

Kealalo

"SEALAB I CHRONICLE"

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Done

1971, 1972, 1973, 1974, 1975
1976, 1977, 1978, 1979, 1980
1981, 1982, 1983, 1984, 1985

FOREWARD

This Chronicle represents an unedited rendition of the daily reflections of the Principal Investigator of the Sealab I Operation. In retrospect, some of the opinions and judgments herein expressed should perhaps have been modified to spare the sensibilities of some individuals concerned; yet, these were the daily records as I saw them, 24 hours at a time, and I do not elect to change the record of my impressions. Indeed, it is possible that the frank nature of this narrative may contribute to improvement of future undersea operations.

In the course of any underwater venture similar to Sealab I, three written reports should be prepared. In the first place, it is necessary to prepare a situation report, or SITREP, which is a dispatch of a few words to Washington authorities, outlining all project success and omitting or minimizing unhappy events. Secondly, the daily log of the operation is maintained. This log is a greatly expanded version of the daily SITREP, with a small amount of personal commentary by the watchstander.

The Chronicle, however, is of different caliber and texture. Here, the Principal Investigator records each hour of the day his own personal evaluation of the total scenario. It is a biased account, twisted to meet the needs of the author; but since this same author is the man under the gun, it deserves some credence. For this reason, the Chronicle of Sealab I is presented without abridgement.

1914

1. The first part of the year was spent in the field, collecting specimens and making observations on the habits of the various species of birds and mammals. The weather was generally favorable, but there were some periods of heavy rain which made the work difficult.

2. The second part of the year was spent in the laboratory, preparing the specimens and making the necessary measurements and calculations. The work was very tedious, but it was necessary to do it in order to get accurate results.

3. The third part of the year was spent in writing up the results of the work and preparing the final report. This was a very important part of the work, and it required a great deal of time and effort.

SEALAB I CHRONICLE

Armed Forces Day

Came Armed Forces Day, and the big first exposure of SEALAB-I to the quizzical, often skeptical, American public aid 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-I 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 a 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. The Captain, observing the melee, asked if all was well, to which Barth replied that he had been suddenly heatstruck, 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 SEALAB-I 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.

Some hours later, the stream of visitors dwindled to a torrent, and Roy and I exchanged whispered dreams of alternate visits to the nearby Officers Watering and Refreshment Station. Roy had first call, and so departed to restore a voice nigh destroyed by microphone appearances. In retrospect, I should have pulled rank on him, and gone myself, for shortly I was involved in a pair of incidents which did little to enhance the image of the U. S. Navy.

The first of these incidents, hereafter to be known as the Thresher woman affair, came, like so many tragic events, during a period of relative calm. Most of the lost children had been found; my SEALAB crew had slaked their seemingly unquenchable thirst for beer; the sun was fast approaching yardarm, and the situation was in hand. At this point, things began to fall apart.

A fat, pleasant-looking lady, in her fifth decade and wearing a large pink hat, approached my broadcasting station. With clever verbal sortie, she inquired into the escape and rescue capabilities of the Submarine Force, to which I responded with pride. Next came allusion to the THRESHER tragedy, and what had we done about that? On this point I was neither proud nor clear, and the Thresher woman took over as prosecuting attorney.

In loud and ringing tones, the T. W. announced to one and all that the secret details of the Thresher tragedy were, in fact, concealed within the complex organization of the SEALAB-I project. As principal investigator, I was responsible for a massive cloak and dagger scheme wherein the submarine had been deliberately scuttled to test my new escape device; and, in fact, three survivors had been recovered and were now being concealed, together with my escape apparatus on board the YFNB-12. Knowing all this, the Thresher woman continued, she had collared the Officer in Charge of the vessel, demanded and been refused, right of search of all compartments of the ship.

At this point, my look of total consternation was interpreted as guilt, and the crowd took on a threatening aspect. Just as I began to fear for my life, my friends of the EODU unit set off a huge explosion in the bayou, and reprieve was granted. But not for long.

Later, when I had given the Thresher woman my card and file number, and had been assured via the public address system that I would hear more of this, I was approached by a short, nondescript character of about 60

years, who declared himself to be a Navy veteran. A welcome relief from that woman, I thought, and so encouraged him to speak.

Our veteran started pleasantly enough, with the query as to whether I thought the prolonged pressure exposures of SEALAB-I would shorten the lives of the participants. Probably not, I assured him, and returned the microphone for response. This proved to be a major tactical error. The old-timer seized the instrument, squared away, and commenced a very public announcement of some heretofore obscure medical facts of life. Exposure to high pressures, he assured the large audience, would clearly add years to the life expectancy of my subjects. As a stripling, he had been raised, he said, in the rarefied atmosphere of eastern Kansas, a situation deemed intolerable by all clear-thinking medical men. As a boy and young adult, he suffered from constipation, excessive gas, smelly feet, sexual impotency, and a constitutional inability to make friends.

At this point, our audience ceased to file by SEALAB-I, and gathered near the curbstone prophet. In vain, I sought to retrieve the microphone; but our hero was not about to move from the spotlight. What chance did he have for survival, he boomed querulously, in that thin Kansas air? None! was his resounding response to the rhetorical question. The solution, he continued, was clear -- migrate to Alachua country, Florida, where pressures were high, and vitality assured. And this he did, with excellent, but incomplete results. Within a matter of months, his bromidic feet ceased to be offensive, and he made a few friends; yet the horrible constipation persisted, and his sex life remained barren. What to do? Unquestionably, the

advice of a qualified Naturopath was in order, and so sought. And now the kicker: "What do you think he said?" Frantically, I shook my head, which the old-timer interpreted as a question.

"That Naturopath doctor said to take mineral oil by the quart. Said it would get all the crap out of my system, square away my bowels for good, and give me sexual powers undreamed of!"

At this point it seemed useless to comment on his poor syntax; harakiri was clearly indicated, but my sword was in New London. The crowd was ecstatic, and I was very sick indeed. In his moment of triumph, the old-timer returned the microphone to my stricken hands and marched off to greener pastures.

Somehow, life went on, people renewed interest in the SEALAB-I, and urchins continued to transmit communicable disease via my helium mask demonstration. Yet I had an ineffable longing for an escape hatch in a deserted sea; and when Roy returned to the stand, I broke for the oasis, where gin and tonic flowed, and civilians were excluded.

And so, after awhile, ended Armed Forces Day.

With Armed Forces day behind us, we felt equal to any task required for completion of our mission. Subsequent events, of course, proved us wrong -- but that's the way the cookie crumbles.

After a three-day interval to allow thievery of desired material and constitutional return of normal functions, we proceeded to the first submerged operational test of SEALAB I. With no little difficulty, the habitat was

placed in the water, and ballasted by my divers to a point of about ten tons of positive buoyancy. She rode the water like a queen, and towed like a torpedo. In due time, we reached our support vessel, moored off Stage II in about 65 feet of water. SEALAB was transferred to the stinger wires of YFNB-12, and secured for the night.

Next day, we prepared for the drop -- the process of lowering the habitat to the ocean bottom. A seemingly simple exercise, this burgeoned into a nightmare. By mid-day our divers had ballasted the SEALAB to a point of negative buoyancy and the structure was being held at the end of the "stinger" on the fantail of the barge. In order to transfer her bulk to our main nylon line, it seemed necessary to release our stinger support, and rapidly take hold with the nylon, thus swinging the SEALAB some 30 feet closer to the support vessel. This was the plan, and the results were disastrous. When the outboard lines were released, SEALAB commenced to sink with both bottom hatches open. Desperately, we raced to catch her on the nylon; but, as in the case with ladies' nylon hose, the line stretched interminably. As SEALAB sank further, she took on seawater through her open trunks, and became increasingly heavy. The nylon line continued to stretch, and down she went, flooding all the way.

After an appropriate period of consternation, Roy slipped on SCUBA gear, and went down to survey the damage. His report was succinct. SEALAB I was 1/3 flooded, and all systems wiped out. To put it mildly, I was distressed.

And so it came that the first operational message conveyed to Washington was that of failure due to ineptitude. The response was predictable. Roy

was ordered to the Capitol for a personal appearance, with threatened termination of the project.

Three days later, we had SEALAB back ashore, and most of our damage repaired. Ready to return to Stage II for resumption of our sea trials, I got a message from Washington to stop all progress, pending arrival of LCDR Lanphear, who would carry explicit directives. Naturally, we got underway, and prepared for our next underwater test. When Roy arrived, with guarded approval of the project continuance, SEALAB was once more on the bottom, this time under control. This is not the way things should be done in the Navy; but this is a way of life with SEALAB I.

Subsequently, things went as they should. We had learned an important lesson in handling the habitat, and with modified procedures, we learned to lower and raise her without difficulty. In a typically chicken attitude, our Washington bureaucrats would not allow press coverage of these practice procedures; but finally the diving press photographers were allowed on the scene, and some pictures taken. Unfortunately, they muddled up the scene, and the results were less than desirable. Nevertheless, some useful footage was obtained.

The night before arrival of the press photo group, Anderson and I dove into SEALAB to check out electrical circuitry. Going down, the fish schools were so thick that we could barely find the habitat. Once inside, we were both so fascinated with the view, illuminated by 10,000 watts of light, that we spent most of our time watching the fish which were watching us. Probably for the first time, I got a real feel for life on the ocean bottom. And that sensation will haunt me forever.

After a few days at Stage II, we felt that the shiphandling problems of SEALAB I were sufficiently under control, and our Chief Bos'n Mate had undying respect for the delicate condition of the habitat. We returned the whole kit and kaboodle to the Panama City base, where the engineers planned several days of extensive system testing. Satisfied that we were again on the rails and unlikely to come unstuck at once, I departed for North Carolina for a few days leave, and to be on hand for my son George's surgery. Perhaps I allowed myself to dream of a day or so at my cabin on Broad River, to catch trout by day and drink corn likker of a night. It did not quite work out thus, which might be aptly stated as the theme of Project SEALAB I.

Once my back was turned, all hell broke loose on the Hill. Our self-appointed experts in numerous Bureaus decided that the operation, as planned, was too hazardous, and the book must be rewritten. The aquanauts, some genius decided, should be decompressed in the submersible decompression chamber; my schedules, so carefully rechecked by the 800 computer, wouldn't do at all; the show must be run from Washington; and so on, ad nauseam.

This situation was, of course, intolerable. I cut short my leave and emplaned for Washington to do battle. Once arrived, I found to my great relief that the decisions just recounted had not yet been committed to official stationery. This was the saving grace; for although a bureaucrat will reverse a verbal commitment with the speed of waterbug, he worships the written word with the devotion of Amar Khayam yet. Once the moving hand has writ, pride of authorship forbids change of a single participle. In conversation with various and sundry of the brass, I tried to make points

which to me were both clear and irrefutable. If I didn't know my business well enough to run the show safely, we'd better call the whole shebang off. Certainly, none of our second-guessers were better informed than I, and none, when challenged, would agree to accept responsibility. I listened again to their unwise proposals and gave them back the true and proper Gospel. They heard and became believers. The project would go on essentially as planned; we were in harmony, and the world was bright and gay. MacHale's Navy had won another battle.

As I left Washington, however, gloom clouds were fast settling on the Medical Research Laboratory. In my month of absence, outside sources had sought to take control, and had largely succeeded. I determined to pay an unannounced visit to New London.

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With Washington behind me and that snake scotched for the nonce, I addressed myself to the newly-emerged problems of my Medical Research Laboratory. I had, of course, been aware that the local command, the Station Hospital, and even some persons in the Bureau of Medicine and Surgery had long harbored designs to take over control of my activity, when opportunity presented. Sure enough, as soon as I was safely out of reach in Panama City, the powers went to work. At New London, control of the Laboratory was arbitrarily and bilaterally seized by the Senior Medical Officer of the Station Hospital and the Commanding Officer of the Submarine Base. Of course, we had always been under military control of the latter officer, and rightly so; but now came directives and action relative to policy and internal management, without the courtesy of consultation with

myself or my Acting Officer in Charge. I heard of this, and straightway made an unheralded visit to New London, en route to Bermuda.

On arrival, I found the situation incredibly bad. My people had been summarily ordered to manage dependent care at the Station Hospital, at the expense of their regularly assigned research and training duties, and without consultation with my Acting Officer in Charge, LCDR Dalton James. Stick fingers had got into my finances, diverting funds to extraneous activities. New and unacceptable policy had been dictated by the Base Commander. An inspection of my travel file was underway, to ferret out the extent of my boondoggles, and ostensibly to document my general unworthiness as Officer in Charge. Finally, at the Washington level, a document had gone forth to disestablish the Laboratory as an activity, and to reduce it to a department within the Submarine Medical Center command, as opposed to previous agreement that research, training, and clinical branches should all be Officer-in-Charge activities. In sum, the situation had deteriorated to a catastrophic level. I went home, kissed my wife, mixed a very dry martini of about six ounces, and gave thought to the problem. Three hours and several martinis later, the course was crystal clear. In a single day, I must clear things up as best I could, and get back to SEALAB I project.

