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"SEALAB II CHRONICLE"

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GEORGE F. BOND, CAPT, USN
Medical Corps
Assistant For Medical Effects

Bond

FOREWARD

This Chronicle represents an unedited rendition of the daily reflections of the Principal Investigator of the SEALAB II 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 II, 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 II is presented without abridgement.

SEALAB II CHRONICLE

9 July 1965

This day commenced the final phase of SEALAB training, and my first continuous contact with the program. Since 18 September last, I have been in a constant state of travel, conference and desk work, but denied access to the real heart of the program; and now at last I am physically on station, and identified with the people who will make the program succeed. Considering the criteria of selection, this is certainly the finest group of men who could possibly be assembled for such a project.

So much has been accomplished in the past twelve months, and so much remains to be done! Still, thinking back a year, I am confident that all will fall into place, albeit in the last seconds. One year ago, we had postponed our SEALAB I descent because of a tragic air accident, and were in the sad and hazardous business of recovering bits of human bodies at 230 feet, while the hurricane season continued its inexorable approach.

One year ago, we were a handful of determined pioneers, somewhat shaken by our demonstrated inability to handle the mass of SEALAB in the open sea, completely out of money, and facing a doubtful world of bureaucracy. Today, we stand nearly four hundred confident people, funded to more than twenty times the extent of SEALAB I, and with the interest of our Nation and Navy behind us. It strikes me that the whole story of SEALAB has been a tale of difficult escalation against seemingly hopeless odds. In 1957, my first proposal was rejected with the curt official remark that it was worthless, ill-conceived, and impossible of accomplishment; and I was finally admonished to knock off such thoughts and work on matters of operational importance ... or else.

In the years that followed, and led ultimately to SEALAB I, only three of us had faith: Bob Workman, Walt Mazzone, and myself. We fought the system and the odds; but it was good because we had to hold to the tightest experimental designs, and re-examine our motives every day. Finally we were certain that any goal costing this effort and heartbreak must be worthwhile. And now, eight years later, we are on the road.

Return to present tense. Today our team Alpha was first fully introduced to their future home and its support vessel. They were considerably impressed, and excited with the prospect of living in the complex. SEALAB II is really a magnificent piece of engineering, as is the support vessel, henceforth to be known as the Cathouse. Impressed as I am with the undersea habitat, however, I cannot but contemplate the difficulties to be overcome in learning all systems by heart--an absolute necessity for my Aquanauts and those of us who watch over topside. But it will be done and with meticulous care.

10 July 1965

Up betimes this day, after a glorious night of sleep. Walt came by and visited whilst I showered and breakfasted on the fruit assortment collected yesterday. Later, we retired to the poolside, to sun and discuss our program.

Remarkably enough, this is a time of waiting, retreat, and self-assessment by everyone connected with the program. A few weeks ago, in the depths of the Linville Gorge, and in Gingercake Gap, I had my solitary opportunity to study the stars, universe, and my own soul. Now I find that each one of us in the program must go through his own reach of self revelation. In many cases it is postponed by aegis of late, wild hours, or again by impulsive and prolonged hours of work. In any case, each one of us will find a time, be it brief or long, to square this adventure with himself or his God, and hopefully both.

And so on this day, after a requisite bit of work, each man of this team turns to his own solitary and necessary road to Damascus. It will happen again before the experiment, but never again with this intensity.

It is, all told, a strange and wonderful day.

14 July 1965

Bastille day! And activity at Long Beach is at least equal to that in Paris this day. Off to an early start, with a call from a hardware peddler at 0715 demanding an opportunity to show off his undeveloped wares. Somehow, it is nearly impossible to get the word to these birds that the SEALAB II project demands all of the time of the Principal Investigator and his co-workers; still, these merchants are out to make a living, and to hell with the sensitivities of the P. I.

An added obstacle has now been erected by BUMED. Despite reiterated assurance that they wish only to help us, the endorsement to the SECNAV volunteer permission letter placed a number of constraints on the program, and required additional paperwork which I need like a hole in the head at this late date. It's all so damned irritating, since it is obvious that the author of this restrictive endorsement doesn't understand the basic principles of our experiment.

But these contretemps are par for the course and tend, if anything, to increase as our shorebound time shortens. Finally, at the last gasp, things will fall into place, documentation will be complete, and the experiment will start--just a day ahead of total nervous collapse on the part of the responsible parties. A poor setting for this type of monitor effort, but inevitable.

This day we had innumerable conferences, mostly productive, and gradually concluded our way to composite agreement on operation of systems. This is the sensible, and only way of hammering the whole operation flat. Time consuming, but it always shows up deficiencies and the little important things that fill the crack.

And now word comes from the GEAR that four legs of the moor are in a good lie. A typically good Tom Blockwick operation, on schedule and a letter-perfect performance of a very difficult job. Tomorrow, he'll be in with a diffident report of the operation and that constant shy smile which means that he has met his own rigid criteria of performance.

Today, Russ tried, but couldn't get through a call to me. Small wonder, with my eternal peregrinations around this big Naval Yard, plus the sacrosanct atmospheres of planning conferences, but it will probably keep until tomorrow as most things generally do. An added problem, of course, is the cursed time differential of convenience to neither of us working blokes.

At 1530, Walt, Scott, Joe and I were enroute to San Clemente Island, the bachelor haven of NOTS employees, both civilian and military. At planeside, we met our fellow embarkees. To say the least, put it mildly, and all that jazz, we found ourselves astounded aboard an aged DC-3 in company with a rather large group of exotic and eccentric female dancers. I was, of course, stricken in my tracks; yet, somehow I lurched aboard, mouthing my innocence in the entire affair. For the benefit of all concerned, this seemed the wisest course. In due course of time, we landed on San Clemente. The girls went one way, and we fled opposite ways, to have a big tour of the island. Still later, surfeited with vistas of goats, bare hills, and paraphernalia of warfare, we retired to the famed Pink Panther, where our spirits were in due time elevated by available

bourbon and kindred dehydrated souls. After a bit or so, we ate steak, and, in all innocence, accepted an invitation to witness the opening of the Enlisted Men's Club of this celibate sanctuary.

Expecting a lively morality play, or at worst a rapid rendition of chamber music, I allowed myself to be seated on a front row, facing the piano on stage. Appropriately, a rather decrepit pianist crept on stage, and commenced a soft recital of a classic whose name escapes me at the moment, but was strangely reminiscent of opening phrases for the Folies Bergere. Remarkably, the animated stage scenes which accompanied this music seemed to fit the Paris atmosphere. First came a youngish female whose fully clothed endowments would stretch the imagination and part the measuring tape. After a brisk and invigorating upstage dance, the poor girl suffered a catastrophe; somehow, her dress zipper came loose, and in trying to retrieve it, she began progressively to lose other critical and sparse items of lesser clothing. After many futile snatching gestures, the poor dear appeared to give up, and concentrated on the dance. I followed her rapid efforts at concealment with commiserate interest, and shared the blushing humiliation of the unfortunate maid with heartfelt interest. Pending a considerable period of time, and after ascertaining that her garments could not be replaced, this terpsichorean fled to the shelter of the stage wing. Perhaps in a final endeavor to clothe herself, she made one final dash onto the stage, but without success.

Following this shattering episode, a somewhat large contralto approached the microphone singing a lovely aria from Puccini. She, too, must have been a victim of shoddy dressmaking, since her gown fell off before she hit the first high note. Apparently unaware of this catastrophe, and oblivious to the fact

that, in hasty preparation, she had neglected to don any undergarments, the canary sang on, albeit with some rather inappropriate movements of the upper and lower torso, not at all suited for a performance at La Scala. Nevertheless, the sailors rose to the occasion and rendered a great ovation. Scott, Walt, and I joined with enthusiasm. Next came a young woman who told charming but puzzlingly difficult stories about her several marriages. It may well be that I missed the point of her message, what with the howlings and hoots of the audience; nevertheless, I resolved to ask her many questions after the show.

It was, however, all over too soon, and we were buckled into our seats for a return trip to mainland. Unfortunately, I held a window seat, and my partner was both obese and asleep, so I was restrained from visiting with the girl entertainers to satisfy my curiosity about garment failures, dialogue implications, and such like. We landed and went our separate ways.

Back at the motel, I realized that I had been distracted from SEALAB purposes for several hours. Or had I?

16 July 1965

This day commenced with the sad spectacle of Adlai Stevenson's funeral services in our Nation's Capital. I couldn't help but speculate that, had the nation seen him in action as a public servant, as in later years, rather than as a campaigner, we would have better measured the worth of the man, and he would have been a runaway favorite for President. But regardless of his political fortunes, Adlai Stevenson served his country and mankind in a superlative fashion. His mark in history is assured.

Back at the ranch, things were moving along at a famous clip, with the CAT in process of getting a badly-needed coat of paint, my audio-visual trailer control being outfitted, and equipment rolling in from every direction.

Captain Jack Dolan, officially on leave but actually busy with conferences and facility visits, came by for a fast walk-through of SEALAB II, and a brief conversation. Like myself, he is dumbfounded by the escalating cost of the project, and rather articulate on this point, which is undoubtedly a sore one throughout DSSP.

To me, the whole matter of cost estimates and program management is definitely a closed book--and probably one which I will never open with any degree of success. To me, it is fun to run a program; but management, by Mr. McNamara's standards, is just a tricky system of double-entry bookkeeping not bearing responsibility for the end result, nor identifying oneself with the rigors of an accomplished deed, but only projecting a set of improbable events, and leaving the messy details to the contractor. Knowing full well that someone must do this job, I nonetheless spit in the milk of it. I have yet to see a creative program manager. Further this deponent sayeth not.

Telecons with Washington were accomplished before going to the shipyard and with no alarming omens. Seems as if we are on our fatal (or not) leap, and the spectators can only say: "Oh! No!"

Today the trailer with all lab equipment arrived intact. I thank God for both small and great favors. One crackup on this cross-country tour, and we would have--as the saying goes--had it.

A word I think is in order for the supreme medical and dental facilities of the Long Beach Naval Base. Although I lived since September last within an accurate stone's throw of the Navy's foremost medical and dental facilities, I was never able, somehow, to get the annual required attention beyond that available on a technician basis, and damned little of that. Scheduling required the foresight of a soothsayer, and an actual appointment was never in range of

a person of my rank. So much for Washington. Yesterday, I dropped by the dental clinic, hoping for an appointment to have my teeth cleaned, not inspected, repaired, or replaced--sometime before 1 August. Within 15 minutes, I had been inspected by five Captain-type Dental Corps officers, X-rayed, and scheduled for total tusk overhaul within 24 hours. On the way out, I was so flustered that I bowed to a second-class DC, whereupon my glasses slid from my pocket and smashed on the deck. Sixty-nine minutes later I had a brand new set of cheaters. In addition, in the interim, they offered the services of a seeing-eye dog, which I refused. What an outfit!

The afternoon ground to termination, through a series of conferences and brief forays to SEALAB and the Staging Vessel. The latter is in the process of getting a new suit of paint, and will look as well as any Staging Vessel can. Especially, Walt and I are pleased with out accommodations topside--the decor reminds one of "Voyage to the Bottom of the Sea."

