functioned as an underwater house. Why some of us never died of air embolism, suffered from eye squeeze or just plain drowned is beyond me. The only casualty from this esteemed group of would be sea dwellers was the loss of one gang member to the Japanese when they came to town a few months later. I never heard from any of them after the war ended and have often wondered what happened to those that were left. Chances are they went on to do something sane and intelligent with their lives. I, of course, became a Navy diver.

I visited Manila again in 1950 while aboard the aircraft carrier *USS Boxer* and went to the Army and Navy Club to see what had changed since the Japanese occupation. The same manager was still there. As soon as I identified myself to him, he brought up the subject of those damn kids, but I told him he must have me mixed up with someone else.

On board the *Boxer*, I was a signalman striker, and my higher up boss was the Operations Officer, a full Commander. Prior to our arrival in Manila they put out the word on the ship that anyone who had relations in Manila could get leave to visit them. Since I had been born and raised in Manila and had a lot of friends there, I requested and was granted leave. One of my friends' hangouts was The Army and Navy Club which was now an officers' club. While visiting the club with my friends, I asked the

manager if he had any problem with me, an enlisted man, being there. He said, not at all. Since my dad was a life member, I was eligible, but he did ask me to wear civilian clothes when I came in. That wasn't a problem as my comrades from my youth loaned me all of the necessary clothing.

One particular day, I am at the club, and it is long before the enlisted guys got liberty. I ran into this Commander in a hallway and nodded to him politely. He acknowledged my greeting with a look of curiosity on his face. I am sure he was wondering why one of his troops was in his officers' club long before liberty started and running around with a bunch of the young pretty American girls who lived in Manila. He never asked me for a reason and saw me again a couple of times while I was on leave, still in civilian clothes and in the officers' club.

After our stopover in Manila, the ship is underway at sea, and there is a phone call on the bridge. LCDR "so-and-so" asks that I come down to the wardroom. My Chief immediately asks me, "What in hell have you done now?" I say, "I don't know" and head for the wardroom with my hat in my hand. This LCDR was attached to the Naval Attache office in Singapore where my folks were living at the time. He was on the ship to set up for our visit there which was to be our next stop in a couple of weeks. He tells me that he and his wife play bridge with my Mom and Stepdad. He just wanted to know if I was going to have any trouble getting leave when we got to Singapore. "Your Mom is really looking forward to seeing you," he said. It had been over three years since I left our home in South Africa, and I, too, was going to be glad to see her. I felt that getting the leave would not be a problem and thanked LCDR "so-and-so" for offering his help. As I was about to leave the wardroom, who walks in but my Commander friend from Manila, the Ops boss. I am sure he wondered why I was sitting comfortably in the wardroom chatting with a stranger. I leave to go back up to the bridge and try to convince my Chief that I hadn't done a damn thing wrong and was not expecting a court martial.

My folks lived in the famous Raffles Hotel, a place known to all, where, I might add, the famous drink, the "Singapore Sling," was invented. So Bobby who hasn't seen his Mom in years requests and gets another week of leave. I go ashore early, am reunited with my folks who put me up at the Raffles in my own room and start a great visit. One morning a couple of days later I come out of my room, turn around to lock the room door and notice someone coming out of the room next to mine. I glance over, and it's the Commander, the Ops Boss on *Boxer*. I again nodded my head and said, "Good morning, Commander." I got a nod and one hell of an inquisitive

look but still no questions concerning why I was in the Raffles long before liberty started. I would be damned if I was gonna volunteer any reason until he asked.

My Mom is a very social person. She decided she was going to have a cocktail party for some of the wardroom officers while the ship was visiting Singapore. It's the American living overseas thing to do, and she wants me to be there. I explained that I was an enlisted swine aboard that ship and had no damn reason to be at one of her cocktail parties for the wardroom on *Boxer*. She was hurt; I tried to reason; she argued the merits of showing me off to her friends. After all, none of the other American ladies living in Singapore had a son on an aircraft carrier. I finally and somewhat reluctantly said I would pop in for a quick visit and meet everyone. A couple of hours after the event started, I show up at her apartment, and this young Navy Seaman begins the ordeal of shaking hands with everyone who is anyone in Singapore. Plus, I was to be introduced to half the damn wardroom aboard my ship. The Captain of the ship was there and obviously wanted to show my Mom what a great guy he was. So, he stands there, with his fifth drink in his hand, being real fatherly (like he and I were old friends). My Mom, of course, was delighted; what a great guy the Captain is, he treats his enlisted swine like sons. Guess what? In walks my friend, the Commander. He sees me standing there in a circle with the Captain, my Mother and Stepdad and a few assorted other notables. He has another look of wonderment spread across his face but is still reluctant to ask questions. As I feared what might happen next and did not want to meet this Commander face to face, I leave.

After a nice week long visit with my folks, I thank them for my stay and give my Mom a big hug (I won't see her for another couple of years). As I return to the ship, I bid farewell to Singapore, not to return there again for twenty-five years.

Later at sea while standing on the port side of the signal bridge, I get the feeling that I am being watched. Glancing up to the deck above, there stands my Commander friend looking down at me. He has a look of total puzzlement on his face. We never spoke again, not that we did before. He never asked, and I never mustered the courage to go up to the man and tell him. The poor bastard never knew why I was seen all over the Orient in places and at times I shouldn't have been.

I lived the first eleven years of my life in the Philippine Islands as an Army brat. One of my father's bosses in those days was a gent by the name of Douglas MacArthur. When we were stationed at Fort McKinley, an old

fashioned Army post outside Manila, the MacArthurs were friends and lived near us. In World War II my folks were captured by the Japanese. Near the end of the war, they were liberated from Los Baños prison. At the time General MacArthur contacted them and volunteered his help. My Mother's reply was that she just wanted to get back home.

By 1950 MacArthur had the job in Tokyo seeing to it that the Japanese got back on their feet after the war. When my ship was to visit Japan, my Mother writes me and insists that I go from Yokosuka to Tokyo and wander over to the Supreme Commander's office and pay my respects to my Uncle Mac (She told me that's what I called him as a small boy). How in hell does one explain to one's Mother that young seamen in Uncle Sam's Navy don't go around visiting five star generals. I don't think I was ever successful in convincing her that I couldn't do what she asked. To her it was just outright rebellion on my part. She truly couldn't understand why I found her requests so difficult to accomplish. Maybe she was right. It could be that a visit from a young kid from many years ago might have been okay with him. My problem would have been trying to get by those big guys with guns at his front door. It would have been even better if I had invited my Commander buddy to go along. People born at the turn of the century had a wonderful outlook on life. Maybe we of this century have lost that simplicity.

In Manila Bay, before the war, were ships of the U.S. Navy that had men coming ashore for liberty and leave several times a day. The boats that came in with the officers landed at the dock where this gang of kids had taken our gas mask project. As a matter a fact, my first big commercial diving job was that of recovering a sword dropped by a slightly inebriated officer as he stepped to his liberty launch. He gave me one peso for that job which immediately curtailed further diving operations for that day. I had to take the gang back up to the pool area and spend that peso on cokes. In 1941 you could buy a heck of a lot of cokes for a peso.

I was sure that Dr. Bond would find my tale of early vintage SEALAB type of efforts quite fascinating. However, in all honesty I think he just figured I wasn't too bright as a youth and hoped probably that my performance in his upcoming SEALAB operation was going to show better judgement than my underwater exploits as a boy.

What is interesting and worth noting at this point is, anchored out in Manila Bay during this period was the submarine tender *USS Canopus* (AS-9). It wasn't far from where we kids had conducted our dumb operation. Stationed aboard *Canopus* was a Navy diver named Bob Sheats.

Bob was to be the master diver on this first SEALAB dive and would be a team leader for SEALAB-2.

When the Japanese came to the Philippines after bombing Pearl Harbor, Bob was involved with the effort to keep them from acquiring Navy assets. However, like the rest of the military in the Philippines, he soon became a prisoner of war and eventually was assigned to dive with other American prisoners of war trying to recover silver thrown in Manila Bay by the Philippine Government. Bob's story about diving in Manila Bay for the Japanese is described in his article "One Man's War". This is a story well worth reading written by a man that I am proud to call my friend. Bob is held in the highest esteem by all that had the good fortune to work and learn from him.

As I write about Bob Sheats the phone rings, and it is Phil Sheats, Bob's son, who tells me that Bob has just passed away. Strange that I should feel the urge to mention him on the same day he dies. I wonder if maybe he was just somehow saying goodbye as he passed from this life. I like to think there is a life after death and take satisfaction in believing that Wilbur Eaton, Berry Cannon, George Bond and many of the others who are gone were there to greet him on his arrival to that place where we all gather. The fraternity of divers will never find another guy like Bob Sheats. They ain't makin' them any more. He was a man's man and a diver's diver. Just knowing that he isn't around today takes a bit away from how I look at life.

Those of us that were destined to be part of the SEALAB program were still attached to our original commands, and Bond had to continually pull a lot of political strings to get us loaned out to the project. In my case, I was stationed aboard a submarine in Key West and awaited word from him as to when I was to get back to Panama City where the habitat was well into construction. Eventually, after some tough arguing with my boss on that boat and a personal visit from Bond to try and convince the Captain that I was needed I found myself back at the Mine Defense Lab on a set of TAD orders. I immediately found myself deep into habitat building. In those days the engineers listened to divers, and it was our input that appeared to help with the overall design. Actually we practiced on the job training as no one really knew what the hell a house to live in at the bottom of the sea should look or act like. We functioned as a tight knit group. I know of no other time in the program that I liked more.

It was about this time in early 1964 that Dr. Bond came down from Washington and told us of some new things that were being planned. He said that in cooperation with NASA we were going to incorporate one

Astronaut into the SEALAB project. We were quite surprised. Of course, I had to spout off and asked, "What in hell are we gonna do with one of them?" Bond looked me in the eye, pointed a finger at me and said, "You are going to train him to dive with you." "Yessir," I said, and that was the start of my long association and friendship with Malcom Scott Carpenter.

Four men had already been selected to occupy SEALAB-1, and Scott was going to be number five. It was my job to get him up to speed on the equipment we were planning to use and to train him on the tasks we were to perform while on the bottom. There were a wealth of things that we all had to do before SEALAB started. Training was a small segment of the work as the habitat was not completed and tested. Our days were long ones. Carpenter, however, was an eager student and was always ready to learn everything there was to learn about diving to the point that I think I started to worry if I actually knew enough to teach him. I wonder to this day if he didn't end up teaching me more than I was able to get across to him. God knows there was a lot more that I wanted to know about his line of work than I ever imagined he wanted to know about mine.

The early part of 1964 was devoted to getting the habitat built, the internal equipment installed and eventually getting the whole shebang into the water for testing. During this period people who were to be part of the program would trickle in and take up positions that they would have during the actual operation. Putting it all together was a unique task. A house to live in underwater had never been built before by the Navy, and everything we did had to be thought out carefully.

All of us hoped that what we did was going to work. I must add at this point that it was great fun. Not too many folks were interested in what we were trying to do so they kept their distance and let us get on with it. Some people, I'm sure, figured we would fall on our respective asses and didn't want to get dragged under when we went down. In those days no one had yet invented all the various certification boards and bureaucratic stumbling blocks we find in today's diving community so we misfits were left alone to get our house in order and on the bottom. We would still be wondering what kind of ingots to use to make our steel out of if those 1964 efforts were tried today. I promise that at this point I will get down from my soap box and never again mention those nice people who dominate our lives today. We were, after all, able to get the Navy saturation diving program going long before their egg hatched.

Let me tell you a bit now about Lester Anderson. Andy has been mentioned in previous writings but only briefly, and I must spend a bit more

time talking about this guy. There are a few old master divers out there who have gray hairs, fond memories and some wild stories to tell because of Andy.

Gunner's Mate First Class Lester Everett Anderson was a Navy first class diver that came to us from NEDU. He had been there when we did one of the earlier Genesis experiments and told us from the beginning that he wanted to be part of the SEALAB project. Lester was the kind of a guy you surely needed to have around on a program like this. Bond knew it and had him assigned to the program. Andy and I along with the rest of the gang were in Panama City trying to get the gear together to conduct the coming operation. We didn't have a lot of money to buy the stuff we needed so from time to time we had to resort to the old Navy way of procurement. Swipe it. In some circles it's called midnight requisitioning. Andy was always able to find things that no one else could in places the average guy would never think to look.

At this Navy base on the Florida panhandle was a beautiful, well stocked salvage yard. Things of value that we could use and evidently not of current interest to their owners were stored in the place. Anderson and I had found a little used back trail that led right up to the edge of the field where all these "desirables" were kept. If Andy and I were devious enough we could circumnavigate the whole perimeter of the yard in the jeep that I drove without being seen. Always keeping a watchful eye out for the base police was of primary importance because if they saw us there they might intensify their patrols. Then we could never get all the stuff we felt we couldn't live without. When we spotted something laying out there that we needed, Andy would crawl on his belly across the open field like a commando approaching an enemy pillbox. He would then grab the desired item and run like hell back to the jeep. If it was too big to run with, we would put the jeep in 4 wheel drive, tie a line to the item and drag it into the underbrush. You obviously understand that we were only assisting the Navy in "acquiring" components critical to the needs of the service. Nothing else was intended or should be implied. There has been a fence around the salvage yard for years now, darn if I know why.

We were to supplement our SEALAB needs extensively with this method. We quickly became procurement specialists for Bond who was quite impressed with our "shopping" capabilities. When we arrived in Bermuda and set up for the dive, our well oiled and proven method of acquisition was to be a big asset in obtaining last minute gear. Our reputation blossomed to the point that when facilities we had cased for equipment

potential saw us approaching, they would lower their shades, lock their doors and would not acknowledge our presence. However, not to be beaten, Lester Anderson would tenaciously pursue his acquisition efforts and eventually return with the item we needed.

Armed Forces Day in 1964 rolled around while we still had the almost finished habitat sitting on the dock. The Navy base, proud of what they had built, asked if Bond could man it with some of its intended crew and talk to the visitors as they toured the base. "Sure," Bond said. "I'll put Barth, Andy and Doctor Thompson inside, and they will be glad to describe the complex details of the United States Navy's first underwater house." It was a warm day, and the habitat designed to sit in deep water was not too well ventilated. Andy came up with the idea that a case or two of cold beer soaking in a trash can of ice would certainly keep us cool and content. I couldn't find one good reason to disagree with that. As hundreds of visitors walked by, we would explain our pending adventure and then have a swallow of cool brew. It worked great. However, as with any event where consumption of alcohol is present, you have a tendency to let caution and good sense slide a bit. George Bond recalls the event and recounts it in his own words:

Came Armed Forces Day, and the big first exposure of SEALAB-1 to the quizzical, often skeptical, American public taxpayer. Roy Lanphear and I manned the microphone, while long queues of curious and interested people mounted a high ramp, peered through the portholes at the interior decor and long-suffering inhabitants on display. Hopefully, they went away neither bemused nor dissatisfied with tax expenditures. Inevitably, however, a few disconcerting elements were evident.

First, let it be said that the day was hot, and the inhabitants of SEALAB-1 had done yeoman's work the night through, to improve the public image of their home beneath the sea. Add to this the fact that the day was Saturday, and refrigerator was basic equipment in the habitation. Net result: Cold beer for the SEALAB human occupants. Finally, cold beer being tasteful, a considerable amount was consumed, resulting in some accumulation of empty cans in the waste disposal unit. This, in itself, constituted no real problem, since the disposal area (and the beer bar) were outside the viewing compartment.

Shortly, however, came the skipper of the Base, and immediately proceeded to climb into the SEALAB compartment for a first-hand view. This he got, albeit with difficulty. At the sight of scrambled eggs coming up the trunk, Barth threw all beer cans in the GI receptacle, then fell in atop the clutter himself, then Anderson sat on the container holding the beer, in hopes that it would avoid detection. The Captain, observing the melee, asked if all was well, to which Barth replied that he had been suddenly heartstruck, and was merely resting in the GI can. Thinking this a bit odd, Captain Miller asked Dr. Thompson, in the main compartment, if all went well. Suavely, Bob parried the question with a resounding belch, and the skipper's worst fears were confirmed. Captain Miller retreated, certain that Armed Forces Day had now discredited his Command and the entire Department of Defense, in the eyes of these viewing taxpayers. Such, of course, was not the case. A few minutes later, when queried by a nosey spectator as to why the subjects inside the SEALAB-1 seemed to be acting strangely, I was able to assure her over the loudspeaker system that the exotic gaseous atmosphere to which they were exposed invariably resulted in distorted reaction patterns. To an extent, I spoke the truth. At least, the crowd was convinced; however, the Captain could only smile wanly and stagger to his official car. I felt sorry for this splendid commanding officer. In due time, I felt, he would learn the modus operandi of SEALAB selectees, to whom the book has been long closed.

George Bond was indeed a wonderful storyteller but sometimes a bit prone to stretching the truth. His rendition of that day may not be exactly as it happened, but far be it for me to dispute the facts, I don't remember that day as well as I should for some reason or another. He makes it sound far better than I could anyway so I shall forevermore let his rendition of that 1964 Armed Forces day stay as he describes it.

Some years after SEALAB-1 was over we had gathered for a meeting and were sitting around telling lies. With us was Mal MacKinnon the builder of SEALAB-2. Mal was a Navy engineer at the Naval Shipyard at Hunters Point, San Francisco. He was a Lt. Commander at the time. LCDR

Mac enjoyed shooting the bull as well as divers did and would often join us in our leisure moments. One day Gunner's Mate First Class Anderson (a most prolific prankster) decided that Mr. MacKinnon was going to be his "prey" for that day. Andy sat next to Mal in this particular BS session. When things got kind of quiet Andy leaned over and asked Mal if he could whistle. Surprised that he would be asked that question LCDR Mac said, "Of course I can whistle, why?" Andy said, "Are you sure you KNOW how to whistle?" Beginning to tire from being asked, he said he could whistle, and why was Andy asking? Andy said, "If you can whistle, show me." As LCDR MacKinnon puckered up to give that whistle, Andy leaned over and kissed him on the mouth. There was an instant of shocked disbelief on his face, but before he made a statement condemning Andy, he took note of our glee and must have decided the prosecution of Andy was not necessary or actually would change anything. Andy was Andy. That kiss had endeared Mr. Mac to us forever. MacKinnon made Admiral in later years and was top engineer of the Navy when he retired a few years ago. I suspect Mal MacKinnon remembers Lester Everett Anderson.



Chapter Six

Third Time's the Charm

The SEALAB-1 habitat was completed and ready for her sea trials. As it was constructed on the wharf next to the base waterfront it was going to be a simple operation to pick it up, walk it over and lower it into the water. The habitat weighed enough that it took two large mobile cranes to do the job. We had to hang a lot of weight on the front of each crane because when we attempted the lift the front wheels would leave the ground. Finally, we picked her up and placed her in "Alligator Bayou," the base waterfront. The folks who built and launched the first nuclear powered submarine could not have been any more thrilled than we were to observe that magnificent habitat floating like a pregnant whale alongside the dock. It was the first Navy underwater house made for saturation diving, and yes, we were proud.

We were close to our goal of placing men on the bottom but first had to figure out how to get SEALAB to the bottom. The habitat was towed a mile or so off the beaches of Panama City not far from the old Navy structure, "Stage Two," which was an offshore platform used for testing purposes. It was moored astern of the support vessel *YFNB-12*. Water depth in the location of the sea trial was 60 feet. The habitat was to be turned negative by placing train axles and other heavy weights in the "ballast bins"

of SEALAB. These bins were just large open bins at the base of the legs that held the weights. We figured the weight would hold her firmly on the bottom without any fear of the habitat floating off the bottom.

Things seemed to be going okay. We had a good tight grip on SEALAB with a heavy nylon rope that was about 100 feet long. As ballasting progressed, the habitat was floating deeper and deeper. As she was about to sink, we cinched up on the line to make sure we had a good grip on her when she went to the bottom. She did, and we didn't. As she headed for the bottom, the 100 feet of nylon stretched, and right to the sea floor went our brand new SEALAB filling up with water as she made the descent. SEALAB was designed to be what could be described as a big waterproof camping trailer with a large opening in the bottom enabling its occupants to come and go. As we lowered it we were supposed to add gas at a pace to keep up with the increased pressure. The pressure, in turn, would keep it from flooding. Dropping the damn thing was not the method that would keep the water out. End of test. Back to the dock to fix what we screwed up.

Sailors know that nylon line stretches. We evidently were just too intent on other things and paid the price for not being alert. Back alongside the dock comes the wet house. Everything in it is soaked. We pick it up, put it back on the dock and start repairs. Eventually the repairs are made, and we headed back out to sea to try again. This time we did it right. The habitat sat safely in 60 feet of water, and everything worked great. We were ready. SEALAB was placed aboard the *YFNB-12* for the long sea voyage to Bermuda where the operation was to be conducted. The feeling of satisfaction and accomplishment on getting that monster constructed and worthy of a dive is hard to express. A great amount of good quality work went into her construction.

While *YFNB-12* was under tow to Bermuda the people that did not ride the barge took a few days of well deserved leave. Then we flew to Bermuda and met *YFNB-12* which had just arrived. SEALAB was taken off the barge and placed on the dock to be made ready for the impending dive.

It was early July 1964. Everyone had logistical tasks. Andy and I were to buy the food which would be consumed while on the bottom. The refrigerator inside the habitat had failed to work properly under pressure. Therefore, our food purchases could not require refrigeration. No problem, we just bought canned stuff. In every nook and cranny of the habitat we stored case after case of different canned goods. Being on the bottom for three weeks was going to take a lot of cans. We had learned a lot from

Cousteau about underwater habitation. One fact that was helpful regarding our food acquisition was that the French drank wine while on the bottom. Andy and I figured what the hell; if it worked for Cousteau it surely must work for us. Everyone knows that wine is good for you. As Andy and I pushed our food cart around the base commissary our stop at the wine section took a bit longer than that at the canned beans section. We certainly wanted to retain our health while bottomed.

After a long hard day at work we sometimes would go to the base club for a few drinks and dinner. One evening a bunch of us were at the club, the beer was cold, the night was warm, the drinks were tasty, and everyone was having a good time. I guess we had too good of a time because when we returned to the *YFNB* we were slightly un-sober. The divers bunked in one large compartment, and the bunks were four high. Cyril Tuckfield slept in a bottom bunk over in the corner. Tuck laid down in his bunk fully clothed just to rest a few minutes. The rest of us sat around and shot the bull. Tuck fell asleep. Andy, sensing that Tuck might need a blanket to keep him warm covered him with a blanket. Then a second blanket, then a third. Temperature in the berthing compartment was probably in the mid 90's. The last thing Tuck needed was three blankets. Obviously quite warm but sound asleep, Tuck started to toss and turn. In doing so, he would kick off one or two of those unnecessary blankets. Andy, in complete concern for Tuck's well being, would immediately cover him back up. As the tossing and turning continued, Tuck's brow was covered with sweat. At times you could detect a slight groan or two out of Tuck. By this time everyone in the compartment was intent on watching the outcome of this ordeal. Cyril Tuckfield finally woke up covered with sweat complaining of having nightmares about being thirsty and stranded in the Sahara Desert. I'm not sure he ever really knew how Anderson had contributed to his nightmare.

The berthing compartment did not have a lot of locker space for everyone's clothes. Therefore, one large community clothes rack was prepared to give the divers a spot to hang their civilian clothes. On the evenings that we went ashore it was apparent that the first ones to leave were the best dressed. We all wore each other's clothes. If you were late in leaving, there might not be a lot of clothes to select from. One evening Scott came down to find me and wanted to go out to eat and have a drink. I hadn't planned on going out so all my decent clothes had gone ashore with someone else. He looked at the clothes rack and said, "Here's something that is good enough." When I got the clothes on, the pants were four inches too short, and the shirt sleeves were far too long. The clothes just didn't fit,

but Scott insisted that I looked fine. He wanted company, that's all. I looked like Lil' Abner. Had I been able to find a piece of straw to put in my teeth, the picture would have been complete. This was 1964; Scott Carpenter had recently orbited the earth. He was a well known figure, and he had a goddamn hayseed along with him on this night out in Bermuda. As we met and talked with people, I would just mumble a long drawn out "DUH" so folks would think my mentality matched the attire.

A final sea trial was ordered for SEALAB-1 to insure everything worked before the habitat was set on the bottom. She was ballasted alongside the dock until just slightly positive and then towed to an area about 30 miles southwest of Bermuda which was the intended location of the dive. The site was right alongside the Navy's four legged structure known as Argus Island which was an underwater listening post in those waters of the Atlantic. The structure was in about 200 feet of water, and like other offshore platforms it was in the neighborhood of about 100 feet above the surface with a two story top where the crew lived and worked.

After final dive preparations were completed additional ballast was added until the habitat sank. Then we intended to lower it slowly to the seabed. This first attempt to get her to the bottom was about as successful as the first one in Panama City. The habitat got away from us again and flooded for the second time. With our tail between our legs we towed it back to Bermuda. Everything in it was destroyed or at least thoroughly soaked.

Handling that big monster was not as simple as we had hoped. Back in Bermuda we once again start getting the house back in order. The immediate problem I had was to sort out a few hundred cans of different foods. The flooding of the habitat with the carbon dioxide removal chemicals and the shaker effect during the tow back had dissolved all the labels and cardboard cartons. There was no easy way to tell what was in the individual cans! Bernie Campoli and I spent days stacking up the cans by the number stamped on them. We opened one can from each pile to find out what was in it. Then we would write on each can with a marking pen as to what it contained. One can from each batch had to be consumed by either Bernie or myself. I had all I wanted to eat of canned food, and I hadn't even made it to the bottom yet.

While in Bermuda an accident occurred that would change the intended profile of the dive. Scott Carpenter who was scheduled to be a bottom team member was injured in a scooter accident and broke a few bones. The crash ruined any chances he had of making the dive. After a short stay in the

hospital he was transported to his home in Houston to recover. This left the original four men to occupy SEALAB.

About then we received a call from the Air Force. Two of their planes conducting an operation over water had collided close to Bermuda, and a lot of their folks had gone into the sea. Recovery of the remains was now their main thought. We were the only group in the area that was geared up to dive to the depth of the downed planes. All preparations to place SEALAB on the bottom were postponed while our support ship got underway and went to the crash site. Recovery of bodies from airplane accidents is not one of your better choices for work, but Americans want to bury their dead, and the gruesome task of recovery was ours. Water depth in the area was about 240 feet, and the job took awhile. Eventually we finished what needed to be done and returned to Bermuda in order to continue with our own operation.

Let me tell you, getting that steel monster on the bottom and made ready to live in wasn't easy. It seemed like an endless parade of events occurred requiring additional work, but finally there she was, all restored to a workable condition. The canned goods were labeled so we knew what was in them, and bottles of wine were hidden all over the place like an old Ray Milland movie. Best of all everyone involved was chomping at the bit to get started. We were indeed ready. In the water again SEALAB was re-ballasted, towed to the dive site and moored astern of the support vessel, *YFNB-12*, which had been moved and moored a few feet away from Argus Island. This big four legged structure would support the habitat during her stay on the bottom. The topside crew and the command van would be housed aboard the *YFNB-12*.

When things were a bit slack one day before the dive, Wilbur Eaton decides that he was going to get everyone involved in a game of "follow the leader." There were enough of us around who were continually suckered into his antics that were dumb enough to be tricked again. Eaton, in his convincing manner, dared the guys in the group to do everything he did and got them motivated enough to follow him. He started climbing Argus Island and jumping off the damn tower from different heights. As he got higher, the followers got fewer. Walt Mazzone, sitting on the barge, recalled that day and said he heard a screech from Argus. As he looked over there, Wilbur, on the next to highest landing, was laughing at Fred Johler who had just made a death defying leap from a height from which he had no business jumping. Those who witnessed his descent said he was far from graceful as he smacked into the water. As he still had a following, Wilbur

was making ready to leap from that terribly dangerous height which was probably some 90 feet above the water. Captain Mazzone hollered over to Wilbur, "If that jump doesn't kill you, Wilbur, I'm going to." That terminated the days activities as far as "follow the leader" was concerned. I believe Fred was glad that Mazzone put a stop to the leaps. The next one might have broken his damn neck.

There were many surface dives to be done preparing for the operation. Many were deep dives concerning the anchoring of the support ship. The anchoring had to be done carefully and almost by hand because of the complexity of the many cables leading away from Argus Island. All of these dives required decompression. Consequently, the divers were quite familiar with water decompression, and it was a pleasant thought that we could soon go to the bottom and not worry about a daily decompression procedure.

With SEALAB ready and heavily ballasted so she would stay put, she was lowered to the seabed without incident. Gas samples were taken, and the check off list was reviewed. All seemed ready. Prior to giving his approval for the four divers to go, Bond first wanted to inspect the habitat himself. He and Walt Mazzone made a trip to the bottom, took a look in the house and returned to the surface. They had a smile on their faces, a gleam in their eyes and a nod to go.

Older divers know that up to this time deep work dives were of relatively short duration because of long and costly decompressions. Now, we were going to almost 200 feet in the Atlantic Ocean in water that was crystal clear and 80 degrees in temperature, and no one was a bit concerned about the diver's old adversary, bottom time. The price of two days' decompression at the end of many days on the seabed was something that we certainly were all willing to pay.

The Navy didn't have many bells capable of being pressurized in 1964. In order that we had a place of safety in which to go in an emergency, we had to contrive something that would work as a backup for the habitat on this dive. We used an old single lock recompression chamber with a medical lock on the end. It was probably five feet in diameter by about eight feet long. We stood it on one end in a steel framework so the hatch was a few feet above the bottom of the framework. It was somewhat like a bell in today's diving. The bottom of the framework was ballasted with lead until it sank. This contraption was to be our elevator, our bell and above all, our safety haven if things should turn ugly in SEALAB. The bell, or in those days, we called it a submerged decompression chamber (SDC) was

operated from a small crane on Argus. The plan to occupy the habitat was that the crew would ride the bell to the bottom, arriving a few feet away from the house. When ready the four of us rode over in a rubber boat, shook hands with the topside crew, jumped in the water, swam to the SDC and climbed in and started our journey to the bottom.

For more than 30 years divers have made their saturation sojourns in pressure vessels that were already at depth. On this trip to SEALAB we had an open bell requiring the addition of gas as she went down. Therefore, the trip was not one of rapid descent. The winch lowering our SDC worked better than the air supply we used to keep water out. As the water began to rise in the SDC, we would holler for topside to stop the descent while we added gas. When we caught up, the lowering was resumed. It took a lot of air and a little bit of hollering to get us to the bottom.

Divers are not generally lucky enough to make dives in nice warm clear water. Those kind of dives are few and far between. The water around Bermuda was the exception. As the SDC reached its location a few feet above the bottom about 75 feet from SEALAB, we were able to duck down in the water and look around. The good visibility gave us a complete 360 degree view of the bottom. The habitat and the four legs of Argus Island were plainly in view. We knew that this was going to be a good dive. As training tank instructors who were good at breath holding, we elected to "skin" over the distance to the habitat, eliminating any need for a diving apparatus. Each one of us had a small bag of gear to bring so we just took a breath, grabbed our bag and swam over to our new home. I often thought in later years that we should have taken photographs of this event to show our friends. The caption for the picture could say, "Here I am skin diving at 200 feet off Bermuda."