Thus I found myself at the desk next morning, sorting mail, dictating curt messages, and making brusque phone calls. By noon, I had corrected perhaps fifty percent of the evils and had come to the sad realization that the balance were incapable of remedy. Later, I bade farewell and best wishes to LCDR James, and retired to the Escape Training Tank, where I did breath-holding skin dives to 100 feet for the balance of the day; a postman's holi-

day, but in keeping with my state of mind.

Soon thereafter, I departed for Bermuda, and rededication to Project SEALAB I.

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In open defiance of travel brochures, the weather in Bermuda was unpleasant. A wind of near gale force boxed the compass with monotonous regularity; rain fell at intervals, and the sea state was miserable. The famed Bermuda "High" was foundered in the lesser Antilles, and the future of SEALAB I seemed grim indeed. I resorted to prayer, with added incantations acquired from a Cherokee witch doctor. The weather continued bad.

The YFNB-12, with SEALAB I aboard, arrived in the early morning, after an uneventful tow from Panama City, Florida. All components of the project seemed a bit weatherbeaten, but unscathed. As my team filtered in from various points of the globe, we set to work on a final refit program. First, the Naval Base was searched, and desirable items tagged for future theft. Next, we established liaison with transportation, to assure an adequate supply of wheels. Finally, we all went swimming, ostensibly for training, but actually for the purpose of beach-hawking. In most areas, we met with unparalleled success.

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Soon, it was time for a fast run to Mexico City, San Francisco, and a final touchdown in Washington to quiet the rebellious natives. Since I had the tickets and invitations, I departed. Perhaps another boondoggle; but, to quote an authority: "Damn the taxpayers!"

Mexico City, some hours later, was delightful. Hoping to arrive incognito, I was met by two Admirals, one Captain, and a host of lesser lights. Since I was attired in sweatshirt and sneakers, with Bermuda shorts between, I felt less than composed at the initial confrontation. However, all went well, and we departed for the hotel chattering foreign languages, both Spanish and Mexican.

At the Del Prado Hotel, I immediately fell in with a gang of old diving buddies, who introduced me to Tequila. The introduction was quite unnecessary, since I have tasted both corn likker and kerosene for more years than I choose to recall. Tequila is, withal, a useful beverage, despite its tendency to stop wristwatches, part suspenders, and create the illusion of sexual potency. I cannot, however, subscribe to its habitual use.

Next morning, I was off on a tour of the city, complete with Navy vehicle and driver, Mario by name. In later days, I learned that this tour normally required 3 days for completion; yet, we accomplished same in a space of 5 hours. At the conclusion of our final hair-raising run from Chapultapec Castle to the hotel, Mario informed me that he was a former racing driver. My response, in broken Spanish, was, roughly: "What's with this former bit?"

Later, our Underwater Society meetings began, at the Universidad de Mexico Medical Center. Surely, this was the most ornate and panoplied symposium I have ever attended. Present were the Mexican Secretary of Navy, guard of honor, Marine band, and a host of plenipotentiaries. Add

to this a mere thousand naval cadets and nurses, a few hundred indigent professional people, and a handful of visiting firemen, and the picture evolves. The auditorium was fantastic, with trilingual interpreters on the headphones and perfect acoustics. The entire setting was such as to convert the village idiot to a Demosthenes. At last, it was so for my address. I spoke for an hour, and enjoyed every second of it. At the conclusion, I was awarded a lifetime membership in C.E.D.A.M., plus the Nagy award of the year. Somehow, I fell in love with Mexico.

At lunchtime of the second day, I indulged myself in all of the seafood available, and thus scribed a pattern of gastrointestinal downfall. A few hours later the Vengeance of Montezuma seized my upper and lower G.I. tract, and I was hors de combat. Between waves of intermittent coma and black vomit, I was able to telephone a regretful non-appearance at the evening social function. Admiral Canizares offered the services of his personal physician, which I declined, choosing to die without assistance from my own profession. But all things pass, and so did this, after a fashion.

Next morning, I had revived to a semi-comatose condition, and commenced preparation for a Comida to be given at the hacienda of the Surgeon General Salazar, in my honor. Between desperate journeys to the head, I struggled with my bow tie and donned a suit. Ultimately, I arrived and was given a glass of Tequila, which took a bit of undoing. Conservatively, I estimate to have swallowed the stuff at least ten times; but it stayed down at last.

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San Francisco

All good things pass, and so it was with Mexico City. On Saturday, I attended the excellent morning sessions, made a dozen or so pit stops, then stole away to the hotel, to rest and pack up. By midafternoon, in a great rainstorm, I was aboard a jet, aimed at San Francisco, this time in uniform. The latter helped considerably in getting through customs, and I was mistaken for an airline pilot, what with my dolphins and all.

Finally, and very late at night, I reached the Jack Tar hotel, where I resolutely took a medicinal tot of Tequila, made two fast runs on the head, and thence to bed and deep sleep.

Awake at 0500, I made a cup of tea in the self-service coffee machine, shaved, bathed, and watched sunrise over this glorious city. At 0700 the phone rang. It was Margit, Judy, and David, ready for church in New London, and calling to wish me Happy Father's Day. I don't remember our conversation; but I felt kind of choked up. A hell of a father I was, indeed - virtually absent since first of the year, and so deep in the project when home that I was out of reach. However, this was my life, and it would often be so. I resolved that Sunday morning that it would not always be after this fashion. After prayer, I dressed, and went below to moderate the panel on hyperbaric oxygen therapy.

The meeting was remarkably well attended, due in part to the novelty of our papers and to the slack church-going habits of chest physicians. With three exceptions, the papers were good, and well received. About 800 colleagues were in attendance, many of them old friends and past acquaint-

ances. As in Atlantic City, our note was one of cautious optimism; and the spirit of the group was well received.

Unable to make my afternoon plane, I shifted to a daybreak flight, and so had a few more hours with old friends. But the time differential caught up with me, and I was in the sack by 2000, a very tired customer. Up at 0400, I took off finally for Washington, D. C., first having taken care by wire to guarantee my reservations at the Willard Hotel.

Much later, I had a cold reception at the Willard. First, I was told that they had never heard of me. Then, when pushed a bid, the clerk admitted knowledge of my reservation, cancelled out because of a "no show". My three dollar telegram, sent the previous day, had not, he said, been received. My room had been assigned to three brownies from den six of the Wauwautoosie, Wisconsin girl scouts. I toyed with the idea of posing as den mother, but considered it beneath my rank and dignity. An alternate hotel was proposed, accepted, and I taxied forth again. At the Commodore, the clerk denied receipt of the phone reservation, and suggested that I sleep in the park. At this point, an irate customer stormed in with complaints of pigeons in his bedroom, and resigning or otherwise relinquishing his right thereto. I have always liked pigeons, so I took his room without cavil. A snug harbor it was, if the mating habits of the homing pigeon are acceptable. Fortunately, for my purposes, it contained a head.

Before supper, I called Margit, and found that, up to the last minute, she had planned to fly to Washington, to be with me at the Willard for a last farewell. This is how it should have been, but never was. Some day, however, I plan to see my wife again.

All next day at O.N.R., where final SEALAB I plans were discussed, and future programs promulgated. A final dinner at O'Donnell's, some sleep, and off to Bermuda at an early hour. Subsequently, the aircraft encountered weather problems; I missed a flight; my baggage was lost; but nonetheless I reached Bermuda intact, and ready for action. In due course, I got both action and reaction.

3 July 1964

A few days ago, things were proceeding on schedule. People were missing, parts were not available, deficiencies were rampant. Clearly, we had reached our peak of training. We were, by my calculations, on schedule, and ready for dunking. This was the situation on the morning of 30 June 1965 - 6 days prior to projected launch. If past history could cast light on the operation, all essential elements would fall into place 30 seconds before we cast off number one line. I was satisfied with the calendar and the state of affairs.

At approximately 1150 of that day, in perfect weather, and under conditions of excellent color photography, two large Air Force planes were conducting a combined paramedic ocean drop exercise, for the purpose of making a promotional film in connection with Project GEMINI. Several "sticks" of paramedics had been dropped into Bermuda waters, when, for reasons neverafter determined, the pilot of one plane swerved into the path of the other. There was a violent midair collision, followed by a minor explosion, and the smaller aircraft began to disintegrate. Together, in a grotesquely handsome swan duet, the two plunged into the sea. A second explosion birthed at least five separate and distinct surface fires. In minutes the wreckage sank, a few bodies floated free, and the balance of personnel were committed to depths of 30 to 50 fathoms of ocean water, as free objects or else incarcerated in parcels of crumpled aircraft metal. Available military SCUBA-divers ordered to the scene were quickly recalled, because of water depth and the presence of many sharks. A few bodies were found floating, and were recovered by small boat crews; but at least a dozen

paramedics and plane crew personnel were missing and presumed dead.

As soon as I heard of the tragedy, I volunteered the services of our SEALAB topside diving crew for whatever help they might offer. A few hours later, however, we were reliably informed that water depth at the site of the sinking was about 120 fathoms, which put it well beyond the capabilities of any conventional divers. We proceeded with our planned schedule of SEALAB operations.

Next morning, the picture changed once more. A reported positive fix by the Coast Guard showed a water depth of 210 feet - too deep for standard SCUBA diving, but within the capabilities of my people. Our services were requested for body recovery, and we got underway with the YFNB-12 at once.

On the scene, we commenced a bottom search, first with divers (to determine visibility), and subsequently with our underwater television equipment. It was immediately obvious that the location marked by the Coast Guard was a false contact; but by 1000 we were skirting a large area of wreckage and localized intense shark activity. The wreckage was fantastically scattered, at depths of 190 to 240 feet, with almost no large pieces, and none really identifiable. We buoyed off the more promising areas, and commenced diving operations.

After two long days of extremely hazardous recovery operations, we had recovered one and one-sixteenth bodies, in a state of advancing decomposition. We had also encountered moderately severe nitrogen narcosis, some shark activity, and gruesome evidence that little, in the way of human remains, was left to recover. I returned to Kindley AFB with our grisly

remains, and advised the Commanding Officer that further diving search with our teams would be futile, extremely hazardous, and productive of no identifiable remains. Our portion of the operation was terminated, with expressions of gratitude.

Underwater recovery of human remains is an unhappy and unrewarding chore. In all honesty, most of us feel that, save in the case of a simple drowning in shallow cold water, with almost immediate recovery of the body, it is infinitely kinder to consign the remains to the ocean depths with an appropriate ceremony. Thus, the dignity of death is best preserved for survivors and deceased as well.

SEALAB I personnel returned to Naval Station, Bermuda, to pick up lost threads. Operation Recovery was terminated, for better or for worse.

4 July 1964

Came Independence day, and the schedule began once more to firm up. All preparations inside SEALAB were reasonably complete, and all personnel accounted for. On board YFNB-12, technicians were falling over one another in the control trailer, making last minute adjustments on the myriad of complex electronic gear which would monitor every heartbeat, breath, and change of temperament in the habitation and its aquanauts. In truth, Captain Mazzone and I were being instrumented out of living space; but we were both thankful to have such a dazzling array of the best possible gear.

In this open-sea experiment, as with our previous GENESIS I chamber runs, we were intent on getting the maximum amount of useful scientific data

consistent with the conditions of the operation. Without these data, real progress in undersea experimentation cannot be expected. For all of the fanfare of Cousteau's remarkable experiment in the Red Sea, not one iota of useful physiological information was obtained. Likewise, Ed Link had demonstrated that man could live for a 24-hour period as deep as 400 feet; but no significant data were derived from his exposures. Both of these pioneers had committed a major scientific sin, in accomplishing a feat without recording the events leading up to it. In SEALAB I, we were quite determined not to perpetuate such mistakes.

Daily, we find ourselves plagued with a serious problem in public relations. The press has been exceptionally good to us, and a model of cooperation. Many correspondents have faithfully joined the ranks of camp-followers, and have abided strictly by our often arbitrary ground rules. Now, at the final scene, they rightfully expect to be on hand for continuous coverage, and to get some underwater footage as well. Unfortunately, the time which we could allow underwater photographers at this depth was extremely limited; and most topside operations are either hazardous or highly technical, or both. In any event, the presence of extra personnel, whether abovedecks or in the water, would always interfere to greater or lesser degree with the success of daily operations. Thus, fairly severe restrictions were required and imposed. By and large, they were accepted.

Next day our final checkout of all systems was scheduled, and we would all be at sea by the 7th of July. Tonight, we received news that Ed Link had successfully kept his people at 425 feet for 48 hours, and had commenced decompression. My prayers were with his subjects.

Subject: Characters

God knows, in the course of accumulating my composite group for SEALAB I operation, I gathered a strange and motley crew. Idiosyncracies to the contrary notwithstanding, these lads were as nothing, compared to the group of technical advisers which we inherited from all corners of the earth and many walks of life which I would normally avoid.

From Britian came Syril (not Cyril) W _____, an Irishman, who hated the British, but loved their tea, and the money he got as a civil servant. He was a whiz of an engineer, and sharp as any cookie crumbled; unfortunately, he crumbled readily. Keen for deep diving in general, he turned pallid when invited to join us in the body search and recovery, and hastily declined. Later, when I recounted the unpleasant details, he blanched and departed. Exactly what he will do in the face of a diving casualty remains a closed book. Presumably, he will hide. Nonetheless, he has considerable technical ability. Diving, however, is a tough and deadly game; and I tend to wonder about such experts.