LCDR Hugh Golightly is due to arrive next Tuesday, for which I am duly thankful. His capabilities in the field of public relations are vast, and his position as a buffer betwixt the news media and myself is a welcome relief. With Hugh's arrival, the gang will practically be complete, and God help the Natives, who are already restless.

Now comes the anticipated problems of latter stages of a project. From every quarter I am alerted to apparent conflicts of management and control of vital program elements, team personality conflicts, and alarms and loud noises all over the place. Ninety percent of these I have long since anticipated, and provided for; the remainder are of little real consequence.

Yet a few people in the program feel a compulsive need to uncover new (to them) problems, often only to underline their value in the program. For this very reason, I established clear-cut lines and areas of responsibility months ago, and this business of peeping over the other guy's shoulder or overhearing his conversation is of little or no help to the Principal Investigator, who generally has the big picture, and can do without distractions. This day alone, I received four false reports, any one of which, if true, could have stalled the project. All were wrong; more importantly, none were checked out before being brought to my attention. This is no help to a harried investigator. To each man his own responsibility, I feel; and when a man fails, I don't need spies to inform me. Room is not available for busybodies in the SEALAB II program.

Commencing tomorrow, the tempo will again increase, with further acceleration after next Friday. After that, we are locked in, with the die cast and the job in its final phases of acceleration. No more time, then, for reflections or second guesses: We will shortly be frozen in concrete.

20 July 1965

At this early stage, it is of no importance that days be logged, only events; hence the gaps, from time to time, in daily sequence. Actually the days here are remarkably similar, being composed of early morning telephone conferences with Washington, the general spate of emergencies and alarms, hurried conversations and brief forays to SEALAB and the CAT, and the Navy Exchange, with side visits to the scuttlebutt, the head, and on occasion, to the "O" Club to restore the ebbing spirit and stoke the calorie burner.

Had a call yesterday from Captain Jack Bennett concerning my billet situation. Jack worked hard on our behalf just before his transfer, and was assured that our billets would be immediately forthcoming. Alas! When his back was turned, so were the tables, with a prompt return to the status quo. I plan to visit briefly with him in San Diego, and to have Scott join me in a presentation to a group of young officers at Ballast Point.

Today, more news that the BUMED experts will require more paperwork relative to my subject selection and other items. The hour grows late, and shuffling papers at this point could do real damage to the program but I make the effort to comply because I can do nothing better in the interest of the program. These late-season willies are also apparent in my own Special Projects Office, where I'll be required to justify at length a number of critical program features I had considered as accepted fact. I sense a great deal of BUSHIPS influence in these developments, and predict that considerable effort will be expended to prevent our use of the MK I SPU's. I felt this to be a strong possibility two months ago, when the grand play of the SPU unit was made, and so am keeping my fingers crossed.

It is because of the ultraconservative, nihilistic attitude of many people in the Navy that diving practices and capabilities made no appreciable progress during the past 25 years. Now comes our program, and the backsliders set into it with a vengeance. Perhaps it is because it shows up their own unimaginative program. Surely the oldest and most damnable ploy in the world is to scream "unsafe" at the very last moment before an operation. This will (1) stop the program, (2) make the crier seem

wise in event of a minor or major casualty; or (3) afford opportunity of saying "beginner's luck," if the show comes off o. k. Anyway, the investigator can't win. I've seen this trick too often, and hate the self-seeking show it demonstrates.

But all is not bitter, since we have made progress and will continue to do so. The program has too much intrinsic merit to suffer defeat because of petty personal jealousies or bureaucratic politics. Still it would be an easier and happier road if only it winded downhill on occasion.

23 July 1965

And now comes the fateful day of the SEALAB II christening. At first blush, things seemed to be in reasonably good order. This in and of itself is a bad omen in any of my projects. It is the simple, straight forward situation that will inevitably parlay into tragedy or worse.

The morning started benignly enough with only a severe seige of diarrhea to disturb my early day calm and threaten the protocol of the morning press conference. Things took care of themselves, however, and I made the scene in time to face the press. This massive conference was scheduled in a working area of the shipyard, and appropriately in front of the impressive mass of SEALAB II. A battery of microphones was set up for all major networks, and sound-sync TV cameras were appropriately placed. All hands were properly garbed, and the setting seemed ideal. At this point, the situation commenced to deteriorate.

Two of the near-by Navy fighting ships made a decision to commence testing their radar equipment. Ordinarily, these test sweeps are innocuous enough; but on this day they were unerringly tuned to the frequency of our public address system. The net result of this combination was a series of

15-second interval waves of nerve-shattering sound, sweeping the area and wrecking the sound engineer's equipment. Angry protests were in due time relayed to the appropriate commanding officers of the offending men of war, but without demonstrable effects, save for a few clearly audible and unprintable retorts from these doughty commanders, forcibly demanding their prerogatives to test equipment. Sturdily, the conference continued, with each speaker trying to time his words between decibel blasts, and being consistently outguessed by radar operators, who changed their timing on each sweep.

Ultimately, order was restored, and a deadly silence blanketed the scene, punctuated only by two wildcat chippers who had found an offending piece of steel to hammer. Captain Melson commenced a general rundown on our program. Speaking without notes, he started well enough, but soon the factual material began to fall through the cracks. Unbelievably I heard that the operation would take place in the Scripps Canyon--700 feet deep at this point, but that the habitat would be located at 215 feet (we slipped 5 feet downhill); the SEALAB II had gained 25 tons of weight since yesterday; and that we would provide all gas requirements from the Staging Vessel. This may not be the true gist of Lew's apparent errors, but it came out that way on the networks. In conclusion, reference was made to the Senior Line Officer Present, which was shorthand by all press gentry as SLOP---damn these acronyms!! Nevertheless, the conference went well and, save for the difficulty of lady reporters climbing into SEALAB II, there were few further problems. And so the day wore on.

Came noon, and a brief respite before the Admiral-loaded climax of the christening. Last night, I had carefully prepared my service dress

garments for the fancy affair. My whites were complete, medals in order and pinned on, shoulder boards right, and white shoes carefully polished. There remained only the bit of borrowing a sword belt and sundry other accouterments. Nothing could thus go awry at the last countdown. The whole world might be displaced, but Bond would be in perfect order, and on time as always.

As I said, noontide arrived on schedule, and I commenced leisurely preparations for the event. First, I mounted the sword belt over my skivvies, and struck various military and ferocious poses before the mirror, alternately brandishing my sword and standing ram-rod straight, with the weapon held at precisely the correct carrying angle, a pose which would make John Paul Jones look like a slovenly recruit from the sticks. At length, satisfied that I could cut as military a figure as General George Patton, I commenced the meticulous grooming process. A hot shower, careful drying, and application of anti-perspirant were followed by a clean shave. At least, it would have been a clean shave, but the blade was defective--as were all the rest in the pack; but no matter--a slight stubble would scarcely show at 20 feet, and time was fugiting.

Next came the coiffure, sock-donning, selection of least objectionable underwear, and the putting on of the pants. By now, the time schedule was short, so I moved rapidly to the fitting and lacing of white shoes. Almost scornfully, I kicked into the right shoe, tying laces with the consummate skill of a surgeon. And now the other shoe--and utter, total, calamity!!! Twist and turn as though I might, the remaining shoe continued to be designed for the right, not the left, foot. Taking an alternate approach, I was dismayed to find that my left foot could not be rearranged into its dexter ego without a time-consuming bit of major surgery. The situation was becoming desperate, and my composure was disturbed. The latter problem was

corrected with a stiff gin and tonic, but the former continued unabated.

After a hasty, barefoot consultation with Walt Mazzone, I set out, partially undressed in search of a shoe store--a very elusive commodity in Long Beach. First, a dash of only one mile, to a shopping center where I recalled seeing a Grant's store next to a liquor vendor's shop. As I swept into the circle, I halted in stunned disbelief at the sight of the smoldering ruins which must have been Mr. Grant's pride and joy a scant few hours previously.

Wildly, I swept the street with the piercing gaze of a hawk as I cruised down Pacific Coast highway at full speed. My vigilance was shortly rewarded with a glimpse of a Thom McAn emporium somewhere to my left. A simply executed U-turn at high speed placed me in excellent triple-parking position, and I strode quickly into the store, seized a snivelling clerk by the forelock, and demanded a pair of 13C white shoes. This idiot stared as if bewitched at my bare foot and mumbled some drivel about his store catering to the gentleman's, not the coal miner's, trade. As I attempted to shake him to his senses, I caught the words, "Kinney's--way up the street." Releasing the wretch, I bounded to the waiting Ford, and screamed up the street for some distance, then down the street for a greater distance. At long last, Kinnery's rose into view next door to Thom McAn's. The clerk, a brilliant fellow, sized up the predicament, sped to the rack, and handed me a pair of 13B white shoes, his only comment being related to prices. The return trip, the act of dressing as I drove to the shipyard and the actual arrival are a blurred, but vivid memory. Nevertheless, I was in time for the ceremony. Captain Jack Dolan, I noted carefully and disdainfully, arrived without a sword. Obviously, meticulous planning will always pay off handsomely.

The christening ceremony went off, on the whole, quite well. Captain Jamie Adair led the show with exceptional ease and grace. The parade of the colors was moving, and the benediction more so, as a splendid band played a muted Navy Hymn throughout. I wept unashamed and not alone. Next a beautifully prepared speech by Secretary Morse, a smashing blow on the nose of SEALAB II by Heidi Nitze, a concluding prayer, the colors retired; and the show was over. My Aquanauts and the supporting team were magnificent throughout.

It was, withal, a great day.

24 July 1966

The most severe and intractable problems which can beset a program are those involving personnel; and our program has no natural immunity in this respect. My SEALAB II crew was largely handpicked, and in my opinion, the most highly motivated and best trained group of men available in the U. S. Navy. By virtue of this very fact, however, they possess complex personality makeups and are prone to development of primadonnish attitudes with minimal provocation. To an extent, this is healthy, since they must see themselves as a breed apart for maximum efficiency of performance.

Now to the problem. Since the tragic chamber holocaust at EDU last spring, L. A., a plank-owner Aquanaut, has shown a marked revitalization of his latent rebellious attitude against authority. This is not a new situation with A., but I believed that out of loyalty to the program, he had whipped himself into line, and would fit into our command structure without further outbreaks. I was dead wrong. Without adequate advance warning, and after we arrived at Long Beach, A. chose to challenge authority.

The instrument was simple--as uncomplicated as the reasoning of my Aquanaut. A. categorically refused to participate in physical training each morning. When directly ordered by CDR Scott Carpenter to participate, he disobeyed the order. Scott attempted to reason, got nowhere, and so disqualified A. from the Aquanaut team.

For reasons apparent only to himself, A. thought that I would take his part, and over-rule CDR Carpenter. Further, he informed Scott of this belief as an added goad to authority. I was told of the situation, reassured Scott of my concurrence with his decision, then sought to get hold of A. without success. He evaded me throughout the night, and was absent during the Friday morning press conference and following christening ceremony.