On the afternoon of 20 July 1964 George Bond's dream of men living on the bottom of the sea became a reality. Dr. Bob Thompson, Sanders Manning, Lester Anderson and Bob Barth had descended to SEALAB-1 for a scheduled three week stay at 193 feet.

SEALAB-1 sits firmly on the bottom with the bright inside lights on, the hatch wide open and quite ready for her four diver crew. In this habitat dive and those that followed, I always had the same strange feeling that I was entering a place which seemed out of the ordinary, which I guess it was. You are swimming around in deep water in a strange foreboding environment. Then all of a sudden, you're sticking your head up into a well lit, warm, comfortable house. Warm cozy places with food and beds are just not the kind of thing you expect to find at the bottom of any ocean.

Arrival at the habitat meant we then had to make her ready for the long stay. The potable water had to be put into service so we would have fresh water from topside and the sanitary line for our head had to be hooked up. Lining up our gas manifold for the gas we would be breathing was of course the most important chore. Like a good Navy diver, the next task was that of figuring out what we were going to eat for dinner. You have to do about the same things as when you first arrive and hook-up at a trailer park with your RV. With the habitat hooked up and humming we let out a sigh, smiled at each other and shook hands. Then I mumbled something to myself like, "I'll be damned, here we are sitting on the sea floor at 193 feet, and nobody is watching a clock." It was seven years in the making, but here we were.

As I think back to those years a lot of the incidents have faded away. The minutes, hours and days seem now to be one big blur. I can't tell you what we did on a day to day basis, but we were busy. Like everything else in this experimental field there are those daily donations of assorted body fluids the medical folks wanted. Peeing in bottles and giving blood had been our way of life for some time; there was no reason to think it would be any different on the bottom. The one welcomed change was that we were no longer confined to a chamber. By golly, when we were done with our physiological testing, we could get into our snuggies, put a face mask on and get our ass outside into that clear warm Bermuda water. The sea was ours.

SEALAB-1 had been lowered to the bottom by a crane on Argus Island. Therefore, we were right alongside this large four legged structure and could see all four legs from where we sat with visibility as good as you could ever ask for. The bottom was pretty flat except for a few outcroppings of coral. Sea life was abundant. You could see large schools of amberjack, assorted critters from the grouper family and a never ending variety of other things that live in the sea. With the water temperature around eighty degrees excursions outside were pleasurable. How often do divers get to dive in water like that? In those days things were kind of lax. Without a ream of directives governing your every movement, diving was a pleasure. No one was down there to tell us we couldn't do something, and the folks topside were not expecting to see you back up there for awhile. What else could a guy ask for? Nowadays, we would have 14 people from 8 different offices in Washington telling

us they had to study what we were about to do. Then they would engineer it to death or just quote some verse in a book that just plain said, "No, you can't do it." God, those were good days.



Chapter Seven

Something Fishy is Going On

In excursions outside we used the semi-closed mixed gas MK VI apparatus and scuba. We found that going on air at 193 feet after being on helium was a bit hard to handle so we diluted down the air in the scuba flasks with helium eliminating somewhat the sudden narcosis. This was a dive like no other. We swam around the clear water and ventured out as far as we could safely go. After completing our schedule for that day, we were free to do pretty much what we wanted.

Daily trips around the habitat were routine. The support divers would bring us down fresh scuba bottles, and Wilbur Eaton would prepare us a few MK VI's that we would use for longer sorties. It was like living in one helluva big aquarium. Life was good!

You are all aware of nitrogen and its effect on divers breathing air at a deeper depth. Dives that we had made prior to entering SEALAB had all been done on air. Therefore, narcosis was not a stranger in our midst. But something we failed to take into consideration was what would happen to our disposition when, after being on helium for a while, we suddenly went back on air. One small compartment at the end of the habitat was the place you might call our basement. That's where the umbilical entered which provided water, electricity, communications, and anything else that was

delivered from the surface. We saw no reason to keep this compartment on helium and have to worry about a proper mix, so the atmosphere was kept on air and ventilated from time to time.

After a few days in an atmosphere of helium – which contained little or no nitrogen – we were called upon to duck outside the tranquil helium compartment and enter the air filled room to perform some task. Upon entering that nitrogen compartment with a body that had been breathing helium the sudden impact of all that nitrogen at two hundred feet would immediately cause us to lose our tranquil, mild mannered disposition. The hair would grow on the backs of our hands, two teeth on either side of our front teeth would enlarge, and our face would instantly fill with hair. (Well, sorta.) Not only did we look like the wolfman, but we would act like him. We would instantly find fault with everything that didn't go like we wanted it to, and each of us would stand there and bitch to those poor folks topside. It got kinda funny after awhile, and when one of us would duck into that compartment the other three would stand at the port between the two rooms and watch to see what new things would happen when he hit that air. Dr. Bond and Walt Mazzone who were the recipients of our verbal abuse finally had enough of our impolite rhetoric and diluted the air with helium putting a stop to our nonsense. If everything the four of us did and said were done today we would have had a court martial waiting for us when we surfaced.

Habitat diving. What a grand way to visit the seabed. All of us have experienced at one time or another the dive that can be remembered as a great dive in a great place, but I'm here to tell you that you haven't visited the bottom of the ocean until you go there to stay. SEALAB-I was in a spot that afforded all the things that you would want in a good dive. We had great natural light. The water was warm. The sea life was abundant. We had a batch of good folks looking after us and were pretty much left alone to go do what we wanted after meeting the necessary requirements of topside.

At the end of the living compartment was a vertical shaft that came up from the deck about three feet and was about four feet square. This shaft extended down in the water about five or six feet. This is how we got outside. It was opened to the sea and if you walked over to it and peered down what you saw was the Atlantic Ocean. You could control the water level in it by adding gas or letting some out. During times big waves or swells would roll through the area or when the tide was in or out, you could tell by watching the water level in this "trunk." As a swell would roll across the top of us, the added water column weight would cause the water in the

trunk to come up a bit and then subside as the swell went away.

A lot of "fun time" was had by all. Scheduled events were accomplished on a daily basis, leaving a good deal of time to play. One day Tiger Manning and I were on a sortie away from the habitat, when I came upon a big fishing pole that someone on Argus Island had lost while fishing. They told me later that the fisherman had this pole in a holder on the handrail when a large fish took the bait and broke the pole off at the holder. The expensive Penn reel looked new and in good shape, so I brought the pole back to the habitat. Earlier we had installed an underwater television camera outside SEALAB and would move it around from time to time so that the folks topside could view what we were doing. As Tiger and I came back to the house with this large fishing pole, I noticed that the camera was stationed in a location that looked at the front entrance. I motioned for Tiger to stop and I turned around, held the pole like I was fishing and commenced to fight an imaginary whopper of a fish. Looked kinda goofy; here's a guy sitting down on the ocean floor fishing. Hell, it broke the monotony for those guys topside, and we all got a chuckle out of it.

The fisherman who lost the pole saw this fishing stunt on the TV monitor and called down to see if that pole might have been his. He was the radio operator on Argus Island, and like so many of them, he too was a ham radio operator. He and I negotiated the return of his pole, then made a deal. If he sent me down a ham radio remote unit so we could talk to the States, I would send him back his pole. With that swap made, we had the capability to talk to ham operators all over the world. It was great fun. One day we were chatting with a fella in one of the Carolinas, and he commented that our voices sorta sounded like that of a chipmunk. We had explained where we were, but I don't think he really understood, so in an effort that might let him understand why we sounded funny I once again told him we were breathing helium and sitting under two hundred feet of sea water. He said, "Uh, that's nice, we've had a lot of rain here too." With that I gave up and said goodbye.

It was obvious we weren't going to be too successful in describing our current situation to a lot of folks. They set up a phone patch with the Secretary of the Navy so he would have the chance to talk to these pioneering aquanauts at the bottom of the ocean. I am sure too that he had no idea at all of what we were doing, or why we were doing it. His comments convinced us of that.

When Andy and I had done our shopping for food in Bermuda, we had bought a case of canned sardines. Not many of us ate them, so we ended up

with a lot of canned fish. As the days went by we had a lot of big and little fish gathering outside around the habitat; they were a bit skittish at first but soon got accustomed to us. There were large amberjack, groupers of all sizes and a jillion little fish. I got an idea one day just before I was to go out for awhile that maybe those fish would enjoy some of the sardines. So, I went outside with a couple cans, and by golly, I was immediately swamped with fish who devoured the damned sardines as fast as I could get them out of the can.

As the days went on I got into a routine of feeding the fish at least once a day. I found there was a lot of pleasure in just sitting outside with a bag of sardines and feeding one fish at a time. After a while they would line up and await their turn to eat. Schools of big amberjack would swirl around, then come in and take a sardine out of my hand. I had the feeling that I was actually working with them like an animal trainer in a circus. You see folks in large aquariums feeding fish that way, but sitting out in the wild was an experience I shall not soon forget. Each time any of us went outside the habitat, we were immediately surrounded by a hundred fish who thought it might be feeding time; they would look in one hand then dash over to the other to see what you brought for them. It was the highlight of my stay down there.



Chapter Eight

Incidents, Accidents, Mayonnaise Jars and Success

While stationed at the Escape Training Tank in New London I got to know a fellow diver and submariner named Smokey Stover. After he retired from the Navy, Smokey went to work for Electric Boat (EB), the builders of Navy submarines. Smokey became involved in EB's small submarine program. A series of small boats was made by EB, one of the first of which was *STAR 1*. One morning at breakfast in the SEALAB, our project leader, Dr. George Bond, calls down and tells us that Stover would be visiting that day in *STAR 1*, his little one man submarine. On this visit Smokey was to cruise down to the bottom where we would be waiting for him outside, our SEALAB living space. Earlier, topside had sent down a fairly large flat steel plate which we laid down near the habitat. His *STAR 1* was capable of landing on the steel plate, and Smokey could move a pump handle inside the boat causing a rubber diaphragm on the bottom of his craft to adhere to the steel plate.

This little submarine was propelled by what looked like small electric trolling motors, so it didn't operate with any degree of power or speed. My habitat roommate, Tiger Manning and I went outside to await Stover, and after awhile we could hear the distant whir of the electric motors. As

Smokey came into view above us, we could see that the whole boat wasn't much bigger than an office desk. In the middle of it, behind a glass dome, Smokey sat with a proud look on his face. After all, he was the first submarine to visit these guys in SEALAB. (Actually, the only one.) I hadn't seen him for a couple of years, so we exchanged waves, smiles, and some sign language. After a few minutes of visiting, Stover motioned that it was time for him to leave; he waved goodbye, released himself from the steel landing pad, and put the power to the little electric motors. However, he didn't go anywhere, because I had a firm grip on his boat, and there wasn't enough power in the little motors to break my grip. As hard as he tried, that little boat just sat there making noise. I thought it was funnier than hell, but I don't think he did. I continued holding on to the boat while Tiger and I flooded out our face masks from giggling about Smokey's dilemma. Finally, I let him go, and the last I ever saw of Smokey was his middle finger waving to me as he headed for the surface. Ironically, Smokey Stover was to die a couple of years later in another small submarine that stuck on the bottom, but nobody was there to help or to let him go.

While outside with Stover's little submarine, Tiger Manning had the only near fatality that we experienced on SEALAB-1. We were diving with the old MK VI semi-closed circuit apparatus which served us well during both SEALAB-1 and SEALAB-2. However, it could be a temperamental rig and did bear watching. The MK VI was not very forgiving for those who didn't pay attention to safety and operational alertness. Three of us were operating outside, doing what needed to be done with Stover's dive. Andy remained on watch inside the habitat. All of us were very busy; consequently, we were not really paying a hell of a lot of attention to what the other two divers were doing. Evidently, Manning failed to open the gas valve on his rig when he put it on and went outside breathing only the gas that was in the bags. This is an operational mistake that is easy to do when everyone is excited and busy. He soon realized that all was not well and headed back to our only haven, the entrance to the habitat. He made it as far as the bottom of our vertical ladder; where, he lapsed into unconsciousness. As he fell, his equipment clanged against the ladder. Andy heard the noise, went over to investigate, and observed Manning laying out there. He jumped into the water, wrestled Tiger into the house, and brought him around. With a little luck, he had saved Manning's life. The other two of us that were outside never knew this was happening as our vision of the

entranceway was obscured. It was a close call for Manning whose eyes turned black and blue within minutes from the lack of oxygen. The incident did serve notice to each of us that good solid dive buddy practices still applied, saturated and living in the sea or not.

During an experiment of this nature, we found that practically everyone in the water business has something that they wish to be tested. Such was the case of a group from a university in South Florida. This group of scientists had invented, designed, and fabricated a device which when energized, attracted sharks, and they wanted to test it near the habitat to see if it did, in fact, bring sharks around. Now, that was exactly what we had been praying for, to have someone send out a toy that would bring sharks into the area where we lived. Brilliant decision.

When I was a teenager, I lived in Durban, South Africa. Durban had been a haven for sharks for years and was notorious for fatal attacks. I remember well numerous people being attacked and devoured by some of the biggest sharks I have ever seen in my life. Consequently, I had not developed a great deal of affection or desire to be close to them over the years. I figured they could handle their business far better in the water than I could, and certainly, I saw no reason to invite them to the bottom of the Atlantic to live with me. I have seen those finny bastards swim when they are motivated by hunger, and I knew damn well that I couldn't move fast enough to get away from one if he wanted some of me. Dr. Bond sensed that this shark idea might give us cause to wonder about his interest in our behalf and decided he should calm our apprehension (at least mine). Therefore, he talked to us in that soothing voice of his, and like always, we accepted his good judgement. After all, we trusted him enough to be sitting down here in the first place. I have always had this nagging dislike about real people being eaten by critters. Somehow, I find it totally unacceptable.

We had always been aware that sharks of assorted sizes lived in the waters of Bermuda. Therefore, we had designed a safety factor into the habitat by building a mesh screen around the entrance. This screen which we called the shark cage would serve to protect us from the big fish that ate divers. In the event that we were bothered by one of these magnificent creatures, we could swim into the shark cage, shut the door and be protected. Sure! So far we had seen nothing that resembled one of these creatures except a dead one that landed outside having been done in by someone topside. Luckily for us, we had some Joe College kids who were

gonna change that for us. How nice! Well, the day arrives that we expected this apparatus. Bob Sheats, our master diver, evidently had some differences of opinion with these guys from Florida, but those details were unknown to us on the bottom. After a few words with them, they called below and told us that the shark attracting equipment was being lowered. It was my job to retrieve it and set it up for them. As we sat in the habitat awaiting its arrival, we heard a muffled explosion, or actually, it was an implosion. The shark attractor had on it, along with some other doodads, large light bulbs that the college kids said would stand the pressure. The noise we heard was the destruction of those bulbs. The machine's descent was halted and returned to the surface. A few unpleasant words were exchanged, and our friends from this school in South Florida departed never to be seen or heard from again. Damn, we were really disappointed in not having the chance to bring into our area some nice, big, inquisitive, hungry sharks.

In conventional diving, with the exception of dives that require decompression, the diver knows that in a ticklish situation he can abort his dive and head for the surface. In saturation diving our safety haven was the hatch at the bottom of the house where we entered. You were constantly aware that the only place to get away from danger or go to when you were in trouble was that hatch. It gave you something to think about, and frequently, during sorties of any distance from the habitat, you would find yourself pausing for a brief moment to turn around and locate that hatch. It was the only safe place to go, and you damn well wanted to know where it was.

I have talked a lot about what took place outside the SEALAB habitat, but I might at this point briefly describe what it was like inside. As you can see from the photographs the "house" was a cylinder, had four ports about 12 inches in diameter, contained bunks for the occupants, had a galley area with a table at which to sit and eat or write, and had a shower and head. It also contained a refrigerator which failed to work under pressure, so we kept our shoes in it. If you imagine a round, almost windowless, camping trailer, that pretty much covers it. The big difference, of course, was there were no side doors on it; the only way to get out was the vertical hatch at one end; this entrance way was always open. It was sort of like having an aquarium in your house, but ours was the Atlantic Ocean. As habitats go, it was sufficient for our needs and comfortable, but this first habitat lacked

some of the sophistication that we later had in SEALAB-2 and SEALAB-3. However, of the habitats we built, I remember this first one as the best, and I remember the times as the happiest.

The visibility at 193 feet was super as you could see several hundred feet in any direction. On days when you were outside with the sun directly overhead, it was visible. If the lights were turned off in the habitat, one could still read a book by the daylight coming through the ports. The waters of Bermuda were made for divers. Each day our support divers from the surface would come down to deliver or pick up things that needed to be transported. Wilbur Eaton would set up a couple of MK VI rigs on the surface and bring them down to us to be used on dives that day. Mail would be brought down in a plastic jar that was always flat when it got to us, but our mail would be dry. We, in turn, would send up the blood that had been drawn that day. It was kinda like we were supporting a couple of vampires topside.

Of the years that I have been around the water, I can't recall having a better time. We could come and go at our leisure and would often just venture outside for a few moments wearing nothing but trunks and a face mask. There were also occasions that we didn't even wear the trunks. These incidents would almost certainly create a comment or two from our masters on the support ship. They would see our antics on the ever present closed circuit television and tell us to get some clothes on. There was a TV camera installed in the habitat that was on 24 hours a day. Dr. Bond or Captain Walt Mazzone would be watching us a good deal of the time and often would just want to chat almost like they were in the room with you. The situation always reminded me of the movie *2001: A Space Odyssey*. Do you remember the computer "HAL" that would chat with the lone astronaut? There were times in the habitat in the middle of the night, the one of us on watch would be feeling somewhat alone because the other three guys were asleep. In boredom you might pick up something, look at it, and all of a sudden a voice would say "what's that?" At that point you would realize it was George or Walt up there just being curious about what you had in your hand. During the Genesis and SEALAB years I got to know Bond and Mazzone better from our late night conversations than when we were face to face.

All good things have to end eventually. In our case, a storm was due to pass through Bermuda. Having a few divers on the bottom during a

hurricane didn't appear to be what Dr. Bond wanted. Consequently, we were told to prepare for decompression. The plan for the decompression phase of SEALAB-1 was to raise the habitat a few feet an hour and to allow the crew to remain inside. This approach worked fine for the first day or so, but that was to change. The approaching storm was starting to create big seas and swells. The folks topside who were trying to control our depth were having a hell of a time. The habitat was yawing up and down like a yoyo, and accurate decompression was practically impossible. The habitat would spring upward to the point that the straps holding us on the crane would go slack and slide along the outside of the habitat where we could see them as they passed the ports. Then, the house would lurch in the other direction, and the sling cables would snap taut. With all of this up and down motion, the water level in the trunk would rise alarmingly to the point that we thought the next time it went down we were going to get water in the house. Then with the next lurch upward we would see all the water disappear, and we would lose gas as it expanded and bubbled out the skirt. It was kinda hard on the eardrums and exasperating as hell to the folks who were trying to conduct a decompression schedule. They finally told us we had to evacuate the habitat and swim to the submerged decompression chamber. The SDC was suspended about fifty feet away from the habitat and was our method of "escape" in case of emergency. The four of us riding that bronco weren't too disappointed at being told to get ready to leave. Although we had not discussed it, I think all of us were a bit worried about one of those downward lurches snapping the cable or breaking the crane that was trying to bring us up. If that had happened, we would have gone to the bottom like a bullet, flooded out on the way down, and for sure, would not have considered it a good day. We didn't know it at the time, but one of the factors in making the decision to abandon SEALAB was that the crane on Argus was, in fact, getting strains on it that surpassed its intended capabilities, and the decision makers, up there, were also concerned that something might give. I am sure glad they waited till later to tell us about it.

Decompression in any form, was, is, and will always be, a necessary pain in the ass. After swimming over to the SDC with a little bag containing our most important belongings, we climbed in and shut the door (or in this case, the hatch). Our depth was somewhat shallower than 100 feet which left us, with approximately, a full day of decompression. I must add,

at this point, that old single lock recompression chambers from the 1940 vintage are not very large and were certainly not made for four large men. However, we waited for the lift to the deck of Argus Island with guarded optimism. If we were forced to abandon our home on the seabed we might as well get started on our journey to the surface. Upon reaching the surface, we still had about 100 feet of travel to reach the deck, which was probably the scariest part of the whole operation. Once laying on the deck of Argus, hoses were attached to the chamber for air, and decompression continued. The chamber, hanging by one end, had been hoisted through the air, stood on its end, and then rolled over on its side. It then instantly became a decompression chamber, never more to be used as an elevator for divers.

A single lock recompression chamber is not the ideal spot to undergo saturation decompression, but it was all we had in those days. In addition, as we were already stuck in it, there wasn't much of a choice. The damn thing had a lot of water in it from the hours that it was a bell which certainly aggravated the situation. There was little room for the divers to get comfortable, and in addition, a few inches of water sloshing around in it made the chamber all the worse. As our plans did not call for any long stays in the SDC, we were not prepared with the necessities. Therefore, the folks topside decided that we would each receive an air mattress, stretch it out sideways, and hope for the best. Here we are on four air mattresses side by side, with no chance to visit a toilet, or to lay out flat. We are all concentrating on letting the air out of the mattress as we decompressed, and to a man we are feeling mighty uncomfortable. With the four mattresses laying across the chamber there was little room left for anything else. If one person moved, all four guys moved. It was sort of like setting up housekeeping on a trampoline. If for some reason you lifted up, your mattress would come out of the water and splash the other three when you sat back down. We had a lot of unkind things to say to each other and questioned the wisdom of those people out there who made decisions which impacted on our well-being.

Fortunately, this old chamber was equipped with a medical lock at one end. Therefore, we were able to send things in and out. Without it, we would have been stuck in there with no food and with no method to rid ourselves of things that you don't want in the chamber with you. We were all ready for a hot cup of coffee after the ordeal of the hoist to the deck of Argus Island. The coffee arrives in a couple of mayonnaise jars. After

drinking the coffee, we set the jars on a ledge to send back later. As you know, coffee doesn't generally hang around too long, and eventually, there was a call to nature from this captive crew. What are we gonna do? Hell, we can use the glass jars as there was certainly nothing else in there that would be suitable. We gritted our teeth until they started to float. Then we decided that the jars were going to have to be put into outgoing service. If you think that kneeling on an air mattress with three other guys wiggling on theirs and trying to pee in a mayonnaise jar is easy, you are mistaken. Once we realized that wiggling on our mattress impaired the operation of the guy attempting to relieve himself, we would wiggle even more. That, of course, would cause a spill and consequently caused words to be said that even today I am too shy to repeat.

As the decompression hours dragged on, things in the chamber got worse. The first thing that occurred which started the next chain of events was that one of our mayonnaise jars fell off its perch and broke, spilling its unpleasant contents. Things were bad enough with all the sea water in there, but the contents of that jar was the final straw to our misery. We decided then to do something about the muck that we were sloshing around in. "Why not take a hose and hold it up to the vent line while they were venting the chamber?" someone suggested. Great idea! I asked for a hose which was promptly sent in. We then asked that the next time they started a vent that they keep it up until we had evacuated all the fluid in the chamber. Things worked great. Bob Thompson held the hose on the outgoing vent while the rest of us just vacuumed out the water. With it gone, we were about to secure that function when Lester Anderson made a decision that he wanted to use the hose to relieve himself instead of having to go in another jar. We all questioned the wisdom of that move, but Andy was determined that it would work as our depth was probably only 50 or 60 feet which would not create a lot of vacuum. Andy takes position on his knees, yells at us to sit still. With the hissing hose in his left hand and his hoozit in his right hand, he slowly lowers the hose to the point that he felt would suffice for this pending close encounter. The three of us were howling with glee, and in doing so didn't help Andy much trying to perform this delicate maneuver. The end result was a terrific "POW!" as the hose came in contact with the item he had in his right hand. He let out a screech, said something about our parents having never been married, made a terrible comment or two about our mothers, and threatened bodily harm if we didn't sit still. By

this time we were hysterical, so the insults weren't taken seriously. The "POW!" occurred a couple more times which only heightened our mirth. Poor Andy may have been disfigured for life, but by God he finished what he set out to do, not too neatly I might add, but by that time we just didn't care. The episode certainly relieved any tension that we might have had.

Finally, decompression was completed, and we made ready to exit the chamber. After the hectic decompression and departure from SEALAB, a rather miserable trip in the SDC, and an even worse time sitting on deck, we were filthy, felt like hell, and in general were downright miserable. We looked forward to getting out, standing up straight and feeling daylight for the first time in almost two weeks. Dr. Bond had told us prior to arriving on the surface that a boat load of reporters was on its way out, and wanted to be there when we got out. Of course, the boat was late, and we reached the surface before it got there. Dr. Bond wouldn't let us out of the chamber until the damn reporters were there; so, we sat inside madder than hell. I don't know about the other three guys, but I had not been able to relieve myself in over two days. If any of us tried it in the confines of that chamber, the other three would have killed him. I was about to bust, and the only thing I had on my mind was a bowel movement. I was in no mood for dumb questions asked by guys who didn't know the difference between air embolism and jock itch. About the time I was ready to mutiny, the boat shows up, and the reporters and camera people gathered around. Four of the ugliest SOBs you ever saw in your life crawled out of the SDC and tried to look happy, pleasant and so awfully glad to be able to chat with them.

As I was asked to sit down and answer questions, I reluctantly agreed in the hope that it wouldn't take long. However, that was not to be, for these guys had flown out to Bermuda from New York, made the miserable fifty mile seasick boat trip out to Argus Island, and were damned if they weren't going to get a good long story. Meanwhile, I am still dying, and little doubt remains in my mind that I will soon explode and kill off half the visiting press corp. A guy who I often see today on one of the TV channels was one of the interviewers. Whenever he comes on, I say to myself that I should call him and apologize for the curt and abrupt manner that I displayed when we spoke that day. He needs to know the state of fear and pain that I was in at the time. At any rate, I was to get through it all without exploding and embarrassing everybody. Eventually, we loaded aboard a helicopter with the rest of the gang and flew back to Bermuda for a checkup and a hot meal.

As we were being served, one of the mess cooks asked us for our autograph. Man, we had made the big time.

The first SEALAB experiment was over, hailed as a success, and completed in a mere ten months after we had finished our last Genesis experiment. I don't mind telling you that I was proud to have been a part of it all and even more proud and happy for George Bond, Walt Mazzone and the rest of the crew. We had shown a world full of Navy skeptics that this small band of misfits could, in fact, put men on the bottom to live and work and make it safely back to the surface. Saturation diving was here to stay. Best of all, they had let me be part of it.

In Bermuda, the public affairs folks had decided that the four Navy divers should once again be interviewed and presented to the public. We gathered in a large building that appeared to be a hanger, and the press conference began. Doctor Bond describes the event as only Bond could, "The questions posed by the press were sensible, and the responses relaxed and informative: at least, up to the point at which Anderson, Gunners Mate, took the microphone. As I may have mentioned before, Andy has a fantastic vocabulary, not one word of which is deemed acceptable in polite society. In consequence, when he was called to speak, many of us felt a real need to be elsewhere. Yet talk he did and without so much as a whisper of blasphemy, profanity or vulgarity, his three known modalities of self expression. As we watched in awe, Andy sweated each word, visibly sorting through his repertoire in search of acceptable rhetoric and syntax. Somehow, he did the trick, though his pauses and groping tended to accentuate to all the scurrilous four letter words which he detoured. At last it was over, and Anderson was our hero. The strain on the man, however, was obvious; possibly this was his longest printable communication since he was weaned."

After seven years of temporary travel all over the place, never knowing what was to happen after tomorrow, the Navy decided that what we were doing was something worthwhile and issued orders to about everyone that wanted them. It was one of the wonders that you seldom see in the Navy. George Bond asked me to help put together a list of divers that we thought would be the kind of people that would work well together. The names were submitted to the Navy, and in a short while they got orders to a permanent

and exciting new job studying the benefits, methods, and techniques of saturation diving. Soon we were to have a great group put together that would train for and eventually man SEALAB-2.



Chapter Nine

Shrinks, Pranks and Hard Work

The successful completion of Project Genesis and SEALAB-1 had shown the diving community that saturation diving did indeed work. George Bond had proven that his idea was a viable way to conduct deep water diving. Almost overnight, modest interest in this new concept sprang into life. The Navy could not argue with success and decided to form a permanent group of people who would continue to refine Bond's concept for deep water exploration. Bond assembled all the participants of Genesis and SEALAB-1 to determine whether we wanted to be part of this new program. Without dissent and with a resounding "HELL, YES," we became members of the Navy's new "Man In The Sea" Program. This was something that we dreamed about for years without ever imagining the Navy would go for it, and now we were being asked if we were interested. Damn right, we were interested. What diver wouldn't want to be part of a program like that?

Bond had asked several of us to assist in selecting good men for the program. Most of us knew divers who would fit well in the close confinement of saturation, but there were folks in the Navy who wanted to set the program up similar to that of manning a ship, with so many of this rate and so many of another. As divers, we felt the important thing was the individual and his ability to be a contributing member of a deep water team. When

you're living at the bottom of the sea in a steel can, venturing out to a strange, cold world and working long, grueling hours, the last damn thing of interest is the man's rate. If he has a personality like a bent trash can lid, he certainly doesn't belong on the bottom where he can make everyone else's life miserable. As there were those who didn't understand this reasoning, it took a bit of persuasive disagreement to change that thinking. Pressure, job training, bubbles and salt water fail by themselves to create harmony. Good people with good attitudes do that.

In all the years that I have been around this man's Navy, I can't recall anything happening as fast as Bond's effort to get men assigned to his program. The Navy moved so fast that it warmed your heart and amazed you at the same time. No sooner than we could submit the man's name to Bond – BAM! He had a set of orders in his hands. Nothing has moved that fast in the diving Navy since.

"Man In The Sea" commenced in January 1965 when a handful of divers and support folks were issued orders to report to the new program. The men selected were divided into two groups. For research and additional experimental work, a small detachment of men was assigned duty at the Navy Experimental Diving Unit (NEDU) in Washington, D.C. The rest were sent to the Navy Mine Defense Laboratory (MDL) in Panama City to run a training program for the newer divers. As SEALAB-1 had been built and tested at MDL, it was the logical place for the water portion of our training program. The people of this small Navy base in the Florida panhandle were allies who were solidly behind our program. In the years that followed, their engineers continued to work in our habitat program until its demise in 1969. During the planned training period, the divers at NEDU would come down to Panama City to do their open water work. Of course, with any diver training program, the participants received not only hands-on work with the latest equipment and concepts, but an extensive refresher course in humility.

In addition to Navy divers, ten civilian divers were selected for this program. They came from the base in Panama City, Scripps Institute in La Jolla and the Navy Electronics Lab at San Diego. The divers totaled twenty-eight and were supported by a large group of folks. Some of them were also divers who would look after things topside. For every man we had working on the seabed, we had two or more topside working their asses off. Those are the guys who made things work. They saw to it that we were safe, happy and well-fed, and they stayed awake at night while we slept.

Cyril Tuckfield and I had been stationed in Key West; we had both been

on the SEALAB-1 project and had returned to Key West and our old commands to await these new orders. When they arrived, they read MDL, Panama City. We looked forward to this permanent duty station change. Until now, all the folks that had been involved with any of Bond's efforts had done it on a temporary basis. Things were looking up for "Bond's Misfits." Needless to say, Tuck and I were ready to embark on this new adventure, and don't think for a minute that we didn't consider it an adventure.