Next, we were presented with an effeminate character, who said, "Oh my God - I've never been below 60 feet". Obviously, he was in the right tent, but the wrong desert. He disqualified himself immediately.

Now came a female, complete with a single bottle of compressed air and an Aqualung, demanding a five-day stay in SEALAB. Her measurements were below par, and her abilities at the 1.4 level. My aquanauts said they'd rather study their magnificent pinups - scratch that female.

Finally, a host of characters like the Thresher woman and the man with the loose bowels, of which the world seemingly has no end. All such people demand entrance to SEALAB habitation, and threaten legislative reprisals or the fix of an actual malignant curse on the whole enterprise. Somehow, we survived all these malcontents, and prepared for the final phases of our mission.

6 July 1964

This was to be the day for manning the habitat on the bottom, but our slippage took care of that very nicely. Our plan to get YFNB-12 underway this afternoon, with SEALAB following tomorrow, went by the board when a weather front with 30 knot gusts and 12 foot seas moved in at 0930 today.

At least, we had our scheduled press conference, which no act of God is ever known to stop. This time, for a change, we had all of the support personnel in on it, and the aquanauts blended, as it were, into the background. The reporters were particularly well-behaved, asking questions equally of all subjects, without favoritism - and they got frank answers, with some wry humor. All told, the session was quite informal and went very well indeed. After, final tours of SEALAB control and the habitat were conducted by Captain Mazzone, and the group departed in fine fettle.

Scott and I departed to make a courtesy call on Captain Belcher, where a new surprise awaited. During the night, a longish dispatch had arrived, saying in effect that the investigating board of the air-crash had reconsidered, and now desired recovery of all aircraft pieces, better to determine the true cause of the disaster. Furthermore, we were requested to

comment on the advisability of moving the SEALAB I operation in toto to the scene of the accident, and have my aquanauts do the entire job of undersea mapping, bottom photography of the whole mess, and salvage of all parts.

In light of this new development, we cut short our call, and departed, I for some real soul-searching, and ultimate conferences with our people most directly involved. The soul-search was a most agonizing reappraisal, best done while sitting on top deck, examining the seascape. I went topside alone.

At first blush, the proposition was attractive, even mouth-watering. We could show magnificent flexibility in moving from a planned to a totally unplanned underwater situation. We would be doing a significant operational job, and proving a point I'd preached for years -- that the SEALAB concept was the most effective means of doing useful underwater salvage and/or extensive survey. In addition, a successful completion of this task would bring kudos and tremendous popular response. Finally, my aquanauts would consider themselves usefully employed, and not just experimental subjects for another in a long series of scientific reports.

All of these factors I considered over four pipefuls of tobacco, and ultimately rejected. Project SEALAB was conceived in 1957, and each slow reach toward completion had been aimed at our first undersea manned exposure. As we painstakingly approached this goal, I had selected a site of operation. The site had been studied from the point of view of five-year bottom current reports; daily sea-states for an equivalent period; uniform ocean-bottom depth; and minimal obstruction hazards to the aquanaut on a sortie. Addi-

tionally, we were to be working atop an Atlantic seamount which had never been the subject of intensive study.

To change our scene of operation and primary mission overnight might well defeat the purpose of the initial experiment. At least six precious days would be lost, moving us too close to the hurricane season. Of necessity, important physiological studies would have to be curtailed or deleted, to allow for the new operational mission. The ocean bottom depths were extremely irregular, with abrupt shelving to six hundred feet near the wreck site; and thus a new factor of decompression problems could be foreseen, with no conceivable means of treatment, should bends occur at this depth. In addition, a 4-point moor for the YFNB-12 in this location would be technically difficult, and of uncertain holding capacity; and no records of bottom currents or daily sea states were available. After discussion with Roy Lanphear and Joe Pinning, we made a conference call to ONR, Washington, where we received a sympathetic ear.

Accordingly, at 1600, a joint dispatch went out from us in disagreement with Red Hollingsworth's message, and recommending that we stay on steady course, as previously approved at all levels.

Thus, the flap was turned over to higher authority, as is the custom. Tonight, phones will ring in Washington, and feelings will undoubtedly be hurt; tomorrow, we'll have the final word. Unless otherwise directed, and by highest authority, we will proceed to Argus Island tomorrow afternoon, weather permitting. Failing that desideratum, we'll grit our teeth and do as directed though with new and uncalculated ground rules. I grow older by the day, and these things speed the process more than a little.

The formula of success, already loaded with unknown factors, may yet increase in length and obscurity.

8 July 1964

And at least another day lost, thanks to Bermuda weather. On best advice of our local meteorologist, Roy took a calculated risk yesterday, and got underway with YFNB-12, trusting that wind and seas would abate during the night, so that he could drop weather anchor, and get into a moor today. I was to follow at 0400 this morning with SEALAB in tow. Up at 0300, I brewed a glass of tea, finished packing for sea, and prayed for a good report on sea state and word to cast off. My prayers missed the mark: word came at 0345 that YFNB-12 was returning, with nothing accomplished. The weather front which so plagued us was stationary, and again we must wait.

It is ironic that an experiment such as this, designed to demonstrate man's ability to work underwater, independent of surface conditions, should be so hopelessly dependent on those very conditions. With SEALAB II, this will not be the case; but with our first venture, we are immutably bound to respect the vagaries of wind and wave.

And now we are faced with the realities of date slippage, for extension of SEALAB bottom time cuts into other programs of equal or greater importance to the Navy. I may well be forced to compress and shorten the project to two rather than three weeks. If this is required, it can be done, though reluctantly.

A major consideration in these delays is the psychological effect on the subjects themselves. A fine edge of motivation can be easily lost, and

short tempers become apparent. Since it serves little purpose to damn the weather, it is more satisfying to damn the judgment of the investigator in selecting this site, or the project officer for not being bolder, or even the unfortunate pilot whose tragic error caused our delay to this point of time. This all could make up a problem of serious proportions, and is a difficult factor to control. I console myself with the knowledge that every space shot has been plagued with holds of this nature; yet somehow the principals have survived the experience.

Tomorrow, we hope for a better day.

10 July 1964

And yet another delay, due to weather. Our meteorological whiz-kid studied his synoptic charts and chortled over a host of new lows spawning off the coast of my home state, aimed dead center at Bermuda. According to his glib interpretation, the high which had lingered for seven days off Nova Scotia, thus stalling a miserable front right slap-dab at Argus Island, was retreating northeast, thereby enticing all available lows to cross our track. As these lows sweep over, we will have both wind and waves, not to mention swells and foul weather. Bermuda in July? Give me rather Greenland in February or the Seychelles during monsoon season! In the future, despite blandishments of the local Chamber of Tourist Deception, I shall mark this island "Off Limits" to serious investigators.

However, life must go on, and crosses are made to be borne. Even Job, the complainer, had a spot of bad luck, so we are not without worthy precedent. Still, the morale of the crew, not to mention that of the Principal Investigator, was in need of a large boost. Faced with impending mutiny, I had a clear call for action, of any kind. Also, we got word of a visit from the Secretary of Navy three days hence, and could not be caught becalmed.

Accordingly, we decided to tow SEALAB I to the fantail of YFNB-12, open her up for occupancy, reconnect our full umbilical package, and turn on all systems at full power. Since our weather hold was for at least 48 hours, we should have a good engineering checkout, and useful data could be obtained from all working channels. We might risk wetting our umbilical

terminals, and some work would be involved, but the former was calculated, and the latter desirable. In addition, the myriad of technicians who had patiently been sitting on their duffs could get a good continuous operation of all control systems in unison. Finally, SECNAV would have something to see, albeit 180' too shallow, and in the wrong parking lot. The treacherous thought crossed my mind to hint to him that the experiment had been delayed and held locally as a matter of convenience to him; but of course I voted that dishonesty down in a wink. Instead, we would be forthright and truthful, and blame the whole mess on the Air Force.

By 1500, SEALAB I was tethered astern of the barge, and the umbilical connected. Shortly after, a ground was discovered, and ultimately traced to the power cable itself. The interior of the habitat was bone-dry, with no condensate, and all shipshape. The umbilical was disconnected for required work on the power cable. Tomorrow, a fullscale run of all systems is in order.

11 July 1964

Last night, since the program seemed to be stalled for another 48 hours, we descended on the "O" Club in force and drank and sang bawdy bits until the wee hours. Perhaps this bit of unlicensed activity broke the charm; but I can never be certain of this. In any event, the weather map changed dramatically, and by daybreak we were promised continuing improvement. Spirits lightened all over the place, and we made preparations to get underway with YFNB-12 at 1600, with Andy and myself to follow at 0400 with SEALAB I in tow.

Two minutes early, the barge cast off its lines and commenced to back down. Over the horizon at flank speed came two plank owners of the Chief's Club bar, and successfully closed the gap to the ship with an inspired pair of leaps, and millimeters to spare. A typical departure for my unorthodox crew, I thought. All of this was covered by our official Navy photographer, but not for the record, I pray.

And so, God willing, the show goes on the road before daybreak, with modifications all over the scene. I must now compress my 21-day span into 12 or 13 days; our plans to tour SECNAV are probably shot; and some features of the program remain fallout items for SEALAB II. Nevertheless, we will go, and accomplish what we can. Further, this deponent sayeth not.

And now to mention people, on whom depend this or any similar program of significance. SEALAB I has been formed, in essence, around four men: CDR Bob WORKMAN, CAPT Walt MAZZONE, LCDR Roy LANPHEAR, and myself. In honesty, we must add sixteen people who compose our essential support crew. But the prosecution of the project nonetheless depends on the first four persons named. This is not as it should be. In a venture of this magnitude and importance, we need a sizeable staff of Chiefs, and a multitude of Indians. To launch a single astronaut, several thousand technical toplevel specialists were required. In many respects, our problems are of equal difficulty. It follows that we must soon form a group of pressure experts who can stay together as a team, with good laboratory support, to pursue the goals of the program. Without design, four men in the Navy have concentrated nearly all knowledge of prolonged high pressure exposures within the group; and this is dangerous. We must move as soon as possible to bring

in new talent, and indoctrinate other professional people. When Zetterstrom died at the hand of a stupid winch-handler, a mass of wisdom went with him. We dare not risk a similar mistake.

Tomorrow, we go to sea.

13 July 1964

Yesterday (I think), I took off at 0430 onboard the YTM, with SEALAB I in tow. Faithful Joe Pinning, CDR, USN, and "Andy" Anderson, GMI, USN, were on hand, the former to see me off, the latter as company. And so began a very long voyage. With our tow riding magnificently at about 1.8 knots, we commenced the long reach around Bermuda. Twelve hours later, we were nearly opposite our starting point on the island, and I was rapidly tiring of the view, which changes little, if any, at this speed. At sundown, we commenced the open-sea reach to Argus Island, some 26 miles southwest. Four novels later than sunup, we reached our destination, not without eyestrain, due to poor reading conditions. Whoever wrote the "Slow Boat to China" had in mind something better than a bunk on a coil of 4 inch line, and a handful of sex books, plus a 38 degree roll and a 22 degree pitch. I am, of course, a good sailor, although I admit to the occasional bout of dyspepsia such as might be induced by careless shiphandling. Be that as it may, all went well with the Bond upper G.I. system until chow call at 1600. Prior to this catastrophe I had seen the tug crew merrily cutting up scraps, intermingled with jettisone bits of lard and rancid pork, in a large container. Naturally, I judged it to be chum for a later fishing program, or else garbage to be heaved overboard at a safe distance from Bermuda. Instead, these conniving stew-burners heated and served the mess for daily chow. I ate in a spartan fashion, shoving aside

egg shells and coffee grounds to get at the spoiled cabbage hearts and grapefruit rinds; but after a bit I tired of the game and politely asked where to scrape my leavings. With a shrug, a seaman deuce pointed to an empty pot labelled "Late Snack", but suggested it would be simpler to put it back in the supper pot. "There's more hungry mouths waiting, you know, Captain", he smirked.

Be it forever said that the YTM 726 is a towing vessel par excellence, but no feeder; and she could do with a bit of stabilizing. Somewhat later, I relieved my indigestion after my own fashion, without aid of Tums, and on the port side. Shortly thereafter, we sighted the lights of Argus Island, many hours distant.

Once arrived at our site of operations, we were met by SEALAB divers in a rubber raft, the whaleboat having been rendered hors de combat by virtue of unplanned collision with YFNB-12. This was about par for a SEALAB course, and almost reassuring. Swimming heroically, and under considerable hazard, Tuckfield and Eaton hooked us up to the buoy, with SEALAB I streamed out astern like a placid lamb. According to wind and swell direction, she would remain taut astern until daybreak, and separate tow to the barge. Unfortunately, SEALAB I, being a deep-draft creature of the oceans, heeds only current, which perversely was going contrary to wind and wave. As we watched in horror, the technicolor monster began a long and inevitable reach to our port quarter, and, snubbed by the end of her tether, turned abruptly to ram the defenseless tug. All hands rushed to the waist to fend her off with pikes and boathooks, and the rubber raft strained mightily; at last she stood clear astern, but obviously not for long.