At long last on Saturday afternoon, he was available, thanks to Bob Barth and Wilbur Eaton. A. and I had a closed session at the motel, with pitiful results. I pointed out the obvious fact that he had let down the Aquanaut team, himself, and me, in that order. Further, I tried to ferret out the reasoning behind his misbehavior. His answers were devious, specious, and loaded with rationalization and self-pity. Finally, I asked him to look within himself and stand ready to talk with Scott and myself tomorrow, anticipating dismissal from the program at worst, and retention as a surface support diver at best.

It is almost certain the A. will leave the program tomorrow. This is in best interest of my other Aquanauts, and probably in the best interest of the subject individual. Nevertheless, Scott and I together with the other team members will make the best effort at a decision fair to the man and the program alike.

As a sad clincher, this day I received a personal note from Rose A. noting that A. would be on the bottom during his birthday, 20 August, and could I send him a cake and sing "Happy Birthday" over the communication system. How to answer a proud wife who has agreed to a most hazardous venture for her mate and the father of their family? Can I send this man back, branded as a quitter, a traitor to the program? Or should he be retained in minor capacity to damage the vital morale of my remaining Aquanauts? The decision is mine; and the isolation of command grows more apparent by the hour.

26 July 1966

Up betimes, with telephone calls to Washington and other spots occupying most of the morning, and Navy Exchange visits taking up the balance. To the club for lunch where I ran into an old friend, Captain Lytle, now skipper of the Naval Base. We had a lot of gossip--talking--to do, not having seen one another in over ten years. The good Captain volunteered all of the facilities of the base before we parted company--a comforting situation. Having a Carte Blanche at both the base and the shipyard pretty well guarantees a comfortable existence for the program.

Shortly after lunch, Scott, Walt and I held a final conference re: A. Agreed that it was best for the man and the program that he dissociate from this particular operation, Walt came up with an excellent suggestion. Since a sight relief was required for Bob Sheats, let us send A. up to do the job. By so doing, the Torpedo Station would be getting an outstanding diver, A. and the team would be temporarily separated, and Bob Sheats would be available to us early in the game. And so it shall be. If all goes

well, I will have A. relieved in time to join us as surface support for the third run, when the situation and personalities will have improved. He is a valuable man who must learn to solve his problems without revolt against authority.

A bit later, I gave my decision to him in private, and he accepted it in good grace and with humility. The problem, I hope, is on the road to solution.

Today, Paul Cohen of Sperry came by with news of his physiological telemetering system, which sounds very good indeed. We went over the prints then checked out our various recording systems for compatibility. It now appears that we may be able to telemeter or record free-swimmer's physiologic responses using three separate systems. And if only one system works, we're ahead of the game.

Outfitting of the trailers is proceeding in good order. This promises to be a real elegant layout, complete with nothing but the newest and best. From my chair, I can communicate through many channels with my Aquanauts, anyone on the Staging Vessel, other vessels in the area, including the workboat, personnel at Scripps, and anywhere in the U. S. Not bad for an early effort.

Good news today that the PTC is on its way this evening cross country with round-the-clock drivers. The DDC will follow one week later. Schedule is still tight, but tolerable. So many things to fit in at the last minute; but it will all fit in. The spares for the MK VI gear, source of so much hate and discontent, are reported to be located in the Navy Supply System, where they have been all along--and this after haggling with BUSHIPS representatives since February! The situations are not calculated for mutual happiness.

Today we have two Aquanauts at EDU for further diving test procedures; five divers en route to Coronado for MK VI additional training; and all other personnel are deeply involved in final outfitting of SEALAB II and the CAT. It is by virtue of people that a program goes or fails; and we have the people to make our program go. And so the day ends.

27 July 1965

This is a day of documentation, scheduling and phone calls. The latter started at 0630, and pinned me in the motel room until after 1300. Meanwhile, back at the shipyard, Scott, Walt and other dedicated souls were hard at work, double-checking all available operational bills, largely pertaining to engineering and shiphandling aspects of the program. Between phone calls I continued work on the bills relative to personnel safety. And so the morning and forenoon wore on, with work being accomplished on all fronts, and hopefully with a minimum of overlap.

Documentation, both before and after the fact, is vital to the success of any project of this magnitude. It is, however, a dreary pastime, and no less frustrating in the light of certain knowledge that all carefully spelled procedures will invariably be subject to daily and often drastic change. Still, without a suitable frame of reference, chaos will be compounded.

It is during this period of agonizing reappraisal that the long painful moments of doubt put in appearance. Now we begin to consider not what we have carefully planned for, but rather what factors we have overlooked, perhaps because they seem so evident as to obviate need of documentation. And now the nights grow long, just as the days grow short.

Two areas are of major concern to me at this point in time: communications, and the probability of an Aquanaut breakaway phenomenon. Against the former

problem, we have developed and are using the finest possible array of new and modern equipment. Yet here a critical flaw is apparent. Diver-to-diver and diver-to-surface communications have never been reliable in my book, and it is difficult for me to believe that they will work this time, after so many failures in the years past. Accordingly, I have calculated all my procedures to allow for total failure of these two communication links. The second hazard of Aquanaut breakaway from topside control cannot be fully predicted, but may be partially circumvented by precept, prayer, and brainwashing of my subjects. Further, I cannot go.

Scott and I had a poolside conference this afternoon, resolving the details of the day. Tomorrow must bring its own problems.

29 July 1965

And so the time moves along, as does the project. The early day was filled with telephone calls from all quarters. Too many of these came from well-intentioned people of some scientific stature. All of them wish, even demand, big chunks of my time and an elaborate visit to the SEALAB II complex. It is difficult to explain to these worthies that we are in the last hours of preparation, and time has run out. Every interruption or delay has serious safety implications for the project, and cannot be tolerated. Along these lines, Scott Carpenter and I were unwillingly hooked into a TV show on a Los Angeles channel. At first blush, it seemed innocuous enough; but as the picture unfolded, it became apparent that each of us must give up about eight hours of dear time to make the show. Even worse, this opened the flood gates to other networks and independents. I realize the importance of getting our story to the general public, whose interest and support we

need; but a sharp cutoff must be made and the few of us who are high in the program must spare every b.t.u. of our energy for our program and people.

A. departed today for Keyport, and Bob Sheats will report in on Monday. A. left in good spirits after a long talk with Scott, and a bit more insight into his situation. We will miss his energies and tremendous capabilities, but we need Bob, and this is a good trade, helpful to the program. I, together with all other SEALAB personnel, look forward with keen anticipation to Bob's arrival to join the team. He is easily the most remarkable man I have ever known, one who commands complete respect from everyone whose life he touches, because of the complete integrity of Bob Sheats. He deserves, and may get, an adequate biography--the complete man, and the world's best diver.

Last night, the critical umbilical cord was uncoiled for testing and found defective in that we could not force gas through the system. This morning, the cord was uncovered and 19 complete kinks were found in vital gas supply lines! We separated all components, straightened the mess, flushed and pressure-tested the tubes. Next, my Aquanauts fell to the time-consuming but time-honored method of marrying the cord elements with marlin. Back to good seamanship and the hell with fancy engineering design! It is a kind of old story: sophistication of design always brings headaches--and this one we didn't need, at this late date.

The Krasberg units and the ARAWACS, together with their engineer-inventors, arrived today--a most welcome sight! The equipment, handcarried, is in good shape, and Jerry O'Neill assures me that it is over-engineered for our purposes.

The PTC is due here tomorrow, for refurbishing and final test procedures.

Next, the DDC six days later, for final installation and checkout of the critical mating procedure. We await now only arrival of the two gas-jamming PPI's, and their checkout, then we're out of hardware and down to final details.

We have been looking hard and long at the operational bills which will guideline and document the SEALAB II experiment. This paperwork, adding to over 400 typewritten pages, staggers the imagination. It is undoubtedly a vital element of the program, but will be altered to fit exigencies of the unfolding exercise. There is always the grave hazard of writing these bills in such detail and inflexible structure that one is painted into a corner, and unable to meet a new situation without violation of established and approved precepts. On the other hand, bureaucratic management policies require spelling out in infinite detail each step of the game. On the horns of this dilemma, I try to fight for shoulder room on the part of the Principal Investigator, through the use of loose and somewhat ambiguous verbiage. I am convinced that, in work of this complexity and uncertain nature, one must "temper to the new-shorn lamb the wind." And the winds from Washington can often do with a bit of tempering. Such is the life of a Principal Investigator, and I would not have it otherwise.

This day closes reasonably well. Meliores Tempores Expectamus.

30 July 1965

Things did not go at all well today. I got in fairly early, and in time to see the results of the freon purge of our gas sampling line in the umbilical package. The line was badly contaminated with what appeared to be diesel oil. This in itself presented no particular hazard to the SEALAB II occupants, since

it is a one-way return line to our fractometer and other sampling instruments in the trailer; but it is alarming to note that so little attention was paid to selection of the umbilical components.

Next came the inevitable payoff for the careless kinking of the other gas supply lines. In the pressure test of the first line, it began to blister, then showed multiple ruptures, obviously resulting from internal breaks. Some rapid phone calls were made, and all hoses re-ordered, at an added cost of a thousand dollars, not to mention the price of making up, reinstalling, and retesting the new components. In all, an unhappy situation. But this was only the start. There was much more to come.

At 1300, a meeting had been called for the purpose of final team selection announcement to the Aquanauts. At 1230 came a call from Denzil Pauli, informing me that BUMED had reconsidered, and proposed to disqualify at least four of my civilian-scientist types, on grounds of physical defects. I was disturbed to say the least. We had no choice but to give the news to the Aquanauts, and to watch morale go to hell in a bucket. Next, my job was to do all possible to remedy a seemingly hopeless situation. By virtue of frantic long and short distance calls, and a great deal of personal persuasion, plus a few white lies, I got emergency medical consults on the four individuals concerned, set three corpsmen to the task of redoing all health records, then commenced preparations to make a quick flight to Washington for a personal presentation of my case to Admiral Newman and the Surgeon General, as might be required. At this late date, I can ill afford the luxury of two wasted days; but it is vital that I keep my team intact, and this is the only hope of so doing.

The constant requirement for telephone calls, memoranda, and documentation are necessary, and are my personal job; but the net result is to keep me away

from the real work jobs around the SEALAB II complex, and to make me feel like a slacker. It is far from my will, but it must be so.

The PTC, due in this day, did not arrive, but we are assured of its early arrival tomorrow. There was opportunity this afternoon to give the ARAWAK gear an adequate open-sea test, with dives down to 40 feet, and excellent results. The gear promises good reliability.

This night I finally completed all arrangements for Art Flechsig to have a long glucose tolerance test and a repeat fasting blood sugar. I pray they check out O.K., sufficient to convince BUMED, as his is a very important program.