At Panama City, Jim Bladh was the base diving officer. He had been there the year before when we were tooling up to do SEALAB-1. We reported to Jim when we arrived. Prior to setting up our own department, we had to be working for someone. We more or less were incorporated into the base diving locker while we waited for all the new folks to show up. Hell, working for Jim was about as much an adventure as life with Bond and Mazzone. The team of SEALAB-2 divers was slow in arriving. Scott Carpenter by now had recovered from his accident in Bermuda and was assigned to the program. Some commands couldn't let people leave right away, so during this period we worked for Jim on the various aspects of diving that were necessary to support the base. Bladh saw to it that we were kept busy. However, on days when the work schedule wasn't full, we would go out and dive for fish and other denizens of the deep. Dives like this would supplement our coffee fund to make enough money for a good party every month or so. Diving was what we as divers did; nobody is allowed to do that nowadays. Contrary to current beliefs, divers belong in the water to do what they have been trained to do.

When all the crew had finally assembled, we had ten men at NEDU and the rest at Panama City. There was a lot to do with people running all over the country bringing together various aspects of the planned operation. Some were working on the habitat in San Francisco, some were working with contractors getting badly needed equipment together, and some of the divers were busy doing test dives at NEDU. The folks in Florida were working on training. All were busy, and we felt good about it. There's something about working and training for a goal like ours that can't be matched. Building the habitat, training with new equipment and bringing good people together gives you the feeling of accomplishment and satisfaction you seldom find in a normal society. When you know that all the work will ultimately lead to allowing you to live right on the seabed for two weeks, the effort is painless.

During SEALAB-1 four divers had occupied the habitat for about 11

days at a depth of 193 feet, with topside support coming from a Navy barge called the *YFNB-12* and Argus Island, a four-legged Navy platform 30 miles south of Bermuda.

In SEALAB-2 twenty-eight men in three teams were scheduled to live at a depth somewhat deeper than SEALAB-1. The location selected was about a mile offshore from Scripps Institute at La Jolla, California. Support would be supplied from a Navy barge left over from the Polaris missile test days. Additional support would come from the beach at Scripps. Aboard the barge, named the *Berkone*, would be a brand new saturation diving system consisting of a diving bell and a deck decompression chamber (DDC) which probably can be called the Navy's first saturation diving system. This system would be used to transfer the saturated divers from the habitat to the surface for decompression. The method that was used to handle the bell and the mating system for the DDC would send shivers of fear through today's saturation diving supervisors. The bell sat outside the underwater habitat like a giant phone booth. The divers always had it to go to in an emergency and used it for transfer for decompression. For that trip it was hung on a small deck crane and lifted without any handling system other than a bunch of guys with lines attached to the bell. As it swung through the air they tried to line it up over the DDC and get the mating accomplished, which was a mighty difficult task on a rolling barge. During the mating procedure you would see half a dozen riggers, with lines attached to the bell, being dragged all over the deck while trying to steady this swaying monster. It was a difficult and scary event for those folks topside who were trying to get the Bell mated to the chamber, but I'm here to tell you that riding inside the damn bell with nine other men "weren't no fun either."

Divers would swim down to the habitat in those days of shallow water saturation. With today's deep saturation depths, all divers are transferred to the bottom under pressure in a bell. The end of habitats in the Navy and the requirements for the diving community to go deeper dictated that the work on the bottom be conducted from a bell. That's the way deep diving is done today, but this story is about how it was done well over thirty years ago.

In SEALAB-2, a lot of planning was required to determine what tasks were to be accomplished and who was going to do them. A diver assigned to the program brought with him tasks that he was to accomplish while on the bottom, and each of us was there to assist when it was time. We had a wide variety of functions to perform, from salvaging airplanes, working on oceanographic projects, setting up underwater weather stations, planning and executing deeper excursion dives, to maintaining all the habitat

equipment, evaluating a wealth of diving equipment and even interfacing with dolphins and other bottom critters. Folks who had been working in the sea for years saw a grand opportunity to get to the always distant seabed and stay there. I can't remember all the tasks we performed, but twenty-eight men were kept mighty busy for 45 days.

With any organization doing experimental work, you will find more than your share of physiological testing. Nearly every day it seemed that someone from some distant place wanted to extract something from us to study. So one day, Dr. Bob Sonnenburg announces to us the tests that we are going to endure this day. He stations himself in a nice office and calls us in one at a time to perform the tests. One of the tests happened to be a finger wave. I shall not attempt to explain what that is. We go into his room alphabetically. Anderson is first, and Barth is second. I'm waiting outside for my turn and hear a muffled scream coming out of the room. A few minutes pass, and I hear Sonnenburg cuss at Andy. What happened, I learn later, was that Andy was bent over a table awaiting the doctor's finger. (Bob Sonnenburg was a very big man). To let the world know that the doctor's finger was something terrible that all in the line had to look forward to, Andy let out his scream as the doctor performed this delicate maneuver. Then when the doctor finished, he turned around and kissed the good doctor on the mouth, whispering something about getting some kissing with his screwing. When I walked in for my turn, Sonnenburg was still wiping off his mouth. As Andy left, he stopped at the door and said in a loud voice, "Doctor, if you are giving out seconds, I would like to be at the top of the list."

We must mention, of course, the ever present psychological studies required by our medical staff. We were still, after all, experimental divers and fair game for researchers. We sure didn't want to forget all that great information the shrinks were determined to extract. There were real important things like how many times you went to the refrigerator for a snack, picked your teeth or involuntarily scratched your ass. That's the kind of stuff that is so badly needed. There is absolutely no doubt in my mind that the ten years of reading ink blots and answering dumb questions has made me a better water-oriented person. If you think that you have detected a wee bit of animosity directed towards psychologists, it's your imagination. I really love those guys!

The newly designed SEALAB habitat was under construction at the Navy Shipyard, Hunters Point, San Francisco. People we had never met were hard at work building that home for us, and we all agreed when it was

over that they had done a damn fine job. In particular, one event that I witnessed was the forming of the dish ends of the SEALAB habitat. Our "Ship's Supervisor" for the program at Hunters Point was LCDR Mal MacKinnon, who was responsible for seeing that we had a good house in which to live. He told me that early on in the construction phase of the habitat, he found that he could not get the two dished ends of the habitat made in time for the schedule. Consequently, he had to form the ends by the use of energy from an underwater explosion. I asked Mal to give me a short story minus the engineering jargon that describes how those huge dish ends were formed. In his own words:

It became obvious during the design of SEALAB-2 that the critical path for the delivery of the habitat was through the acquisition of the dished heads that capped the stiffened cylinder. The cylinder comprised the basic part of the habitat. The obvious source of these two heads was from a steel fabricator who supplied similar, but larger heads for submarines. Unfortunately, this fabricator was on strike, and the earliest projected delivery was well after the completion of the SEALAB Project. An alternate was to fabricate in an "orange peel" fashion by welding small shaped pieces and grinding the welds smooth. This was a lengthy process and not a preferred approach since it also involved schedule risk.

The ultimate and successful solution was to explosively form the heads. The West Coast Naval Shock Test Center was stationed at Hunters Point and provided the basic explosive technology and expertise. A large mold was constructed and a concentric circular shaped charge was designed to ensure a planer shock wave at the one inch steel blank secured to the mold. A vacuum was drawn under the blank to ensure minimum venting during the forming and thus minimum distortion. Although forming of metal of this size, twelve feet in diameter and one inch thick had never been tried before, it was the only option that would keep the habitat construction on schedule. The decision was, "Let's go!"

Two perfectly formed dish heads were thus acquired in about four milliseconds each, and the assembly of the habitat cylinder proceeded. Of note, the largest shapes

explosively formed heretofore were ashtrays! This process perfected for SEALAB has become a specialized metal forming technique, used in common practice today, 30 years later.

We seldom are witness to new concepts and techniques. I found this method of forming tons of steel into a giant bowl fascinating and wanted to share it with you. I have always had a keen interest in the way industry tackles large projects. That interest followed me into the offshore world where I was amazed at the size of equipment that is used in this community. I never had any idea that so many big things were out there.

With the saturation theory and its associated equipment still in the early experimental stage, it was obvious that some things would be left out, forgotten, or not done by the rigid standards of today. However, for what they knew then, those folks at the Naval shipyard in San Francisco did a great job both in the construction of SEALAB-2 and a few years later in the redesign of the habitat for SEALAB-3. The diving community in the Navy back in those days worked well together, taking pride in their accomplishments. Matter a fact, I sorta like the old way over the new. Somehow, we seem to have lost the desire or ability for innovation and making things work without months of studying or engineering it to death. In addition, if by chance we were adhering to the volumes of literature and regulations, it seldom said, "Use common sense, do it safely like you were taught and get the job done." We woke up one morning, and without knowing it was going to happen, we had environmentalists and certification folks everywhere who since that time have orchestrated and often impeded our progress.

Thinking back thirty some odd years ago, it's difficult to recall any sense of apprehension by those in the program. We didn't know what was going to come from this expended effort. We did not believe the program was going to have a great impact on how the Navy looked at diving. I can't recall ever thinking that what we were doing was going to change our diving procedures, and there was not a lot of official interest in our program. We had been and were considered outcasts who were working on some scheme that was completely alien to current diving standards. It took a great deal of hard thankless work, but the end result was that we changed the image of Navy diving. In retrospect, we can consider the "Man In The Sea" Program an impressive success, and from the standpoint of the diver we did our job and did it right.

Activities in the spring of 1965 at NEDU in Washington and in Panama City took on a hectic pace. Gone was the somewhat laid back atmosphere we enjoyed in SEALAB-1. It seems like everyone had more to do than time to do it. The habitat was under construction in San Francisco, the guys at NEDU were busier than hell, and those in Panama City were up to our belts in training. Equipment that divers were to use during the experiment had to be tested, and each diver was required to be proficient in that equipment. People from all walks of life had interested the Navy in new innovations. There were things like battery operated suits that acted like an electric blanket to keep the diver warm and pumps that took SEALAB atmosphere gas, pumped it out to the diver, and returned it to the habitat for scrubbing. There seemed to be no end to the equipment that would end up on the bottom for diving testing. We were, after all, an experimental group and were the logical folks to do the testing. A lot of that early equipment, like Dick Long's hot water suit, is still around and working well for the diver of today, but in addition, there was also a lot of that stuff we never saw again. It's called testing, evaluation and elimination.

Having been a dive subject during the Genesis days and a diver on SEALAB-1, I had the questionable distinction of being the subject of continuing medical studies. The folks at the Medical Research Lab in New London, where all this saturation stuff got started, had a lot of background data on me. Consequently, I was often asked to donate one more specimen, give a bit more blood, blow into something or contribute just one more piece of my flesh for science. One day I got a call from someone up there and he said, "We need to have you guys in Panama collect all your stool for a week." "Huh?" I said as he continued, "Keep it frozen, and at the end of the week, pack it all in dry ice and ship it up here." Some important study on doodoo, of course, was evident. It seemed like a strange request, but in the past I had been asked to do worse. Why in the hell they wanted it from everyone else who was new to the program, I didn't know. I didn't care really, but I was having a difficult time figuring out how I was going to get twenty sailors to save their crap, freeze it and give it to me to ship. Needless to say there was a near mutiny when I explained at quarters one day what I wanted them to do. However, it was nothing compared to the uproar in the next few days after their wives had been told about it. They wanted to know what in hell they were going to do with a freezer full of the stuff and of course blamed me for the whole shebang. Seemed like every time something unpleasant was asked of them, they figured that I was behind it.

There were a lot of caustic comments both from the guys themselves

and certainly from their families. I received almost daily phone calls from the wives. Some suggested what I could do with this frozen feces fiasco, and of course, the real hot topic was the daily growth of the package in their freezer and its impact on their kids' afternoon snacks. Running into the house for a snack after the school bus let them off came to a halt. After a while, the irate phone calls simmered down, and I didn't get too many comments from the guys themselves. I thought the worst had passed. At the end of this doodoo collecting week, the folks in New London called and asked, "Are you ready to send that stuff up?" I explained I was about ready but had to collect it all from the guys and find a big enough insulated box. The caller showed a bit of interest as to why I needed a big box. He said, or words to this effect, "You certainly couldn't have generated that much doodoo in a week." "Hell, no," I said, "but I have all these other guys who have been saving crap, too." "Oh," he said. "There's been a mistake; whoever told you all your men were to collect that stuff was wrong. Yours is all we ever wanted." The next day I informed everyone that it had been a big mistake and made a feeble effort to apologize. The irate and threatening calls immediately started up again, and you will never guess what I found in my mail box or on my front yard every day for several days thereafter. Navy wives can certainly be vicious.

With our expanded group a perpetual problem that occurred was obtaining funding for everything that we had to do. As I had been given the task of keeping our divers outfitted, I griped continuously about how long it took for a funding request to make it through the bureaucratic maze in Washington. Prior to one particular trip to sea for deep water training, money had been requested to buy some diving gear for the trip. We hoped it would arrive because we were very short of some items including diving clothes. Well, you know that it didn't arrive. Things were so short that the guys would have to borrow each others gear when it was their turn to go in the water. During a lull in the activity, I got the bright idea to send Dr. Bond some photographs to show his folks in D. C. how we were lacking in diving garments. The thought, of course, was to help expedite the money flow. Wilbur Eaton and Shorty Lyons were standing around on deck, and I told them to take off their trunks and stand stark naked at the rail of the ship. They assumed the pose of two divers waiting for their turn to dive. I sent the photo to Bond, but his mail was opened by his secretary, and you can imagine where this story went from there. Our SEALAB divers were an instant hit with a bunch of ladies in our nation's capitol. A week later I got \$10,000 for clothing and a polite request from Dr. Bond not to send any

more pictures of naked divers to his office.

During this training period, Wilbur Eaton and I were told to give Scott Carpenter a rundown on equipment that he had missed using in Bermuda. Dr. Bond asked us to get him back up to speed, which was easy and always great fun as Scott wanted to learn about everything that went on in the water. One day the three of us were out in a small boat in about twenty feet of water to familiarize Scott in the use of the hand held sonar and a pinger receiver. We anchored the boat, and as Wilbur got the equipment ready, I told Carpenter that Wilbur would go down first and demonstrate its use. Eaton and I had this thing about trying to outdo each other. From the toys we installed in our cars, to things we did in the water, to cooking a steak, we would always conjure up a way to show our best at the expense of the other. As I helped Wilbur get into the water, it was the normal custom to help each other put on the scuba bottles. However, I had this sudden urge to let him pick up his bottles on the bottom as opposed to wearing them on the way down. I just chucked the bottles over the side and told him to go get them. That was no problem with Wilbur; he just jumped over the side with the sonar in his hand and skinned down to retrieve his bottles. As Carpenter watched this feat, Eaton set the sonar down, calmly put the mouthpiece in his mouth, turned on the air, then unhurriedly put the bottles on his back. Scott had never seen this done before and stood in awe at Wilbur. He was continually impressed with the things he saw the divers do and always, just always, wanted a chance to do it too. He constantly left himself wide open to be "had." Why he still calls me a friend today is somewhat amazing as there are still things I have never admitted to.

When Wilbur finished demonstrating his prowess at bottle donning and completed the sonar demonstration, he swam back up to the boat and asked Scott if he wanted to give it a try. Scott was delighted to get the opportunity and asked me like an eager boy if he too could do what Eaton had done. "Why sure, Commander," I said, as he prepared to skin down "a la Eaton" and get his bottles. Wilbur told him how to take a good deep breath and to remember what we had taught him in the "ditching and donning" phase of his training. I made ready to chuck his jugs over the side. This astronaut was quivering with anticipation at getting to do what these hairy-chested divers did. He did fail to notice, however, that I had cinched down as hard as I could on the valve handle of the bottles. Over the side go the bottles. They land quietly on the bottom awaiting his arrival. Scott did everything exactly like Wilbur told him; he skinned down, put the mouthpiece in his mouth and turned on the air. However, something was wrong; he couldn't

get the air on. As hard as he tried, that little valve just would not open, and he rolled around on the bottom in his attempt to breathe. Meanwhile Wilbur and I, watching this poor guy drown, were hanging on to each other giggling like a couple of idiots. We both figured that in a minute he would be back on the surface completely devastated because he couldn't perform this fairly simple operation. Not so. My friend Malcom Scott Carpenter would have died before failing at this task. About the time I was ready to jump in and save him, he got the valve open and performed the rest of the job flawlessly. He returned to the surface like an anxious child seeking praise for accomplishing such a difficult task. Wilbur and I didn't even acknowledge that we had been watching.

We were in Panama City for our second Armed Forces Day in the spring of 1965. The previous year we had SEALAB-1 sitting out for all to see but this year our new habitat was in California. We did, however, tell the base that we would be glad to participate in any function they wanted. Wilbur Eaton, with his explosive ordnance background, put together a demonstration in which a helicopter flew in to a preselected location, several divers jumped out, swam in to the beach and simulated blasting an enemy building to smithereens. It seemed simple to me when he asked me to be one of the helicopter jumpers. "Hell, I would be glad to help," said I. Wilbur and Tuck drove over to an isolated part of a bayou which bordered the base and set up this "enemy" emplacement with explosives and a lot of gasoline and oil to make it an impressive explosion. With everything in place, I reported to the base helicopter landing area and with a handful of other divers climbed into a big helicopter, took off, and flew towards the intended enemy installation. Now, my buddy Wilbur had discussed this operation with the other guys, but not with me. As we flew to the site, they said, "Chief, you jump last and follow us in to the beach." Sure, hell, I can do that, I thought. We hovered over the bayou, and the first guy jumps out. The helicopter gets a bit higher probably because of the reduced weight of this diver. The second diver exits, the bird gets even higher, the third guy goes, and the higher we get. I'm sitting back in the rear of the bird, not really paying a lot of attention, because I was going over in my mind what I was supposed to do. I certainly wanted to look good for Wilbur, who had trusted me to excel and make him proud! The next-to-last guy jumps, and I take my place at the helicopter door and look down. Jesus, it looked like we were 500 feet in the air. I grit my teeth and jump. As I sailed through the air, I glanced over in the direction where Wilbur and Tuck were waiting to set off the charge, and the last thing I saw before I crashed into the bayou

at what felt like a thousand miles an hour was Wilbur and Tuck, all teeth, rolling in the sand hysterically. It took me half an hour to pry the flippers off my thighs. Such was life with Wilbur Eaton. We had an afternoon show to perform that same day; same scenario, except this time I jumped first.

Training for the pending SEALAB operation was just about completed. All the new folks had gone through their indoctrination dives and had done everything asked of them. We were ready to head west and put this knowledge to good use. The habitat was about ready and was being towed to Long Beach where we would meet her and get her ready for the stay on the bottom. It was time for us to head for California.

In Panama City, we packed everything we needed and put it aboard a Navy plane for the trip out west. With that shipment on its way, we decided that we would all drive out to Long Beach together. We got our personal stuff together, packed our cars and headed across country. The trip out there was a pleasant short vacation for us. Although we didn't have a lot of time to stop and smell the roses, the caravan of about five cars stayed together. We would stop early in the evening, find a motel with a pool, go for a swim, have a few beers, eat dinner and then go to bed. In the morning we would get up early and head west again.

After arrival in Long Beach, we met everyone that had come out and started working to make the habitat ready. I don't recall any other time in the SEALAB experiments when something that failed to arrive on time or a delay of some sort prevented us from being on schedule. However, such was the case with this operation. What was intended to be a couple of weeks to get ready ended up closer to two months. Nevertheless, we were far from idle during this period as there was always something that needed to be done. Probably the highlight of our stay in Long Beach was the christening of the SEALAB habitat which sat on a barge alongside the pier. It was a strange sight to behold, and unless you were told what it was, you wouldn't have any idea.

In the event that the intended site for the dive at Scripps had to be changed, we had selected an alternate location next to San Clemente island. This island is a few miles off Long Beach. San Clemente has long been a Navy island and promised to be a good location if for some reason it did not work out at Scripps. With its potential of being the dive site, we were required to scout the place. Several trips were made to the site. On one occasion a handful of us, including Scott Carpenter, flew out to make an inspection dive on the intended location. On this particular day, one of the divers from San Diego who was to serve as a photographer, among other

things, brought a very expensive prototype camera out to the island to take a few pictures on the bottom. The dive included Walt Mazzone, Bob Sheats, the photographer and one other diver from the island. During this dive, Walt had a problem with his apparatus and suffered a partial blackout on the bottom. In the period that his dive partners were attempting to get Walt back to the surface, the camera was dropped and left on the bottom. Walt's problem, along with his dive buddies', was resolved by a short stay in a treatment chamber. However, the sun was starting to set, and the camera was still sitting out there in about 240 feet. As we were soon to fly back, the guy responsible for the camera was anxious and worried about its retrieval. We needed to get it back before we left.

Scott and I were the only two divers who had enough time left to go and get the camera. The water depth was a concern as Scott had not been to that depth before, and I was slightly worried that narcosis might come as an unwelcome surprise for him. We talked about what we were going to do on the dive so it was clear to both of us, then jumped into the water and started down the descending line.

Narcosis affects all of us in different ways. My experiences with "Raptures of the Deep" are far from being mystical experiences. Deep air work has always forced me into a heavy concentration mode because I knew without a doubt that if I didn't concentrate on what I was doing I would screw something up. That knowledge has kept me out of trouble a few times in the past.

The descent to where the camera lay calmly on the bottom was uneventful until we got down to around the 180-foot level, and Scott spotted the camera. In his desire to get that camera back and his need to do a good job, Scott left the descending line and took off hell-bent for the bottom with me close behind trying to slow him down. You just do not work hard when diving deep on air; the narcosis will knock you right on your ass. Narcosis reared its ugly head that day. Scott met with his first taste of it, but everything worked out all right, and we got the camera back. Scott knew he shouldn't have left his dive buddy, but who am I to raise hell with him. Chief petty officers don't raise a lotta hell with full Commanders, and his was an honest error based on the desire to be part of getting that camera back. Scott was a good dive buddy and was always ready to do more than his share of any work. He was to learn that day what nitrogen narcosis felt like, and don't all of us learn from our mistakes?

With our survey of San Clemente Island completed, we headed back to Long Beach. To get there we generally flew on a vintage aircraft flown by

a small airline that had the contract for this service. On this particular day, the trip back to the mainland was in an old DC-3. Dr. Bond was rightfully concerned that having a bunch of divers aboard who had recently finished some deep diving, ascending to a high altitude in an unpressurized airplane might bring on a case or two of bends. With this in mind, he asked the pilot if he would not go any higher than a couple of hundred feet. "Sure," he said, "no problem."

The airport runway at San Clemente is at the top of a mountain. We rolled down the runway, got airborne but never got much higher than the runway altitude. A lot of the passengers who were on this plane had made this trip hundreds of times and were used to climbing out of the area. Today, they didn't. This particular airline was the kind that didn't instill a great degree of confidence in its flying ability, so there was always this nagging feeling that you as a passenger ought to pay close attention to the flight.

The pilot had announced to the passengers that a famous astronaut was making the return trip with them and welcomed Scott on board. However, he said nothing about flying just a scant few hundred feet off the water and around islands, not over them. The divers knew why, but the other passengers didn't. There was a lot of concerned looks on the faces of the other passengers so a couple of us got up to walk among them, explain the reason for the low altitude and hope to calm their fears. We made our return to Long Beach without further incident, but I am sure that particular day added yet another chapter to the many stories that circulated about this "infamous" small airline. As a matter of fact several years later when we were getting ready to do SEALAB-3, San Clemente was the selected location, and on many of the preliminary trips to the island we once again found ourselves flying on the same airline, on the same planes and with the same lovely stewardesses.

One early morning we assembled at the Long Beach airport awaiting our flight out to the island and also waited on the crew to fly the plane. On their arrival, I noticed the cockpit crew was somewhat preoccupied or just maybe sleepy. We boarded the plane and waited for them to start their engines. A guy came out to the plane with a big fire extinguisher and gave the high sign to get the engines started. With a rumble, shaking and a lot of smoke we were ready to start to taxi. When we reached the end of the runway, we did the engine run up and were given permission to take off. Rolling down the southbound runway at DC-3 speed, we got airborne, but instead of doing a right turn to head for San Clemente, we just continued to climb and started a slow 360-degree turn to the left. This got our attention

because we had always turned right. After making the slow left turn, we landed and rolled up to our original position. The guy with the fire extinguisher came back, but this time with a ladder. He went to the rear of the plane to return into view with the rudder locks in his hands. Rudder locks are two boards connected by a short rope that are put on the plane rudder at night to keep the rudder from blowing in the wind. They will also keep the pilot from being able to use the rudder and fly the airplane. We kinda thought we might make our next trip out to the island in a boat.

Finally, SEALAB-2 was ready to make her maiden voyage to the bottom of the sea and Scripps La Jolla had been firmed up as the location. Once again we bid goodbye to our hosts in Long Beach and headed south to the site of the pending operation.

When the gang reached San Diego, we spread out like a broken bag of marbles looking for a place to stay that didn't cost an arm and a leg. As it ended up Wilbur Eaton and I bunked together in an apartment complex down at Pacific Beach. He was scheduled to be on Team One, and I was going down on Team Two so we really would have the place to ourselves some of the time. When Team Three was down, Wilbur and I would both be up on the surface helping to bring the operation to a successful completion.

The site for SEALAB-2 was about a mile off the beach in front of Scripps Institute at La Jolla. Scripps was going to be our host for the operation. As a matter of fact, a few of their people had been selected as bottom candidates and had gone through training in Panama City. Several buildings at Scripps had been designated as SEALAB facilities and were ours to use while we were there. The public affairs office had a spot, the shrinks had another, and the divers had a place to hang out. The folks at Scripps really opened their hearts to us, and we felt good about the prospect of working there during the operation.

The *Berkone* was towed to the site and put in a moor. Things started to fall into place, lines of all sorts and sizes were run from the beach, and communications were established, eventually giving us the capabilities we would be needing during the dive. It takes a hell of a lot of work to get something of that magnitude together, in particular, when nothing like it has ever been done before. While we were looking after the needs of the habitat, the *Berkone* crew was making ready to be our surface support headquarters which included the saturation system and the berthing for those who would remain on board for the operation. The contractors who were going to feed the crew and everyone else who would have an active

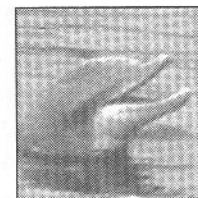
role in the work were busier than hell bringing it all together. These were exciting times, and by God, we were excited. We all knew what our job was and had no problem doing it.

The fully outfitted habitat had been towed down from Long Beach and hung floating on the surface astern of the *Berkone* to undergo last minute provisioning. SEALAB-2 (and SEALAB-3) had the ability to sit on the surface with the lower hatches dogged shut. We could gain entry by a topside hatch that would be closed and secured once the "house" was ready to head for the bottom. From our location offshore, we could see the tall cliffs of the California coastline, the town of La Jolla and the beaches that served that small community. It was sort of comforting to be that close to civilization. Not one of us was without something to do during this period; we were busy getting a million things together that we were to use on the bottom. Once assembled, all this gear had to be tested or checked to see that it worked. We worked hard, and I might add we played hard, but when it was all over everything was in place. It was time to get the habitat on the bottom and man it with a crew.

Three teams of ten men each had been assembled to man the habitat for 15-day periods. Two men were scheduled to stay 30 days, bringing the total diver count to 28. Scott was to stay a full 30 days, and Dr. Bob Sonnenburg was the first and third team doctor. Each team had a pile of work to do when they were down there and probably had more to do than hours to do it, but by golly, everyone was ready. The habitat was lowered to the bottom, not without the problems that we had learned to expect, but eventually with a little tweaking and cussing, she made it down and before too long was ready to receive the first team of anxious divers.

On the morning of 28 August 1965, Team One gathered at the dive station on *Berkone*, smoked their last cigarette for 17 days, shook hands with the other guys and then jumped into the water for their swim down to 205 feet and the waiting SEALAB. Scott and Wilbur were the first two to head down.

It had been just over a year since we surfaced from SEALAB-1, and here we were with a brand new state of the art house. Although it was sitting somewhat crookedly on the bottom, on the slope of Scripps canyon, it was nevertheless ready. Team One left the surface a pair at a time, and finally all ten men were inside. It was another great day for Bond and Mazzone who had struggled for so long to see this event take place. The builders and users of SEALAB-2 had a lot to be proud about on this summer day in California.



Chapter Ten

Cold Water, Critters and Wilbur's Ghost

The year was 1965, and the 57-foot-long manned subsea habitat SEALAB-2 had been successfully placed in 205-foot waters off the coast of La Jolla, California by the U. S. Navy. The ten divers of Team One settled in and were ready to begin their fifteen days at saturation. The habitat was sitting calmly on the bottom, while topside on the *Berkone*, we settled down to a routine. In addition to the many people who were supporting the operation, the other two dive teams stood watches until it was their turn to dive. There aren't too many of us in this business that haven't stood long watches on a diving station for days on end. The whole operation was not unlike any offshore operation with the exception that *Berkone* could not house everyone involved. Therefore, trips back and forth to the beach each day were a necessity. Ride the boat out at the beginning of the watch and ride home when it was over. In later years while working offshore in the Arabian Gulf, riding a crew boat in at night, and looking back at the barge from which we left, I often thought of that view of *Berkone* that first night. Sitting out there in the ocean, this large array of hardware with lights from one end to the other was full of activity. Sounds of the equipment running could be heard far across the water. A ten minute boat ride to La Jolla was certainly a far cry from a two-day tugboat trip to a town where no one spoke

your language which would be the case if you were working a job in the North Sea. Who was going to bitch about La Jolla?

I knew that the crew's sole responsibility was to look after the ten men 205 feet below them. Soon I, too, would be down there and be part of it. I don't think I will ever forget that first view and the grand feeling of anticipation for things to come. My gosh, they were actually paying us real money to do this stuff.

Funny thing about that pay, most of you know that when you travel for the government or a private corporation, you receive extra money for travel. It's called per diem. We had been on per diem for some time while preparing the habitat. In those days the per diem for the military was \$16.00 a day. This covered your hotel and meals (try that today). As we got close to going to the bottom, some financial wizard looked at a book that defined per diem and made a decision that for the 15 days while we were inside SEALAB, the government would be providing room and board. Therefore, we lost per diem. This was probably the only time in what is now the long history of saturation diving that the divers lost money in saturation. It cost us \$240 bucks each to stay in the habitat. I just thought you oughta know that. In the years that I worked offshore, I took great delight in telling our divers that story. Particularly, when they were sitting around griping about their sat pay. But those oil patch sat divers couldn't have cared less about how much money we lost doing SEALAB.

The seabed off La Jolla is a far cry from the bottom at Bermuda. In Bermuda we had nice warm, clear water, and the diving was pleasant. On SEALAB-2 it was cold, dark and far from being any great pleasure. Bermuda was certainly an exception, and this water near La Jolla was what we all had grown accustomed to in a career of diving – lousy conditions.