I held a hasty conference with First Class Worley, Master of the YTM, and a gentleman from the Appalachian mountains. Our choice was a four hour job of dividing the two belligerents in a dark and reasonably high sea, or simplifying the procedure, on recommendation of an Appalachian country doctor who had become a Navy Captain. My advice was to attach the SEALAB I, at short stay by the towing bridle, to the moor, and to remain in same ourselves, but with longer scope. Thus, the beast and the bullfighter would be in the same arena, but tethered, safe as puppets, on a single center point. Worley gravely sucked on his pipe, allowed as how he'd never heard of two freeswinging vessels on a single moor, but that it made sense to a country boy. We did just that, made Naval history of sorts, and saved four hours of time. Later, Worley became so intrigued with the game that he shortened his scope, to allow SEALAB I to sweep his bow within inches on each slow lunge. Watching from the barge, I shuddered at each near miss, but chuckled to hear the redoubtable mountaineer squall at each near collision, "missed me again, you big red bastard!" The Navy will fare well, so long as we have men like 1st class Worley.

On board the barge, at 0230, and after a very wet trip on the rubber raft, things were not so well, and rapidly degenerating. Instead of going into her prefixed moor at 1130 the day previous, as planned, she had dawdled on various pretexts, and not in the best interests of the program. Hanging on a single line, she had requested and received delivery of a whaleboat from Argus Island Tower. Within a brief span of hours, this excellent craft had been allowed too close astern of the barge, and a large swell had partially crushed the boat and injured an occupant in the collision. The whaleboat was out of commission, the occupant in sick bay with a badly

broken foot, and faces were loaded with egg. This was the scene at 0230, 13 July, when I was received aboard, wet and tired, but stupidly happy.

The stupidity and happiness were shortlived. My first onboard encounter with ChBOSN Hollingsworth, skipper of the YFNB-12, started on a familiar and unpleasant note: Let's abort the entire mission, try it another time, another place (and, presumably, after Red had gone to another billet). I was not very sympathetic at this point, and suggested that we go to the rack for a couple of hours, to resume our discussion afterwards. Which we did. Walt Mazzone and I retired to SEALAB Control, where I tried not to snore too loud.

After a hearty breakfast three hours later, dispersing memories of the YTM chow, I betook myself to that haven of refuge where all adult men to to contemplate and concentrate. In the midst of this ritual, I was shaken and no little frightened by a resounding shock on the upper deck, then on the side of the barge - about a kiloton load, I figured, and dashed undressed for the disaster control station. Nothing developed, so I ventured forth, to view the remains, plainly evident.

The decision had been made to bring aboard the remains of the whale-boat, previously damaged, in order to determine whether the ship's company could repair the damage. The picture is confused, but it is clear that inadequate preparations were made to raise the boat on our crane, without coordination from the bridge. We were rolling 18° in the swell, which could have been corrected with our harbormasters, and was so intended. Yet, abruptly, the nearly three ton load was lifted clear of the water and

wavered over top deck, with all steadying lines on the deck below. The crane operator, swinging fast, and seeing the boat headed to demolish SEALAB I control trailer, tried to stop the massive swing. At this point, a Bo'sn sensing a stress on one line, shouted "slack" to a single gang - and all hands slacked. The boat crashed against the barge; - - - - - the crane operator reversed his overrun, stood the wreckage clear, and wisely dropped it in the water, where it belonged. The damage was done, and a new problem born.

Ten minutes later, Red, Roy and I were together on the bridge. I was told that the reason for the calamity was a massive stripping of control gears on the crane, that it could not be repaired in our time frame, and that we would best settle for a seventy-foot run in the harbor at Bermuda. Somehow, I tended to disagree. In company with Scott Carpenter, I sought statements from the crane operator, and later from everyone who knew this crane which had so faithfully moved our Submersible Decompression Chamber at sea before. I was not desperate; I only wanted the facts. The facts, as Scott persevered, were to the effect that perhaps the crane operator had swung too fast, and that damage had not, in any case, been proven. We set to work. Inspection plates were removed, the crane operated, the oil drained; and finally, the manual was found and read. The crane was exonerated, in good working order. Personnel error was the fault. Nevertheless, Red Hollingsworth was adamant; he considered the crane handling of the SDC to be unsafe; without the SDC, our operation was extremely unsafe; therefore, the entire operation should be aborted.

Over the open circuit, plain-language communication, this went out

from YFNB-12 to all stations on our frequency. The damage was done; the news media heard the word and began composing next day's headlines.

Shortly thereafter, Roy, Red and I had a conference on the bridge, and in Red's stateroom. Red, and to a much lesser extent, Roy, sought to convince me that we had fallen on our face operationally, and could not possibly complete our task. I discussed the problems of an abort at this stage of the game, and we agreed to a phone discussion with Captain Melson and Al O'Neal, both of whom were fortuitously in Bermuda. After radio-chit-chat, Captain Melson requested a conference with Roy and myself. Accordingly, we put aboard the Mac III at 1300, bound for the island, with our latest human accident victim aboard. We arrived early, delivered our patient to the station hospital, and went to Tudor Hill Laboratory, where awaited Captain Melson and Al O'Neal.

In this meeting, as pretty well agreed upon by Roy and me prior to arrival, the question was never - can you do it, but rather, how can it be done. Both Al and the Captain had given the matter a great deal of thought, and, not surprisingly, had come up with about the same alternates. We sorted these out, married three together, and came up with a best bet. Talking to YFNB-12 on radio, we learned that Red was in a solid moor, had SEALAB I on the stinger, and the umbilical connected, with all systems go. And thus it came about that we would again go ahead.

15 July 1964

Back in Bermuda tonight, after being in tow from the Argus Island site since late yesterday afternoon, when we aborted the run, after partially

flooding and nearly losing the SEALAB. The former situation was in part the fault of SEALAB personnel; the latter was a repetition of Panama City seamanship. May I recite the sad episode.

Upon return to YFNB-12 at 0830 yesterday, certain that we could correct the deficiencies of the crane which would handle the chamber for submersible decompression, Roy and I went aboard. Everyone clamored for news, and assurances were made that it was good. I suggested a general planning conference in the mess deck as soon as it was cleaned, so that all plans would be understood and agreed upon. Roy went in to brief Red on our meeting with Captain Melson, and to formulate a work program. I asked my SEALAB people to be patient, pending the general conference to commence shortly. The conference was never held. In about 15 minutes came loud and clear to all hands, "Now hear this: make all preparations for ballasting and lowering away the SEALAB!" I was dumbfounded; and in a few minutes, meeting Roy in the passageway, I asked if we didn't have time for a general meeting.

"I don't believe we really need it, doctor," was the response. I hastened then to tell each of my people about the previous day's decisions and plans, but action was already underway, and headlong at that. Later, when I suggested that ballasting operations could proceed at a leisurely pace, I was told that the sea state was good, and we must make hay in a hurry. Considering that our best information was that the sea conditions would steadily improve for 48 hours (this subsequently proved to be true) it didn't make sense; in no case could I put SEALAB I occupants down until all repairs and modifications to the crane and SDC were complete, and this

looked like a 30 to 40 hour job. In passing, I asked Roy if this could be effected and tested during ballasting and lowering operations, and was hastily assured that it could. Shortly thereafter, when I asked Red about the program to complete this secondary job, he professed ignorance of the requirement. Too late, I sensed that Red had washed his hands of the affair, and that Roy had dealt him out of the picture, assuming full responsibility as on-scene commander, with the nigh-impossible task of directing SEALAB movement control and SDC operational repairs simultaneously.

In such a complex operation, assumption of solitary control without coordinated planning can be disastrous for the chief operator, his minions, and the project alike. And so it was in this case. Matters which would have been brought up in the pre-work conference, discussed and clarified, with responsibilities clearly defined, became random inputs, to be integrated in a mosaic of frantic and hazardous action - namely, ballasting and lowering of SEALAB I in the Atlantic swells of Plantagenet Bank.

And so it was when Bob Barth informed me that he was authorized to take the retaining cap off the shower drain to sea, and replace same with a 2- $\frac{1}{2}$ " hose, leading to and secured at the level of the ballast bins. I agreed to the proposal as relatively harmless, though possibly unnecessary. Since the SEALAB I could not carry an internal overpressure, and since the hose end would be well below the spill area of the umbilical hawse-pipe, it seemed safe enough. True, it meant two, instead of one, hull penetrations; but our program for lowering one foot at a time would surely allow a sufficient internal gas flow to prevent water entrance into the hose. I assented to the innovation. Over the din of moving parts, and in the confusion of ballasting,

Roy was informed, and nodded confirmation. The hose was attached; but within minutes we saw that it leaked gas at a joint much higher on the hull than the low point of our umbilical stuffing tube. We instantly recognized this as a source of potential hazard, in event of an unexpected drop, and requested to send Bob overside to stop the leak, or else replace our watertight cap. Roy held the plan in abeyance, stating that he wanted to square away arrangements for transfer of SEALAB from outboard stingers to the final 9" nylon hoist first. Since SEALAB was apparently not too heavy, and since our supposedly clear and complex plan for final heavy ballasting and lowering seemed a time away, I repaired to the control shack, where my absolute pressure gauge stayed on a steady 26 p.s.i. absolute for about 20 minutes. Sure that I would be notified before any further lowering, I dropped to the mess deck for a fast bite of late lunch. On the fantail, Barth waited to dive and repair or seal off the johnnie drain. Abruptly, the decision was made to swing SEALAB off the outboard restrainers to the 9" nylon under the stern, and to add ballast at once, to prevent her bobbing under the fantail. These were the orders, and our people complied. With the addition of the second ton of ballast, SEALAB sank to 20 feet. Through the 400' and 1000' gas feed lines, gas flow tried valiantly to maintain internal pressure, and with reasonable success; then a great swell came, and the nylon stretched in response to a sudden total load of about 90,000 pounds of habitat mass, and characteristically stretched to accommodate the situation, as if it were the expanded calf of a fat woman with slim ankles. The SEALAB dropped to 30 feet ... 36 feet ... 40 feet ... 42 feet ... and back to 35 feet. From the strain, the line commenced to emit blue smoke, the warning of internal frictional stresses portending disaster. The ancient rollers over which

the line passed froze in seeming horror; and now, with each lateral swell, the line see-sawed in a horizontal fashion across the lower rusty bars, scorching badly with each traverse.

Unaccountably, unbelievably, we had again lost control of the situation. The fantail was cleared, firehoses turned on the nylon, and the order for gradual raising of the habitat was given. Meanwhile, Bob Barth was given permission to replace our hose with a cap, at the 24' level, which he did, too late. Gradually, we gained on the monster, and brought her near the surface. Meanwhile, I ate my lunch, happy in ignorance.

Walt Mazzone broke the gastronomic reverie with a fast beckon. "We're aborting, George", he said; and I had to believe him. Running aft, with veal steak cornering my mouth, I saw the 9" nylon dwindled to a thread; saw the burn marks, and the anxious wave-asides. Do-or-die, we raced to the fantail, now strangely devoid of spectators. Red and Rpy showed me the spectacle; a line far too taut, and steaming under a hose, and desperate operations already underway to deballast, even jettison, in an effort to avoid parting lines and loss of life and, incidentally, SEALAB I. Obviously, we must fall back and regroup; which we did, under hair-raising circumstances.

Some time later, with SEALAB I buoyant, and all diving hands accounted for, we noted a newly-acquired heaviness aft, of SEALAB I, coupled with reports of ominous sloshing gurgles within. Unquestionably, she had taken on a large ballast of sea water in the course of her unexpected drop. Divers' inspection confirmed a condition of minor flooding. The situation was now clear; we could not handle the habitat from YFNB in these waters; she was

at least partially flooded; we had once more - perhaps finally - failed in a dream proposal some seven years ago. I was very sick, in the real sense.

When I practiced surgery, the joke of the successful operation and dead patient was routine. Now we had a successful experiment and a dead operation. Having got our partially-flooded SEALAB to the surface and out of immediate danger, I sought analysis of the double casualty, then solitary respite for regrouping of thoughts.

In retrospect, it is always easy to assume control of a situation. In actuality, things just don't so happen, especially in an open-sea operation, where the natural forces are inexorable and human demands and desires are vacillating. At this point, the loneliness of command is very real indeed, and little cries, though significant, must go unheeded. Faced with a warning blue smoke in nylon, possible loss of life and habitat, Roy made the only possible decision: scrub the operation for now, recover if possible, and talk later. This decision cannot be faulted, especially in light of our flooding. Undoubtedly, we could have dropped away rapidly, sparing nylon but accepting stretch; yet we could not have maintained pressure, and massive flooding would have resulted.