1 August 1965

This day has been a dilly. It started innocently enough, with a call from Bob Worth reminding me of the TV show scheduled for night-time taping. So far so good. I was ready, if not eager, to comply. After all, it was only thirty minutes of talk, scarcely a warmup for a dedicated raconteur such as myself. With any luck at all, my impromptu address to the Nation could easily dig me two graves, and result in a court martial to boot. Now the other boot dropped. Scott Carpenter had just called Bob to tell him that he could not join me on the program. In a flash, my astronaut shield of protection vanished, and I felt naked. Seems Scott had made a 220 foot dive on the site this morning and so had to stay near a recompression chamber for the customary twelve-hour period. This was as it should be, though I had thought the dive was scheduled for yesterday. Nevertheless, requirements of the program outweigh other considerations, and I accepted the situation with ill grace.

There remained the problem of getting to the NBC studios somewhere north of Hollywood, and of returning to Long Beach in time to pack and enplane for Washington. To Buffalo Bill, Magellan, or Christopher Columbus, it would have been a no-sweat deal. To me, it rapidly became a sweaty ordeal. Travel on the California freeway system is, to me, equivalent to plotting a trip to Mars by way of Venus. Knowing that I had a map in the glove compartment, however, I set out in good faith. Very quickly, I found that I had not reckoned with the problems of freeway travel. Moving at seventy miles per hour in a six-lane highway, it is difficult, even dangerous, to unfold a highway chart and to plot a true course with substantial accuracy. Indeed, it is damned near impossible. Consequently, I drifted with the high speed tide, a bewildered bit of jetsam, until my unerring sense of time informed me that I had driven long enough. Quickly dropping off at the nearest exit, I glided to a service station stop, only to be directed to another, more complicated freeway. In due time, I found the studio, and then the fun began.

To complicate matters, I had a number of important phone calls to make, not the least of which was to have been directed to my long-suffering spouse, on occasion of our 27th wedding anniversary. At the studio, I was assured that telephone service was readily available at my instant command. Somehow this piece of apparatus never seemed to be accessible or in working order, and no calls were made. Fortunately, Marjorie assumed that I was at sea, or being held incognito, and so did not commence demarriage proceedings at once.

Having got through a conference dinner in which we determined that the show would be 11.5 minutes too long, we set about the pruning operation. In such a situation, the choice is clear: the interviewee may reduce his lucid responses to monosyllabic grunts, or the beloved and tortuous questions can be

largely eliminated. So the battle lines were drawn. In the end, however, it smoothed out quite well.

The next crisis involved my choice of uniform. Since I was equipped only with wash khakis and boondockers, I had foresight to bring along a dazzling set of tropical white longs, considered acceptable by the military for film appearance. It seems, however, that dazzling white is anathema to color TV, and could not be tolerated in the words of the show producer. With minor overhaul of the camera lenses and lighting, it was tolerated; and though my interrogator televised in brilliant purple, Papa Topside looked ready for inspection, save for large smears of makeup which slathered my collar, fortifying the public impression that I rarely, if ever, washed my neck.

Nevertheless, the show went on, and my inane commentary became a reprehensible matter of record, subject no doubt to review and analysis by high and low authority. In retrospect, most of the opinions I volunteered to the TV audience wouldn't have been cleared for an Elk's Club smoker; but it's now a matter of record, and I must await the inevitable repercussions.

The evening ground to a midnight conclusion--a round of drinks at the nearest bar. As I entered the welcome refuge, I was dismayed at the startled looks of waitresses and customers alike. It was not until I returned home that I discovered my makeup was still intact, and painfully obvious. This sort of thing does not improve the Navy image, and may well be reflected in my next fitness report.

Finding my way home was rather difficult. Although supplied with an excellent map, drawn on a cocktail napkin, I found that accurate perusal of the document, at 70 mph on a crowded freeway, was conducive of mass accidents.

Just short of San Diego, I made a quick navigation check, and retraced no more than two-thirds of my steps before finding the motel. A fast check with Walt Mazzone, who was still awake, and I packed for the trip to Washington, and new adventures.

3 August 1965

At 35,000 feet over western Kansas, with a good meal and two martinis safely stowed below, it is possible for me to view the day's events in mellow perspective. In all, things seem to be on a better track, though I would have denied this statement as of 1330 this day.

After wishing wife a happy anniversary at about 1700 yesterday, and a day late, I completed the minimal requisite paperwork, had a steak supper, and retired fairly early. Through some strange process of reverse osmosis, my infallible time clock got turned around, resulting in an early reveille at 0300 hours. For two hours, I lay abed, gaunt-eyed, gradually building up my resentment at BUMED tactics and policies to a fever pitch. Up at 0600, I shaved with a cruel swipe, and gulped hot tea as if it were fire water.

Some three hours later, Captain Melson, Al O'Neal, and I were in RADM Newman's office, accompanied by Messrs. Schulte, Ninow, Kingston, Pollard, and some others. Admiral Newman patiently and kindly tried to explain why the flap over the Form 88's, which had been improperly filled out. Further, he tried to explain that this put him in an indefensible position. Unfortunately, I was still boiling, and unreasonable at first. Finally, the logic of the Admiral's requests got through a thick skull, and I saw the light. Shortly thereafter, three of us were hard at work, cleaning up the 88's, and by early afternoon, the project was back on the rails, with a promise that BUMED would grant my waiver request. Perturbed though I was

at having to drop business at hand and run a messenger service to Washington, I now see that this was the only solution fair to both sides and happy to have made the trip. Still, there were discernible elements of nit-picking which had origin outside of Code 7, the abode of RADM Langdon Newman. Guess I'm a shade touchy at this point in the program.

For the third time, the question arose of Bob Workman's participation in the project. CDR Hedgepeth is reluctant to let us have him onboard either as consultant or observer, and I cannot follow the logic on this score.

The implied BUSHIPS attitude is to the effect that they have not been adequately consulted or kept informed along the line, and so don't wish to condone the project. I find this difficult to understand, since EDU has been fully represented on my Steering Task Group, and has been kept fully informed. It was never contemplated that they would be asked to assume or share any responsibility, save in the case of sudden disability on my part. Certainly, it would seem that being the lead position in Navy diving, EDU would be sufficiently interested to wish an on-scene observer, especially since we offered to foot the bill. Such is not the case; and so we go our separate ways--a sorry policy.

To further muddy the waters, now comes BUMED requesting that ONR make a vehement demand for Bob Workman's services, with clear implication that I am incapable of running the project safely. This I resent, and will not tolerate. Since BUMED showed no interest in, and gave no help to, the project in months and years past, the present nosey-Parker attitude is intolerable--and so much for that.

Shortly, I'll be back on the West Coast, and with my motley crew. Hopefully, there will be less interference in the remaining days before submergence.

But I doubt it!

4 August 1965

Up betimes, a bit weary from the 5,000-mile dash. Learned with relief and satisfaction that the PTC and the PPI helium jamming pumps had arrived. The former item was time-critical, and its tardy arrival will enforce a program slippage. Another case of industrial unreliability, since we had been guaranteed delivery by 24-hour per day, 2-driver system. In the end, only one driver was used and he wasted time. But it's an old story. The PPI gear is being installed, and has apparently checked out well on first trial. Maybe the company president got the word on reliability when we recounted to him the past sins of his organization, and demanded performance. The PTC delay really hurts, because at least 8 days of work and checkout will be required for this item. Days are a damned precious commodity in the program.

Work on the Staging Vessel, now renamed the BERKONE, after Berkich and Mazzone, has come along beautifully. The galley is functional, my communications shack is nearly operational, and laboratory spaces are coming along well. It will be a pleasure to go aboard for some sea duty.

A fairly serious problem in connection with our operation grows more ominous by the day. This relates to the environmental conditions prevalent at the selected site for SEALAB II. Because of the season, unusual sediment transport, or the prolonged siege of Red Tide--or for other reasons unknown--the visibility at the site has remained near zero. Worse yet, the silt accumulation, all black, threatens to further obscure what little visibility may be had. It seems entirely possible that visibility may range from six inches to one foot through the operation.

This possibility raises very grave problems to the fore. If these conditions continue, as they have for at least two months, we will be deprived of nearly 70% of our human performance data, for lack of visual records. Additionally, motivation for prolonged undersea work will undoubtedly plummet if my people are required to exit into a black curtain of silt, consistently failing to do their appointed jobs, and leaving no record save that of failure. I had selected this site because, among other more important reasons, I wanted to present our Aquanauts with varying degrees of water clarity. I did not, however, wish to present them with a set of hopeless conditions around the clock. In addition, underwater photographic records are critical to the program, and national TV networks must be considered. If the silt compacts, and if visibility improves, the problem will be minimized; but this has not yet come to pass, and our deadline approaches.

There is another possible course of action, even at this late date. Months ago, before final decision was made on the location of choice, a hard and favorable look was given to the San Clemente Island area, where we have an active Navy underwater facility. In addition, we have a permanent and completely stable moor in water depths to more than 230 feet, and in clear water, with hard bottom, undisturbed by weather. Finally, San Clemente can provide shore-based power and water. We could shift to that location with no more than a week's loss of time, and reasonable assurance of an operation which would yield maximum data and a good photographic record to boot. Now balance against this the possible alienation of some of our scientific community, loss of some of our daily TV communication with the world, and the obvious admission that our planning did not allow for the

adverse conditions which might occur on the edge of Scripps Canyon. It is a tight and difficult decision, and not mine alone. But still I must turn this over in my mind, since it is my project, and my men; and I will probably make the final decision--and that must be soon.

I intend to sift this one carefully, making the required telephone calls in the morning. At least, today I got word that all waiver requests on my Aquanauts have been approved.

6 August 1965

Another day of telephones, and incarceration in the motel. It all started soon after I got up and continued until 1400, which is now. Not unlike the breeder reactor, I find that the official business telecon invariably begets a progeny of satellite messages most of which eventuate in return visits. And yet, however much I deplore the system, I must admit to its utility. Although physically separated from my men and hardware because of these prolonged transcontinental conversations, a great deal of essential work is done, without which the project would suffer, perhaps founder. This particular operation has grown so complex that each party of responsibility must move out on his own job, with only occasional contact with other principals, trusting that we all know our jobs by now, and that no major items will fall through the crack. As I have said redundantly, extreme flexibility is an absolute requirement of a program such as SEALAB II and it is best sustained by keeping loose, at this stage of the game. As dropdown approaches, we will tighten up, and on drop day plus 12 hours, the command echelon will be few in number and taut in structure. And though this concept may not agree in all respects with current directives, this is how the show will go on the road.

More good news last night. Some fool sidetracked the DDC in El Paso, Texas, with resultant loss of seven hours travel time before we could recouple the flatcar. This loses us a full day and a half, and possibly one more day. How these things happen is a complete lesson in human behavior; but happen they do, and we suffer accordingly. My people willingly work around the clock and on weekends, but morale suffers when such useless delays become predictable. American industry, I am convinced, has long since lost its conscience and much of its integrity.

Yet all is not bad news. A speedletter from BUPERS today assures me that all personnel subject to waiver have been approved for participation in the operation. The trip to Washington was therefore worthwhile, and my faith is augmented, if not restored.