It's seldom that we get to work in warm, clear, tranquil water. The habitat was sitting at the edge of a canyon which was a lot deeper than the house location. Early on, there had been a bit of concern that SEALAB might slide off into the canyon, but that never happened, or ever was going to happen. It was probably a thought that originated with the press who were always eager to find a sensational angle. You seldom see news footage of weddings because everyone is happy. It's the gore and guts that the media thinks we ought to see with our evening meal. The habitat alongside the canyon did afford a few exploratory trips, but only a few of the guys made those trips into the canyon, which was well beyond the 300 foot range. Excursions from a saturated storage depth were still not thoroughly tested in 1965.

The SEALAB experiments were just what the name states – experiments – and a hell of a lot of them. Each team had a long list of things that they had to get done and seldom were there enough hours in the day. If need be, we could work well into the night as it didn't make a lot of difference to the bottom dwellers. Days looked like nights; it was dark on the bottom all the time. After awhile everyone fell into a routine, and things came easier. Days and nights blended together; things were working as designed; nobody had slugged anyone, and everyone enjoyed the hard work. Then, all of a sudden, the 15 days were up. Team Two was told to get ready. I was about to make my second SEALAB habitation.

Saturation diving as it is done today is much different from the way the divers in SEALAB did it. Today divers go up and down in a diving bell each day, transferring to a decompression chamber, living there under pressure and going back down in the bell the next day to continue work. In SEALAB we lived twenty-four hours a day on the ocean floor. Unfortunately, few folks have ever had the opportunity to occupy an underwater habitat as we did. Everything was done at a slower pace. There was time to wander around on the seabed and look at things. You could take in sights for which you would never have time in modern day diving. Sure, the work was hard, but the leisure hours made it all worth it. The National Oceanic and Atmospheric Administration (NOAA) has an underwater habitat, "Aquarius" which has been in operation for many years and sits in about 60 feet of water near Key Largo, Florida. The only other habitat in operation belongs to Ian Koblick at Marine Resources Development Foundation and is also in Key Largo. This unique habitat sits in about 30 feet of water in a quiet lagoon. It is available to the general public if you are a certified diver. It is an experience that one will never forget.

It was necessary that Team One and the guys on Team Two spend some time together to exchange data. We needed to know what they had learned the past 15 days, so a few of us headed to the bottom. Two of my best friends, Wilbur and Tuck, were down there. After I made my way down, we got together and had a great time bringing each other up to speed on the happenings of the past two weeks. They wanted to tell me all the great things they saw or did during their interlude on the seabed. I was telling them about the good bars and eating places I found in La Jolla, lecturing Wilbur about keeping our apartment clean, and threatening reprisals if the refrigerator did not have food in it when I surfaced. The info exchange was beneficial to both sides. I don't think any of Team One slept that last night. They were ready to head back to the surface, and I shared their excitement,

looking forward to my 15 days on the bottom. In the morning we had a cup of coffee together and shook hands. Then Team One, minus Scott Carpenter, jumped into the frigid waters and swam over to the personnel transfer capsule (PTC). From there they made the trip to the surface for two days of decompression in the DDC. I think Scott was a bit sorry to see Team One depart without him; it would be 15 more days before he could leave with us.

In a few hours all members of Team Two were on the bottom. Scott was also the team leader for the second team. He met with Team Two and talked about our schedule for the next two weeks. Carpenter, with his two weeks down there, knew pretty well what it was like and knew the solutions to some of the obstacles we would encounter. This habitat was certainly superior to the first one. We pretty much had all the comforts of home, including the well-stocked galley with all the things we needed to be able to cook. All of that was missing in the first habitat. The water around us was probably 40 degrees colder than it had been in Bermuda. It made a noticeable difference. This SEALAB habitat had been designed for the colder waters off California. The deck itself was warmed electrically, and a nice big tub was installed near the entrance to the habitat. When you got back from a cold swim, it was great to jump in and warm up.

The many innovative gadgets installed in the habitat to assist the SEALAB divers were always evident and helpful. However, one of the most useful was the dumb waiter, which was a large reinforced pressure-proof aluminum can that would travel up and down a line to the surface many times a day. The device enabled us to receive and send things to the surface and did it without anything getting wet. This was something we didn't have in Bermuda. You see movies about old market places in ancient times where the population would trade for food. That's essentially what we did. Each morning we would pee in a bottle or maybe donate 25cc's of blood which would be sent up in the dumb waiter and traded for a delicacy of some sort, a bag of jelly beans for Tuckfield, a coke for Ken Conda, or even maybe a birthday cake for a guy having his birthday. Who knows, but on each return trip we would gather around that can like expectant kids at Christmas.

Retrieval of the dumb waiter required a diver to dress up and go outside to get it. After awhile, we figured it would be just as easy to go out holding our breath, saving all that dressing up time. Soon we were getting into the water at the entrance way, taking a couple of good breaths, then scooting outside for a couple of minutes to return with this big canister. Now Scott,

who was always interested in doing what everyone else did, became fascinated with our breath-holding ability and started timing us. Upon our return, he would read out our time outside, which would be one or two minutes, maybe a bit more. He thought that it was really something, and I decided one day to really impress the hell out of him. I made a big show of hyperventilating at the entrance, ducked underwater and headed out to get the canister. However, without his knowledge, I stopped a few feet from the entrance and quietly stuck my head up in a small pocket of breathable gas and stayed there for a couple of minutes. Then, taking a final breath, I ducked back under the water to continue my canister recovering task. When I finally returned to the habitat, I saw Scott with his stop watch announcing to everyone that Bob had been out for something like 4 minutes and 28 seconds. Unbelievable. I, in turn, just shrugged it off as a normal trait found in hairy-chested Navy deep sea divers. Nothing to it. With that time firmly planted in his mind, he eventually would take his turn. He got ready to go outside, stood by the entrance up to his hips in frigid water, and sucked in one deep breath after another until he was giddy, then ducked under, determined to at least get close to my four minute mark. Maybe a couple of minutes later, he would explode back into the hatch, devastated that he had come nowhere near my mark. I just let him think I was the superior breath holder and let it go at that. More than 25 years later, I confessed to this trickery, but Scott, being the gentleman that he is, would say nothing.

We had a lot of interesting visitors down to our domain. There were wild critters and even some trained ones. Prior to the operation, one of the divers, Ken Conda, had undergone training with a porpoise named Tuffy. Tuffy was intelligent and very large. I would from time to time be Conda's dive buddy when he went outside to work with Tuffy. The program had several goals, one of which was using Tuffy to locate a lost diver. If a diver was away from the habitat and lost his way back, Tuffy was trained to locate the diver by homing in on a noise-making device carried by the man. Tuffy would then lead him back to the habitat. I have always found great fascination in being around animals that are not afraid of humans, and Tuffy was certainly one of those. Ken and I would go outside when the folks topside would tell us they were ready to send Tuffy down. We would wander away from the habitat a bit, and Ken would turn on the pinger device he carried. Before too long, there would be a streaking shadow and a giant swoosh, and then this damn big fish would be sitting right in front of us smiling. The first time that he roared down on us scared the hell out of me, as I hadn't been there during the training for this event. Those critters

are big! Working with that mammal was an unforgettable experience, to say the least.

Ken Conda was a Coke freak. The one thing that he missed most was his daily ration of Coca Cola. As the folks working topside with Tuffy knew of Ken's addiction to this popular soft drink, on particular days Tuffy would show up on the bottom with a bottle of Coke attached to the harness he wore. When Ken returned to the habitat, he would cool the bottle down and growl at anyone who came close to him like a cave man protecting a hunk of dinosaur meat.

Some of you may believe as I do that old divers go on to be porpoises when they die. There is no doubt in my mind about it. Let me tell you a story about that. Wilbur Eaton and I often discussed what happens to guys when they die. He told me that, if he had a choice, he would come back as a porpoise. We had more than one conversation on this subject, and his wish to be a porpoise never changed. Anyone who spends any amount of time at sea knows that porpoises seem to enjoy life. They play a lot, and you can't help but admire them. Well, years later, my best friend Wilbur Eaton passed on to another life, and I missed him. I often wondered if he got his wish to be a porpoise. One morning, a couple of years after his passing, I was standing on the bow of my boat fishing in the bayou where I lived. It was early morning, and the bayou was quiet and still. We often had porpoises come in to fish, as was the case this particular morning. One of two porpoises that had come in to feed came over by my boat, getting closer each time. It was early, and I knew that none of my neighbors would hear, so as this big fish got closer, I started talking to him. Of course, I used his proper name, "Wilbur." He would swim off for awhile, then return back to where I was fishing. I continued my one-sided conversation with him, and then on one of his passes, he came directly in front of me, rolled over on his side and defecated right there in front of me. It had to be Wilbur. I called him a SOB; he smiled and swam off to join the other porpoise. There was absolutely no doubt in my mind who that guy was. I, of course, kept this incident to myself knowing quite well that you don't go around telling folks about something like that.

However, a couple of days later my neighbor came over and said, "Let's take your houseboat out in the bay for a ride." I agreed and we got underway, heading out the bayou. We ran into a mutual friend in his boat and stopped to chat, drifting alongside each other just a block or so from my bayou. As we chatted, two porpoises came into view close to my boat, and we stopped to watch them. I said that one of them was Wilbur and the

other was Dr. Bond. My friends chuckled politely. I also told them about the recent incident alongside my boat, implying maybe that I had some weird rapport with critters. Both these guys knew Wilbur and knew, too, that I might be a bit daft. One particular porpoise, who looked just like the one who had crapped in front of my boat, kept swimming closer and closer. Then in a flash, he dove down and picked up a flounder off the bottom. He headed back to near where we were drifting, flipped the flounder about 15 feet into the air, swam over to retrieve it, brought it back over to where we were, and flipped it into the air once again, making sure that we had noticed his fishing talents. Have you ever seen a porpoise do that? I never had, and this reinforced my conviction that it was Wilbur. The other two guys were silent. They had just witnessed a live figment of my imagination. Wilbur Henry Eaton was once again trying to show me up! That's a true story; I got witnesses. I see Wilbur every once in a while. He still tries to impress me with his prowess underwater, but then, he always did!

The SEALAB-2 habitat had several large portholes to give the occupants a view of the outside. However, at our depth and water clarity there was little to see. Near one of the ports we installed one or two of the old diver-held underwater lights. This illumination afforded us decent visibility out of that one port. These lights would attract minute shrimp that, in turn, would attract thousands of anchovies who would feed on the shrimp. Then something bigger would feed on the anchovies, followed by another critter feeding on them, and so on. The problem we encountered was that a mesh screen on the lights would eventually fill up with hundreds of dead anchovies to the point that the bulb would burn out from the heat. We had to replace the bulbs every couple of days.

Our PTC sat on the bottom just a few feet away from the habitat and was there for our transfer back to the surface. We kept a light burning in it so it could be seen in the dark. We failed to consider that if the light *outside* SEALAB attracted anchovies, the light *inside* the PTC would do the same thing. Finally, someone went over there to check it out and returned hollering that the PTC was full of dead stinking fish.

They had to haul it back to the surface and scrub it out. I can well imagine what it would have been like for ten men to ride that bell up with a hundred pounds of dead anchovies in there with us. Cripes, I can't even handle a couple of them on top of a pizza.

There was never a time that the port with lights didn't have something going on around it. It was a continuous show of big critters feeding on smaller critters with the largest one being a sea lion. The topside folks

would see the sea lion on the surface and tell us he was back. We, in turn, would wait for the word that he was heading for the bottom and stand at the port to await his arrival. The port would be full of fish, which all of a sudden would scat away as the sea lion flashed into view. There was some concern by everyone that we might end up embolizing one particular sea lion. It seems that his curiosity would cause him to try and stick his head up in the habitat. In doing so, he would breathe our gas and obviously not exhale until he went back to the surface. You talk about a sea monster. The first time he came into the hatch area, we heard this commotion and glanced his way; it frightened hell out of us; we had this vision that we were being invaded by a monster who was about to crawl into the habitat. Remember that movie *The Creature From The Black Lagoon*? On SEALAB-1 I tried to find the guy who had that Black Lagoon suit. I was planning on scaring the hell out of everyone but never could find out who owned the suit.

Three oceanographers from the Navy base at Panama City, Wally Jenkins, Bill Tolbert and George Dowling were part of Team Two. Therefore, there were a lot of things to do that oceanographers do. We installed an underwater weather station to record water direction, temperature and velocity. Inside the habitat was a noisy recorder that ran just about all the time collecting data from the weather station. Then we had these little hoozits that looked like long-stemmed mushrooms that drifted across the seabed. We would let them go and watch them slowly drift away, kinda like a note in a bottle to be retrieved in some distant land. The world of oceanography, with all its many devices to learn about the sea, is certainly one that intrigues us all. Those guys were always busy doing something, half of which I didn't understand.

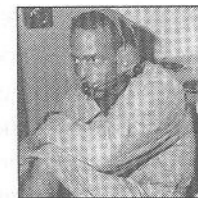
As always we, too, were blessed with paraphernalia designed to test our intelligence and dexterity. A two-handed dexterity coordinator sat outside the habitat like an old abandoned pinball machine. Daily stops at this gadget were a must in fulfilling our psychological commitments to those wonderful people upstairs who wanted to know what made us tick. Somewhat like a well-known watch commercial, we kept on ticking. We read stupid questionnaires, gave equally stupid answers and knew all along that we would lose the battle. Those guys are kin to the people who become environmentalists. They have everyone convinced that their data is the most important in all the world, and by golly, you need to march to their drums. Whenever you get a bunch of test subjects together as a captive audience, it is not long before our psychoanalytical brethren arrive like buzzards after a lion kill on the Serengeti. I honestly hope that before I die

I am told just what the hell they always looked for in their information quest from divers.

SEALAB-2 was a large and fairly comfortable habitat as far as habitats go. One end was the bunk area, which could support ten divers. The middle of the house was the galley area which was well stocked with the equipment needed to prepare food, including a nice stove, a refrigerator and freezer and everything else you might want in your kitchen. Next to that was the lab area where we did all the work on diving equipment, communicated with topside, and where the sole man on watch at night hung out. Adjacent to that was the other end of the house and the entranceway into SEALAB, which was a 48-inch hole in the floor that held the Pacific Ocean. Next to the entrance/exit hatch was a big tub that would hold one diver. When a diver would come in from a cold dive, he would get rid of his diving equipment and crawl into the tub that was full of very warm water. It was better than sex and certainly more readily available. You don't know the value of a hot tub of warm water until you have been outside freezing your ass off and have that tub to jump into. I can't ever imagine being without one.

Although living in and working out of a habitat sitting on the ocean floor keeps one busy, and tired at night, there is still a chance that a degree of boredom will enter the picture. Maybe, too, it might be the desire to annoy someone who is a pain in the ass, but whatever it might be, it always gave us the desire to create havoc in some way. The natural targets were the shrinks topside who sat in a room somewhere watching our every move and taking notes. Having been topside during the first team's occupation of SEALAB, I knew that they were up there watching. Those on the bottom would often sit around at the end of the day and talk about what we had done that day or maybe what we were going to do tomorrow. Inevitably, the subject of those that were watching us would come up, and we would just naturally have to do something about it. We might find something to cover up the video camera without their noticing, or we might sit around and appear to be talking but really not saying anything – prompting them to check the audio on their monitor. Maybe one guy would cross the room, kiss one of the other guys and pat him on the ass – anything to give those bastards cause to work harder. In our case we would chuckle every time one of us went into the refrigerator, telling the guy who was doing it that someone up there was counting the trips. It actually became annoying when you felt that the apple you were getting was going to show up on a tote board. We were entitled to a bit of friendly rebellion, plus who the hell cares

if they tell Bond we aren't quite right. He found that out a long time ago.



Chapter Eleven

It's a Wrap

The day-to-day activity of ten men living at the bottom of the sea was without a doubt something to write home about, but since we had a telephone down there, calling was preferable to writing. It was enjoyable talking on the phone and trying to communicate with folks in our helium speech. Once they understood where we were calling from, it got easier, but people's reaction to the chipmunk talk the first time they talked to us on the phone gave us a lot of entertainment. Nowadays we have helium unscramblers enabling conversations that are distortion free, but that was not so in 1965. During decompression, the White House telephone operators attempted to establish a phone connection between Scott Carpenter, Doctor Bond, and President Johnson. The operator at the White House was quite adamant about not letting this guy with a strange unintelligible voice talk to her President. Bond would try to explain, and Scott would try to explain, but to little avail. There was no way in hell she was gonna embarrass her President by letting him talk to this clutz who sounded like a damn chipmunk. Finally, Bond found a way to get his message across that it wasn't a hoax but a real honest to God astronaut at the bottom of the sea speaking in helium. I think she was about to ask, "If this guy is a damn astronaut what in hell is he doing at the bottom of the Pacific?" Finally, she

put Johnson on the phone. He made a very presidential statement about Scott's bravery and sacrifices for his country. Scott would respond and talk about the other men in his crew, but President Johnson had absolutely no idea what Scott was saying to him. I asked Scott if I could talk to our President. He looked at me for a minute and said, "No!" What I think he really meant was "Hell no!" You would think he would have trusted me more.

Carpenter received another interesting call while we were on the bottom. An old friend of his from the Mercury program was in orbit a couple of hundred miles above the earth in a Gemini capsule. We were fascinated at the linkup of Gordon Cooper and Scott. This was big time communications. Later, Team Three was to get a call from the Cousteau group who were in a habitat at the bottom of the Mediterranean participating in the Conshelf III program. Bob Sheats, our Team Three leader, chatted with his counterpart thousands of miles away. Events like this tend to keep you interested and motivated. With the satellite service available around the world today, I can well imagine what great communications we could establish now. Hell, we might even have HBO in surround sound. Actually, we did have TV down there. It was a small set that was housed in a pressure proof container which afforded us the evening news and other things of interest.

The divers went on daily sorties outside the habitat performing all sorts of projects. Each trip outside was different from the other, and there's generally more to do and see than time to do and see it. Divers who wander too far away are constantly aware that if something happens, their safety haven is back at the habitat. As they can't return to the surface in an emergency, the only place to go is that 48-inch hatch. With that fact firmly planted in their mind, you can bet that going outside required a bit more planning for safety than a camper in the mountains. Most of us are trained to set our weight belts for quick release. However, working as a free swimmer out of a habitat, you make damn sure that weight belt can never come loose. Lose that weight belt, and you commence an uncontrolled, deadly ascent to the surface.

During the second team stay Scott put his hand on a scorpion fish. The barb on the fish's body penetrated Scott's finger, and his arm swelled up to the elbow. He was sick in bed for a couple of days. Those scorpions were all over the bottom, and it was hard to stay clear of them.

The work went on day after day until all of a sudden the 15 days had passed, and we were told to make ready to enter the PTC for the trip to the

surface and decompression. As we did with Team One, some of Team Three came down a day early in order to spend time being briefed on how everything worked.

When the changeover was completed, the ten divers made the short swim to the PTC, stacking ourselves in it just like sardines in a can. Until this day I know of no one who has made a bell that was so small that held so many. Ten men in a PTC which was approximately ten feet high by six feet in diameter made it very cramped. Once we were all inside, we shut the hatch to retain depth, and the folks topside commenced the ascent to the surface. The ride to the surface was uneventful, but once we cleared the water we were swinging on the end of a wire from a deck crane on a rolling ship. It is not done that way today, but this was 1965.

The handling system for the PTC was a bunch of guys pulling and being pulled by this big pendulum swinging back and forth. About the time we were near mating with the DDC, the ship would roll again, and there we would go in another circular orbit above our intended destination. I was near a port in the PTC and could see what was going on. Watching the chaos outside was like observing the Keystone cops making an arrest. It is sorta funny now, but by God, it was far from humorous when we were in that bell. Eventually, after a lot of hollering, cussing and rope burns on the hands of the line handlers, we were attached to the DDC and ready for our two day sojourn back to the atmosphere at the surface.

The story of decompression: ten guys in a deck chamber with low light, long days, long nights and boredom. That pretty well covers it. It had only been a few short months since a bad fire had occurred in a chamber at NEDU. Two divers had died that day, and one of the theories was that a light may have been the cause. That just may have been the reason why our DDC was so dark. The elaborate lights found in chambers of today were nonexistent back then. Scott Carpenter was in the chamber with us, and there was a lot of interest in the fact that this astronaut had just spent 30 days on the bottom. The calls to him over a phone we had in the DDC kept the boredom from rising to a dangerous level. Everyone who was anyone wanted to talk to Scott, and the list included celebrities, politicians and all kinds of Navy Brass. Each time he was told to pick up the phone we would all ask, "Who is it? Who is it?" It was an enjoyable respite during the decompression waiting. We never knew who he would be talking to next.

Finally, with decompression completed, we surface and leave the chamber to be greeted by a flock of people with cameras, annoying

flashbulbs, and stupid questions. The technology of today has given us a wonderful assortment of pesticides that eliminate unwanted critters. If only they could come up with something to legally get rid of those ladies and gentlemen with microphones and bright lights.

Team Three headed up by Bob Sheats was firmly in place in the habitat. This team would finish up the remaining programs and invent a few of their own in the final leg of SEALAB-2. Sheats had been captured by the Japanese as they swarmed across the Philippine Islands in 1942. He was to spend the war as a guest of the Emperor and picked up some out-of-the-ordinary eating habits along the way. Habits that came in handy at the bottom of the sea. Bob had learned to like eating raw fish. Therefore, you can imagine his delight in being surrounded by a million different varieties of things that could be eaten raw. This attitude was not necessarily shared by his team members. However, Sheats was a leader, and his men that knew and loved him would do almost anything to please him. If Bob was to suggest that eating raw plankton or fish filets was fashionable, you can bet your ass they would try. Bill Meeks, a Team Three member, who in later years was to be my partner in the Middle East, ate some of these raw delicacies with Sheats. He would have gone to hell with Bob if that had been suggested.

Meanwhile, Wilbur Eaton and Bob Barth were on the surface. We had both done our time on the bottom, knew where everyone was hiding, and were ready to seek vengeance on those who needed it. Hidden away in an old building up at Scripps was a room on the third floor which housed all the seekers of illicit information, the shrinks, who watched the divers' every move while they were in the habitat. Wilbur and I knew we were being watched, but we didn't know how many were doing the watching. One day Wilbur came to me and said, "Follow me, I found them." Like a couple of commandos we climbed the stairs to the third floor, dashing from one hiding place to another. The shrinks' dark room was full of video screens monitored by half a dozen guys and girls. Wilbur and I hid in the shadows, watching. It was interesting seeing them at work. As things went on in the habitat, the watchers would see something happen, and every one of them would start writing in a notebook like they had just witnessed a notable event. Eaton and I watched for a period of time. Then, with a silent understanding, we stood up and went screaming into this dimly lit room.

My God, you would have thought we had just invaded a top secret meeting of the Joint Chiefs at the Pentagon. Books slammed shut, and piles of papers were immediately covered. Looks of sheer terror appeared on the

faces of the data collectors to the point that Wilbur and I became a bit alarmed and wondered if maybe we shouldn't have invaded the place after all. However, having scared the hell out of them achieved for us some degree of satisfaction. We left and never heard a word about it from anyone. Until this day I have no idea what was so important and secretive. I know their reports surely must have contained special remarks about Wilbur and me.

The SEALAB-2 operation drew to a conclusion. Team Three accomplished all their tasks, and Sheats had one or two of his crew convinced that "catch and eat" was the way to consume fish. Soon we were ready to bring them up. They transferred to the PTC and we brought them up for their decompression without incident. All went well until close to the end when Sheats came down with a nice case of bends. However, he was treated and surfaced without further problems. The operation was over; the habitat was raised to the surface and towed back to Long Beach. Eventually, it went back to the Navy Shipyard at San Francisco for modifications and was subsequently to be the habitat for SEALAB-3.

After packing up our equipment, we headed back to where we came from. Those from NEDU in Washington went there, Bond headed to his office in D.C., and the rest went to Panama City. When we were back home, we got all our diving gear together for the next job and in our spare time sat around the office reminiscing about our stint in and around the waters off California. We waited patiently for word from the boss on the next operation.



Chapter Twelve

Dancing With the Destroyer

Upon completion of SEALAB-2, the habitat was returned to the shipyard in San Francisco and was undergoing a major face lift. Meanwhile, Tuckfield and I applied for a class at the deep sea school in Washington and were accepted. Going to Washington, D.C. at the end of the year is a bad choice. It gets colder than hell in that part of the world, but nonetheless there we were. We arrived about the time the first big blizzard hit the D.C. area. After crawling over snow drifts, Tuck and I checked in at the chiefs' barracks and started our studies.

One morning before daylight, I was sleeping soundly. Suddenly, there's a shaking of my bunk; I open my eyes, and who's standing there, but Wilbur Eaton and a bunch of the other guys from the project, smiling down at me. Fully awake, I said something like "What in hell are you guys doing up here?" Almost in the same voice, they announced "We're going to Spain." Tuck and I groaned, as we knew immediately where they were headed. I said something unprintable and showed an unhappy expression on my face. All of them had been advanced cash for the trip, and each had a roll that would choke a horse. They took great delight in letting Tuck and me know how much they were going to enjoy themselves on their next adventure.

The Air Force had lost an atomic bomb at sea off the coast of Spain. One of the groups called to look for it was our SEALAB bunch. Everyone but Tuck and I was going to go. These gloating bastards commenced to tell us of the grand time they were going to have on the sunny coast of Spain. All the pretty girls they were going to see, all the great food and wonderful apartments right on the beach where they could enjoy the sunsets while they drank Spanish wine. What a grand time they were going to have. It was the kind of a trip that all of us hope for with good diving followed by great liberty. Meanwhile, Tuck and I were stuck in our nation's capital. These guys had traveled all night and couldn't wait to wake us up and tell us of their good fortune. My candid response made their journey well worth the effort. They had breakfast with us, showed us one final time the large roll of money they had, said they might write if they could find the time and then bid us farewell. Tuck and I were too dismayed and disappointed to talk much about it that day. I bitched at Tuck for several days over the matter. After all, it had been his idea to go to school.

About a month later Bill Coffman, one of the people who had gone to Spain, shows up in Washington. Apparently, Bill had a medical problem, and they had sent him back. Tuck and I took him aside to talk about what was happening in Spain. We expected to hear about the wonderful time they were having on the sunny coast. Surprisingly, Coffman relates how terrible it was, and how lucky he was to get sick and be able to leave the damn place. It seems that when the SEALAB contingent arrived on scene, there were no beautiful Spanish ladies, no apartments on the beach, and the cash advance was taken back. They were housed in a tent right on the beach, ate in another tent, never got to town, spent the day and half the night diving, had a portable potty for a toilet, and took showers under a 55-gallon drum. The whole group was madder than hell when Coffman got to come home, and they had to stay. There is, after all, some justice in life. Washington was bearable for Tuck and me after hearing Coffman's unhappy tale.

In early 1966 the Navy determined that the "Man In The Sea" Program would move to San Diego. SEALAB personnel around the country received orders to the Submarine Support Facility at Ballast Point, which was a small out-of-the-way place on Point Loma. We had to pack up all our equipment at the Mine Defense Lab and ship it out West. In addition, most people had to sell their homes and ship their household goods to San Diego. Consequently, I arrived there in late August without my family, who stayed behind in Panama City to sell our house. At Ballast Point we were a brand new organization with a new building, a waterfront pier for our boating

pleasure and a couple of new boats. Before long we were looking like a real diving organization with a new training program for SEALAB-3. Life was good.

The gathering of people for the new operation was underway. Our new organization was now called DSSPTO, which in English stood for Deep Submergence System Project Technical Office. The program required a five-team operation with ten men in each team. Each team was to perform a specific task for which training would start immediately. DSSPTO set up housekeeping in an old WWII hospital building that was perfect for our needs. We had started just four short years ago with half a dozen guys, and now it felt like we had made the big time.

The boss of this group was Captain Walt Mazzone. Walt had been with Bond and company since the very beginning and was surely the logical choice to run this lively group. Some of the old timers from SEALAB-1 and SEALAB-2, including my two pals, Cyril Tuckfield and Wilbur Eaton, were reporting in along with all the new folks. We had two Canadians, two British and one Australian who were sent to us by their respective Navies. These guys were with us for a total of four years before they returned home. Many of the offshore hands that you find in major diving companies today were the people that were coming into the program. They completed their Navy careers and entered the oil patch world where they serve in various capacities today.

I had been promoted since the last operation and designated team leader for the first team. All of the divers had been selected, and I was quite fortunate to have what I considered to be the cream of the crop. They called upon my experience with the two other SEALABs to get things off and running. The responsibility was both exciting and scary at the same time.

The program for SEALAB-3 was to be an ambitious one. The intended depth for the operation was in excess of 600 feet. Team One was tasked to set up the habitat on the bottom and to conduct basic physiological measurements that would assist with answers to work that had started at NEDU. Team Two was the salvage team. They would test a wealth of new concepts including special lift equipment, hydrazine generators, stud guns and cutting tools. In addition, this team would evaluate thermal protective clothing. Team Three was the Navy Seabees and had the role of underwater construction which included building some interesting structures on the seabed. They would test some new designs in equipment that would move heavy objects over the ocean floor and lift large objects into place. Team Four was to evaluate electronic and photographic equipment used in

underwater communications including underwater television. Team Five was to work on diving equipment for the sat diver, in particular search and recovery techniques. They also were to complete anything that the other teams did not get done, clean up everything left down there by the other teams and prepare the habitat for its return journey to the surface. The program presented some interesting challenges and many worthwhile achievements.

Jim Vorosmarti, one of our doctors, had been assigned as the Team One medical officer. Jim and I formed a friendship that has lasted till today. Soon after our arrival, another doctor was found dead in his apartment, apparently a suicide. I was designated as the officer to coordinate his affairs and collect his personal belongings. Vorosmarti was assigned as the officer to accompany his body back to his hometown.

The day that Jim is to depart with the body he finds that a normal casket will not fit on the aircraft used by the small white knuckle airline on which he is to fly. Consequently, we had to dress the good doctor in full dress blues and put him in a body bag. We delivered the body to the airport and saw to it that the bag was stored correctly in the baggage area. As the plane was late, we went to the airport bar to await Jim's departure. Before too long we were feeling just fine as they announced his flight. Jim said, "Cripes, I have a nice buzz on and on the flight they will give me only two drinks. That's a waste of a good buzz." Now I thought about this for awhile and said "Tell you what. Why don't you get our departed shipmate out of the baggage section, take him out of the body bag and carry him on the plane. Hell, he's dressed better than you are. You can tell the flight crew he's just tired, and you can get two drinks for him." We laughed, not really intending to do it, but at the moment it was worth the laugh. As Jim boarded the plane he asked me to call his wife and tell her that the departure was delayed, and he would call her when he reached his destination. After another drink (maybe two) I called Carol, his wife, to explain that he would be late. On an impulse, I told her that the last time I saw her husband he had this other doctor over his shoulder and was boarding the flight so that they would give him four drinks as opposed to the standard two. Carol did not know me or my depraved sense of humor. Subsequently, it would take several years before she would even talk to me, and Jim didn't know why she was so damn mad when he called home that night.

When we had first arrived at Ballast Point, Captain Mazzone said we couldn't operate as Navy divers without boats. As the new Waterfront Officer, it was my job to find out how in hell someone got a boat assigned

to them. It wasn't all that hard. There was a big Navy boat yard on the south end of San Diego that was full of them. I found out whose back you had to scratch, assembled all the official forms, filled them all out and got them signed by important people. Soon we were told to pick up our brand new 35 foot MK11 LCPL. A beautiful craft it was. Cyril Tuckfield and I got one of the guys to drive us down to where the boat lay in the water. We couldn't have been more excited about our new acquisition. Tuck was an engineer, and I had been a quartermaster. What better duo could you find to get that boat fired off and bring it back to Ballast Point? It was a big day for both of us.