Never send a boy to do a man's job - and we had done just that. In recognition of this imposition, the entire YFNB-12 had rebelled, after a fashion. However much they may have desired success for our project, they knew their limitations, and would not accept undue hazard or clear reflection on their capabilities. The equipment was marginally equal to the task; and,

without command drive, it was doomed to failure in all departments. This I understood with sadness. Too late, my legs, my dedicated people, and SEALAB I, had been shot down. We turned tail and went home to Bermuda, and to a conference.

16 July 1964

The conference with Captain Melson and Al O'Neal was mighty interesting. First, Roy told of the monstrous handling difficulties, the near-loss of SEALAB I, and the general hopelessness of doing the job with the material available now or in the foreseeable future. Red Hollingsworth spoke at some length about handling impossibilities, dangers of lying in a moor near the Argus Island, and his unwillingness to continue with the project as planned. Give, he said, a completely sheltered mill pond, and the job could possibly be done, but Al O'Neal came up with an ingenious system of using very large buoys from which SEALAB could be lowered and raised on chains, using hand-powered jacks. This was not acceptable to Red or Roy.

Having reached the conclusion that our entire project was fast disappearing down a drain of pessimism, I put in my two-bits worth. I said that, in my opinion, all possibilities of handling SEALAB on Plantagenet Bank had not been explored, although that was obviously a matter for the engineers of the group to examine. If the final judgment ruled out the Argus Island run, I would with great reluctance accept a one week exposure in the 70 foot hole in the bay. The physiological data would be virtually useless; but at least the environmental controls, swim gear, communications, and TV monitors would yield important data; and we would not come home quite empty-handed. It was a forlorn little soliloquy, but nobody cried.

After a long period of silence, dramatized by navel-staring and head-shaking, it was time for Captain Melson to speak, which he proceeded to do. His opening comments were to the effect that apparently the majority present had spent more time figuring why the job couldn't be done than how it could succeed. He had heard us all out, and would now offer a last resort. Walt and I exchanged big grins: we had us a winner, and knew in our hearts what was coming next. It came, loud and clear. Handling of SEALAB I would be done from Argus Island Tower itself, utilizing her excellent crane capabilities for a guaranteed safe job. He would put aside essential ARTEMIS work, and order the Tower at our disposal. And now it was up to us to come up with solutions to the problem. At this point, with a fine dramatic touch, he left the room.

Something wonderful happened to the lethargic and sad group. Al O'Neal sensed the chemical reaction, and skillfully began to exploit it. Problem areas were listed one at a time, and solved in minutes. Telephone and radio orders went out; talent was borrowed from Tudor Hill and Naval Station; people smiled and backs were slapped. The show was on the road, and not to be stopped this time.

The Navy doesn't have too many Captain Melsons and Al O'Neals. But those that are around manage usually to be in the right place at the time they are needed. At least, such has been my experience; maybe it's luck. More likely, problem areas are natural abodes for such individuals.

At 1300, I gathered our SEALAB personnel on the crane deck, and gave them the word. It was a ball. Immediately, fresh assignments were sought

and given. SEALAB I was ready for hoist and refit, and they fell on her like a swarm of bees. Twenty-four hours later, all systems were repaired, and she was ready for submersion. This was McHale's Navy at its best.

This morning, I awakened at 0430 to watch a fair weather sunrise, ate contentedly from my hoard of fruit, and leisurely read my operational notes and last minute procedures. The world was bright, and I had an indefinable sense of well-being. At about 0600, a knock on my door announced a telephone call: something had gone awry. The phone call was from the station dispensary.

And then there was Dr. Bohan's voice saying that Scott Carpenter had just been admitted following a motorbike accident, with a compound fracture of the left arm and assorted injuries; now the telephone booth grew very dark, indeed.

When I saw him, Scott was totally heartbroken. His terribly painful injuries were nothing to him, in face of the anguish of missing the SEALAB I participation. After seeing the X-rays, I had to tell him that he was on the scratch sheet; and it wasn't easy for either of us. Off he went to Kindley AFB hospital by ambulance for specialist attention, where I revisited him a few hours later by helicopter flight. My guesses were morbidly right: he should have primary debridement of the wound, but no attempt to reduce the multiple fractures for a couple of weeks. For the definitive open reduction and introduction of steel pins, he must be evacuated stateside. I promised him a permanent billet with SEALAB II, and flew back to the base, to tend to the thousand details involved, including a talk with his wonderful wife, Rene. It was a bitter blow to all of us, who had grown so fond of the man

and so wanted him on this first run.

Men like my SEALAB personnel and Scott Carpenter are truly a breed apart. They are immensely resourceful, incessantly curious, impervious to hazard, and impatient with the progress of the world. They are the men who take the chances for all of mankind, who care nothing for fame, but seek only the satisfaction of battling odds and attacking new frontiers. Scott had long been in this fraternity, and each of us felt a low blow at his loss from the program, if only for a few vital weeks.

Work on SEALAB I continued through the day, including an external repaint job. By late afternoon, I had word that all systems were in perfect operating order, and the toilet paper replaced. As of now, we are ready to get underway tomorrow.

In open defiance of travel brochures, the weather in Bermuda was unpleasant. A wind of near gale force boxed the compass with monotonous regularity; rain fell at intervals, and the sea state was miserable. The famed Bermuda "High" was foundered in the lesser Antilles, and the future of SEALAB I seemed grim indeed. I resorted to prayer, with added incantations acquired from a Cherokee witch doctor. The weather continued bad.

19 July 1964

It seems as if this day commenced three days ago, which is exactly the case. On Friday last it appeared that we could make one final stab at completion of the project, utilizing Argus Island tower as a point from which to lower the habitat. The procedure seemed simple enough: we would proceed to Argus Island with SEALAB in separate tow, get into a moor,

receiving SEALAB under our fantail, ballast the monster to neutral buoyancy, attach buoyant floats, and continue ballasting until she was about three tons negative. At this point, we would tow the supported SEALAB under Argus Island where the crane would hold her while the floats were removed by divers; then, gradually, SEALAB I would be lowered to the ocean floor, while Walt and I fed gases into her innards via the umbilical cable, all the while sampling with cromatographs and the like, and inspecting her inside and out with remote T.V.

It was a simple plan, sure-fire and seemingly easy of execution. It required only some basic planning, some working machinery, and a reasonable amount of hard work. Friday morning, we were in agreement on procedures, and happily went our separate ways until sailing time at 1600 hours. I returned to BOQ where I was faced with a refrigerator stocked to the hilt with fresh fruit, fruit juices, and a residual supply of Beefeaters' Gin, the latter said to be effective against sinus conditions so prevalent in Bermuda. I munched and sipped my way through the horde, completed packing, and boarded the barge in an optimistic, even exuberant, frame of mind.

As the barge widened its gap from the pier, the doors of the Chief's Club flew open, and about half of the SEALAB crew set new records for the 440 yard run followed by broad jump. We were underway in classic, though harrowing, style.

Next morning at first light the fun began. One by one, our careful plans went by the board, by virtue of vagaries of weather, material failures, or human nature under stress. The memory of the ensuing twenty hours, with the repetitive cliff-hangers, the near casualties, and short tempers, is

painful, and I draw the veil. Suffice it to say that midnight of Saturday found me on the top deck of Argus Island, peering at the swells 95 feet below, where SEALAB I hung suspended from the boom of our crane. At periodic intervals, depending on the sea state, the crane would dip slightly and emit loud groans, interspersed with ominous popping noises. The crane operator, riding his sick steed at the edge of this watery abyss, seemed remarkably unhappy. No more so, however, than Roy and the small host gathered to assess the situation. Earlier in the evening, to relieve the strain imposed by the deep-running swells, I had reluctantly jury-rigged a means of lowering SEALAB first to 40 feet, and then to 62 feet; but the benefits of this procedure were not immediately apparent.

For my part, I was not convinced that the crane was in mortal danger of collapse and avulsion from Argus Island. Some cranes, I am sure, are born complainers, while others bear an equal burden with stoic silence. Maybe we had a cry-baby. Roy set a constant watch on all features of the operation, and I returned to the nearby barge to pray and sleep a bit.

I awakened at about 0400 on the Sabbath and wandered from the trailer over the unlighted deck in bare feet, to contemplate the tower, its crane, and its burden. The trip was productive of a near broken toe, a bruised forehead, and visual proof that our SEALAB was still there. Sleep returned mercifully; and as I slept, the seas abated.

By 0900 this day, the ocean was nearly calm, and the wind slackening. We had punctured one rubber boat, and two other supporting small craft had been put out of action. But the umbilical cable had been installed at the unbelievable depth of 63 feet, without wetting a single component. Our

planned communication network had given up the ghost, and we were running this tremendously complex procedure with the aid of semaphore, bull-horn, runners, swimmer-messengers, and a rare bit of mental telepathy. When a system of sorts was established, messages went invariably to the wrong stations, and were garbled in nearly every instance, to our dismay. Meanwhile, SEALAB I was being ordered lowered from the command at the tower, while we sat in control shack in the trailer, desperately trying to keep up an adequate gas flow to prevent flooding. On occasion, we fell behind, or at least our gauges said so; and at least twice, we had minor casualties requiring temporary interruption of gas flow. And yet, somehow, we got her down safe and dry--more a tribute to the inherent engineering safeguards of the habitat than to our handling procedures, which were atrocious.

At 1330, SEALAB I was settled level on the ocean floor at 193' of seawater depth, dry and with all systems functional. I breathed, with all the rest, a prayer of thanks, and went to eat. The ocean had, for the first time in many months, attained a flat, glassy calm, as if somehow satisfied--for the time being.

Tomorrow, after my final inspection dive, the aquanauts will enter their new home.

20 July 1964

THE DAY dawned clear and as glassy calm as the night before. And now to me and to all of the SEALAB I personnel came the strong conviction that the project would go as planned. No room now for pessimism; no time for aught but to get our aquanauts in their habitat safely and expeditiously.

We ate an early and hearty breakfast, and commenced final diving activities.

Meanwhile, throughout the night, the people on Argus Island had labored mightily to ready our SDC and final ballasting arrangements. The former involved extensive welding and erection of a standoff pulley arrangement, repositioning of air stations and communication systems. The latter called for making up of powerful wire straps for lowering away the large anchors for final placement in the ballast bins; recheck of our underwater TV camera for anchor replacent; and refit of the Argus crane. They did their work well, and were ready for us, come sunup.

At 0700, our first set of divers entered the water, for a repeat inspection dive and to complete unbuttoning of SEALAB I. They returned to report a low water level in the entrance hatches, excellent position of the habitat, and all ready for final ballasting, which commenced at once. One at a time, with ponderous care, the great anchors were lowered to SEALAB I, delicately poised above the bins through TV control, and placed in position, after which the divers descended 190 feet to unshackle and allow the cycle to be repeated. It was slow, dangerous, and delicate work; but our whole team was skilled and drilled, and it proceeded with only minor delays.

Meanwhile, word came that the first visit of newsmen and photographers was scheduled around noon, for a brief tour, to observe final checkout, to interview the aquanauts, and to witness their final water entry. All but the last item proved possible this day. Work on the SDC, aboard Argus Island, was interrupted on almost a score of occasions, and she was not ready until about 1630. Walt Mazzone and I, as plank owners in this long

series of experiments, reserved the right of final inspection of the quarters for our subjects. Accordingly, we swam from the YFNB-12 to Argus Island in company with our following team of large but friendly barracuda, and, after another short delay, entered the SDC for the final trip. This, too, would be the first working trial of the SDC.

With Chief Lavoie as operator, we lowered rapidly away to the vicinity of SEALAB I, which soon became visible with startling clarity on the ocean floor beneath us. Remarkably, even at this late hour and great depth, the international orange or fluorescent red color of the habitat showed clearly. This is contrary to divers' experience and known laws of physics; but there it was, nevertheless. The reflected light from the coral sand on which our baby rested was remarkably bright, and the water absolutely clear. The SDC came to a halt at about 160 feet of depth, which meant a long breath-holding swim of about 90 feet before we could reach the shark cage and enter the hatch to the house. I went first, after a last deep breath from the air of the SDC, with Walt behind.

The swim was beautiful, but at first a little frightening. This was certainly the deepest breath-holding skin-dive I'd ever made, and possibly the deepest in history. SEALAB I seemed a long ways off, and much interesting marine life in between. I wondered if the back porch might be accidentally shut, or if the shark cage might be full of large groupers, as had been seen on TV the night before. I wondered if the hatches were really open, or if my divers had played a grisly practical joke on us, and removed all bolts save one. The wondering ceased: I was in the cage, past the first hatch and rolling on my back to enter the hatch to the living quarters, which

gaped open and welcome. I bobbed up inside, breathed a wonderful atmosphere, and was immediately joined by Walt. We announced our safe arrival in helium chipmunk voices, which could not be understood topside. A fast inspection of both compartments, and we were off for a leisurely free-ascending swim back to the SDC, blowing bubbles all the way, to the amazement of our marine escort. At 1700, we surfaced, swam to the barge, and bade farewell to our aquanauts, as they prepared to repeat one part of our round trip to the ocean floor. As they submerged in the SDC, Walt and I took station in SEALAB control, he at gas monitors, and I in communications. Minutes passed, and more minutes.