Final plans were completed today with Howard Talkington in regard to possible shift of sites to San Clemente. All required steps will be set up, and the proposed operational bill prepared against that eventuality. Actually, the shift could be simply performed, with virtually no loss of time. There would, however, be a slight loss of face on the part of Scripps Institute, which I regret, and a partial dislocation of the planned TV and press coverage. Both of these, I believe, can be compensated. The Scripps scientists, I am assured would rather work in an unfamiliar site, and be assured of acquiring useful data, than to work near their familiar canyon under conditions which preclude useful observations. It is true that the oceanographic recordings to be derived from Vic Anderson's elaborate setup would be delayed by a matter of some weeks; but these are not critical to the program, and the delayed installation of the Benthic Lab would not be

of serious consequence. TV and press coverage can probably be shifted to San Clemente with little loss of availability. This problem will fall to Hugh Golightly, who is informed, and will make alternate arrangements, if necessary.

Last-minute decisions of this sort are difficult at best, and always subject to vicious review. The present condition of our La Jolla site stands as patent evidence of poor planning on my part, despite months of photo survey, core sampling, personal dives near the site, and long interrogation of Scripps' divers. I can protest an act of God, a mysterious sediment shift, or the Red Tide factor--but to no real avail. Better to have a well-planned escape route--and San Clemente fits the bill.

Just finished a long talk with Meeks, Meisky, and Coggeshall, all very cognitive gents. We sized the problem together, and they will go any way I choose. This is representative of the crew any boss could dream of. You can talk straight to them, get straight answers, and yet be sure that they will do as ordered without cavil. This is the diving Navy at its best, and that statement holds for every Aquanaut aboard.

And so the decision remains to be made, yet cannot be made until the ultimate hour. Considering how I hate indecision, this is very rough indeed. But we'll survive, and handsomely.

7 August 1965

A Saturday of work today, refurbishing the PTC, using our own people. In consequence, things moved along well. Not that the shipyard work has been bad--far from it. It is only that with present-day labor union restrictions, the versatility needed to do the many small jobs in our program is sadly lacking. When it becomes necessary to bring in as many as 6 separate

trades to accomplish a single coordinated choice of repairs, time is irretrievably lost, and the job may suffer. Fortunately, work on board the BERKONE, and with the life-saving hardware so important to my people, can be done by our team, in part or in whole, without invoking the corporate union wrath.

Today I received the not unexpected news that the DDC will not arrive until tomorrow. This is a cruel blow, since it had been so assiduously traced by Denzil Pauli, and all assurances of prompt delivery given by company officials. Oh, well! We'll survive it!

Faced with the dilemma of nearly impossible work conditions, I have derived a pleasing alternate and solution. It is simple, daring, but it can be accomplished. We will make the first team run at La Jolla, thus satisfying the requirements of Vic Anderson's program, then raise SEALAB II and proceed to San Clemente for the completion of the program. The plan has a great deal of merit; and aside from the fact that it will be difficult from the technical and mechanical point of view, should be within our present capabilities.

To a man, my military and civilian Aquanauts are all for this new plan, though it will cost them all per diem, and mean isolation on the island for a month. Monday, I plan to try it for size on the staff at Scripps, then spring it on Washington. I am sure that I can sell it on its merits, since it offers, among other things, the only chance of meeting or ever exceeding all of the goals of the program.

8 August 1965

A quiet day withal. Up at about 0900, leisurely dress procedure, thence up the freeway to Torrance in search of the honcho of our TDP. Hopefully, I would be able to proof read the early chapters to obviate the multiple cross-country transmissions of the document. Had no luck in locating my principal, however, so after lunch I again braved the freeway for a return to the Outrigger, and an afternoon by the pool.

And now comes our total menage of psychological investigators to gather on the scene, and to tie up loose ends of their procedures. They are withal a dissimilar group of headshrinkers. On the one hand, a pair interested in minute measurement of work performance; others are concerned with motivation and lack thereof; while still another group seeks adequate selection criteria for future Aquanaut operations. Just how they will reconcile their data remains a closed book to me.

Plans call for a quiet evening with Dr. Perry Gilbert and thoughts for the morrow. Today I weighed in at a trim 198 pounds.

10 August 1965

Eight days to go by our ultra-tight schedule, and the pot is really boiling. The tempo is up to the last notch, but work is being accomplished at a great rate--by others I hasten to add, since my principal function seems to be that of chronicler, attender of conferences, and telephone talker.

No time to write for two days, so let's fade back to Sunday evening. At this point in time, an influx of visiting consultants swept down on the Outrigger, bringing in their wake a retinue of lesser luminaries and bag carriers. Most welcome in the tribe were Drs. Perry Gilbert and Sem-Jacobsen.

The former of Cornell U., is world renowned for his shark and other elasmobranch research; the latter, who carries the full moniker of Wilhelm Karl Sem-Jacobsen, hails from Norway and parts west thereof, is a neurologist of world fame, and a man of voracious and protean interests. A huge, gangling, loquacious, friendly Scandinavian, he envelopes everyone in range with his charm and enthusiasm; and his involvement in our project is hopelessly out of proportion to the scope and price of his contract.

On Sunday evening, Karl was delayed in arriving, so Perry Gilbert and I commenced a long conversation in my room pausing only to migrate to the Leilani for a fantastic celestial dinner served by our host, Don May. All through the meal and for hours after, we talked--mainly of sharks. It was a remarkably informative evening, spent in good company, and before its end, I knew that the Aquanauts were in for a mighty interesting lecture from a great man.

Monday morning Perry and Karl were introduced to the team, then whisked off for a tour of the Staging Vessel, and an outside look at SEALAB II, which was temporarily buttoned up for pressure testing. They were evidently pleased with our degree of development and state of preparation alike. At mid-day, we returned to the motel, I to make phone calls, and my friends to have lunch.

Later we returned to the shipyard to continue our tours, and were well on our way when Denzil Pauli exploded from Building 39, waving his hands in recall, and telling me that we had a diving accident on the island. I moved to the phone with alacrity.

On Saturday, I had decided to send an Aquanaut diving team to San Clemente for the purpose of surveying and photographing the 220 foot site I had selected

as an alternate to La Jolla. Walt Mazzone went along as a diving medical representative since I had to remain in Long Beach; and Walt elected to dive with the first team--all using open-circuit, compressed-air rigs. At about 205 feet, on the bottom, Walt began to experience the unmistakable buildup of nitrogen narcosis. Simultaneously, his regulator seemed to be delivering an inadequate supply of air. Recognizing the seriousness of the situation, and without immediate help, he attempted to return to the descending line; but instead he swam into the blissful, deadly cloud of narcotic oblivion.

Bill Bunton and Gallagher missed Walt, and turned back to find him in an inverted position, floating face up about three feet off the sea floor. Together they carried the unconscious man to the descending line, and began to boost him up the 200-foot run to the surface, making sure that his mouthpiece was in place, and that he was breathing properly. Progress was agonizingly slow, as it always is with an inanimate diver. Bunton, realizing the urgency of getting Walt up, jettisoned his tremendously valuable camera, and pulled the CO₂ lanyard on Walt's vest, inflating his jacket to that degree. Now the ascent up the line went easier, and soon they were on the surface, where Walt quickly regained consciousness, though incoherent and shocky. He was immediately transported to the pier, thence to the chamber, where a precautionary Table I treatment was commenced, and a phone call put through to me.

As Lew Melson quickly sized up the situation for me, with assurances that Walt, at 100 feet in the chamber, felt and looked well, I hitched my galluses for a fast run to the island. Entirely aside from the fact that I

must go to observe and be with my friend and co-worker, it was imperative that I see immediately the effects of this near-fatality on the other team Aquanauts. Such an episode can, at this stage of the game, wreck morale in a single stroke. I had to see my team, and quickly.

The plane was held only five minutes while I set a near record through Long Beach traffic; and thirty-five minutes after takeoff, I was at the diving locker, ready to enter the chamber with Walt. Within a minute I knew that my men were concerned, but not shaken. The situation had been handled with speed and skill by real professionals.

In the chamber, Walt was in very good shape, with no discernible after-effects from his misadventure. I stayed inside for the brief duration of the decompression. During this period, Bill Bunton told me, through an oxygen mask, of the loss of his precious camera, and his keen desire to recover the same, and I was in real sympathy. Without this gear, which he had willingly jettisoned to assist a diving buddy, his personal project was shot, finished. The camera could possibly be found, if search dives were made immediately; tomorrow would likely be too late, what with tidal sweeps and the near-neutral buoyancy of the camera.

I outlined the situation to Bob Sheats and to Bos'n McCafferty over the horn, and requested their collective judgment. The answer was clear. They would make all preparations to go on the search with SEALAB divers as soon as the chamber surfaced. And so it came to pass. At 1800 hours, in a 30-knot wind, and with rapidly fading light, Barth and Meeks dropped over 200 feet, located and recovered the vital camera. This is the sort of performance that makes P. Topside proud of his gang and completely certain of their steady competence. We packed gear and sped to the waiting plane.

Somehow I managed to have a late supper with Karl, Perry, and Karl's charming daughter, Anna, who majored in Physical Education, and looked it. A tricky idea began to hatch in my furtive intellect. Our men had physical training every morning. Why not a new instructor?

Scott took to the idea, and at 0700 this morning, with the Aquanauts in ranks for calisthenics, Anna emerged from her hiding place in the mustang, and took charge. Forty minutes later, the SEALAB team was pooped, Anna was radiant, and the tension created by the recent accident was gone.

At 0900, Perry Gilbert began 90 minutes of the most interesting illustrated talks I have been privileged to hear, and all on the subject of sharks. My Aquanauts were with him word for word.

As the question period began, I got an urgent signal that Lew Melson had words for me, and so crept out to the passageway. With deeply serious mien, Lew told me in hushed tones that he had really bad news for me. I recoiled in despair, mortal flesh quivering like a coelenterate. The evil gods of misfortune, I thought, must have surely exhausted not only slings, but arrows as well; and the pipeline seemed to have refilled whilst I dozed. I staunchly awaited the coup de grace.

The Secretary of the Navy, I was told--and I flinched at the awesome name--had today approved awards of Legion of Merit and SECNAV Commendation awards to appropriate SEALAB I participants, and thanks no doubt to some typographical error, was awarding me a second Legion of Merit. I felt strangely warm all over, and had difficulty in clearing these foggy bifocals I've started wearing. Because I could sense that Lew was on the point of falling down, I threw my arms about his neck, thereby saving him a nasty fall.

In due time, we regained the bubble, and passed on the other news. Six divers would dive on locations adjacent to our selected La Jolla site, since there were indications that a slush-free bottom might be found nearby. If need be, the moor could be shifted a bit. In any event, we would start at La Jolla, and damned near on time. A long and fruitful conference was called, and the schedule re-scheduled. The rest of the day was anticlimatic, though I recall with vivid pleasure an extra-dry martini at lunch, and a late dip in the pool this evening.

A remarkable day. But no more deep compressed air diving.

13 August 1965

I start this part of the CHRONICLE in a misty-eyed state, the result of reading wife's letter, with enclosures. Margie's note says she can stand the long, silent separation, providing time continues to pass; and the enclosure tells me of George Jr's triumphs as a water skier, and Judy's first tremulous steps in managing her own life, with hopeful backward glances at her parents as if to assure herself that we're still there, behind our daughter. It is not a nice thing to realize that, though I think of my family often, I worry oftener of the project. Perhaps it will not always be so. At least I can hope that way.