As I made the boat ready to get underway, Tuck took charge of the engine and all the components that make the boat go through the water. When all was ready, I lit off the diesel engine on our new boat, and it actually started. Tuck threw off the lines and away we went, just the two of us in our brand new boat. We couldn't have been prouder. I didn't steam close to shore where a lot of boats went. Hell no, I was right in the middle of the main ship channel and felt not one bit less important than any of the big Navy vessels you see in that harbor. All was going well until we got abeam of North Island. At that time, I looked ahead and saw a Destroyer heading for me right smack in the middle of the channel. It was then that my beautiful brand new boat went dead in the water, and the engine refused to start.

The Captain of the destroyer, probably accustomed to small boats getting out of his way, didn't understand at all why in hell I was sitting directly in his path. He seemed to become increasingly annoyed when I didn't move. Those big horns on destroyers are sure loud, especially when they're honking at you. I'm up there frantically sending semaphore to the destroyer to tell them we are broken down. At the same time I'm screaming frantically at Tuck to find out what was the matter with our damn boat. Meanwhile, it seems that the size of that destroyer increases to about what a heavy cruiser looks like with zero angle on the bow. The CO on the "tin can" finally gets the message from his signalman that I ain't gonna move and goes around us. I figured Captain Mazzone would be waiting on the pier for us when we got back, and my reign as a pin stripe warrant would be over, but actually nothing was ever said. I made Tuck swear he wouldn't tell a soul, but unfortunately, Cyril J. Tuckfield doesn't swear. We were towed back to Ballast Point. Tuck gets the boat fixed, but not before everybody in the whole United States Navy hears about my ordeal. My dreams of becoming a top notch warrant bos'n were shattered.

Some of the people who came into the SEALAB program were not divers. We had an assortment of the standard selection of support folks who are needed to run an efficient diving organization. Walt Mazzone, our boss, pulled us together and started to build a new breed of Navy diver. Saturation was still in its infancy, and we had a lot to do. With all the new guys, there weren't too many of the "old timers" around so it was sorta up to us to keep the spirit of fellowship going that had started when we were just a small band of misfits. We had come a long way from the Genesis and SEALAB-1 days and felt mighty good about being given a chance to show the skeptics what we were made of.

I had a crew assigned to maintain our boats. One particular sailor named Howie, a first class boatswain mate, had the job of keeping our 35-foot LCPL in good shape and as close to being immaculate as possible. I was sorta fond of getting on Howie's back about the condition of the boat. There was always something that needed to be done; it needed washing, maybe the windows needed cleaning, or whatever, and I insisted on excellence. I would always let him know that he was behind in these duties so that it became a weekly ass chewing for him over something that he had failed to do. Howie probably hated the damn boat. On one evening, Howie goes to town, has a few too many drinks, decides to return to Ballast Point but stops at a hamburger joint just outside the gate on Rosecrans. As Howie heads back to the base, he enters that slow left curve on Rosecrans. He has the hamburger and french fries in his lap and falls asleep in the middle of the curve. When the road straightens out, Howie doesn't, and meets a guy driving a Cadillac coming from the opposite direction. There is a terrific head-on collision, with french fries and ketchup all over the VW. Howie sustains fatal injuries.

As I mentioned earlier, as the most junior officer in the command, it was my job to look after folks who depart this world. I had to go to the San Diego County morgue with Dr. Vorosmarti to take Howie's fingerprints. While there I gave him his final ass chewing and told him he had left the damn boat dirty again. Somehow I knew that Howie couldn't care less. For the first time ever, Howie didn't talk back to me, but as I left I noticed a strange expression on his lifeless face.

While Howie was alive, we seldom had messy boats or seagull problems. Bird droppings were extremely rare. However, several days later one particular seagull seemed to take particular pains crapping on my boat day after day until the damn boat was covered with foul smelling seagull doodoo. That damn bird sat on a pole near the boat and had the same kind

of look on his face that Howie had at the morgue. You figure it out, but I think Howie finally got even.

From 1966 to 1968 we had good years. Working on team projects, polishing up of their bottom skills, testing new diving equipment or refining the old, or just out raising hell with the abalone population, the whole organization came together as one. From time to time each team would travel elsewhere to practice their particular jobs. One team, consisting of both Seabees and civilians, was heavily involved with underwater construction. They would go to some isolated island off the coast of California and practice the assembly of their unique underwater houses. Another team would concentrate its work on salvage projects; each team had its things to do.

Team One also had its projects. One, in particular, was that of studying Maine lobsters. On Team One my old friend, Dick Cooper, who has a PHD in Marine Biology, had this job. A Maine lobster must live in water that does not get warmer than 54 or 55 degrees (which is the temperature of the waters off New England). The waters off California reach a temperature higher than that. Hence we don't see Maine lobsters in the Pacific waters of California. Sound logical? It better because that's the best explanation I can give. The job centered around bringing Maine lobsters from Booth Bay Harbor, Maine, where he worked at the National Marine Laboratory to Southern California to conduct a unique experiment. The intended depth of SEALAB-3 was slightly over six hundred feet. The water temperature at this depth was in the 40's. Dick planned to fly the lobsters out and keep them in a lobster pound south of Long Beach. When our team arrived on the bottom we would have the lobsters sent down to us and placed outside in cages or loose on the sea floor. Dick's job would be to feed them and attend to their well being. In this manner we sought to achieve some degree of success in getting Maine lobsters to live and maybe thrive in the deep waters off California.

As with any experimental project, things don't always happen as planned. Cooper flew a bunch of lobsters out for the experiment and put them in that lobster pound. The delays in outfitting the habitat and the arrival of equipment had these lobsters getting older by the day. We were concerned as to whether they would live long enough to make it to the bottom and fulfill their role. Because Dick is a nice guy, he made the monumental error of telling some of us in Team One to stop by the lobster pound and take a few home to enjoy. Soon, because of the continuing delays, there were fewer and fewer lobsters left to conduct his experiment

as the weekends went by. However, Dr. Cooper being resourceful just ordered more of those East Coast delicacies. If we had many more delays, we might surely have wiped out the Maine lobster inventory for the year. I have many wonderful memories of those final SEALAB years, and one of the best is dining on delicious Maine crustaceans.

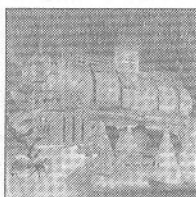
In San Francisco the habitat finally was finished and was towed to the Navy station in Long Beach for final outfitting. We were told to plan on making Long Beach our home for awhile prior to heading for San Clemente Island. Captain Walt Mazzone told me to bring our diving boats up to Long Beach in order that they would be there for the pending operation. I instructed the crews of the *LCM-6* and the *LCPL -11* to load the boats with everything we needed, tie a small boat or two astern, and in a couple of days we would head up to Long Beach. We got underway early one morning. I was running the PL and Earl Maughmer was running the "six boat" and towing one of the 14-foot swimmer support boats. Everything was going just fine. As we got up the coast I saw Catalina Island way off the port bow beckoning for us to stop by and visit. Hell, that seemed like a logical decision to make. I hadn't told anyone when we would arrive in Long Beach so we weren't really on a tight schedule. By golly, we had been working hard the past months, and we had been underway most of the day and would be arriving in Long Beach after dark. Why not stop by Catalina and be a bit sociable with the natives. It seemed logical that our responsibility for these expensive boats made it prudent that we stop off for the night in the interest of safety. With that decision made, we came left a few degrees and headed for the fun island. A couple hours later we were anchored near the cove where the big expensive yachts were anchored and felt no less important than the millionaires driving those big exotic boats. What harm would there be in having a little liberty on Catalina Island?

We straightened ourselves up, but lacked the proper attire to go ashore. Nevertheless, we just wore our greens, put on a few drops of foofoo and headed for the beach in the small boat. The natives were friendly, and it seemed hairy chested deep sea divers were quite welcome there. The food was good and the beverages tasty. Sometime after midnight, we rounded up our two boat crews and headed back for a few hours sleep. Dick Bird and I slept on the deck of the PL, and the rest went below on the "six boat" where there was a comfortable bunk room. I awakened the next morning as the sun was peeking its head up and stood up to stretch and groan a bit. Looking in the direction of the "six boat" I saw nothing; she was gone. Waking up Bird we searched the horizon, and sure enough, way off in the

distance almost over the horizon we see the "six boat" adrift in the middle of the Pacific Ocean. We got the PL underway and headed for them as fast as the PL would go. As we got near the big boat, there wasn't a guy in sight. What had happened was they dragged their anchor during the night and drifted into deep water! Their anchor was hanging off the bow, but it was now in hundreds of feet of water touching nothing. The crew was sound asleep down below with no knowledge at all that they were adrift.

By honking our horn and hollering, we finally got the crew awakened. Realizing their error, they stood sheepishly on their boat awaiting further instructions. We had drifted near another small island, and I saw no reason not to stop by and visit the local lobster population. We could have those for lunch, as no one was expecting us in Long Beach, and further, we could be there long before sundown. So we went fishing. After we had all the diving we needed, we headed for Long Beach. About half way there, I noticed several aircraft flying in circles off to my right. Then they appeared to have seen us and headed our way. I thought they might have been on some kind of air operation as they passed overhead. They were close enough to see the pilots looking down on us. I wondered why they were out there. Probably having a grand time just flying around looking at boats. Like hell, what they were doing was looking for us. When we got into Long Beach, everyone we knew was standing on the dock waiting for us. There were guys there that I didn't even know. What we had seen was the air-sea rescue airplanes looking for two missing Navy boats with a bunch of guys on them. Someone had seen us leave San Diego the day before and assumed we would be in Long Beach that same night. When we didn't arrive, all hell broke loose, and they had been looking vigorously all night and day for us. The headlines would have read "Eight SEALAB Aquanauts Lost At Sea." If you're interested, Bos'n Barth got his ass chewed out, and I had to call the world to apologize to all who had been looking for us. I only mention this today because I haven't heard about it in years, and my embarrassment has subsided somewhat.

Eventually, everything that needed doing in Long Beach was finished, and we headed for San Clemente Island. The habitat, sitting on her support barge, was towed to the island to await a large crane to pick her up and place her in the water. The "Marine Boss," a huge crane, that was building the Coronado San Diego Bridge was hired for a few days to come out and make the lift. After SEALAB was in the water, the habitat awaited final provisioning and her journey to the bottom.



Chapter Thirteen

The End of the Effort

The SEALAB-3 habitat was anchored in Wilson Cove at San Clemente awaiting the accomplishment of the myriad of details before being lowered to the sea floor. For the crew who was to man the underwater home, there was nothing more to do but continue training and wait.

Scott Carpenter, our aquanaut astronaut, knew a heck of a lot of notable people, and it was great fun meeting many of them. One day this big yacht enters the area near us and anchors. Later that day Scott tells me that the yacht belongs to John Wayne and that we had been invited over that evening for cocktails. He asked, "Would I mind driving everyone over on the LCPL?" Hell no, I wouldn't mind so we loaded a bunch of us into the boat and steamed over to the yacht just like we were somebody. I was welcomed aboard by the captain and given a personal tour of the yacht. I even got to see John Wayne's john. It was an enjoyable visit, but Mr. Wayne was nowhere in sight. His yacht remained for a few more days. There were other visits to her, but I was sure disappointed in not meeting the Duke. He was away somewhere making a movie. He had only wanted us to enjoy his boat. Nice man, John Wayne.

During the unanticipated delays in the habitat getting to the bottom, the five teams of SEALAB-3 continued to polish up their respective programs.

Everyone was ready to get on with what they had trained for these past three years. The habitat, floating at its moor, was awaiting yet one more last part to arrive, and the crew was out there standing watch looking after it. There was little else to do.

We decided that going after a few spiny lobsters would keep us busy and certainly enhance our diving proficiency. Spiny lobsters are the kind without the claws and are found around the world in warmer waters. San Clemente Island was loaded with these tasty critters.

The Commanding Officer of the island and a few of his people were convinced that the SEALAB divers were infringing on their lobster harvesting. We often heard stories (untrue of course) that their efforts to trap those spiny crustaceans had been drastically hampered because the "damn SEALABers were stealing them all right out of their traps," they said (another untruth). No amount of effort on our part could convince them that the sudden decline in their lobster harvesting shouldn't be blamed on us. For the life of me, I can't understand why they would think something like that.

We kept our well stocked and quite comfortable *LCM-6* diving boat at anchor near the location of the habitat. Most of the crew spent their time on her. In the evenings we would swim around the cove and get a few lobsters for dinner prepared by the chefs aboard our yacht *LCM-6* fondly known as the motor vessel "Half Fast."

One particular evening Ken Conda and I decided that a swim around the cove was in order. The water was as clear as a fresh water spring, the temperature was comfortable, and to boot we might see a "bug or two" which would be a nice and welcome dinner treat.

I had recently purchased several small battery operated strobe lights normally worn by pilots on their life jackets. These strobes were small, bright and waterproof. I wanted to evaluate them for our divers so I had one on my life jacket that night. I thought that the strobe might be easily seen in this clear water. Our depth probably wasn't over 30 to 40 feet, and it was quite impressive in that clear water of the cove. However, after turning it on, the water pressure held the rubber button in, and I couldn't turn it off. It was much too bright in that dark water. Annoyed at the outcome of my strobe light trial, I just took it off, set it on top of a rock and Ken and I continued our dive. From time to time I could look over and see that strobe flashing away as pretty as you please. It could be seen from anywhere in the lagoon. Our dive completed, Ken and I returned to the boat with a few nice "bugs" and prepared them for dinner. Later, when it was time for him

to bring me back to the small boat landing, we ran into a problem.

As I climbed the ladder up to the dock a loud voice said, "Mr. Barth, I see you guys have been out stealing MY lobsters again." It was the base C.O. who had been watching us from the dock. "No sir," I said, frantically trying to think of something to tell him that would justify my being in HIS lagoon. I am not good at instant excuses, but that night I was in luck. As I stood in front of him trying to stammer my way through this ordeal, I noticed over his shoulder out in the cove my strobe light still flashing away as pretty as you please. "Captain," I said, "if you will look out there you will see my reason for this night dive. It is a highly classified project that I am not at liberty to reveal to you, but I can tell you that the light you see out there is a component of this project." (Everyone knows you can hide a lot when you bring some degree of secrecy into play. Jack Schmitt, one of our SEALABers, gives this type of answer to all questions to which he prefers not to reply.) "That, Sir, is my reason for being out there tonight." He probably knew I was lying through my teeth, but what more could he do? The lobsters that I had caught were in my belly, plus they hadn't been HIS anyway. I think the man had some idea that all San Clemente lobsters belonged to him. I could tell you a better story about our abalone fishing adventures but I am not sure of the statute of limitations in California fishing laws.

Times were good in those years before SEALAB-3. We got used to each other and found great satisfaction in knowing that our efforts were leading to 15 exciting days sitting at 610 feet. In all my years I don't recall working with a better group of people. Hardly a day went by that we didn't go out in one of our diving boats and practice diving or get something to eat. With all the great times we were having we still were getting our work done and anxiously awaiting our turn on the sea floor. We were going to put 45 people on the bottom in over 600 feet of water to stay for two weeks. As a diver you can well imagine the excitement and anticipation we experienced. I often describe our work as "fun," but it was still work. Who can call it a hard job when you enjoy what you're doing. What we were about to do would be the ultimate experience.

With 30 months of training, habitat preparation and telling the world what we were about to do, we were ready to do it. The habitat was gently lowered to her resting place in 610 feet of cold clear water. Team One got ready to make their run to the bottom. Everything seemed to be going as scheduled. However, it didn't work out that way.

SEALAB-3 had received extensive modifications during its change

from the second habitat configuration. One particular change was the way that the service from topside was delivered into the habitat. Now as she lay on the bottom, the umbilical which sends down the electrical power began to swell on the surface. This was a damn good indication that the helium atmosphere inside the habitat was leaking into the umbilical and traveling up the heavy wires to the surface where it did the expanding. This new development caused a lot of concern for those running the show topside. We were losing gas, and if we lost enough gas, the internal pressure would drop and the habitat hatch would probably implode. If that happened, we would then lose the habitat and all we had worked for these past years.

The first team had the responsibility of going down and getting things set up and running. A good deal of our training had been based on the various procedures to get the habitat functioning. The surface support vessel for the operation was the *Elk River (IX-501)*, an old Navy LSMR converted to its present configuration. Installed in *Elk River* were twin saturation systems, each with its own bell. Our plan for the initial manning was to make a normal slow descent to 610 feet utilizing both sat systems. There were 9 men in team one. I had elected to take four down in the first PTC to get the habitat opened and running. Then I would call for the second PTC with the other five guys. Suddenly, this plan seemed inadequate in our need to get down and stop the leaking. Our house was sitting down there losing more gas than we had to spare.

There were a lot of concerned folks topside who were trying to work on solutions that would save the habitat. If we took the normal slow descent to the bottom, it would take precious time that we couldn't afford to lose. We decided that what we would do was get the first four people in the deck chamber, make a rapid descent to depth and then transfer to the bell to make the actual trip to the bottom. While we were pressurizing and getting ready to travel down to the habitat a lot was going on topside. Their concern continued to mount as they witnessed the loss of gas. A nearby small submarine made a trip to the bottom and flew around the house to take a close look which might help us when we got down there. Things were hectic to say the least. Meanwhile, the first four of us were making our way down to the bottom with great hopes that we could get inside and fix whatever needed fixing.

Our trip to the bottom was not the fastest bell run we ever made, and the bell was without heat. By the time we got down and opened the hatch all four of us were colder than hell. However, we had a lot to do and were in a hurry which in a way kept us from thinking too much about the cold.

Getting out of the bell and into the habitat was the paramount goal. The procedure to get inside was not a simple one. There were several things that had to be done outside before we made the entry. These maneuvers had always been a necessity. As the habitat was lowered, it was not as heavy as it would be when on the seabed. We had to make her heavy so she would sit safely on the bottom. Berry Cannon and I had trained for this event and knew what had to be done. We had about 15 minutes of work outside before we would even attempt to open the hatch. Our first job was to exit the bell, make our way to the habitat and commence the unbuttoning procedure. This called for flooding a large ballast tank, shutting and opening a few valves, swimming from one end of the house to the other to make the habitat level, then finally using some of the existing pressure inside the habitat to blow down the entranceway skirt. This done, we were to open the hatch into the habitat, get in there, seal the leaks, and then I would have the other two divers in the bell come over so that the four of us could finish this rather complex unbuttoning procedure. But it didn't work that way.

Everything was happening at an accelerated pace. People topside were anxious to stop the leaks and save the habitat. In the water we were working frantically to get our job done so that everything must have looked like it was in "fast forward." As I struggled to open the hatch Berry was close at hand doing what he was supposed to do. For some frustrating reason, we couldn't get the hatch open and couldn't figure out why. Conversations from the diver to topside or diver to diver were not in vogue in 1969. In the equipment we were using, there were no communications with the diver. Therefore, it was necessary to fall back, regroup and talk about any next step. As we were extremely cold and tiring rapidly, Berry and I headed back to the bell. A good deal of our problem could probably be attributed to this cold. Without warm water and nothing on but a wetsuit it didn't take long before the cold made us somewhat lethargic. Arriving back at the bell we buttoned her up and made our trip back to the surface and the warmth of the DDC.

When our shivering slowed down, we had a brief conference with the topside folks to figure out what we needed to do next. The clock was still ticking, and we didn't have time to waste. We sent out through the air lock our semi-closed diving rigs that we had worn on the first trip to the bottom. They sent in two new rigs through the lock along with hot water suits. We changed into these hot water suits that would hook up to hot water connectors once we got to the bottom. They rigged up a makeshift hose array that would give us the hot water when we got out again. Inside the bell we

disconnected from the DDC and started down for trip number two. I remember sitting next to Berry on the way down with both of us huddled under a big blanket trying to retain what little body heat we had as we looked forward to reaching the bottom where that hot water was waiting. I don't ever remember being that cold. Finally after what felt like an eternity, we were on the bottom again. We opened the PTC hatch, reached out for that wonderful hot water hose, brought it inside and in almost complete horror looked at a small trickle of water that was about the temperature of a drinking fountain. The word "shit" is quite distinguishable at any depth in helium.

Accepting the fact that we wouldn't have hot water to warm our suits, we elected to go out without the water, hoping for the best. As you may know, hot water suits are loose and require a good deal of hot water to work properly. Without that water they aren't a hell of a lot of comfort at 610 feet but a damn sight better than a Budweiser tee shirt. Berry and I each grabbed a new diving rig, put it on and outside we go. I cannot forget the feeling that when the cold sea water ran down the back of my neck it felt warm, damndest thing. I explained to one of our doctors some weeks later how surprised I was to have that frigid water feel warm running into the suit and he calmly said that he wasn't a bit surprised. In the bell without a heat source, the carbon dioxide scrubber blowing and the helium atmosphere at that depth, it should have been very cold. He didn't get an argument out of me on that one. The water temperature outside, however, at a mere 40 degrees gave this impression of being warm.

Berry and I met outside the bell for a brief moment getting our umbilical ready for the short trip to the habitat. As we hung floating out there Berry tapped me on the shoulder and pointed in the direction of the habitat. On our first dive, we were all fired up trying to get into the habitat, and the excitement must have consumed all our need for sight-seeing. However, this time we took a moment to stop and smell the roses. Many years later, I am glad that we took that moment. What we saw is still a vivid picture in my mind. Sitting out there was this magnificent, big yellow dwelling resting comfortably on the bottom. There were many lights to illuminate the whole area, and they were all on. It was lit up like a giant ball field. Berry and I could see various outcroppings on the seabed around our future home. It was a magnificent sight to behold and something that I will never forget. Here we were at just over 600 feet swimming around in the Pacific Ocean. Not too many people had ever done that before, and to top it off we were going to be staying down here for two whole weeks. That's what our kind

of saturation diving was all about.

In the bell we left two divers, John Reaves and Dick Blackburn, who would wait there until it was time for them to come over. In the second DDC topside there were five other members of Team One awaiting their call to the seabed. Four other teams were up there working and waiting for their stay in this home. Berry and I were preparing to be the first two guys inside to start the adventure. It was a day we had been thinking about for a long, long time.

As in the earlier dive Berry and I made our way over to the habitat and started for the second time the procedure to get inside. I was still trying to figure out why I couldn't get the damn hatch open, and Berry had a couple of things left to do. Earlier, while training for this unbuttoning procedure, I had found that the final pound or two of pressure in the habitat was slow in bleeding out so I had a big crowbar installed in a holder close to the hatch itself. I figured what I was fighting was that final couple of pounds trickling slowly out. Deciding that we didn't need to be outside any longer than necessary I swam over to get the crowbar. I was determined that I would get that damn hatch open this time. We had wasted too much time already. With my back to Berry who was not far away, I got the crowbar from its holder. I heard Berry in the background. My impression of this noise was that Berry was working and probably grunting as he did. When I turned around, I saw Berry in convulsions thrashing around on the seabed with his face mask at his side.

I'm sure that when any emergency situations happen in our lives, we revert to the training we have gone through time and time again. I guess that is the mode I went into automatically. I shifted all my thoughts and efforts to Berry Cannon while the habitat and its problems faded away. I dropped the crow bar and swam over to Berry in the hope that I could get his problem resolved. Pulling him over to the area under the hatch, I made what now appears as a feeble attempt to get Berry breathing again. His mouthpiece was no longer in his mouth so I grabbed the buddy breathing regulator and tried to get it in his mouth. I tried again and again, but his convulsions had his mouth shut tight. The whole process wasn't working, and I knew I was wasting valuable time. I grabbed Berry and started swimming back to the bell with him in tow. The bell now looked like it was a mile away.

His umbilical or mine would hang up on something or other on the trip back, and I would have to stop and free the hose. Berry's convulsions dwindled down to no movement at all. I knew then without a doubt that I

had just lost my friend.

After what felt like an eternity of working us both back, I arrived under the bell with Berry's lifeless body but lacked the strength to swim him up to the hatch. Leaving Berry on the bottom, I clawed my way into the bell and told Dick Blackburn to go out and get Berry. However, Dick was already on his way because topside had seen what was going on through a video camera and had told him to get moving. Before Blackie could get out, he had to get me out of the hatch. He just reached down and grabbed hold of my arm pits lifting me into the bell like a rag doll. Then Blackburn jumped in the water, returning a moment later with Berry. Dragging Berry inside, we got him started on CPR and made the bell ready for the lift back to the surface. A PTC is not the roomiest vessel in the world, and three men trying to save the fourth while shutting the lower hatch and making ready for an emergency ascent is pure chaos. With the hatch in the PTC still open there is little room to stand, and we kept falling into the water while working on Berry. The folks in the control room topside must have been going crazy waiting for word from us. Finally, the hatch was shut, and I told them that they could lift. While we struggled with getting off the bottom, we were trying to get a BIB mask into Berry in the hope that we might get him breathing again. BIB masks are essentially a regulator that delivers gas to the breather through a hose. John and Blackie were hard at work with Berry, and I was going through the mechanics of operating the bell. I glanced at the internal bell pressure gauge, and it read well over 800 feet. I had forgotten that all this gas we were trying to get into Berry was driving us deeper. Without saying anything, I reached over and vented the bell back to 610 feet and hoped no one else had noticed.

I have heard the tapes of our trip back to the surface and remember me saying to topside, "Berry Cannon is dead." It seemed like the most logical thing to say. Maybe it was all I could get out. Those words must have broken everyone's heart up there and surely were the saddest thing I could have said. For a brief moment inside that goddamn bell the three of us looked down at our dead comrade knowing that we were also looking at the end of the SEALAB program.

There was a brief moment when all this was going on that I had a picture in my mind of George Bond and Walt Mazzone. The three of us had been at this for nine years and had never expected such a calamity to fall on us. I felt their sorrow somehow. They were up there watching everything happen and seeing their dreams of all we had worked for these years suddenly shattered. I have never spoken with any of the old gang about

their thoughts that day, I guess I ought to do that before we are all gone.

After the trip back to the surface, we lowered Berry Cannon into the DDC with a harness we had made for an injured diver. We laid Berry down near a port so he could be seen by our doctors. I remember reaching down and closing his eyes during this sad moment. Blackburn and Reaves then put Berry in my bunk for awhile until the decision was made to send him out. I sat there talking to topside until they made that decision. After zipping Berry up in a bag they had sent down, we placed him in the outer lock for his decompressionless trip back to the surface. That was the last time I was to see Berry Cannon. In all the turmoil we had forgotten to say goodbye.

No one was saying a whole hell of a lot. I think the three of us just looked at each other unable to speak in our grief and shock. This certainly was not what we were planning on doing this fine Southern California day. There was nothing more we could do. We knew no one topside was interested in another shot at getting into the habitat, so we never even asked about it.

Decompression from just over 600 feet takes almost a week. The rest of Team One was in the other DDC next to us taking their decompression also. Those guys never even got to ride the bell down to the bottom. Their recollection of SEALAB-3 was to be that of sitting in a DDC on *Elk River*. Some memory. It was even a while before anyone told them what had happened. When we surfaced days later and stepped out on deck of the good ship *Elk River* just about everyone was gone. Berry Cannon had already been buried in a remote cemetery in faraway Florida. I think I saw tumbleweeds blowing down the decks of the ship. The abandonment of this unique program was clearly evident. The loss of all that momentum is not much of a tribute to a fine man.

A few days after we surfaced from the dive the whole gang in my team assembled at my house for one last time. Richard Cooper showed up with dozens upon dozens of those Maine lobsters which we had intended to distribute on the floor of the Pacific Ocean. Some of them weighed thirty pounds. We had the biggest damn lobster feast ever put on in Southern California. No one in the state before or since has eaten that many lobsters in one sitting. Thanks Richard.

Three men had died in NASA's effort to get to the moon, but nobody in that program quit. It probably drove them on to bigger and better things. The Navy wanted no more bad publicity, and overnight they just determined that habitats were not necessary for saturation diving.

When we surfaced we visited with those who decompressed us, shook

hands with the crew of *Elk River*, saluted the colors as we left the ship and went home. Nobody said it but we all knew the era of SEALAB was finished on February 17, 1969 when Berry Cannon died.

It has been close to 30 years since Berry and the SEALAB program died. Berry died because the semi-closed diving rig which he put on for the last dive had no chemicals in the CO₂ canister in the rig. Consequently, he was overwhelmed by the CO₂ buildup. The additional trip to the bottom had created the need for two additional diving rigs for which we had not planned. Unfortunately one of these selected for the extra trip was not prepared for the bottom. An inadvertent error which had dire consequences.

I took a trip down to central Florida some years later. Finding my way out of a small Florida town, I drove down several country roads and turned on a long dirt road which finally ended at an old country cemetery. There, among all the old grave markers, sat one that looked kind of new. I just had that yen to say goodbye to Berry in a proper way.

One man who I consider my friend and hold in high respect stood up and tried to take some degree of blame for this accident. He was the only man to do so. A finer man you will never find. As far as I am concerned, he should have never been allowed to blame himself which he still does today. The Navy lost two excellent men, not one, that fateful day.

I knew Berry Cannon well enough to know that he would have wanted us to go on with our program. He would not have wanted us to put it out to pasture because of his loss. Berry had participated in SEALAB-2. He knew the value of our work. Had it been me that grabbed the rig he wore that day, and I had died instead of him, I would have tried to speak from the grave and tell everyone to accept death as a possibility in our line of work and not let this accident defeat us. To abandon SEALAB is something I will never understand or forgive. I have heard the experts with their fabricated reasoning over the years attempt to give justification to some poor decisions. However, what I hear them say I don't accept. Nevertheless, that's the way things are. No one said anything was going to be easy or had to make sense.

Probably the thing that stands out in my mind the most is the men that I worked with those last years of saturation development. They were very motivated, trained hard to learn their job, looked forward with pride to their association with Project SEALAB. These men wanted to do that for which they had trained, and in a flash they had it all taken from them with only scant explanation. It's to those guys that I dedicate this story. They never had a chance to experience that fantastic visit to the seabed to dwell awhile. I shall always regret their loss of that chance.

The accomplishments of industry since 1969 have been phenomenal. There are scores of systems scattered around the world that allow men to attain depths and durations that forty years ago existed only in someone's imagination. Saturation dives of long durations are the norm for today with thousands of man hours spent in waters sometimes deeper than 2,000 feet. Saturation diving has achieved what George Bond and Company hoped it would. Working deep for long periods is now a way of life.