At precisely 1735, a chipmunk in SEALAB I began to sing "O Sole Mio". It was Anderson, the happy gunner's mate. Five minutes later, the aquanaut muster was complete, and all hands at work. The first message came, in ghostly hand, over the Electrowriter.

"HELP!" S. Manning, HMC, USN

21 July 1964

Operation SEALAB I had become reality.

Relieved the watch at 0530 today. Walt and I are heel and toe on the watches; Walt takes the night trick, and I the day shift. Like slipping back into the routine of GENESIS E. On the ocean bottom, however, our aquanauts have set a different watch. For them, with exception of the single wake man, the day commences at 0900, with activities continuing until nearly midnight. Since most of the interesting and previously unobserved marine activity occurs from sunset until dawn, these are tremendously productive hours for careful observation and photography. For example, late last night Manning observed a 400 lb. tuna feeding on schools of Jacks just outside the SEALAB. This is probably one of the very few times this scene has been witnessed by man; and it is only one of countless similar situations which are almost commonplace to these observers. In this connection, I am sorry to say that the marine biologists who were promising such input into the program have not been forthcoming. An agent of Dr. Wisby, whose sole interest is in shark, put in a 30-minute appearance today and retreated to Bermuda, promising much gear and a definite program next Tuesday. Most of the special equipment promised months ago has not arrived. So here we sit in a biological paradise 24 hours a day, and damn few tools to work with.

Meanwhile, the subjects live, work, and swim, all at a leisurely pace, which will quicken tomorrow, and again next day, until normal activity is attained on about the fifth day on bottom. Such has been our experience in

all past chamber experiments; and such was Cousteau's experience with his two undersea experiments. None of us has a satisfactory explanation for the phenomenon. Perhaps it is a natural conservation of body energy, pending an unexpected environmental emergency, or awaiting the process of acclimatization to a new environment of multiple stresses. Characteristically, most mammals move slowly in face of a potential but undefined threat; and thus it is with man in an unnatural surround.

Although this experiment is only 72 plus hours old, a tremendous fall-out of engineering and psychological problems is evident, in addition to our mass of daily data. Thus, as was to be hoped, this exercise will uncover new problems in number far greater than the questions answered. From an engineering point of view, the outstanding problems have had to do with handling a mass such as SEALAB I from a surface vessel or even an ocean platform as stable as Argus Island. Of more interest, perhaps, is the fact that the absorptive properties of sea water can be made to work for the underwater architect, to heat or cool his house, and to provide and purify his atmosphere. Medically, we have found that, once the body is essentially purged of its nitrogen content, then the narcotic effect of high tensions of nitrogen is markedly increased. This has constituted a serious hazard in the present experiment, where subjects were obliged to work for short periods in compressed air at the relatively shallow depth of 187 feet. Unexpectedly, after 24 hours of undersea existence, the subjects became severely narcotized upon entering the air space. So much was this a threat that it became necessary today to dilute the air in this space equally with helium, and to do likewise with the air in the open circuit SCUBA bottles used by the aquanauts. These are but a few of the many daily surprises.

Today activity was pretty intense, both from and on the surface, and in case of our aquanauts. Many diving hours were logged, and yards of excellent underwater photography obtained.

Towards sundown, when all SCUBA gear was breathed empty, and the last job done, our aquanauts retired to their castle to eat and indulge in the uplifting conversation so characteristic of naval personnel under pressure. To quote a characteristic bit of aquanaut language, I must refer to a response obtained when I innocently asked why the TV monitor was giving a poor picture.

"Pappa, the f---ing f---er's f---ed!" came the clear reply. Succinct, clear, and to the point -- that's aquanaut language. Let the astronauts play with insipid phrases such as, "all systems A-OK", or "Equipment is in a go state"; my boys make their point quicker, and keep the dice for another roll.

Incidentally, I am again a papa. Back in the days of GENESIS, I was PapaGen, and my subjects genitalia. Here, I am Papa Topside, or occasionally Seapappy. So much for a name.

It is strangely comforting to sit in SEALAB control, listening to our pioneers, and watching them around the clock, feeling that they are as safe as seven hard years of work and planning could make them; and knowing too that we have only turned the first page of a potentially great chapter in human achievement. And on that thought I close the watch, properly relieved by Walt Mazzone, so named, according to our astronauts, after a grouper named Walter whom they met and fed only today.

27 July 1964

As nearly as it can ever be, our program is now fixed and cast in the concrete of my resolve. All things considered, it is best to terminate the bottom stay of my aquanauts next Friday, July 31, and to commence decompression around 1500 of that day, providing weather conditions are nearly ideal.

A good many factors enter into this decision; but the one of overriding importance is weather. The hurricane season is already at hand, and each passing day drives us a bit deeper into the hazardous period. Last year, Arlene hit here with full force on 5 August, bringing 70 foot waves to Argus Island, and damaging much of the structure. More importantly, the area had only 3 hours warning of the direct hit -- far too little time for protective measures in an exercise such as ours. And while SEALAB I would undoubtedly ride out such a blow very nicely on the bottom, our surface support, both on the barge and at Argus, would probably be eliminated from the picture for many days, if not weeks.

Moreover, by compression of our schedule, we will soon have acquired all of the physiological data which we can possibly process with any degree of success. Extension of time to the planned 21 days would lengthen our curves, but is not likely to produce much more of value. A very long stay -- say, 60 days -- would be required to give results for a "chronic" experiment; and this we cannot reasonably do at this time.

Again, although we have CNO priority to dislocate other important Navy projects to meet our requirements, the wisdom of so doing is questionable, and would only document a selfish attitude. Throughout the years to come, successive SEALAB projects will have to live with other Navy bureaus and

departments; and it would be manifestly unwise to create hate and discontent on the very first operational venture.

Finally, the subjects themselves deserve consideration. In planning the program, an extremely important feature was disregarded or overlooked entirely: the matter of daily housekeeping. In retrospect, it is unreasonable and unwise to believe that experimental subjects in such a new and difficult environment can be expected to tend to all of the menial chores of running an orderly household, and performing a great deal of scientific work simultaneously. Naturally, the maintenance of the habitat will be given highest priority under such circumstances, and the scientific program is relegated to a not-to-interfere status. This is a fact of life learned rather late in this project; and future generations of SEALAB must provide a small cadre of housekeepers who will constantly mind the store, while the subjects are free to harvest data. Yet they (the subjects) cannot have too much freedom, as in SEALAB I, or else all order and direction falls out of the program, and productive activity becomes random. Thus, a director is required, for firm and demanding pursuit of the aims of the project. Scott Carpenter could be such a sparkplug, and is my choice for SEALAB II. Ideally, the routine matters of atmosphere sampling and control, electronic repair, maintenance of daily logs, logistic control of samples and supplies, and ordinary housekeeping should be no concern of the investigative aquanauts, but rather vested in the hands of perhaps 2 or 3 very competent and motivated technical people, since these routine chores require at least one half of all expended effort on the bottom, and can detract to that extent from the scientific program. So much for lessons learned - we must have aquachefs, aquamaids, and aquaswampers.

Yesterday went rather well, considering the Sunday routine. The aquanauts slept until 1000, performed menial morning chores, then held a brief church service, with prayer, meditation, and songs, closing with my reading of the SEALAB I prayer from topside. Later a few sorties were made for short work jobs and photography, with relatively long in-house periods of rest, relaxation and physiological studies. Taps went early, around 2100, and before I had time to treat my aquanauts to their nightly ordeal of poetry -- a captive audience is the recurrent dream of every raconteur worth his anecdotes; and the poem-reciter is no exception. Tonight, I am resolved to start earlier, perhaps opening with a rendition of Beowulf, to tune my vocal cords and set the gay tenor of the evening --

Today is bright, calm and clear. I am clear and calm. No further comment.

26 July 1964

And now I watch the colored dawn of the beginning sixth day of bottom existence for our deep aquanauts, after a typically quiet night. This was a night of predicted great stress and multiple emergencies; of violent weather, and probable parting of our moor and loss of umbilical cable; and as is generally the case in this phase of the experiment, the gloom-peddlers and head-shakers were confounded.

Commencing yesterday morning, the wind freshened out of the SSE, and the seas picked up accordingly. Since our moor seems nicely calculated to put us in the trough of any typical Bermuda swell pattern, we were soon rolling 18° at a clip, and making heavy weather of it, with all strain

carried by a single SE leg of our 4 point moor. Hour by hour, our topside situation worsened. Gradually, but perceptibly, we began to slip in our moor, traveling to the NNW by inches. At 1400, anticipating that we might lose a moor leg and swing violently, I requested that an additional 200' of umbilical line be paid out, as a safety measure. This was accomplished, but the nylon line which should have secured the umbilical to the Tower was loosely fastened to the rail instead of to the precious life-line. Thus, should the umbilical be parted suddenly, it would have sunk to the bottom, beyond hope of retrieval and reconnection to the Argus Island vital facilities. When I complained of this dangerous oversight, the response was that the nylon wouldn't do any good, couldn't stand the strain of retrieval. At this transparent bit of rationalizing, I was visibly and volubly exasperated. Clearly, if the statement were true -- and such was not the case -- then a heavier line should have been used from the start. Shortly, the line was reattached to the umbilical, and I ceased to mutter. By 1600, we were taking a severe and senseless beating in the broadside moor, and the decision was at long last made to shift the ship's position to head a bit more into the weather. When this maneuver was finally accomplished, we rode better, and the severe strain was eased. By now, however, the pessimism so characteristic of surface elements ship's position to head a bit more into the weather. When this maneuver was finally accomplished, we rode better, and the severe strain was eased. By now, however, the pessimism so characteristic of surface elements of the project erupted once more. At once, it was necessary to lower an auxiliary power cable to SEALAB I from Argus Island, as a standby for use when (not if) we were torn from our tending moor. This procedure, ordered in bad weather and after dark, as an emergency when it should have been an early precautionary routine, required hazardous solitary swims in black water by my aquanaut

Bob Barth, but was finally accomplished. As the prediction came for 35 KT winds and higher seas during the night, head-shaking on the YFNB-12 almost matched the rolls of the ship, and a long and dire forecast of impending doom was broadcast to the SEALAB I occupants by our on-scene commander. As I watched facial expression of our subjects via TV during the mournful litany, I detected a heavy overlay of scorn; accordingly, after his gloomy monologue was ended, I urged Roy from the trailer to the bridge, and out of earshot of our diver's broadcast phone. And not a moment too soon.

Hardly had the trailer door closed when a spokesman for the aquanauts, who shall be forever nameless, spoke up loud and clear,

"Papa Topside, for Christ's sake, give the S.O.B. a handful of tranquilizers, and send him below. Since this project started, we've heard nothing but 'can't do it', 'can't help it' and 'can't stand it'. Tell him to cut the God-damned umbilical and run for shelter. We can f-----g well take care of ourselves."

I could only say, go to bed, sons, and sleep well; you are right -- the world does not come to an end every hour on the hour. And so that colossal bit of mass disrespect, if such it was, went unrecorded, save on these pages.

As I have said, the following dawn found us in our moor as before, and the aquanauts had a quiet night.

* * * * *

In retrospect, I have lately begun to understand the philosophy of some of the line officers connected with, and in virtual control of, this projet.

Last January, when it was picked up by ONR, the experiment offered a fascinating challenge in planning, engineering, and seamanship, to the line personnel involved. At first it was a paper exercise, unlikely to reach operational maturity, but worth the enjoyable effort of perfecting in their dream state -- a wonderful conversation piece, and a new naval problem to work on. As development proceeded, an aura of engineering success cloaked the project; and still the human lives involved were an unreal and intangible factor, not a real responsibility.

On that first bad day in Panama City, when SEALAB I was dropped because of inadequate engineering foresight and poor seamanship, it became shockingly apparent to the ship's crew and to the project line officers that, during some phases of the operation, they must share the responsibility for the lives of the aquanauts with the Principal Investigator. This was a shocking revelation; and all hands began to reexamine their material inadequacies and to recognize their own professional weaknesses. Obviously, a failure of the project at this point which could be ascribed to overaged, overloaded equipment, adverse weather, or plain bad luck, would relieve responsibility and still no serious harm done. And so was born the spirit of "if possible, we shall fail gracefully, and without risk of human life".

This project has never pretended to be a safe one; and I thought this clearly understood from the beginning. Yet I mistakenly assumed that the competence of surface handling gear and crew would be at least equal to that of the two investigators who will carry the entire load of responsibility while the aquanauts are on the bottom. But whereas, by training, we are prepared to accept this particular type of burden, our line support team is not -- and thus the dangerous conflict. And probably the worst feature of

the dichotomous philosophies is the morale factor. The aquanauts and topside SEALAB I personnel, including myself, have felt almost from the start that our surface support team was constantly seeking excuse to abort the mission; and the completely negative attitude which we face is an unpleasant curtain which must be pushed aside hourly.

Yesterday, the aquanauts spent many hours in the water, making long (500 yard) and short sorties. Full confidence in the MK VI gear has been attained, and there appears to be some acclimatization to the cool water, even when breathing a helium mix. The fish, which are quite friendly and have not been molested by agreement, flock around to be fed, and offer a beautiful sight for Kinescope recording.