And now to the question of the awards. After a near full year of consideration, appropriate awards are being made to my original Aquanauts and helpers, just before we commence the next exercise. The awards are unusual: six Legions of Merit, and the rest Navy Commendations. That deal must have used up the entire annual budget of the Awards Committee. With a single exception they were richly deserved. The exception is me. I honestly feel that in getting the Legion of Merit for the deep escape work,

I got a rain check on all that I could ever do for our Navy from there out. I need no more plaudits, and deserve none. Given the free hand to work that I now have, I only want to do a job for an outfit I love, and no decorations desired. Since the day I was sworn in at EDU, I have known that the Navy is my life. As I wrote in 1956, on separation, I have never known an unhappy day in the service. Admittedly, I have received exceptional treatment, and unusual privileges; and I can only repay these with a best effort. In all truth, this award should go to Robert D. Workman, Captain, MC, USN, who has done more to advance the Man-in-the-Sea effort, deep submarine escape, deep brief dives, and general Navy diving capability, than any man alive, in both present and past tense.* Since I cannot, by protocol, transfer my award to Bob, I will leave no stone unturned to get him an original. Additionally, Drs. Fischer and Bull, original and faithful subjects of the GENESIS series, deserve no less than the SECNAV Commendation with Metal Pendant, and will get it, if it takes me another year.

And now to current problems. We have slippage, but remarkably little. Last February, our official letter went to CNO, indicating an occupancy date of 20 August 1965. We will not miss this by more than two days, which looks good to me considering the complexity of the program.

One problem does concern me, and this I have conveyed to the front office. I desperately require competent secretarial services for at least the next two weeks. Further, I need a secretary who can take shorthand from me, and who is fully conversant with all of my Man-in-the-Sea terminology. Linda can do the job, and for minimal cost, she can be sent out. But this is contrary to SPO policy, so I cannot have her services. No matter that ONR has shipped out their best secretarial help, in the interest of the program.

*Captain Workman received the LOM in 1967.

I am told to use dictation services for which my office personnel are not prepared to cope. This will be argued further, though probably with no avail. Policy is policy.

As the old man used to say, we're in the short rows now, and the mule's got to turn quicker. Everybody here and at Long Beach is ready now for those sharp turns, till the crop is plowed out and the hames and trace chains on the peg. Then, in the next week, we'll bust out the middles and lay by.

And the crop will be in God's hands.

16 August 1965

And much has happened in the past few days. When last I wrote, things were reasonably well on the track, and our time schedule realistic. On Saturday past, having completed my revision of the TDP, I made all preps for a session with Joe McMann in regard to same, thence to Los Angeles for a talk and visit with Ivan Tors, and a final return to San Diego, and the Halfmoon Inn. It didn't quite work out thataway.

At 0730, as I started to leave the motel room, the phone rang, and I answered. Thereafter, a sequence of calls and responses continued until 1300 hours, when I finally shut down and cut out for the shipyard, only to receive more calls la-bas, most of which were time-consuming, but unimportant. At long last, I reached the CAT, only to find that an apparent leak had developed in the PTC piping system, and this despite all previous testing. Coward that I am, I fled the scene, leaving the more competent personnel to grapple with the problem. En route to Torrance with my TDP clutched in a hot hand, I knew myself for the turncoat I was, but fled nonetheless. Later in Torrance, I tried to rationalize the disgraceful departure, without complete

success. Admittedly, I was completing a critical job--a job which required successful completion to get money for our budget; additionally, I was voluntarily moving into the battle lines of the L. A. riot front, with no weapon bigger than a nail clipper. Nonetheless, I was solving general, not local, problems; and it is the latter category which required resolution. I proceeded to Los Angeles, and my destiny, without serious problems.

It was a tragic and horrible sight to visualize nearly fifty square miles of the city ablaze beyond control. The irresponsible Negro population of the Watts area, exploding from a single, insignificant arrest, had become an uncontrollable mass of brutal, animal humanity, intent only on destruction, killing, murder, rape, and looting--for no logical reason. The city is terrorized now for days, transportation paralyzed, food provisions cut off, and 34 human lives senselessly lost. Add to this the willful destruction of 250 million dollars worth of other people's property, and the story becomes even more tragic.

Against my best hopes, I am daily more convinced that the Negro population of our land, taken as a whole, is not yet ready for the privileges recently given them by rapid, successive acts of Congress and decisions of the Supreme Court. Over a hundred years ago, McCauley said that when any segment of a nation's population demands privilege and at the same time denies responsibility, the future of the nation which tolerates this situation is in jeopardy.

It is not the purpose of the document to criticize another race, nor to expound on the principles of minority group management. Nevertheless, right is right, and what is happening out here is dead wrong. Horribly, it will likely spread to other cities, and if Washington and Baltimore become involved,

may God help us all! Finally, I will make book that less than 10 percent of these animal predators will receive jail sentences.*

This has not been a good day for the human race.

17 August 1965

Things continue to move, and we tighten the cinches at every breath of the beast. Telephone communications represent our present reliable umbilical cord, and we use them with gay, almost reckless, abandon. Viz and to wit, I started at 0630 this day on the phone, and terminated at 1300, without benefit of a morning shave. One call, to the home office, clocked at 55 minutes--all vital communication. And so it ran through the morning.

Finally, Marty Krepp and I got loose for a last Smorgasbord meal at Bali Hai, and off to Scripps. After a good SITREP with Lew Melson, inspection of our newly-arrived Maidenform Bra divers' suits, and a welcome aboard for Bob Thompson, we teed off to visit with my great friend, Pete Scholander, and his colleagues. Pete is the same Pete, as always. Ebullient, profane, and endowed with a magnificent sense of humor, he is a pleasure to the eye, ear, and intellect. Like so many Scandinavians of scientific bent, Pete has an omnivorous talent and interest in the field of warm-blooded scientific investigation, coupled with a hatred and disregard of all administrative constraints. This is the cut of cloth which makes for real pioneering in any research area; and the Pete Scholanders are far too few in the ranks of dedicated observers.

Well, we had a fine hour or more together, savoring Pete's new laboratory, and riding around his perimetric fish pool, waving at the lovely gals in the picnic area. To know such a man is a privilege; to be his friend is an immeasurable pleasure.

*Less than one percent came to trial.

The day wore on, with excellent reports on bottom conditions from Ken Specht, and word from L. B. that the PTC would be ready for loading on the CAT before midnight. Tomorrow the first flotilla of SEALAB II will be on station, and our operation commences. We are, as they say in Bat Cave, ready to plow up and plant over.

And tomorrow at 0915, a few of us will receive medals and awards. Shamefully, this night I couldn't care less. Tomorrow, though, it will be different.

18 August 1965

Decoration Day arrived with a fairly heavy overcast--the first dark day I've seen in Southern California; but not the last, I'll bet. Up before daybreak, I made many cups of tea and ate a slew of fruit, then proceeded to a leisurely shower, shave, and all of the motions which are prelude to donning the uniform of the U. S. Navy. Having vividly in mind the minor problems of dress which accompanied the christening ceremony, I sorted out my garments with infinite care, following a carefully-compiled checklist. With equal care I dressed by the numbers, and surveyed the final result with pride. In all shrinking modesty, I had to admit that I looked like an officer who deserved further decoration. Surely nothing could go wrong with this ceremony, with such meticulous planning. I allowed myself a few extra minutes of leisure by the TV, composed, resolute, and happy. The drive to La Jolla could consume no more than 20 minutes, which would still give 20 minutes of grace--a fantastically safe margin, I thought.

Somehow, things did not exactly come to pass in a smooth manner. As I may have mentioned, I made every effort to move deliberately, in order to avoid unsightly sweating and the appearance of frenzy. Accordingly, my

drive to La Jolla was at a leisurely pace, in keeping with the subdued mental state of a man about to receive a second Legion of Merit, and the kudos and TV interviews thereunto appertaining. Things went well on the freeway, until I neared the crest of a hill, four miles from the Scripps campus. At this point, my rented Ford emitted a burp, then another, then died as I pulled into a left lane, aimed downhill (thank God) at the campus. Horror-stricken, I looked at my gas gauge, nicely two-blocked on the port side of zero.

This, I quoted to me, is it for sure. A four-mile, sweaty walk to the auditorium, and I must do it in 12 minutes. Such a feat, while exceeding all known track records, would scarcely leave me in shape for any award ceremony, and would probably precipitate a coronary attack of sizeable proportions. Aside from these considerations, I probably couldn't do it, with the heavy shoes I was wearing. The outlook was grim.

Miraculously, the Ford caught hold again, and got me over the hill, from which point I coasted wide-open around hairpin curves to Scripps, and made the ceremony with many minutes to spare. As always, careful planning paid off handsomely. Yet I must reflect that they don't make durable gasoline like they used to.

The moment arrived, and Admiral Price pinned on the medals with finesse, while his aide droned out the citations. I caught a few words, such as "fearless leadership," "indomitable courage," and the inevitable, "in the best tradition," but generally missed the text, which I intend to read next week. Fortunately, there was no cheek-kissing--only a handshake, and the ceremony was over. I must admit that I was moved and emotionally stirred; but since the medal should have gone to Bob Workman, I felt like a thief in Service Dress Khaki.

After the awards came a press conference, so necessary to survival of all public relations men, and anathema to those who are targets of questions. Captain Melson led it off with a magnificent performance, in which he outlined in detail every step of our program. Unfortunately, in his enthusiasm, Lew again placed my Aquanauts at the bottom of Scripps Canyon, while I frantically tried to calculate decompression and gas requirements for this new parameter. Bob Barth and I exchanged salty remarks, sotto voce, throughout his talk, unaware of the presence of a microphone nearby. I can only pray that our chat was not recorded. Questions piled on questions, but finally it was over, leaving only the personal inquisition, and the TV interview. The former was tolerable, and the latter somewhat below Oscar standards.

As I sought to break free from the Fourth Estate, the irrepressible Nordic scientist, Sem-Jacobsen, loped uphill to my side, loudly informing me that, following a deep dive yesterday, an EEG on one of my Aquanauts showed erratic brain waves. Karl Wilhelm was only asking my permission to repeat the tracing tomorrow, after recovery from the effects of the dive; but this request was carried on the wind while the opening announcement was absorbed, retained, and fully digested by my news reporter retinue, by now fully convinced that at least one of my Aquanauts had a severe case of scrambled gray matter. I could not convince them otherwise; nor did I try overly, since all of us in this program are probably a bit nuts.

So the day wore on. The Staging Vessel arrived, and Tom Blockwick set about putting her in the moor, with help of a full armada of naval vessels. By 1400 hours, all moor legs were tied in, a few Aquanauts had come ashore and it was necessary for me to call Washington at length.