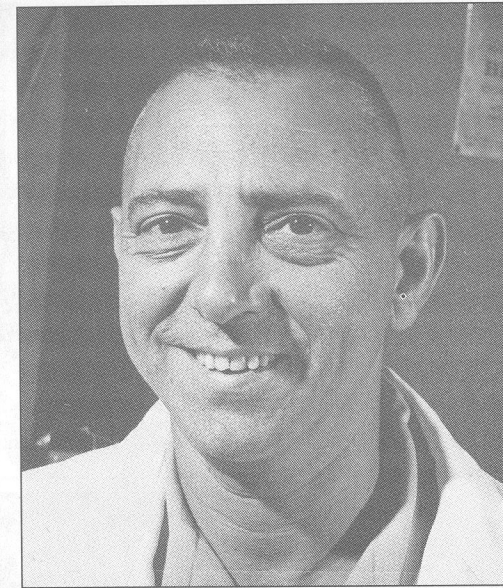
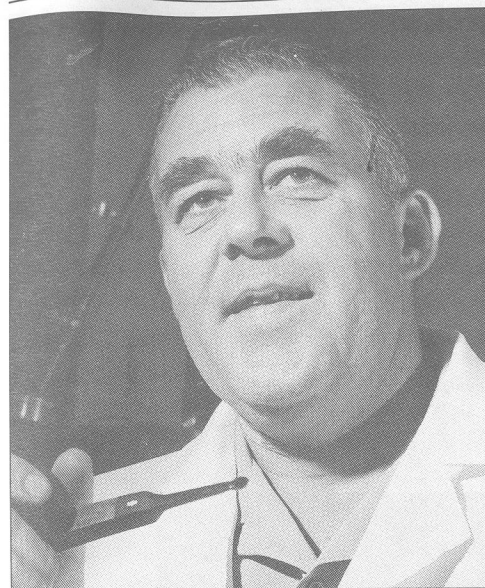


About the Author

Bob Barth, the son of a U.S. Army officer, was born in Manila in the Philippine Islands and lived there until evacuated just prior to World War II. As soon as he was old enough, he joined the U.S. Navy and within a year attended his first diving school. Since then his life has been devoted to that profession.

He was the only person to be on the bottom in all of the Navy experimental diving programs, Genesis and SEALABs 1, 2 and 3. After retiring from the Navy as a Chief Warrant Officer, he took a civil service position in what became the Navy Experimental Diving Unit (NEDU). After two years, he left for the offshore diving business where he was a corporate executive and an entrepreneur for many years. In 1985 he returned to NEDU, where he is today.

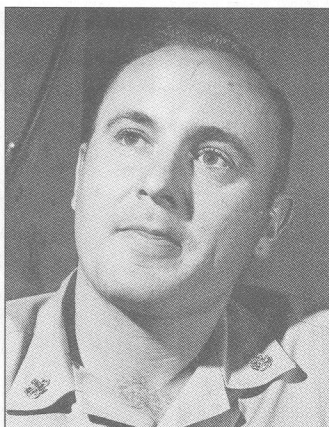
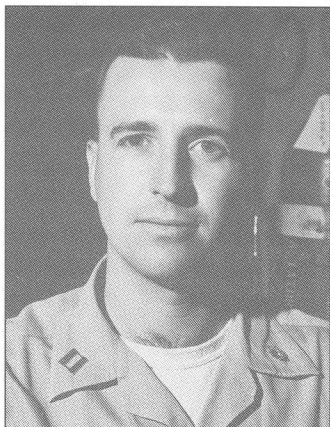
Bob now lives in Panama City, Florida and in his leisure time tends his garden and participates as a Florida State Trooper in the Florida Highway Patrol Auxiliary program.



The investigators, Dr. George Bond and his colleague, Walt Mazzone.



Manning HMC, Barth QMC, and Lavoie HMC – the first to dive under pressure in the human exposure phase of Genesis.



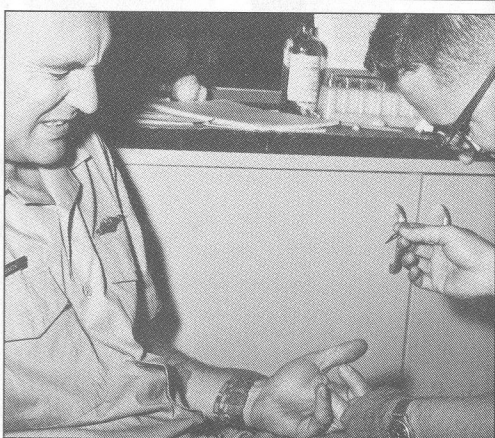
Participants in the final dive of Genesis, Dr. John Bull, Bob Barth, and Sanders "Tiger" Manning



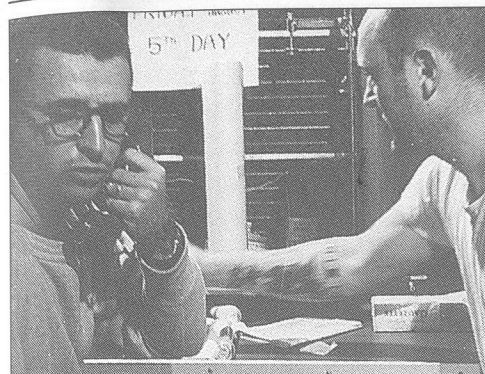
Before closing the chamber door, Dr. Bond gives the participants a final pep talk in the last dive of Genesis.



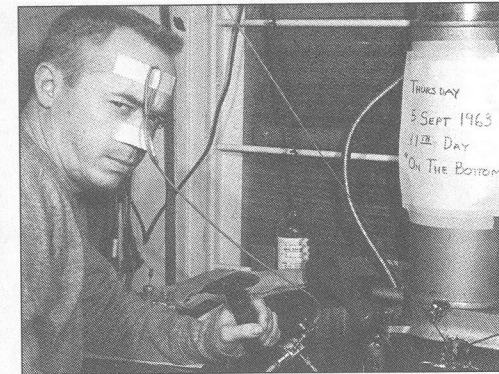
Bond and Mazzone at their customary place, the control console.



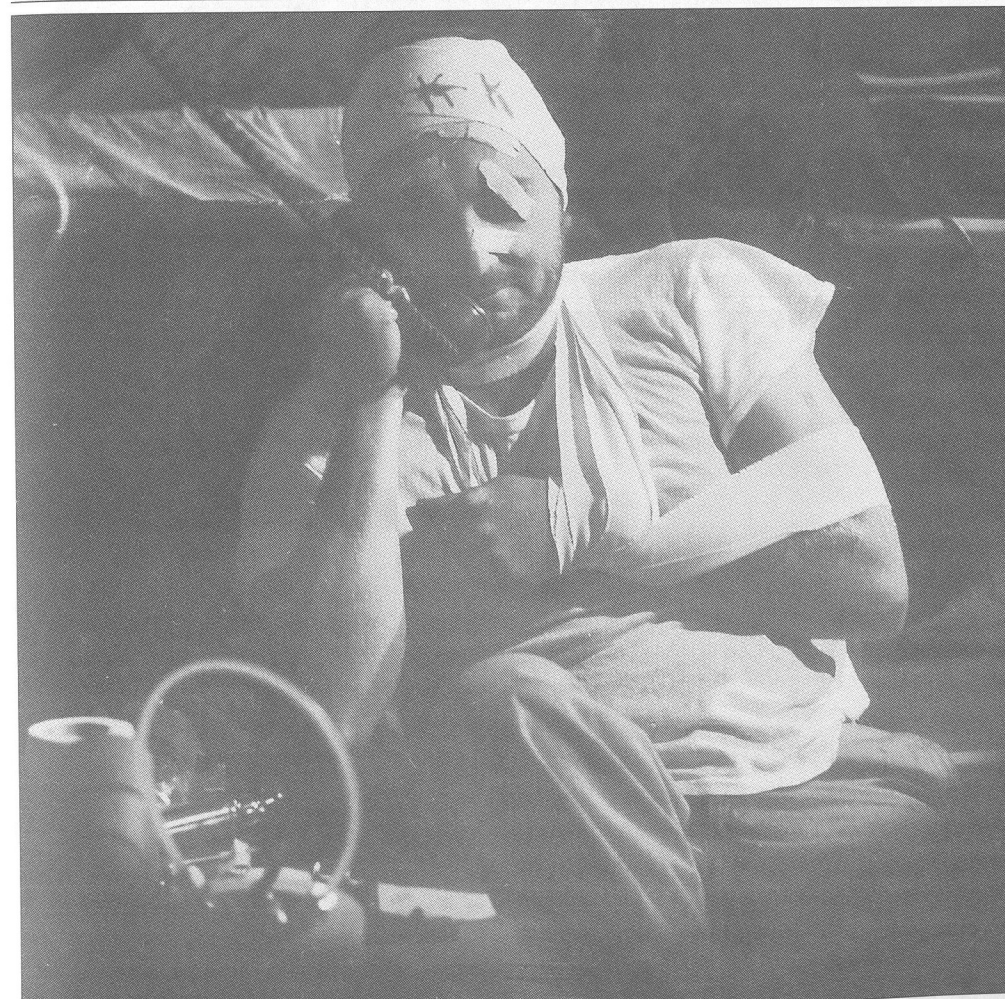
Barth says, "Ouch!" as Dr. Bull extracts blood.



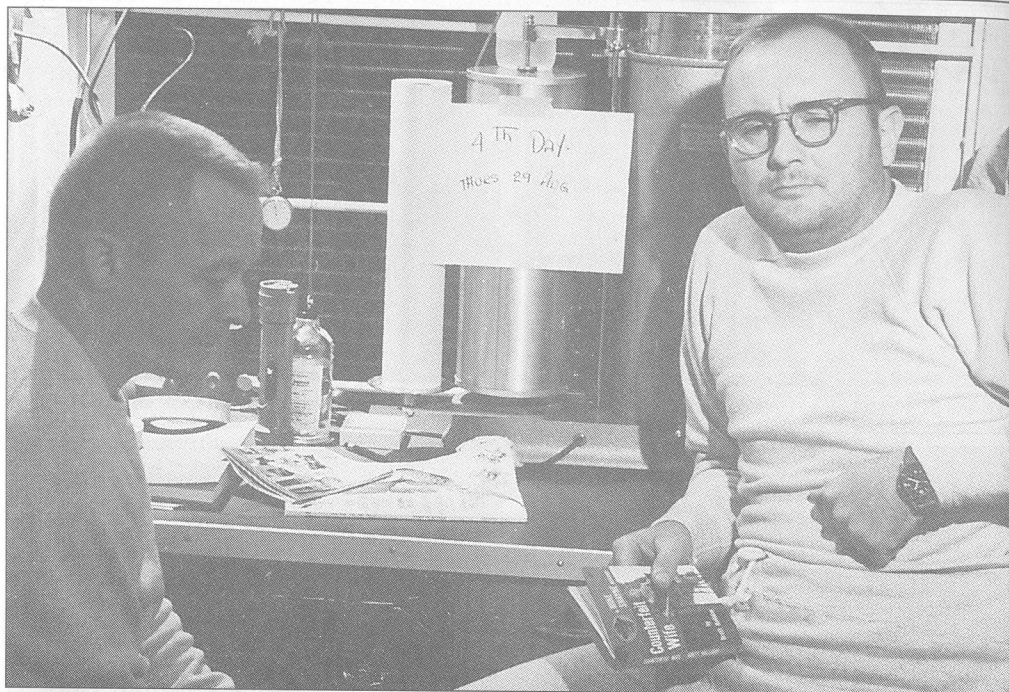
Bull and Barth call out for a pizza during final dive of Genesis.



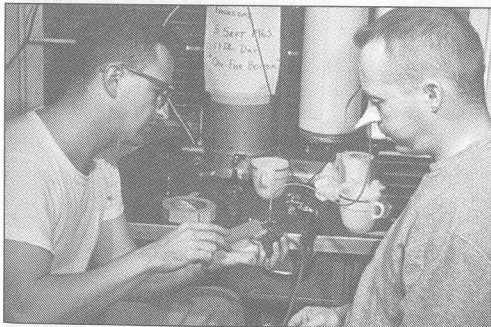
A happy Manning continues physiological tests in Genesis.



Barth prepares a "special" greeting for Admiral Ramage's visit to the facility during Genesis.

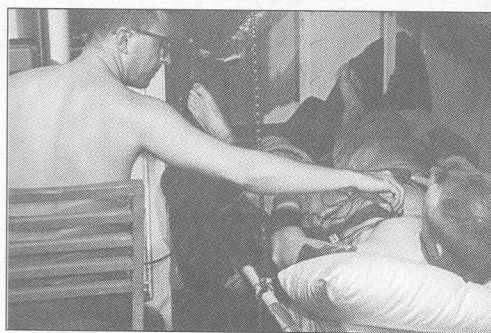
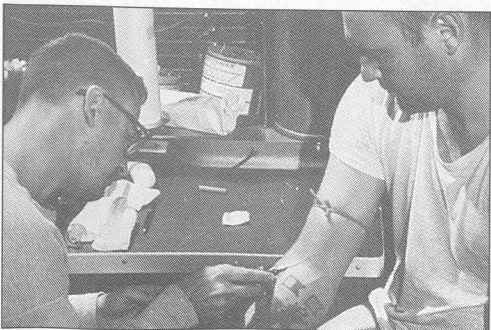


During leisure time in chamber, Manning and Barth discuss philosophical content in steamy pulp novel, "Counterfeit Wife."



Bull and Manning continue physiological testing (above).

Barth's daily bloodletting at the hands of Dr. Bull (below).



Dr. Bull checks Manning for signs of life (above).

Barth's embarrassing trip to Bethesda Hospital (below).



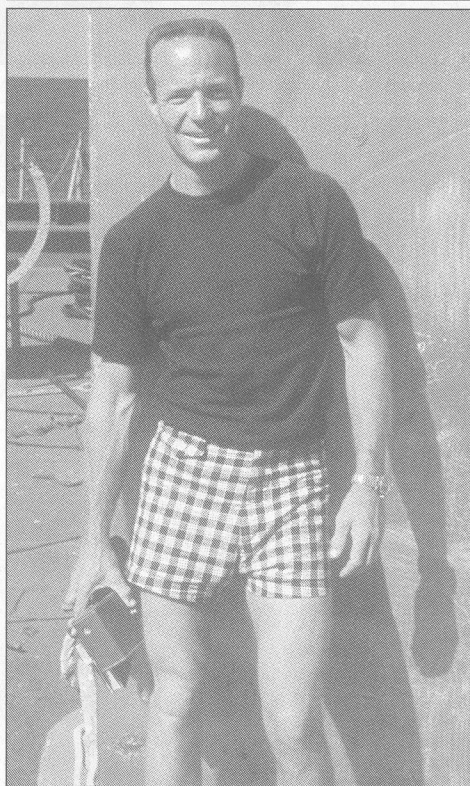
Divers for SEALAB-1, Lester Anderson BMI, LT Bob Thompson, CDR Scott Carpenter, Tiger Manning HMC, and Bob Barth QMC.



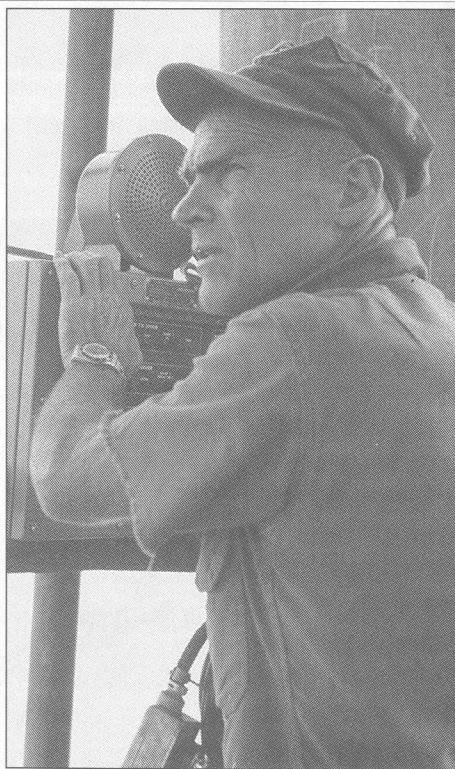
Thompson, Bond, Carpenter and Barth pose with model.



SEALAB-1 on display for Armed Forces Day - 1964.



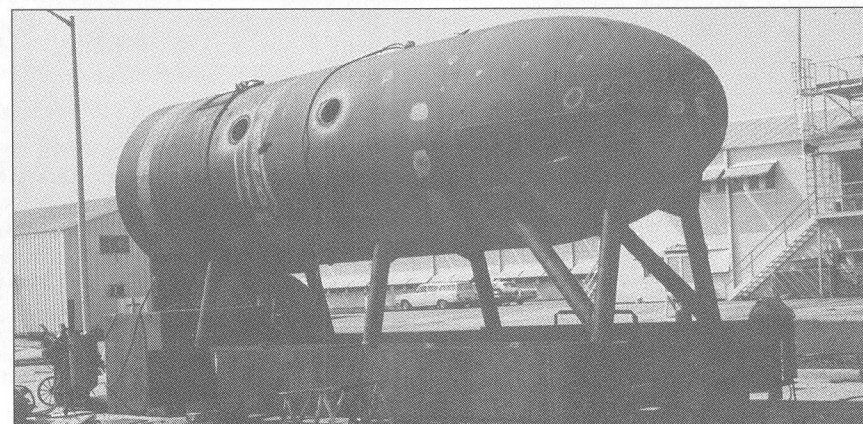
Scott Carpenter during training for SEALAB-1.



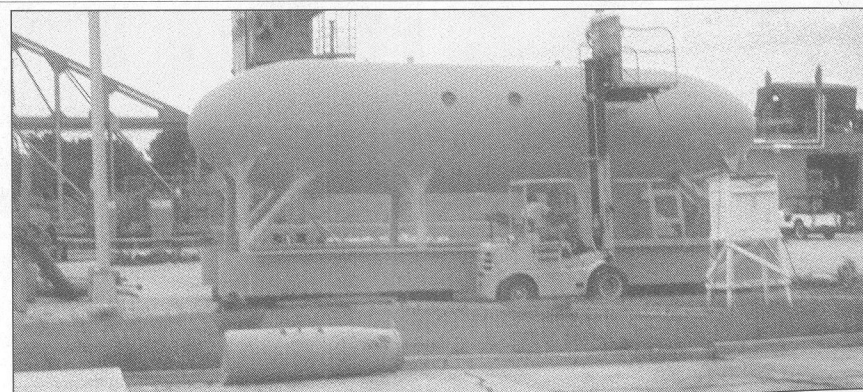
Bob Sheats, Master Diver for SEALAB-1 and team leader for SEALAB-2.



One of the large cylindrical floats (foreground) from which SEALAB-1 was made, in the Panama City salvage yard.



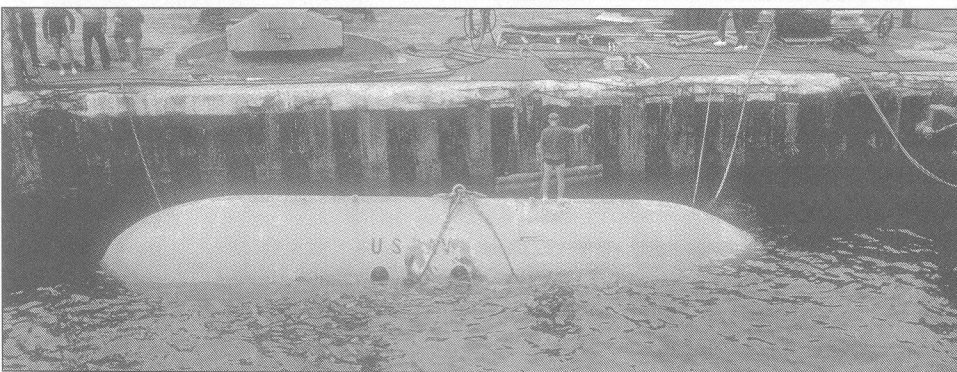
SEALAB-1 under construction in Panama City.



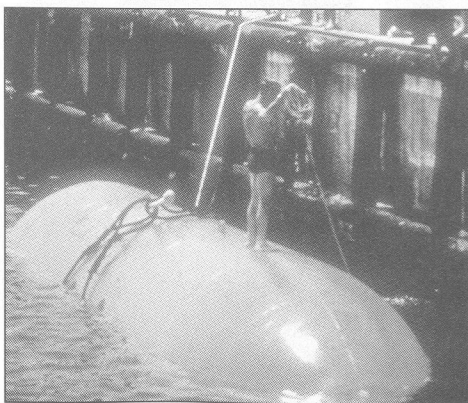
The habitat before being submerged.



SEALAB-1 first placed in water at Panama City. Additional heavy truck is used to counterbalance habitat.



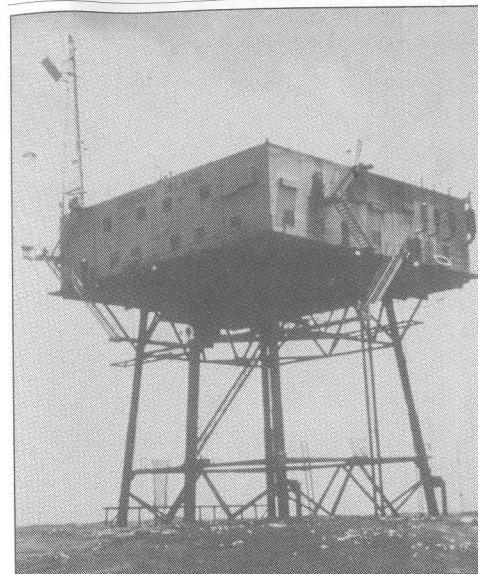
The first Navy underwater house is in the water.



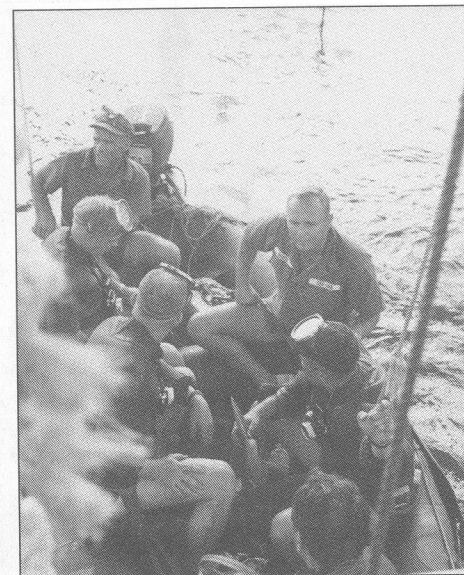
Learning to ballast the pregnant whale.



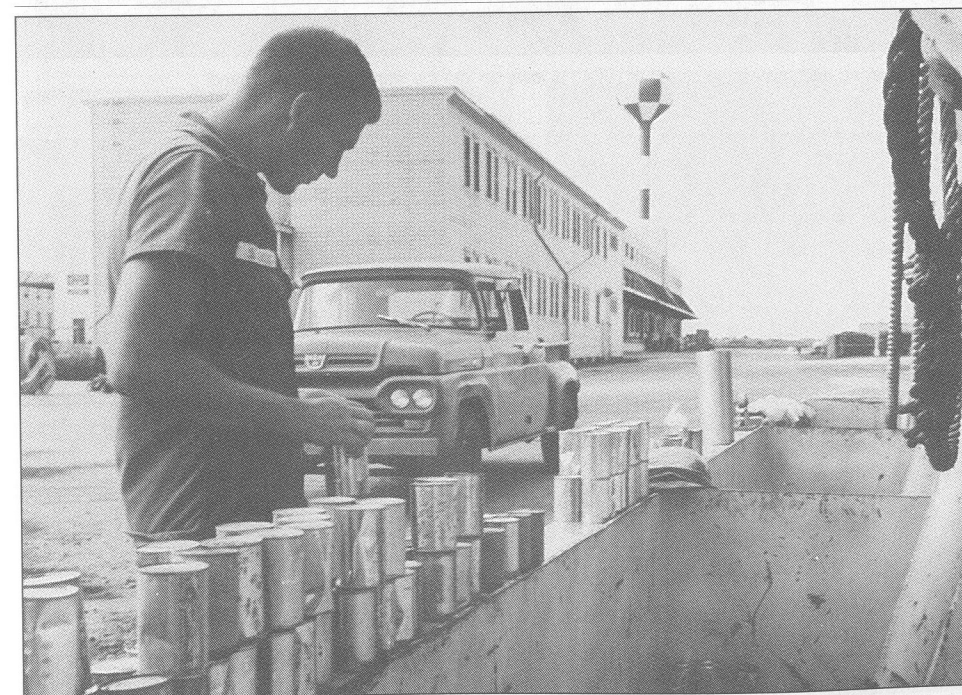
Wilbur Eaton (in water) and Bob Sheats load ballast metal in SEALAB-1.



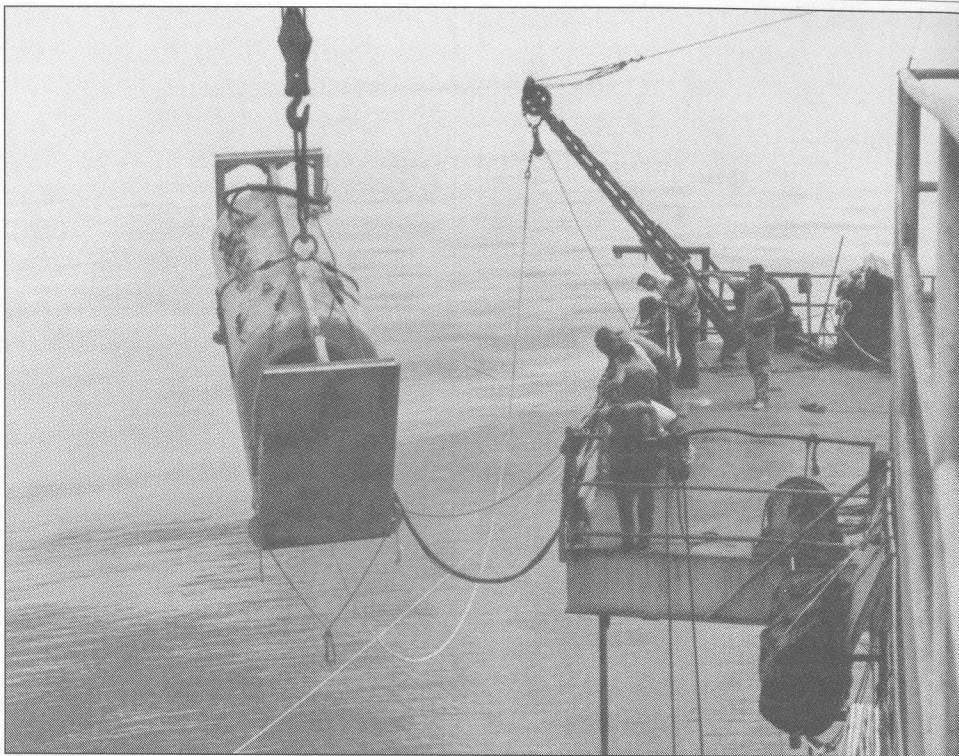
Argus Island, the Navy's support structure for SEALAB-1 off Bermuda



The divers prepare for the descent to the habitat.



In Bermuda, sorting unlabeled cans by number after habitat flooded for the second time.



The submerged decompression chamber (SDC) is lowered into the water from Argus Island.



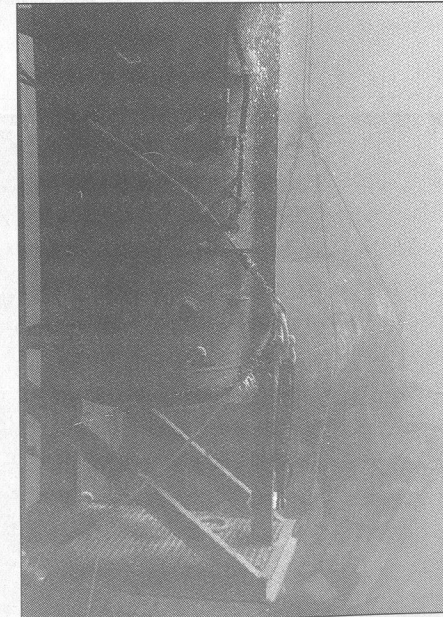
On the bottom off Bermuda in 193 feet of water.



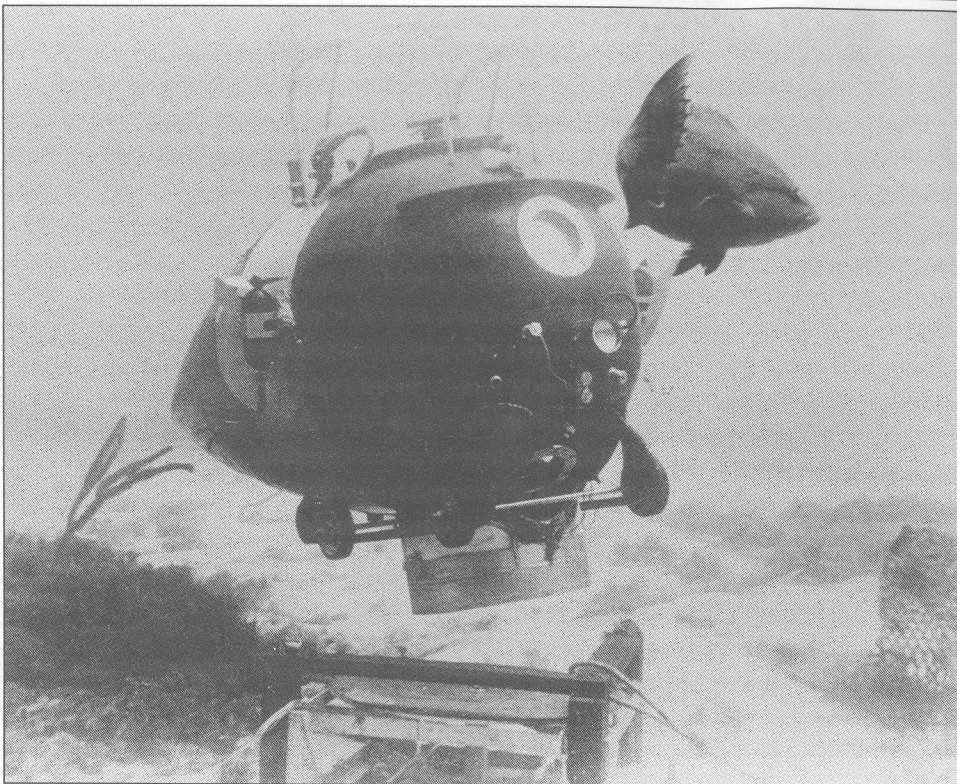
Ballast (including anchors) holds SEALAB-1 on the bottom.



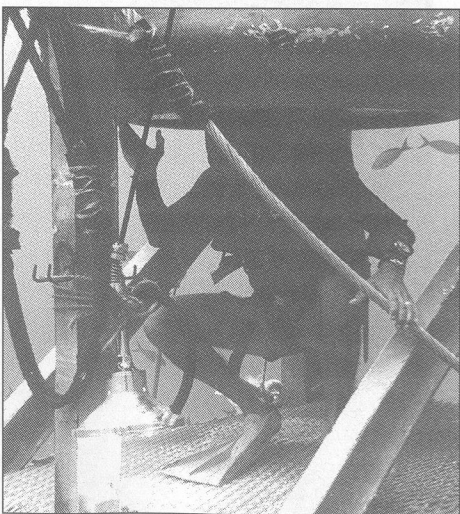
Diver with camera alongside the SDC.



The SDC with the habitat in the background.



Smokey Stover's small submarine *STAR 1*.



Diver in entrance to the SDC.



Diver taking photo through SEALAB porthole.



Bob Barth prepares to feed the fish with the habitat in background.