Later in the day, a multitude of photographers descended to SEALAB I en masse: as a predictable result, we got a great deal of footage depicting underwater photographers taking pictures of other underwater photogs at work -- in short, a bunch of junk. Henceforth, there will be a firm limit of 2 photographers to any given dive. Considering the brief bottom time allowed -- 8 to 10 minutes, we'll have trouble enough getting underwater shots of quality, without washing six dives in one day.

And so the day wore on, and now the weather forecasts built, and tempers shortened; which brings me around to the beginning of this chapter, and further this deponent sayeth naught.

28 July 1964

And so came yesterday our first close call with an aquanaut. As has been heretofore chronicled, our bottom subjects had daily grown more independent with respect to many aspects of topside direction and control so necessary to purposeful action and survival. So much was this the case that important events

in SEALAB I were going unrecorded, and even changes in the atmosphere of the habitat were effected without notification or concurrence of Walt or myself topside. Finally, bit by bit, and despite our admonitions, the general rules of underwater safety were being violated all over the place. The buddy system fell apart; breathholding skindives, alone, and without knife or weight belt were frequently viewed on our TV; and our expressions of dismay fell on deaf ears. The situation was tailor-made for an accident, and Tiger Manning proved the case.

At about 1530 yesterday, a very complex operation was in progress, requiring best possible coordination between SEALAB control, SEALAB I, and Argus Island. The STAR I, a one-man submarine belonging to Electric Boat Division of General Dynamics, was scheduled to descend to the bottom within 50 feet of the habitat, where she would attempt to make a suction seal on a false seat representing the escape hatch of a submarine. It was proposed that the entire operation should be filmed by the inhabitants of SEALAB I, from a vantage point outside their house. Preparations had also been made for the rescue of the submarine operator, Smoky Stover, in event of a mishap, so that he could be carried inside SEALAB I by the aquanauts if required. For these reasons, all SCUBA gear had been fully charged the night before, anticipating possible need of maximum breathing gas during the afternoon operation, and in order to assure that each set of aquanauts should wear identical gear, with exactly equal amounts of breathing gas. The reasons for this were obvious and, I thought, clearly explained to the aquanauts.

Predictably, and in keeping with the independent spirit of the under-sea dwellers, they proceeded that morning to use up most of their helium-

air open circuit mixtures, and a good deal of their MK VI gas in accomplishing petty tasks around the habitat, and this without permission from Papa Topside. Consequently, come early afternoon, we were frantically trying to balance their diving gas budget. Our efforts were only partially successful; and when the critical hour arrived, the aquanauts had a motley assembly of diving gear, in various states of depletion, with which to do the job.

Word was passed to SEALAB I to place the false seat, adjust the TV camera, and to return to the habitat, to conserve precious gas while awaiting the next phase of the operation. With dismay, we watched two aquanauts spend an unreasonable time and gas in doing this job; and now came word that one more set of double-90 SCUBA gear was empty, that they would improvise for the photographic run. And improvise they did.

When the submarine submerged for the operational run, three aquanauts sallied forth from the back porch: one wearing a MK VI gear, one wearing partially depleted open circuit SCUBA, and one holding his breath. Anderson remained in the SEALAB I, to communicate. The operation commenced, with our divers scattered, and watching the submarine maneuvers, with scarcely a glance at their buddies. The breath-holder plied back and forth to the access hatch for occasional gulps of gas; the aquanaut with double-90's disappeared around the nose of SEALAB I; and Tiger Manning, wearing the MK VI, stood squarely with back to the monitor camera, obscuring our view of the submarine operation. We squalled dismay at his position, and after a few minutes, he was nudged aside by the skindiver; but not before three of us had noticed that no gas escaped from his exhaust valve, as it should have, during this relatively long period. At the time, preoccupied with the scene, none of us saw the significance of this discrepancy; subsequently, it was recalled vividly.

Shortly thereafter, Tiger began to experience a sense of impending disaster, and wisely started a flank speed return to the safety of SEALAB I.

His departure went unnoticed by his buddy divers. Frantically, he poured on the coals, and made it to within a few feet of the access hatch where his luck and consciousness failed simultaneously. Inside SEALAB I, Andy heard a set of bottles strike the metal entrance, and liesurely walked to the hatch, to assist the entering diver. To his horror, he saw Tiger lying face down on the deck of the back porch, unconscious. Andy moved fast.

Tiger's head was dragged above water, and his mouthpiece removed. As he was held upright in the half-filled trunk, his airway was cleared, and attempts at resuscitation commenced. Now came assistance, and a pallid, limp form was dragged inside SEALAB I, undressed, and finally revived. In those few moments, the gospel of safety was reaffirmed for the operation.

A few minutes later, the situation was made known to me topside. By now Tiger had regained consciousness, and had only a severe double eye hemorrhage as memento of the near-tragedy.

I swam over to Argus Island to pass the word quietly to Eaton, who quickly collected the two MK VI sets, and brought them to YFNB-12 for careful instrument and gas analysis. Our detective work was thorough and accurate, and the picture finally was clear. Long conversations with SEALAB I occupants confirmed the story.

It is now certain that, after donning the MK VI, Manning reached behind his neck to throw a gas flow block all the way to the left, but somehow did not really get it open. No buddy diver was there to check him fore and aft,

and the discrepancy was unnoticed. His breathing bags were inflated, but that was all he had for the trip. After about 5 minutes, Tiger was out of oxygen, and probably building CO₂ as well. Fortunate it was that he made it back. Had he been at the NW leg, we would have had the first martyr to a U. S. Navy Undersea habitability project.

Much later, in the solitude of the mid-watch, we had a long heart-to-heart talk with our aquanauts. Meliores Tempores Expectamus ---

29 July 1964

And now come to YFNB-12 a pair of graduate student marine biologists from Miami, replete with flashing colored lights and a variable frequency pulsed sound generator guaranteed to arouse the libido of any shark within five miles of the sound source, and to cause an elasmobranch invasion of Plantagenet Bank not unlike the death march of the Norwegian lemmings. I have tried in vain to determine just how they can distinguish the five-mile shark from the two miler, or even the 100 yard dash variety. For this query, I received a look of withering scorn, reserved for dilettante investigators who ask stupid questions about the serious work of men on the verge of a Master's degree. Walt and I finally decided that the criterion of shark distance run must be the degree of breathlessness and general exhaustion of the poor creature, as noted by the intrepid marine investigators. Personally, however, I lean to the theory that the five-mile shark, after a fatiguing dash in search of love and food, who arrives to find only a metal, neuter gender microphone, of indifferent food value, must exhibit a high degree of dudgeon, not to mention chagrin. Thus, show me a clearly disgusted and disgruntled elasmobranch, and you've got your five miler. After all, it is possible that some sharks, like humans, tire easily, and thus yield spurious data. To me, even a 440 yard underwater dash is tiring.

In any event, the equipment came aboard and was duly lowered, together with multi-colored lights toward SEALAB I, on our patented trolley. About 10 feet before the equipment reached the SEALAB I, a series of explosive concussions were heard in the water by our divers, heralding the mass destruction of the light array. Having previously tested the lights to 250 feet in open sea without casualties, the Miami savants were reluctant to accept our

explanation that the bulbs had imploded. Rather, strong suspicions were voiced, in front of Bob Sheats, to the effect that personnel carelessness had caused the calamity. This was taken as a personal and gratuitous slur, and Bob was very near indeed to battle stations. Considering that Sheats and his outstanding crew had labored 18 hours per day or more at their dangerous and thankless support job, his ire was understandable. Further, one of the future scientists ordered people around with a degree of arrogance not commonly tolerated on this project. At last, it was suggested by Sheats that we might do well to test the spare bulbs in the pressure chamber, prior to lowering again. Our sneering genius condescended to this effort, certain that we would only confound ourselves in the process.

This morning at late breakfast, I thought it wise to advise our new guests that it was in poor taste, and dangerous to boot, to impugn the honesty and judgment of SEALAB I personnel. Waxing poetic, I went further to remind them of their miniscule contribution to the program, and concluded with a gratuitous offer to throw the scholars off the ship, should they persist in such asocial behavior. With this, our more offensive student got set for an insulting flow of righteous indignation, while I made preparation to drive him over the side. Suddenly appeared Fred Johler, with sad news that the test light bulb had just imploded in the pressure chamber at the shallow depth of 160 feet. The scholar deflated before our eyes, and thereafter remained plain Samuel Gruber, a young and humble seeker of wisdom. In truth, the trail of my SEALAB people is strewn with bruised and ruptured egos.

30 July 1964

The peace of the postprandial hours in the SEALAB control lasted only a short while, for now came news of a tropical disturbance, 700 miles to the Southeast, but unquestionably developed for and aimed at, Project SEALAB I and its benighted support vessel. In sepulchral tones of final judgment, we were advised that the project must be prepared for emergency termination; all civilian workers, photographers, and news people, who had labored so long in our interests, were ordered ashore; and liberty-starved sailors stood by with axes to cut us adrift at a moment's notice. The sea was flat calm, the skies clear, and the barometer high. Figuring that, at 20 knots forward speed, I had an hour or so of grace, I took a nap, after advising the aquanauts to do likewise.

I awakened some minutes later to a hurly-burly of dissociated activity. All of the emergency bills, so often amended or rescinded, had undergone simultaneous renaissance; the confusion was remarkable. For hours, the activity persisted, both on deck and in the water. In the control trailer, Walt and I caught the carnival spirit, and bellowed an amazing volume of conflicting and purposeless orders into our many microphones. The aquanauts used up incredible volumes of breathing gases, swimming missions of no great importance, many of which should have been performed at leisure days before. By nightfall, material and human failures multiplied, and the sense of urgency, however valid it might have been, was succeeded by an atmosphere of grim despair. Finally, at 0100 this morning, the SEALAB with its occupants was ready for the long, steady rise to the surface, two days in advance of our already condensed schedule, and manned by a crew which was tired and irritable.

I was told that almost certainly it would be necessary to evacuate my men to the uncomfortable and physiologically hazardous SDC, for a great part of their decompression, at which I cavilled. The safest and best place for my aquanauts, I was certain, was inside SEALAB I, at least until the sea state offered some measurable threat to the supporting crane. At such a time, the retreat to the SDC could be accomplished in orderly fashion. Instead, it seemed we were being driven to a poor course of action by a weather forecast of undetermined validity. A compromise was reached, with agreement that abandonment of the SEALAB I would be dependent on severity of weather, rather than at an arbitrary depth beneath the ocean surface. Walt and I took up our tedious jobs involved in raising the habitat inches at a time, while constantly changing the internal gas mixtures. And so the long night wore on. The sea remained a dead calm, with a three-quarter moon presiding during the closing sessions.

At 0500 today, sea conditions were essentially unchanged. The SEALAB rode quietly at the end of its tether on the boom of the crane; and the dynamometer registered no strain. Except for Roy on the Tower, the crane operator, and Walt and I, the crew of our flotilla slept peacefully. In SEALAB I, Anderson on watch tried manfully to compose a letter to his mother which would contain a minimum of disreputable words. The day, despite the alarums of the previous night, promised to be peaceful.

But not for long endured this state of bliss. At 1000, Roy called to say that he had bad news, to which I responded, sotto voce, what else? Seems a new report had come from Bermuda, the home port of all weather lies, to the effect that we would be devastated by the tropical disturbance by 2300

hours. Plans were afoot to send YFNB-12 and her escort SAGAMORE to safe harbors; the majority of Argus Island personnel would be evacuated; SEALAB I was doomed, and its occupants must go to the SDC, and so forth. I asked for and rode to a policy council on Argus, going over in a rubber raft on a glassy sea. Again, after long discussion, a compromise. Prepare for disaster, but do not execute until ordered. And so it stands six hours later, with the tropical disturbance wandering aimlessly about in the Sargasso Sea, and the aquanauts on an inexorable ride to sea level and fresh air. Yet, we have accomplished much, and none injured.

1 August 1964

This has been a long and trying period; yet, all is well with SEALAB I and her people, so I shall not cry, but only moan a bit.

I guess it all began with a tropical disturbance, far enough away to be of no significance to me, but so near as to strike terror into the hearts of the seagoing men who have had experience with the ocean's violence. Our final and devastating forecast from Bermuda predicted incredible winds and colossal seas. Considering the source, I was not alarmed, since the same commentator urged, in the next breath, all money holders to visit the isle during this period of excellent weather. On board, however, the situation grimmed up. Suddenly, we had to plan for the YFNB to quit the scene, a partial evacuation of Argus Island, and a nearly hopeless situation with respect to SEALAB I, which would be jettisoned. At this point, I rebelled.

From the moment that SEALAB I had been safely bottomed, and responsibility shifted almost completely to Walt and myself, it had been evident that, if possible, our support forces would avoid the task of raising her to the surface

whether occupied or not. The problem of raising the habitat simply carried too many unknowns and risks for officers near the end of successful Navy careers. To come a cropper at this point would be an unhappy matter of record; whereas, a simple log entry to the effect that the job was impossible of accomplishment would stand as incontrovertible evidence of the seasoned judgment of the on-scene Commander, and no retrofire.