Two hours of phone talk later, Washington was mollified, and I was tired. The car was gassed up, and the lure of the open road was clear. I departed for

the motel to write a bit. I suppose that we can at last say that the operation has commenced. In retrospect, we have been remarkably successful. It was only about six months ago that we got the green light. Since that time we have built a million and a half dollar complex, trained 29 people to perfect pitch, involved over 300 technical persons in the project, traveled a collective distance of well over one million miles, and brought a massive project to the point of commencement. Aside from that, our documentation has exceeded 500 pages, and we have endured nearly 1000 hours of interviews on radio, TV, and before live audiences, plus writing 25 full-length papers. Moreover, we have coped with nearly 1000 backsets in the form of fabrication failures and human slipups. But the job is nearly done--and soon my personal road to Damascus must be commenced.

Sufficient unto the day is the evil thereof.

20 August 1965

Events are piling up, one on another, in a relentless stream of isolated items, all falling into a mosaic of intricate design. The BERKONE is in a taut moor, very close to dead center over the spot. SEALAB II is tonight in tow at a steady rate of 2.5 knots. All Aquanauts are in good shape; the weather is excellent; and the sea is quiet. So far so good. The sweet smell of success enshrouds the scene. A few little contretemps, however, tend to besmirch the peaceful image.

On board the BERKONE, a prolonged test of the externally-driven, water-lubricated CO₂ scrubber revealed, at pressure, a few defects such as motor overheating, shaft-seal leaks, final cutout. Possible solution: we graduate from a $\frac{1}{2}$ h.p. motor to a 1 h.p., and finally to a 2 h.p. drive, which may or may not solve the problem. This approach failing, we will tear the whole damned

system down, and grind, bush, and rebuild. Against the possible failure of this action, an additional scrubber has been obtained through the good offices of CDR Carl Gobel, on the Tender NEREUS, and flown in from the submarine SCAMP, for standby use. We can thank this escalation of problems on the blind fright of scrubbers which enveloped BUSHIPS after the EDU disaster. Because of the unreasonable constraints placed on our DDC design, to eliminate completely any possible electric sparking devices or sources, we had to power the offending CO₂ scrubber through a shaft-sealed drive. I had experienced sad and hazardous results at New London with such a device, and did not trust the engineering state-of-the-art. Nevertheless, we were forced to install the system, and are now paying the penalty. I predict that, in the long run, we will rely on the internally powered spare scrubber, and still be concerned about potentially hazardous shaft-seal leaks around a piece of gear we didn't need.*

For the record, and once and for all, let it be known that even pure oxygen will not burn, save in combination with a hydrocarbon. When this fact is understood, my job will be easier.

So much for the DDC. Also on board the BERKONE is my elaborate network of communications in the trailer. From this center, I can communicate, or else establish communications with SEALAB II, through five channels, with any station on the ship, any ship at sea, or any point on the mainland. In addition, I can patch a communication between inner and outer space. It is a remarkable and reliable network; but it is largely dependent on the integrity of the Benthic Lab. The Benthic Lab, a tremendously complex system of multiplexers, switching and self-repairing electronic circuits, is the brainchild of Dr. Vic Anderson, developed partially under the aegis of ONR, and designed to the highest state-of-the-art of American industry. We tied our chariot to this star, and the star

*I was wrong. It worked!

glimmers in a frightening fashion. Multiple failures have occurred, and now today Vic says he needs another week of work on the Benthic Lab before it will do the job satisfactorily.

This heartbreaking announcement does not kill us, but it hurts like hell. Immediately, we had to shift to a second system, running a coaxial TV cable to the Scripps pier, and recircuiting much of my onboard communications, to maintain full capability via my ship to SEALAB umbilical cord. Damn! More hours of work; and all hands are worn thin already. More than two hundred failures have been detected and remedied in the Benthic Lab since delivery by industry. What, I ask in righteous indignation, has happened to quality control, and pride of production?

Finally onboard the BERKONE, the PPI gas jammers are requiring an outlandish amount of maintenance, after only a few hours of operation--this after admonition to the company officials that their product had better be right, this time. More headaches, and no redress.

Shift now to SEALAB II, a few hours before time for the tow to the site. The massive helium bottles, subject already of some verbiage in this CHRONICLE, had been carefully tested, rechecked, refilled, and re-rechecked, five days previously. The SEALAB II had been lowered into the water for trim tests, and some additional leak points found and corrected. Lifted back on the pier for final loading, she was at last ready for refloat and tow at 1600 hours yesterday. At 1400 hours, a pressure safety plug in a helium bottle let go for no discernible reason, and our timing went to hell in a bucket. Emergency repairs and refill were expeditiously accomplished, however, and she was in tow at 2230. This casualty is completely without precedent in my experience, and has no logical explanation; but most certainly it again alerts me to expect mechanical failures

from any quarter. And despite the repetitious systems checks we have made at every point of progress, I guarantee that a final, comprehensive checkout will be accomplished before SEALAB II is turned over to the engineers for lowering to the site.

And now, in the past few minutes, comes added unwelcome tidings. The power transformer, an item quite separate from the Benthic Lab, but essential to power supply from shore, tumbled on a steep bottom, and flooded. I can operate without shore-power backup, but deplore the casualty.

And now finally it is certain that we are off a bit in our moor. Throughout this day, Mr. Mac and his divers have been diving in a single spot, and report a downgrade declination which cannot be tolerated for SEALAB II location. I am certain that they are only about 100 feet too far to the west, out on a promontory. The good site was found by Ken Specht's divers; but there has been no communication between these two groups. Since I have no control over either group, and will not use my own Aquanauts this close to dropdown, I can only gnash teeth and beg for a conference.

Over many long years, I have learned the hard way that location of objects or specific spots on the ocean floor is an exceedingly difficult task. Accordingly when Al O'Neal reported early this week that Ken Specht had found the site, I asked how he marked it for accurate return. Al assured me that he had perfect transit cuts on the site, give or take five feet. With that news, my heart sunk, such a fix relates only to the overhead surface vessels, and not at all to a location on the ocean bottom. Why, in God's name, no acoustic pingers were placed at the good site, I'll never know. At the conference tomorrow, I will firmly hold for Bob Sheats to dive with one of Specht's men on the site to the east. Bob's evaluation of the bottom, to me, will be Bible, Book, and Game.

Nearly one quarter million dollars have now been spent in site location; but final location depends on a single, exceptional, underwater human worker. That underscores the philosophy of our program. Man continues to be the best underwater sensing agent.

There is more to say, but this plume is tired, and chapters never really close.

21 August 1965

So, as must come to every questing soul, comes now a good day. Last night Al O'Neal and I had lengthy conversation, and planned a late night repeat conference, which did not come to pass—but no matter. Marty and Hugh came by at eight, and after a drink we went out for a long, late, excellent, dinner, with much conversation, none of which related to SEALAB. At 1:30 a.m., I rolled into bed and slept until 0600.

Awakened to watch a perfect Gemini launch, then raced to Scripps for 0800 muster with my troops, who looked very fit indeed. Since the whole session was on TV, Scott and I hammed it up a bit; but generally, all went well. The day's schedule was outlined, and specific duties assigned. This was to be the day of an onboard press conference, and a live TV presentation by Scott Carpenter. All hands were alerted to the schedule; boat schedules were established, and I took off to pick up Admiral Smith for transport to the Staging Vessel.

Admittedly, my knowledge of the San Diego street system is casual to non-existent. It seemed prudent, therefore, to engage the good services of a Navy driver plus vehicle, in order to arrive at 3306 Curlew Street at 1000 hours, as agreed. Further to guarantee the success of the mission, I took care to telephone the number assigned to this address. Admiral Smith's father himself answered, and reluctantly admitted that locating his residence was such a horrid task that he

dared not venture to give directions. The former point I had established from a study of the city map, which showed at least six Curlews, widely separated by canyons, and apparently inaccessible to auto traffic. The senior Smith's latter point, in retrospect, was wisely taken.

Buoyed by faith in the homing instincts of a native Navy driver, I entered the official vehicle at 0930 on the button, and ordered my guide to proceed at once to the aforementioned address. It developed that my driver, Shoemaker by name, was recently of Greencastle, Pa., and not at all familiar with San Diegan canyons and streets.

The situation was loaded with all necessary ingredients of tragedy. Normal human courtesies aside, one does not lightly leave an Admiral, USN, waiting, in a manner of speech, at the altar. Indeed, under such circumstances, the altar may become very real, and with appropriate human sacrifice, if careers can be considered a part of human makeup. One way or another, the situation was grim. We sped from pillar to post, from freeway to byway, from canyon to mesa--but no 3306 Curlew. Twice, we stopped to interrogate postmen, who are surely the fountainhead of all poop on residential locations. The first such worthy admitted to being lost himself; the second letter peddler brightened visibly at mention of the address, then confessed he had been seeking to deliver mail there himself for six months, and really hoped we could give him directions. I gave him the back of my hand and darted forth.

Ultimately, as we prepared to U-turn for the third time in a blind alley, I determined to ask local residents for help. Charging across the lawn of a grotesquely-located house, I encountered a civilian who had a strangely familiar countenance. I started brusquely to demand directions, only to be startled with a soft-spoken, "Hello, George: Have trouble finding me?" It was RADM Levering Smith, cleverly disguised as a civilian. My God! I thought--how long have I been away from the office?

Before escorting the Admiral to my vehicle, I had time only to note that senior Smith's house, labelled 3306, lay between houses numbered 3216 and 3218. The logic of San Diegan house and street arrangement remains, to me, a dark mystery.

Too many minutes later, we finally located Quivira Basin, and our vessel of opportunity. In company with my first Aquanaut team and a motley assembly of well-wishers, Captain Dolan and I escorted the Admiral aboard and lines were cast off. No sideboys, but what the hell! Somehow, I had once more escaped court martial.

During our hour-long run to the BERKONE, I was happy to see that Scott Carpenter had cornered Admiral Smith on the fantail, whilst I had Captain Dolan cornered beneath the windshield, portside to. Scott's problem was relatively simple--to sell our program; and with his superlative capacity of persuasion, I was satisfied that things would go well in the direction. With Jack Dolan, however, I had a somewhat different problem.

Through an unusual and unhappy combination of circumstances, the story of Walt Mazzone's near-tragic accident was not relayed directly to Captain Dolan and RADM Smith, but rather was received as third-hand information, and apparently with some embellishments and criticism as well. The good bible known as the DIVING MANUAL was liberally cited, albeit by wrong verse and chapter. Accordingly, Captain Dolan arrived on the West Coast well prepared to crucify me for promoting and condoning a negligent diving operation, for going against the book, and a host of minor offenses. To his credit, Jack did not immediately bring charges against me, but instead allowed time for me to clarify the situation, which sure as hell needed illumination. As a start, I suggested to Jack that he should not invoke the DIVING MANUAL, since that would be tantamount to quoting Scripture to a

preacher, and not likely of success. I explained to Jack, and subsequently to Admiral Smith, my position and prerogatives with respect to divers' safety, and the issue was closed. It is my privilege to be Principal Investigator, and I willingly accept the responsibilities which append. That, as the old man says, is that.