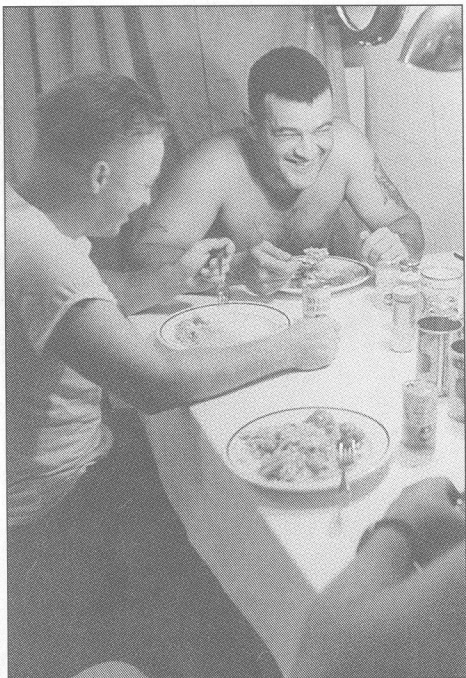
Barth sitting outside with a can of sardines feeding one fish at a time.



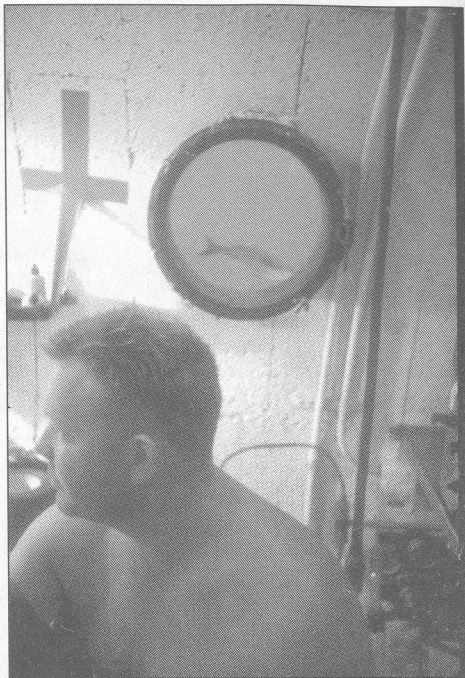
The fish line up for their turn.



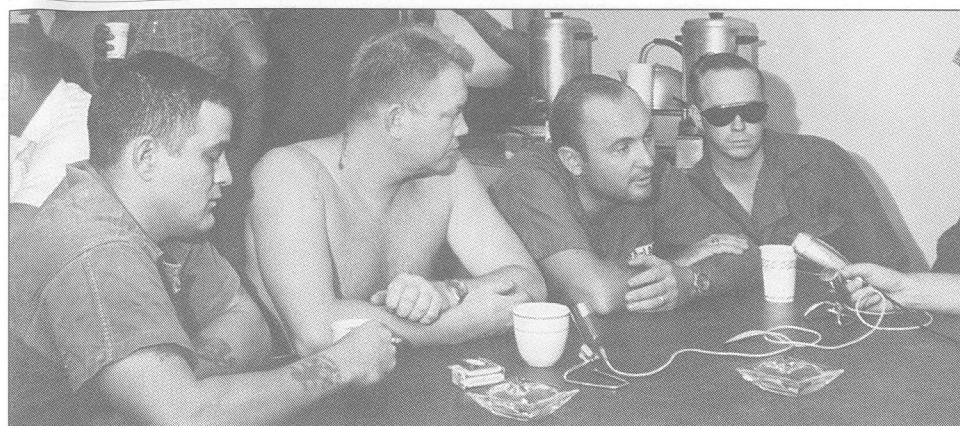
Diver without rig doing breath holding outside habitat.



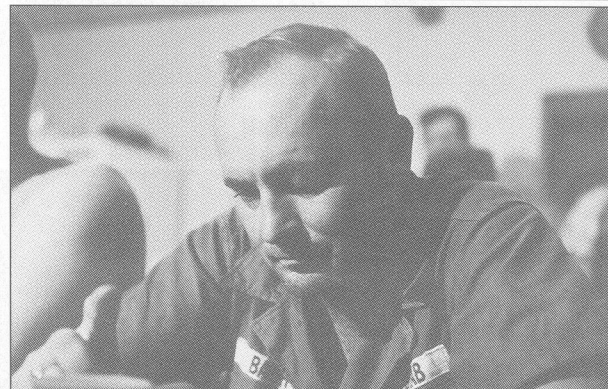
Mealtime in the habitat.



Bob Thompson in habitat.



Barth (third from left) endures a distressful press conference after SEALAB-1 dive. Accompanied by (left to right) Anderson, Thompson, Manning.



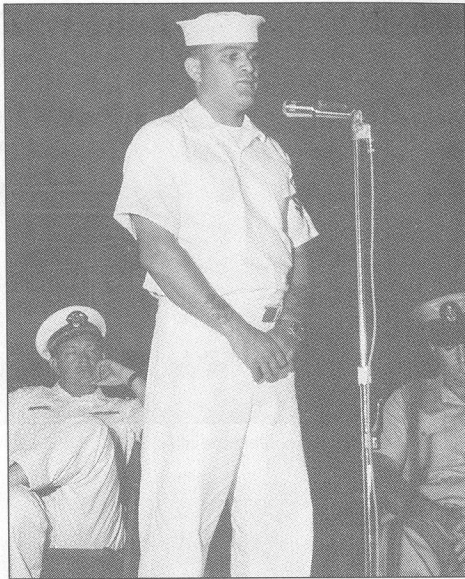
Barth fields questions with bountiful enthusiasm while contemplating internal explosion at press conference.



Relaxing - (left to right) Manning, Anderson, Thompson, Barth.



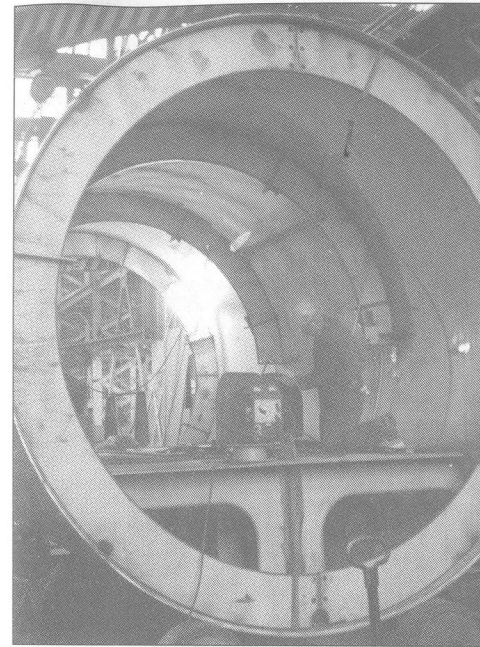
Divers Anderson and Barth fly back to Bermuda aboard helicopter for physical checkup.



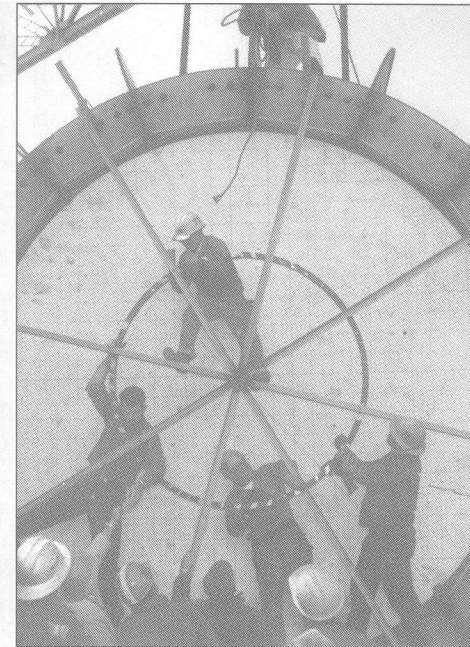
Andy Anderson makes famous printable speech at press conference.



Press conference in Bermuda at end of SEALAB-1. (Left to right) Thompson, Anderson, Barth, Manning.



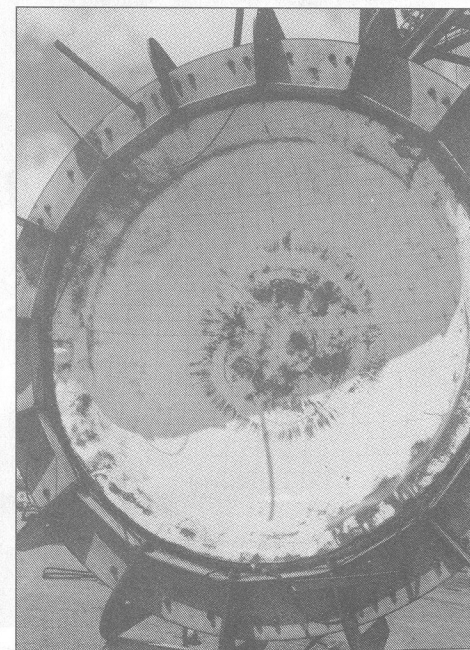
Fabrication of the SEALAB-2 habitat.



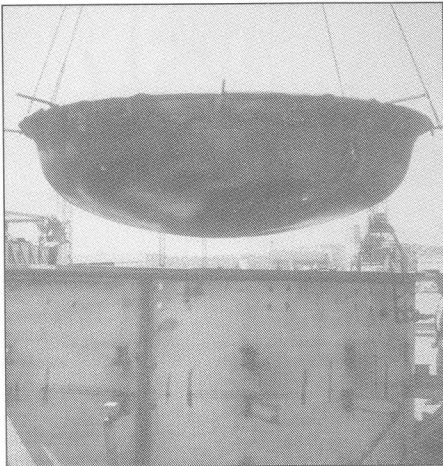
Innovative mold and rig for placing explosives to form the ends of SEALAB-2 habitat.



Mold for the end cap being lowered into the water before detonation.



End in mold after being formed by explosion.



Fabrication of end caps for SEALAB-2.



Final fabrication of ends after being formed by explosion.



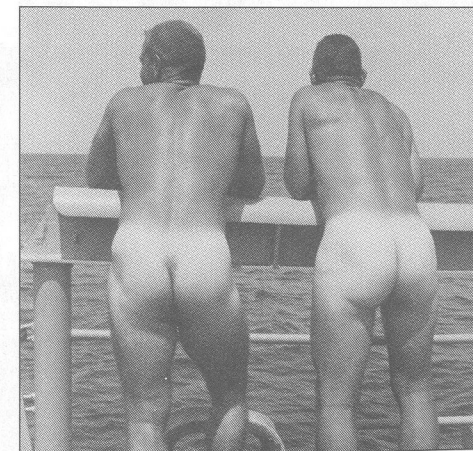
U.S. Navy Undersea habitat SEALAB-2 which housed the Navy's Aquanauts at a depth of 205 feet on exhibit prior to christening in 1965 at Long Beach Naval Shipyard.



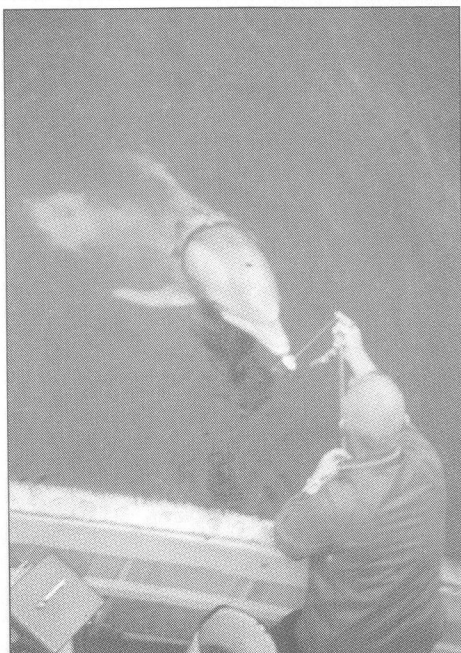
Dr. George Bond talks to crew during operation.



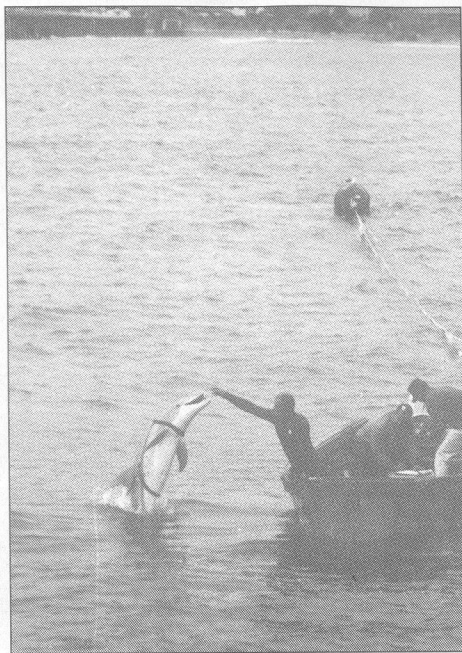
Barth contributes physiological data during training.



During training for SEALAB-2, the divers were obviously somewhat short of equipment.



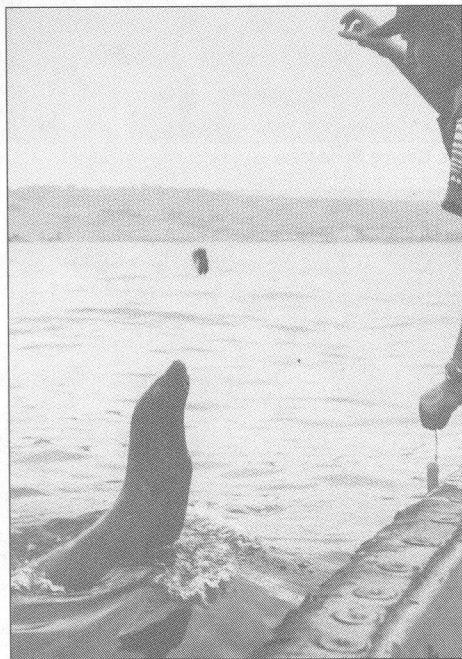
Tuffy, the porpoise, with collar for attachments.



Tuffy (rigged for underwater work) gets a reward.



Tuffy in training.



Training the sea lion "Samantha".



Habitat being towed into position to be submerged.



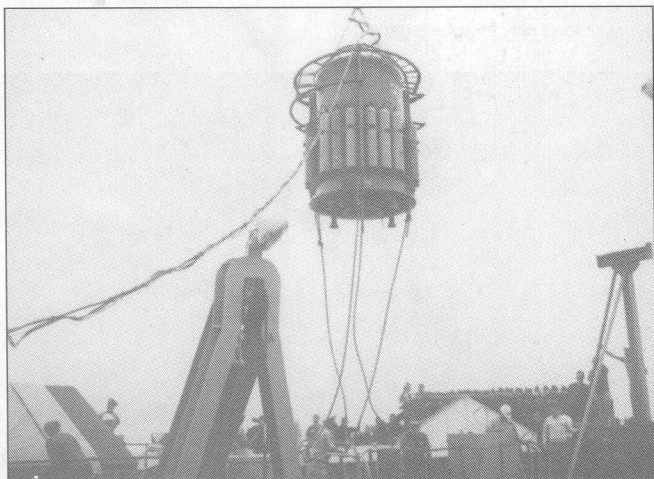
The habitat being loaded prior to submergence.



SEALAB-2 floats near the "Berkone".



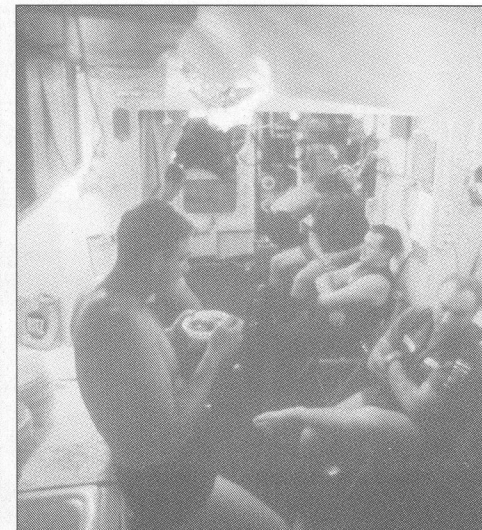
Habitat during final outfitting before going to the bottom.



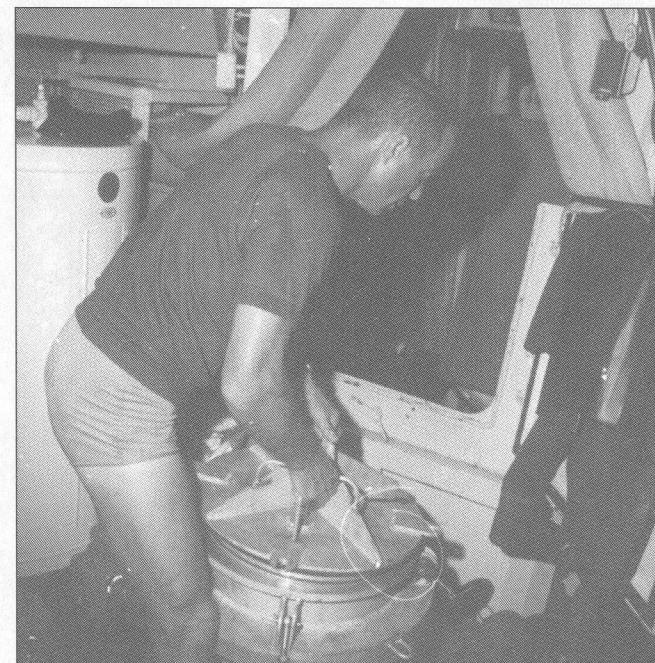
The personnel transfer capsule (PTC) being lowered for mating to the deck decompression chamber (DDC).



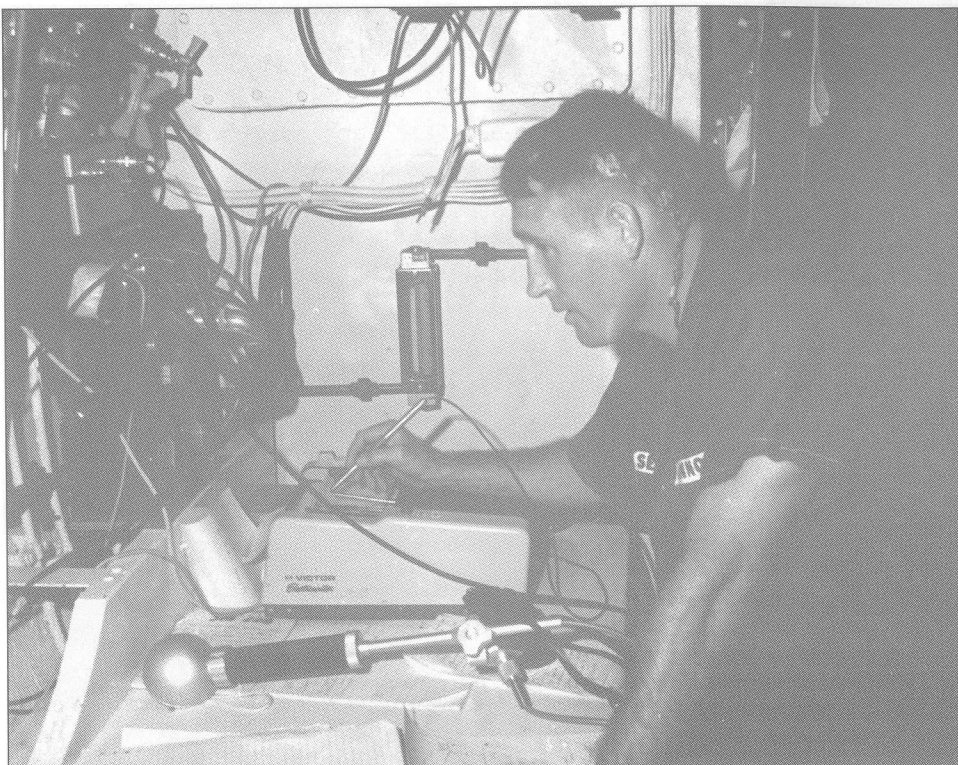
Barth, Iley, and Buckner as they prepare to descend to the habitat.



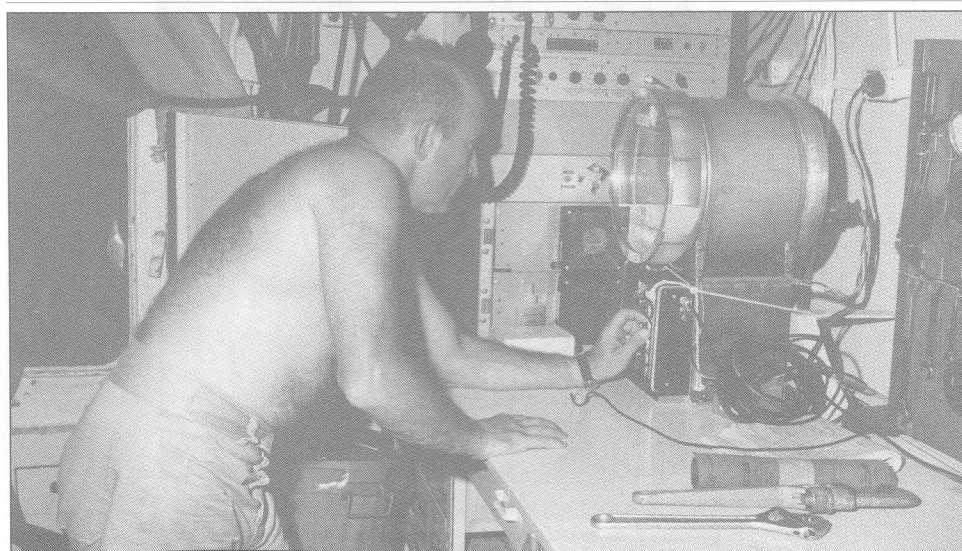
Team Two in leisure time during dive.



Scott Carpenter opens dumbwaiter to check for surprises inside.



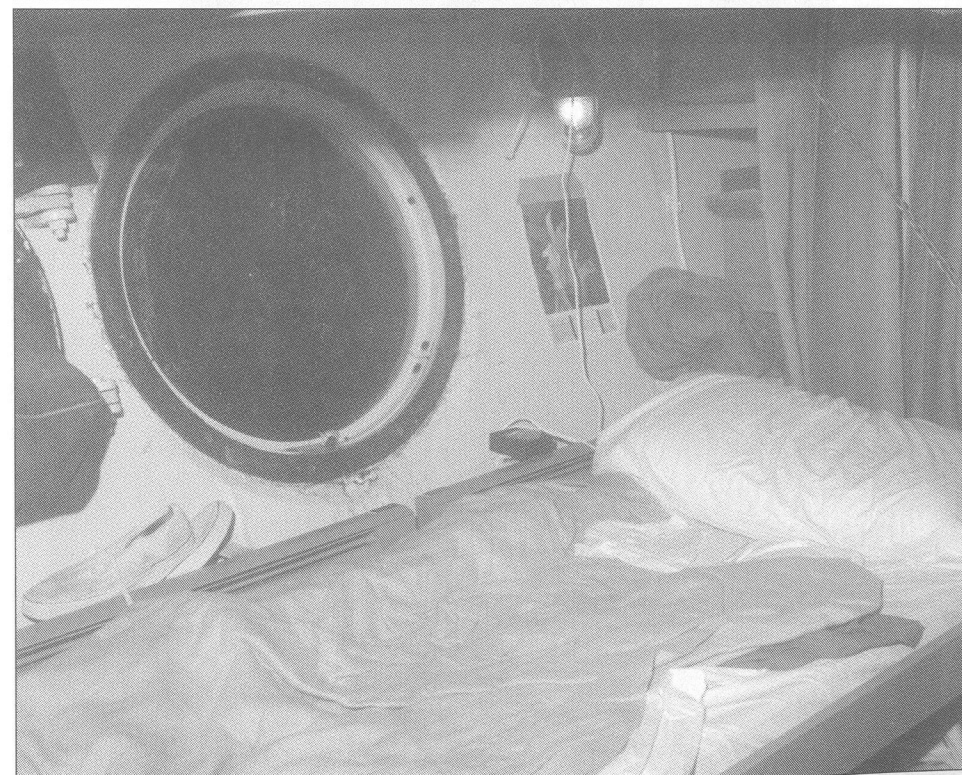
Berry Cannon uses the electro-writer which duplicated the messages topside.



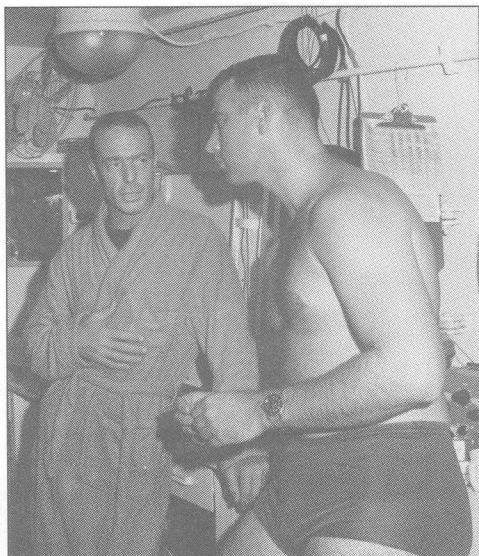
Fred Johler adjusts television (housed in pressure pot so that it would not implode).



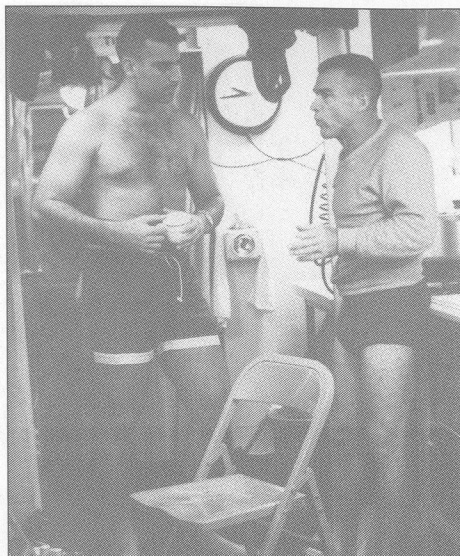
Tub for warmups near entrance to habitat.



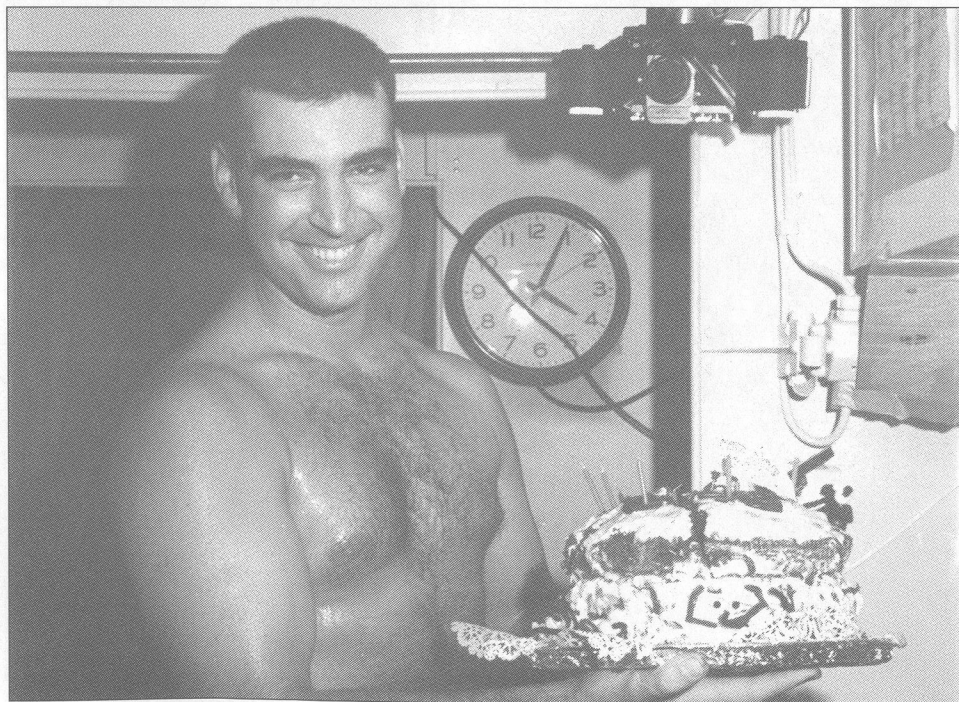
Bunk with picture window.



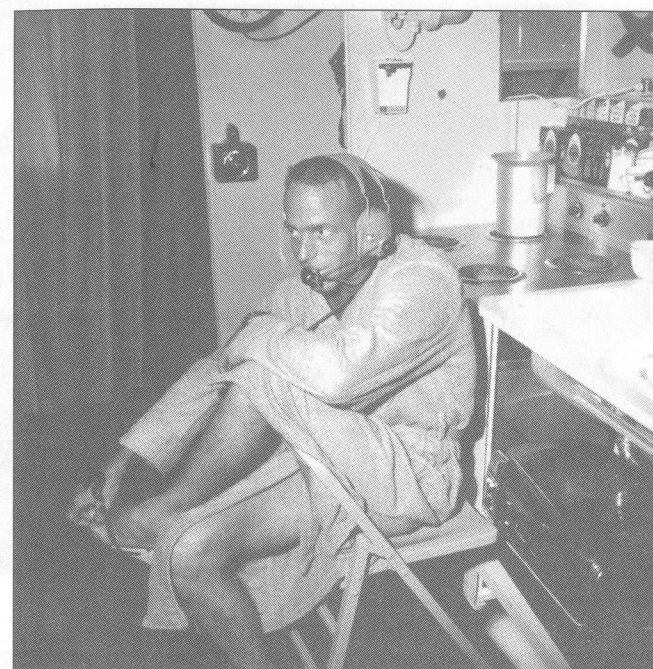
Scott Carpenter and Bob Sonnenburg.



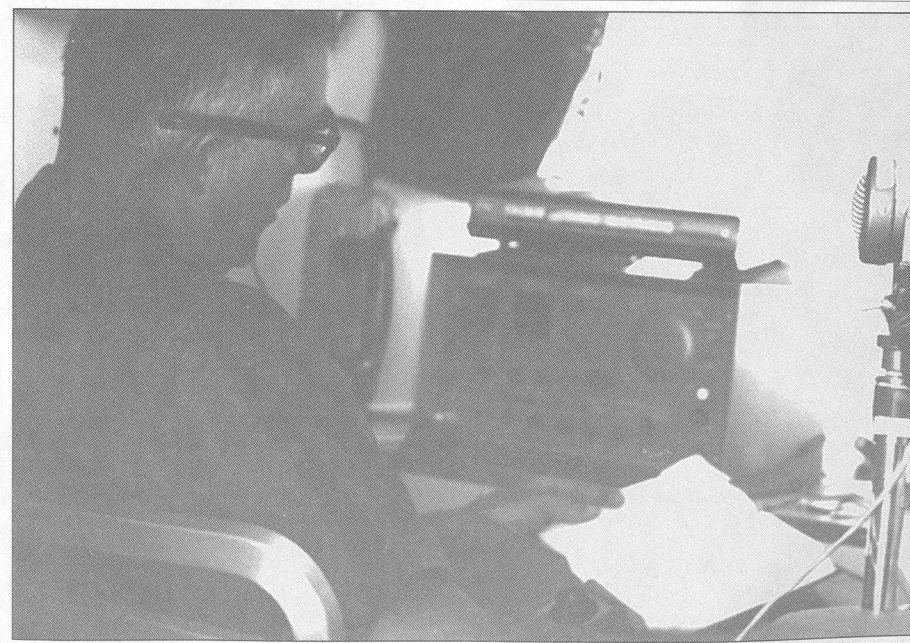
Bob Sonnenburg and Bob Sheats.