From my point of view, however, such an arbitrary decision was unacceptable. At once, I would be committed to a decompression schedule in the SDC and on compressed air which would guarantee at least a 50% probability of pneumonia in my aquanaut population, and the possibility of bends would be equally increased. Should the latter situation develop, I would have to lower all subjects back to the bottom in SDC, and commence an even slower lift, after a 4 hour stay at 193' on compressed air. In this case, I could be certain of 100% pneumonia, and possible fatalities. Clearly, no naval career was worth this risk, and I so informed Roy and Red.

With obvious reluctance, it was agreed that an attempt would be made to raise SEALAB I, complete with occupants, at least to a depth at which ocean swell surges began to put a measurable strain on the Argus crane. When I asked what dynamometer reading would be interpreted as a cutoff point, I was told that this precision instrument would be disregarded. Fortunately, such was not the case; and ultimately the dyna readings became our cutoff criterion.

And so it was that at 2200 hours, preparations were made to get through the prelift phase of surfacing procedure. The aquanauts were fully informed, and performed their necessary tasks prior to evacuation; communications be-

tween SDC, Argus Island, SEALAB Control, and Gas Station were checked out, and found functional. Finally, at 2400 hours, the aquanauts were ordered to evacuate to SDC, and to report effects of the lift-off. Ten minutes later, SEALAB I was 10 feet clear of the bottom and in a stable attitude. The aquanauts returned to the habitat to commence the long, tedious return to the surface.

Topside, in the SEALAB Control, Walt and I buckled in for the lonely and tense hours of decompression procedure, which ultimately required some fifty-six hours of gauge-reading, complex communications, and recalculation of decompression criteria.

The procedure seemed simple enough: we had only to raise the habitat and its occupants at a nearly steady rate of three feet per hour, from a starting depth of 175 feet. In fact, however, the task was quite complex, fraught with hazard, and ultimately so riddled with changes that the programs so carefully printed by our computer were left untouched on the shelf, while we improvised the procedure by ear.

To begin with, we were raising a 35 ton mass through sea water by means of a crane situated atop a 300 foot high platform. Aside from the fact that lifting in eight to twelve inch increments is a difficult task under these conditions, the problems of communication were formidable. In the SEALAB Control, Walt or I would talk to Roy or his relief, on Argus Island, and he in turn would transmit the order by radio to the crane operator. When the desired inches of rise had been accomplished, we would be informed, and a standby called, while one of us took a final reading on the absolute pressure gauge connected to SEALAB I internally, then translated this figure into feet

of sea water. Then, since accuracy in inches could rarely be achieved by the crane, we had to calculate the span of the next lift, in order to maintain a safe working average. This information was relayed to Argus Island and duly logged, after which a ten to twelve minute rest period was allowed before the next lift. Meanwhile, periodically, Walt and I would analyze the atmosphere of SEALAB I, and order such addition of oxygen as required to maintain a steadily mounting percentage of this gas, commensurate with the lessening pressure in the habitat. And now, because of the diminishing internal pressure, the requirements for added oxygen changed with each raise, which required calculation in advance, to allow for adequate mixing for final analysis. ~~Add~~ to all this the fact that we wished to gradually raise the nitrogen level in the atmosphere during decompression, while controlling carbon dioxide at lowest possible levels, and the complexity of our tasks can be understood. By and large, however, we did well until the 100 foot depth level was reached. From this point upward, a technically difficult operation became a nightmare.

As a result of the tropical disturbance, now nuzzling at our eastern flank, the seas were building, with long swells of 10 to 12 feet. Because of the long period of these convolutions, wave effects began to act on SEALAB I at a depth of about 110 feet beneath the surface. In consonance with the unforgiving laws of hydrodynamics, the downward thrust of each swell acted on the total mass of SEALAB I, and the strains on our dynamometer began to creep up by the minute and foot of rise. As the hours passed, and the swells increased in amplitude, SEALAB I was raised higher to receive an increasing thrust with each travel of the sea on the surface. Finally, at 2400, some 24 hours after lift-off, we were reading dyna forces of 12 to 14

tons, as opposed to initial thrusts of 3 tons, at greater depth. The storm was now broadside to us in the east, and moving north at 20 knots. Swells were running to 15 feet, and no wind to beat them down. Roy and I arrived, by a miracle of mutual telepathy, at a simultaneous decision to hold. The decompression was revised and recalculation of our raising formula was in order. Unfortunately, this was to be but one of many such holds, as the sea state worsened. Nonetheless, I turned the watch back to Walt, who had managed nearly three hours of sleep. Being an older man, and less physically fit, I commenced a six-hour nap, untroubled by dreams.

At 0545, I awakened with customary flatulence, brewed a cup of tea, and brushed my teeth. The barge was rolling so that I could not accurately perform the latter task, so I strolled ten feet forward to get a situation report from Walter. Somehow, during the night, and despite several holds, he had coaxed SEALAB I up to about 90 feet from the surface, and was in another hold, with the dynamometer pulling 15 to 16 tons. I took the conn and sent him to bed.

By 0800, we had literally inched up, between swells, to a depth of 81.5 feet, and another feat of empathy between Roy and myself became a matter of record. On one particularly malevolent 18 foot swell, the dyna recorded a 17 thrust, and the picture was indeed clear. We could not continue the surface raise of SEALAB I, lest we tear loose the crane from atop Argus Island. The time had come, regretfully, to transfer the aquanauts to the SDC for the completion of decompression.

Accordingly, at 0720, the aquanauts were again ordered to the SDC. Final button-up of SEALAB I would be completed by surface divers, and it was agreed

that best effort would be made to bring the empty habitat to the surface. In this connection, however, a number of problems arose.

Assuming that I could transfer the aquanauts to the SDC, I would still encounter a substantial hold in recommencing the decompression. The SDC would be tethered to an electric hoist which could not raise the chamber to the surface, much less lay it on deck for terminal decompression. For this final phase, it would be necessary to free SEALAB I from the crane hook, and preferably by bringing her near to the surface.

It had been previously agreed that we could raise SEALAB I to a depth of 55 feet, at which point four buoyant floats could be attached on long pennants, to permit release of the crane hook, and towing of the habitat out of the area for final deballasting and return to Bermuda. Thereafter, the SDC would be lifted on the crane hook to a high deck of Argus Island, where decompression of the aquanauts could be completed under direct supervision and with adequate control. This is how it should have worked, but it did not so eventuate.

After a one hour delay, pending my transfer to Argus Island with log and slide rule, the subjects were ensconced in the SDC, with lower hatch open to sea, at a depth of 81 feet for this period of time. Throughout this period, and for the next 6 hours, my subjects had to remain in a vertical position, immobile, cold, and without adequate supervision. This hazardous situation was acceptable, but barely so.

And now came another problem. At 0945, while I held my aquanauts in the SDC, Roy came by my command post with head ashake. In a word he told

me that it would be impossible to raise SEALAB I high enough to attach our buoyancy spheres. It would, he said, be necessary to lower her to the bottom again, and to abandon the habitat. This entire procedure, I knew, would require nearly 8 hours of work, would burn up all of my surface divers' time, and would immobilize my aquanauts at their present depth in water for that period of time. In turn, this would guarantee a 50% incidence of pneumonia in my subjects, and increase the probability of bends by an unknown but significant factor.

I told Roy that I could not accept this imposition, without at least a token try. Loss of SEALAB I would be a serious matter, to be sure; but damage to our aquanauts must carry more weight. After I spoke my piece, Master Diver Bob Sheats took over. For a while, he talked to Roy at the edge of the platform. I heard stray words of profanity and strong conviction. Shortly, Roy returned to my side, with the statement: "We'll try it one time." I passed the word, and we went into action. Within one hour, the SEALAB I was buoyed off, and we were in business.

And now, at long last, the decompression was resumed. The bottom hatch of SDC was closed at 64.5 feet, a good seal was made, and the chamber was raised to the surface and Argus Island deck by the crane. Unaccountably, she was attached with a shackle incapable of holding a grocery basket; but somehow the SDC reached the upper deck intact. Now came more trouble. As we attempted to lower the chamber into the horizontal position, one of the wire straps of the bridle contacted a small pressure fitting, and carried it away, with immediate leakage of pressure from the SDC. Simultaneously, I lost all pressure readings from inside the SDC, and could only scream over

the phones to blow in all possible air. Fortunately, Dr. Thompson spotted the trouble and stopped the leak with his thumb. Nine minutes later, the damage was repaired, and we continued our decompression.

At 0835 Saturday morning, the hatch opened, and our aquanauts stepped out to breathe fresh air, to face representatives of the news media. One hour later, we were on our way to Bermuda by helicopter. Save for followup medical and literary debriefings, Project SEALAB I had reached a successful conclusion. Later, I lay down to sleep for sixteen hours.

4 August 1964

THE AFTERMATH

Like all phenomena of natural existence, any human experiment, after termination, continues to send out backwash vibrations, which decay exponentially. It is thus with the bouncing ball, and the ripple pattern on a mill pond surface; and so it is with human physiological and emotional circadian wave patterns after a prolonged period of artificial living and unrelenting stress.

For the aquanauts and topside scientific observers alike, the day following the successful completion of the project had slowly receding patterns of activity and rest; of alert mentation and emotional boredom; of hunger for, and satiation with, the company of fellow men; and finally, of happiness and marked irritability. I cannot estimate the relative importance of this phenomenon to future underwater stays, but only record it as worthy of note.

Personally, I had an overwhelming desire for solitude and opportunity for introspection. I sensed that the aquanauts felt much the same. None of us, however, had much opportunity for privacy, the requirements of the news media being what they were. Consequently, we were all a bit short-tempered and impatient with the multiple intrusions on our brief hours of solitude. This is an unreasonable attitude, but it exists nevertheless. For my part, I had a great deal of writing to complete, and each interruption broke the continuity of my thought. To me, there was a very great sense of urgency to make a written record of the event, before my impressions became flattened by the passage of time. To Walt Mazzone, who does not enjoy writing, the best outlet was to assume responsibility for packing and trans-shipment of all SEALAB I gear destined for return to New London, and for arranging return travel details for the personnel of the project. In this connection, he met with a degree of post-experiment apathy, which made him more than a little irritable. When in this state, Walt can be, and is, very disagreeable and viciously sarcastic. In consequence, a considerable degree of alienation occurred between investigators and subjects, in random order.

And yet, these things will pass, as they do invariably, for we are all bound to a common cause, and like one another very much. It is just that, for a few days after any such experiment, we should each one look in a different direction.

* * * * *

And now came Tuesday, 4 August, and the day of the really big press conference. Scheduled to arrive from Washington was a plane load of Admirals and Captains, accompanied by news men from almost all major papers, save the

Rutherford County Excuse, which has no paid foreign correspondent. Multiple and extensive preparations had been made for this session, the climax of all SEALAB I conferences. The stage would be set in the outdoor theater, at 1400 hours, and martial music would pitch the emotional tenor of the occasion. It did not quite work out in this fashion.

At 0400, I was awakened by peals of thunder and blinding lightning flashes. An unpredicted squall had struck sunny Bermuda, accompanied by lashing rains. By breakfast time the rain abated, but not for long. At 1330, when the plane from the Capitol of Confusion was due, torrential rains were falling, and visibility was zero. We switched our conference site to a spacious air hangar near the heliport, where a shaky platform was installed, along with a public address system. The Sousa marches were salvaged from a storm sewer, and the program re-established. One hour later, the helicopter deposited a load of damp broad-strippers, who re-embarked for a visit to Tudor Hill Laboratories, while we completed arrangements for the show.

Five minutes before the return of the VIPs, and while the P.A. system was grinding out the "Double Eagle", I stepped off the platform to speak with a friend in the audience. Somehow, mistaking the record player for a step, I stood squarely on the former, and eliminated Sousa from the afternoon's performance. A few minutes later I tested the microphones in the reverberant chamber we had chosen, and found that the echoes produced were of quality equal to those enjoyed on the Alpine slopes of Zweisimmen, Switzerland. Indeed, it would hardly be an overstatement to state that the closing words of the ceremony, completed some four hours past, are still bouncing around the hangar. But this was the story of our life, and we bled quietly through the ensuing 90 minutes. On the whole, the sensation was not unlike living in a giant

glockenspiel, without earmuffs. Strangely, the press seemed relatively happy; perhaps because, if they missed an answer on the first bounce, at least a score more opportunities were presented before the message died away to a roar.

The questions posed were sensible, and the responses relaxed and informative; at least, up to the point at which Anderson, GMI, 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 gropings 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.

The day wore on, with sodden visits to SEALAB I and desultory tape recordings for later network playback. Finally, at 1700, the buses cranked up and we were alone. Three minutes later, I entered the bar at the Officers' Club wearing my hat, and was charged with a round of drinks, according to Naval custom. Somewhat later, I bought a bottle of sparkling wine with which to romance my wife on her arrival tomorrow, 5 August, and returned to BOQ to write a chapter in the SEALAB Chronicle.