Birthday cake for Bob Sonnenburg arrives in dumbwaiter.



Scott Carpenter in SEALAB-2 habitat talks to Astronaut Gordon Cooper as he orbits the earth.



Dr. Bond reads the Bible to the divers.



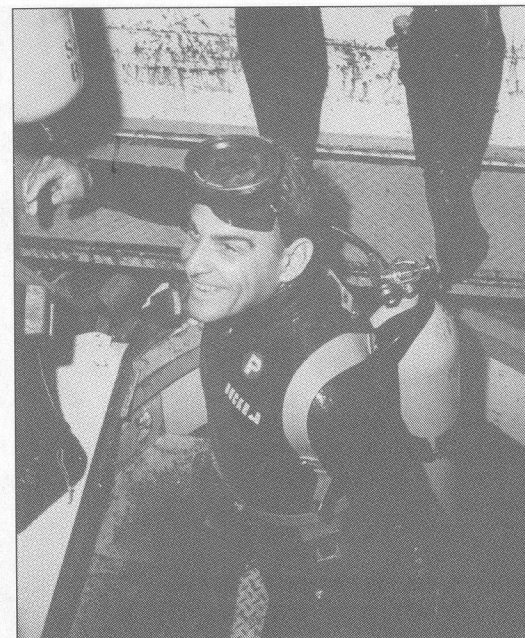
Ken Conda returns to the habitat with a Coke delivered by the porpoise "Tuffy".



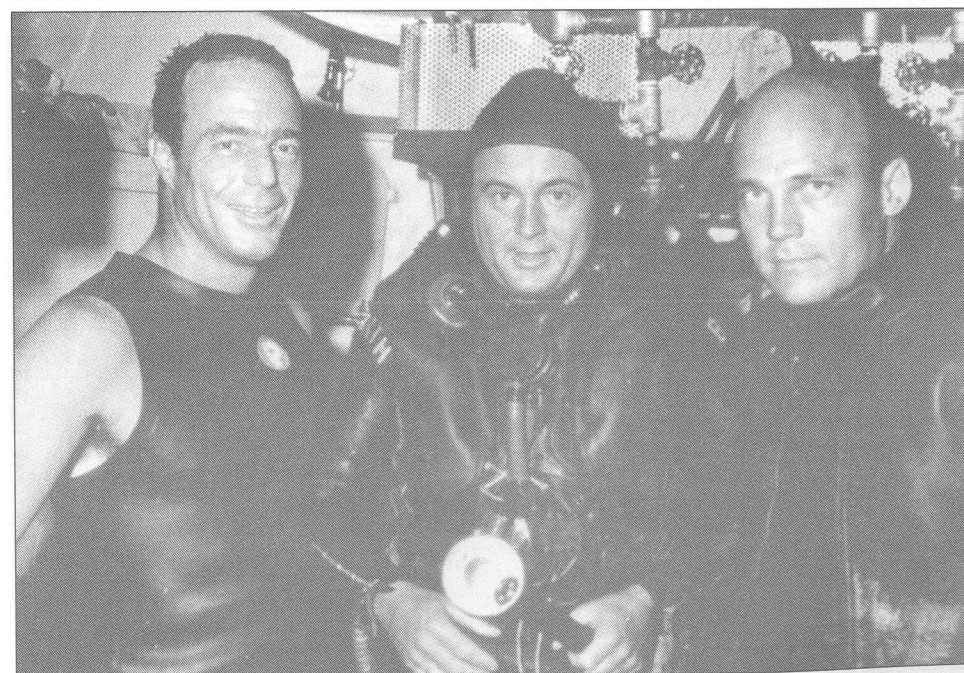
Barth and Buckner return from outside.



Wilbur Eaton suits up for task.



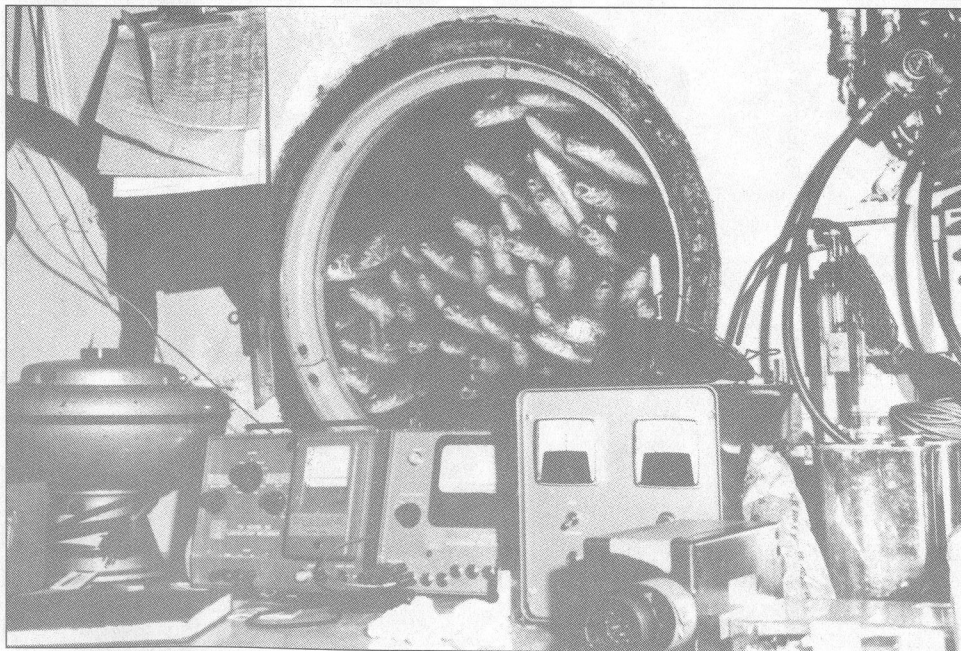
Howie Buckner comes up in entrance to SEALAB-2.



Carpenter, Barth and Wally Jenkins prepare to go outside.



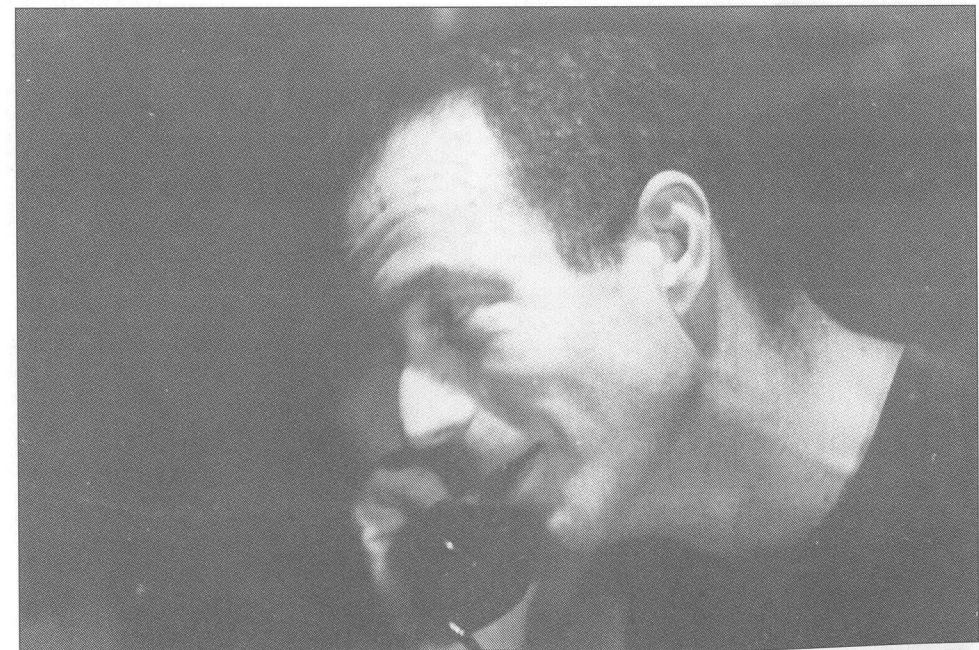
Scorpion fish like the one which stung Scott Carpenter.



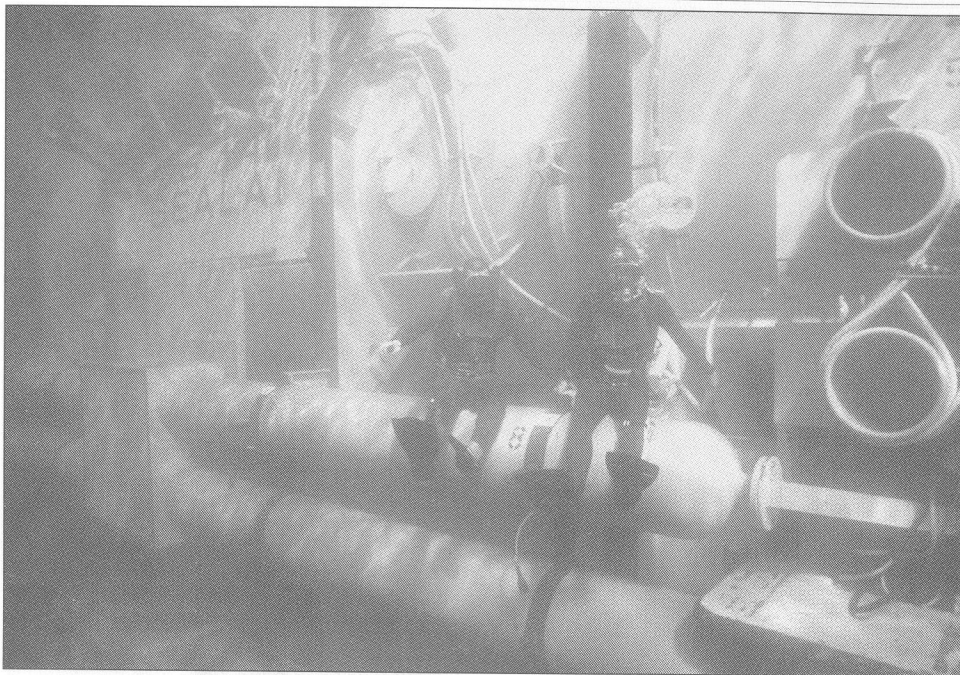
So who's watching who?



George Dowling and Scott Carpenter during decompression.



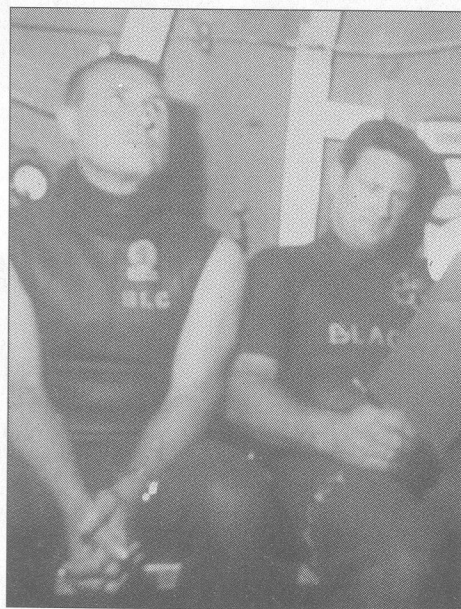
Scott Carpenter talks to President Johnson during decompression in the DDC.



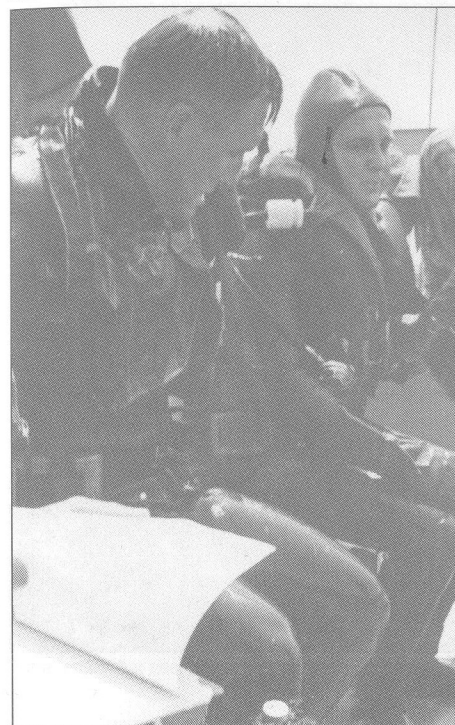
Divers during outfitting as habitat floats on surface.



Diver prepares to climb into the bottom hatch of a personnel transfer capsule in training.



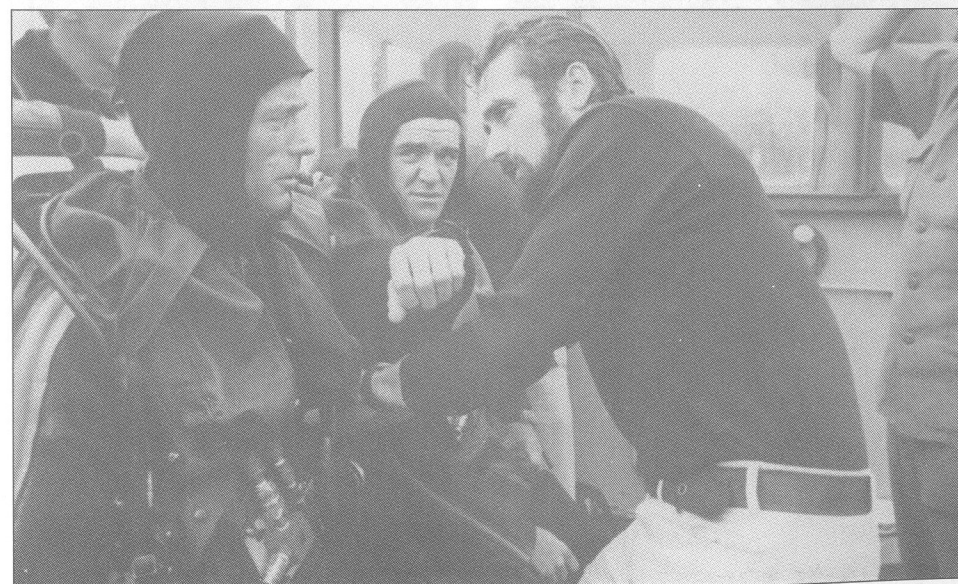
Cannon and Blackburn inside the personnel transfer capsule (PTC).



Cannon and Barth.



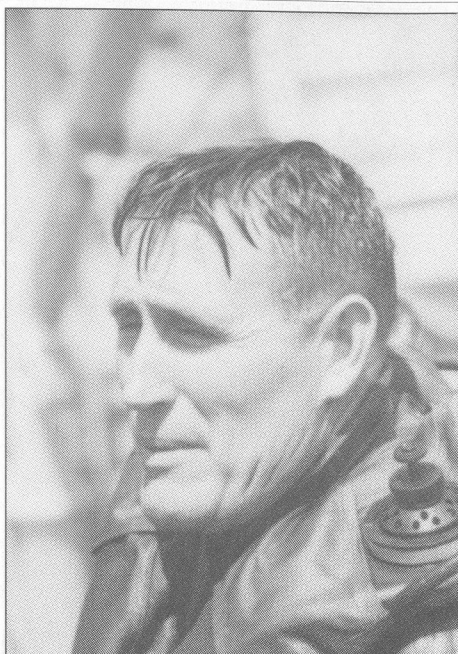
Marty Harrell and John Kleckner assist Scott Carpenter in pulling on wet suit.



Philippe Cousteau adjusts Carpenter's gear for training dive for SEALAB-3.



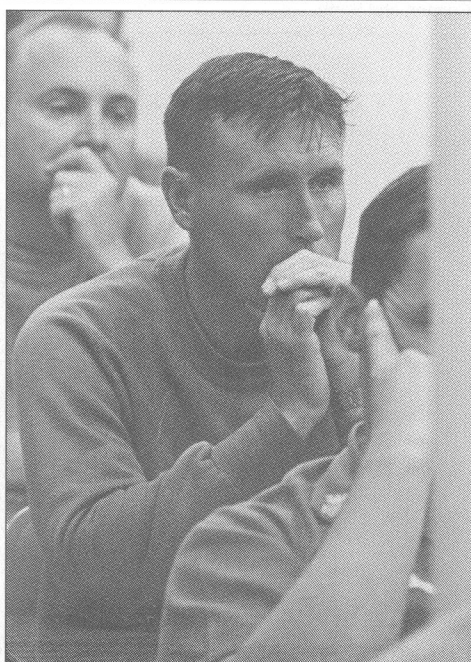
Bob Barth.



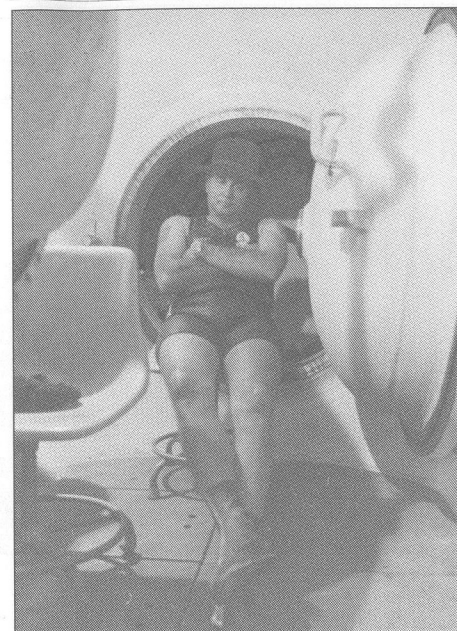
Berry Cannon.



Berry Cannon prepares for dive.



Cannon (foreground) and Barth intent on lecture.



Barth was banished to the DDC for the day for wearing the ugliest hat seen that week on the work site.



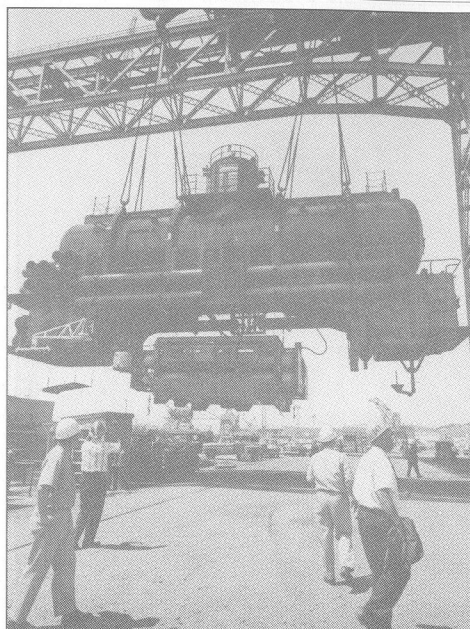
Fringe benefit of associating with divers: Mazzone prepares flounder.



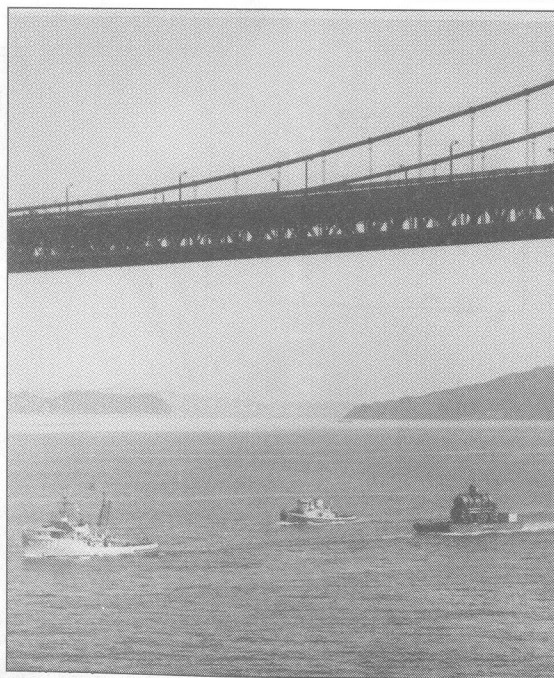
Bob Barth in interview with Walter Cronkite at San Francisco Naval Shipyard in 1968. Habitat in background.



The habitat undergoing modifications in shipyard at San Francisco prior to SEALAB-3.



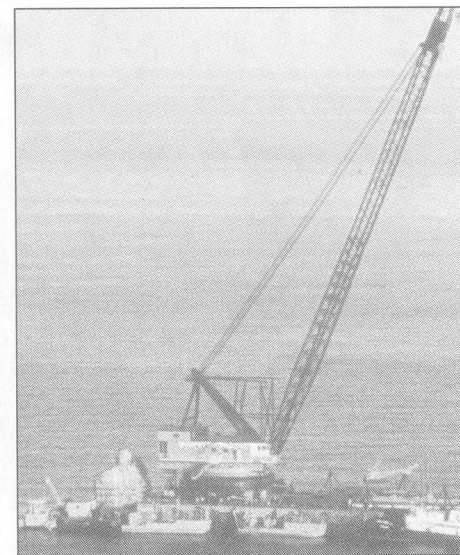
After modification, SEALAB-3 is being moved to a barge for transfer to Long Beach.



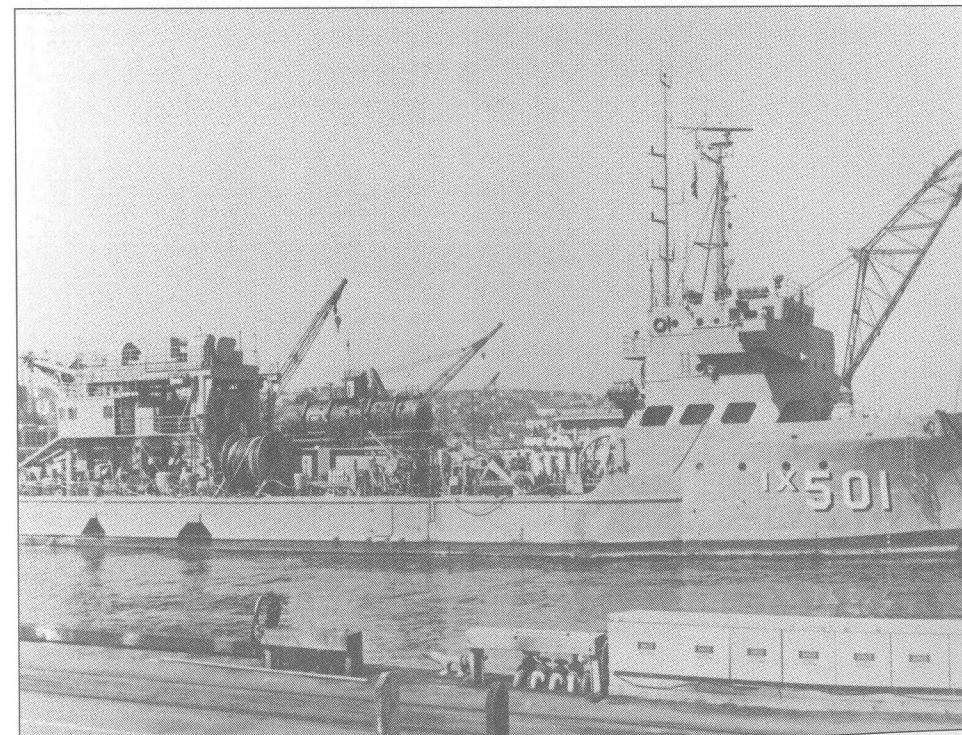
The habitat passes under the Golden Gate Bridge as it is towed from the San Francisco shipyard to Long Beach.



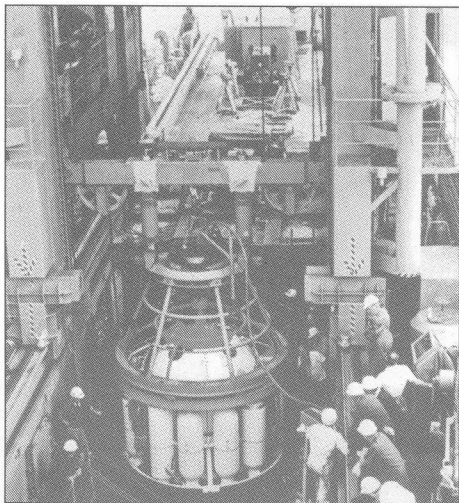
Habitat on barge awaiting "Marine Boss".



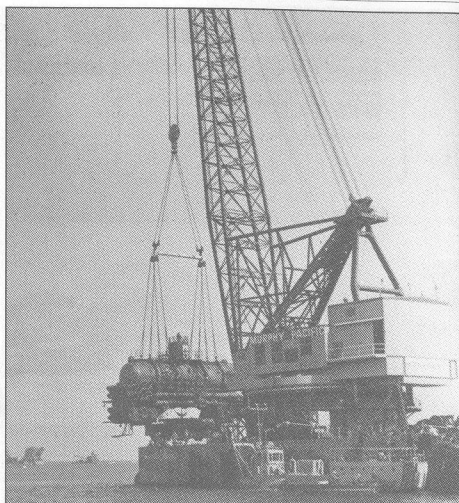
The crane, "Marine Boss" underway to site to place habitat in water.



The USS Elk River (IX-501) was the primary support ship for the habitat SEALAB-3.



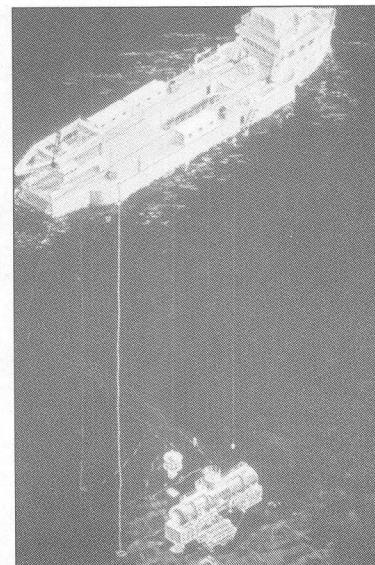
The PTC used on board the *Elk River*.



The crane, "Marine Boss" lifts the habitat into the water.



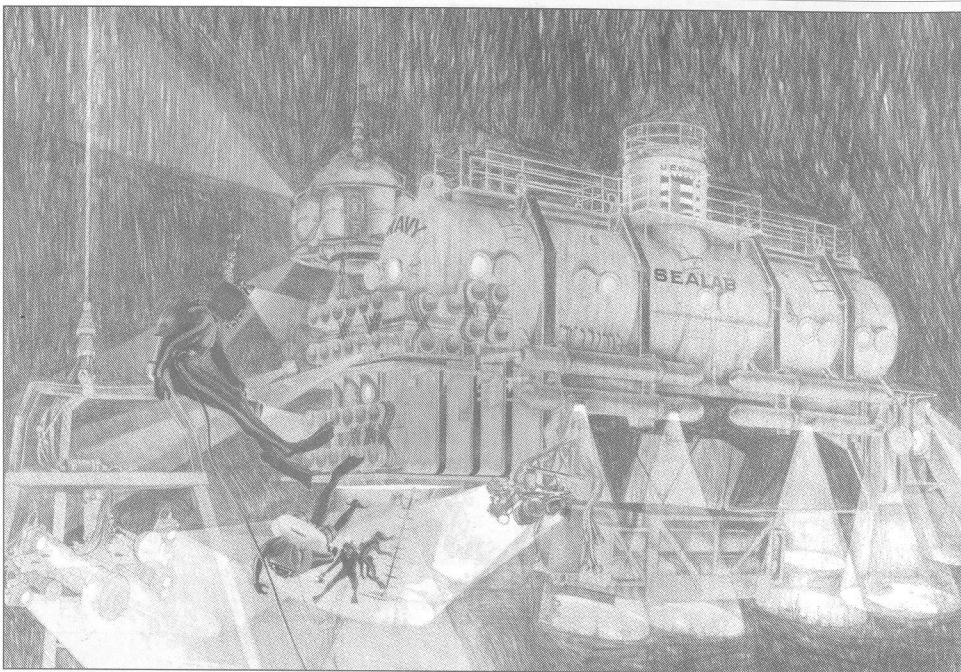
The SEALAB-3 habitat is towed alongside of the *USS Elk River* for attachment of the umbilicals prior to submerging to site 610 feet deep off San Clemente Island.



Artist's rendition of SEALAB-3 on bottom supported by *Elk River* (IX-501).



SEALAB-3 habitat being lowered to the bottom.



Artist's rendering of the SEALAB-3 habitat sitting on the bottom.



Berry L. Cannon: 22 March 1935 – 17 Feb 1969

SEALAB-1 Aquanauts:

Robert E. Thompson
Lester E. Anderson
Robert A. Barth
Sanders W. Manning

SEALAB-2 Aquanauts:

Team 1

M. Scott Carpenter
Robert E. Sonnenburg
Berry L. Cannon
Thomas A. Clarke
Billie L. Coffman
Wilbur H. Eaton
Frederick J. Johler
Earl "A" Murray
Cyril J. Tuckfield
Jay D. Skidmore

Team 2

M. Scott Carpenter
Robert A. Barth
Howard L. Buckner
Kenneth J. Conda
George B. Dowling
Arthur O. Flechsig
John F. Reaves
William H. Tolbert
Glen L. Iley
Wallace T. Jenkins

Team 3

Robert C. Sheats
William J. Bunton
Charles M. Coggeshall
Richard Grigg
John J. Lyons
William D. Meeks
Lavern R. Meisky
Robert E. Sonnenburg
John M. Wells
Paul A. Wells

SEALAB-3 Aquanauts:

Frederick W. Armstrong	William C. Ramsey
Robert A. Barth	Lawrence W. Raymond
Richard C. Bird	Frank L. Reando
Richard M. Blackburn	John F. Reaves
Robert A. Bornholdt	Terrel W. Reedy
Mark E. Bradley	Don C. Risk
Frank Buski, Jr.	N. Terrel Robinson
William J. Bunton	Irwin C. Rudin
Laurence T. Bussey	William J. Schleigh
Berry L. Cannon	Donald J. Schmitt
M. Scott Carpenter	Richard R. Sutton
Derek J. Clark	Cyril J. Tuckfield
Kenneth J. Conda	James Vorosmarti, Jr.
Richard A. Cooper	Paul A. Wells
George B. Dowling	William W. Winters
Wilbur H. Eaton	
Matthew C. Eggar	
Richard A. Garrahan	
Leo C. Gies	
Lawrence W. Hallanger	
David Martin Harrell	
Samuel E. Huss	
Wallace T. Jenkins	
Duane N. Jensen	
John C. Kleckner	
Cyril F. Lafferty	
Lawrence M. Lafontaine	
Paul G. Linaweaver, Jr.	
Fernando Lugo	
William P. Lukeman	
James E. McDole	
James M. Melder	
Jack W. Morey	
Keith H. Moore	
Jay W. Myers	
James H. Osborn	
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Sea Dwellers

As a self-professed grunt and guinea pig, Bob Barth willingly gave his blood, sweat, tears, the prime years of his life – and even his heart and soul – to the U.S. Navy's Genesis and SEALAB programs in order to experience what most men can only dream of... *life on the bottom of the ocean.*

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*– Scott Carpenter
NASA Astronaut,
Navy Diver*