We proceeded to the BERKONE, where Walt Mazzone took the press on a ten dollar tour of our facilities, and I escorted Admiral Smith and J. Dolan on a counter-circuit tour. Half-hour later, a massive press conference was held topside, and all fourth estate queries were satisfied, with appropriate film documentation.

Somewhat later, the horsepower of the project held a lengthy conference in my trailer, where miscellaneous questions were posed and answered, to the apparent satisfaction of Admiral Smith. Following this, a few more photos, and Scott deployed for a live TV show, with Admiral Smith, Jack Dolan, Marty Krepp and I returning to San Diego. Once ashore, we floundered for long minutes trying to find the appropriate Curlew Street. Let's face it: we are poor navigators at best. Despite all these little slips, however, I gained the impression that Admiral Smith was satisfied with the mechanics of our operation. Which is more than I could say, one hour later.

At 1700, I received a phone call which I could have done without. Not only was Vic Anderson's Benthic Lab out of business for an undetermined period of time, but his power transformer was disabled as well, thus eliminating our shore power backup to SEALAB II. At this point, Scott Carpenter got on the line opining that the project should not go without the shore-based power and water supply. Reluctantly, I agreed with his point of view. Although I ran SEALAB I

from an unstable moor and with support from the Stinging Vessel only, we were now in a more sophisticated program and the additional backups are mandatory. Still, I have the distinct feeling of having been sold a bill of goods.

This feeling was considerably fortified when I got the next message, to the effect that our engineering fraternity had decided at this late date that they could not handle the PTC under prevailing swell conditions. It would be necessary now to prepare a separate counter-balance system, to solve this problem. At this point, I lost my temper. Since May 1964, I have been telling the seagoing engineering types that they couldn't handle objects of large mass from a floating vessel. Told to go back to tonsil inspection, I finally shut my mouth. Now, at the last moment, after having had at least seven months of assess the problem, our slip-stick artists have failed. I find no honest excuse for the lack of proper consideration of the number one problem of our project. For the moment, however, I will stand clear, since arguments at this point will serve no useful aim, and could adversely affect our operation.

On that note, I close the day's commentary. It was a day which started well and ended fell.

22 August 1965

At 0900, local time, the rector of the Church of Transfiguration at Bat Cave opened the service of morning prayer with the SEALAB I prayer which I wrote a little over a year ago. In like fashion, I opened this day with a prayer, dedicated to a similar but more pretentious undertaking. To an extent, my prayer failed in its mission. Deeply though I believe in the power of prayer, I must have erred in delivery, for things did not go well with the program today.

First at 0935, came news that Tom Blockwick didn't think it possible

to handle the PTC with our conventional crane arrangement. This comes as a late, and revolting, development. After my many months of argument that the Navy had not yet learned how to handle large masses in any appreciable sea state, I am amazed that we have not as yet discerned our deficiencies in this area. In any event, we will have problems in handling the PTC. The dear Lord only knows what will happen, come time to lower the SEALAB II!!

There are other problems, perhaps of greater importance. The power transformer, designed to boost the input to the Benthic Lab to 4000 volts, was damaged in placement, and must be recovered from the ocean bottom for repair. Location of the transformer has been difficult; recovery and subsequent repair will consume even more time, and so the hours trickle through the cracks. The point of irritation is that we don't require 4000 volts for SEALAB II--that requirement is for Vic Anderson's undersea weather station. While I am eager to further his program for all time, I cannot permit it to constrain me for days to come. We could go with only the power source from the BERKONE, but a shore-based power supply is a required item of our program, and I do not intend to cut corners at this stage of the game. I am sure, however, that we can boost a 440 volt line from Scripps pier to SEALAB II with a conventional transformer, and let Vic repair his devices on his own time. I cannot allow many days of slippage for the sake of Vic's Benthic Lab and associated equipment.

Perhaps this is a poor time to jump on the engineers; but I have been chanting this theme for more than a year, and see little improvement since SEALAB I. This situation should have been properly calculated, but was not. I am unhappy. It is as if I planned an abdominal operation, but had no knife, at the last moment. As program manager, I bear the brunt of these delays; but as medical director I am barred from looking into the engineering frailties of the program. My slide rule is designed for decompression calculations only, it would seem.

I talked at length with Tom Blockwick and Walt Mazzone, and determined that I should stay ashore tonight, to go aboard permanently tomorrow. This is no time to ruffle tempers, so I'll stand clear. Late today, I brought Rear Admiral Smith up to date on our probs, and got friendly support.

We will succeed!!

24 August 1965

Two days at sea, and very full days they have been. Sometimes painfully, and always at cost of precious hours, we are correcting deficiencies and working our way around obstacles. The Benthic Lab continues in a questionable state of function; therefore, we will do without it for the early days, making oceanographic observations directly, and recording by hand. The destroyed power transformer has been rebuilt, and will be delivered for cable splicing and bottom placement tomorrow. A similar communications cable has been procured, and is tonight being tied in for direct shore communications, to give me two private telephone lines.

We have found a good, relatively level seafloor, and visibility improves daily, with about 30 feet nearly the rule. Sea state is good, with 4-foot swells, and low wind speeds. The San Clemente shift is off.

The PTC continues to require corrective action. O-ring leaks, fitting leaks, and general handling characteristics continue to plague us, and to eat up precious time. Often I muse at the soft life of Job, the original Old Testament groaner. Again, it occurs to me with increasing frequency that I ain't so damned smart after all. Chances are that many people before me thought of the Man-in-the-Sea concept, but also foresaw the problems involved, and said to hell with that noise.

Still and all, we do make a bit of progress here and there. So late as this morning I managed to wash my socks, bring the log up to date, and

read last Sunday's newspaper--finding the SEALAB II story in the comic section, natch.

Tomorrow, I vow, we will pressurize and lower SEALAB II.

25 August 1965

Up before dawn this day, largely because of faulty plumbing overhead which emitted anvil strokes at irregular and nerve-shattering intervals, resembling nothing so much as the final sounds of a great ship breaking up. This is not to say that the SS BERKONE is a great ship, indeed, she is not even a ship. Still, I do not quibble: when my floating home is breaking up, it's the O deck for your truly, and grab the first buoyant object on the way. Anyhow, as I said, I got up early.

On deck, I breathed fresh sea breezes, stared into the California fog, and determined to make this the big day. I could feel it in my bones, success was mine already. Well, these bones better rise again, say I, for it sure didn't come to pass in such a fashion. Still, at dawn I sipped my tea in happy ignorance of what lay in store and just around the corner.

By 1000 things were proceeding so well that we ordered the helium barge underway for loading and overpressurizing SEALAB II in preparation for lowering away to the ocean bottom the following day. We all went whistling about our work, watching Scott and his team complete final outfitting of their future home. After buttoning up the habitat tight around mid-afternoon, we were heartened by the arrival of the helium barge, loaded with the wherewithal of my magic breathing mixture. I was so ebullient that I ventured to eat shipboard chow for supper.

Now my proposal, accepted universally two days past, had been to pressurized SEALAB II to 100 pounds per square inch, using cheap compressed air before risking our precious helium for final pressurization. Come time for the event, however, objections were raised from every quarter. The compressors

would take 12 hours to build up the pressure; and it would take an equal time, or more, to depressurize the habitat. Further, use of compressed air would cause loosening of the insulating cork. Time was running out. The SEALAB was tight, had been tested to depth before, etc. To my eternal disgrace, I agreed to forego the air test and proceed directly to helium pressurization. O blithe and happy spirit! O stupid ass!

At midnight, all preparations were complete. SEALAB II was pressurized to 26 psia with compressed air to provide the necessary oxygen percentage, then rapid pressurization with helium commenced. At 60 psia, we stopped for a leak check, and detected none. SEALAB II lay rolling astern like a happy white whale. Reassured, we completed pressurizations to 108 psia, the terminal pressure. As we secured the charge, a raucous voice on the intercom foretold disaster. Horror-stricken, I watched my pressure gauge begin to fall. Walt Mazzone, at the controls, said disaster.

Disaster it was. SEALAB II was leaking massive quantities of precious helium from the vicinity of more than half of her viewports. This was confirmed by my divers within an hour, as my gauge continued its inexorable march back to sea level. SEALAB II, with two or three ballast tanks already flooded that afternoon, lay low in the water; loss of internal pressure could result in flooding through the failure areas around the ports, so I dared not open her up to evaluate the damage.

Through the rest of the night, we pieced together evidence, and came up with a diagnosis which had to be right. The internal metal covers, designed to protect the ports which could stand no more than 15 psi pressure differential, must have buckled under the high pressure, permitting gas to leak around the gaskets, escaping through protective channels built through the pressure hull to prevent unequal pressures on the viewports. Our divers

could have stopped the immediate leaks by capping these outlets; but in this case, pressure would build up on one side of the windows and quickly blow them out, flooding and sinking the habitat. There was no immediate solution, save to maintain a reasonable overpressure with compressed air, since we were out of helium, and to await the dawn, and arrival of SEALAB's design engineers, and the On Scene Commander.

So the early hours passed, as we pumped air into SEALAB's leaky carcass, giving a sustaining but not a saving, transfusion. At daybreak I lay down for an hour, but could not sleep.

28 August 1965

SEALAB II is on the ocean bottom. Not flooded, swamped, abandoned, or cast off like some vile thing, but deposited in working order and with loving care about 150 feet southeast of Scripps Canyon, on a bluff overlooking what would be a great view of the canyon, if we had such visibility, which we have not. What is more, she was lowered away not stealthily in the dead of night, nor shielded from curious eyes by a veil of security, but rather at 1500 on a bright day before a large assortment of press and TV folk who marvelled at the skill of our riggers and the measured cadence of our profanity.

For the latter, I offer only the lame excuse that either we were carried away, or were convinced that various pieces of gear were about to. Of course, it was unfortunate that the animated performance took place in front of many cameras and as many microphones, since Tome, Smitty, Joe, and I put on a remarkably uninhibited show of verbal direction. Fortunately, very little of the action was on live TV; nevertheless, editing of the videotape must have filled the cutting room floor. Somehow I fear that, as of today, the image of kindly, lovable, pipe-puffing old Papa Topside

will be supplanted by a ragged, dirty, foul-mouthed old bully whose diction reached its highest peak only with hyphenation of four-letter words. But damn the image! I say; and on with the cotton-picking, snag-frazzled show.

After the incredible concatenation of fiascos which terminated early yesterday morning with the loss of our hard-earned helium, not to mention dollars and days, a sickly pall crept over my organization. From here and there, one could hear moans, wails, some tooth-gnashing and scattered wracking sobs; but on the whole, the group took it like an exceptionally well-trained bunch of zombies. For awhile after daybreak I wandered around, seeking a place for a private hanging; but the good old ship, BERKONE, isn't even equipped with coat hangers, and the crane operator had thoughtfully raised the hook out of reach. Finally, since misery loves company, the principals in the act fell together into desultory conversation. We were of one accord on several prime issues: (1) we could not now correct the faulty design responsible for the leaks; (2) we must go ahead with the project without unseemly delay; (3) we must devise a means of lowering SEALAB II, accepting the ghastly gas loss as a matter of course; and (4) we must convince our respective bosses at our 0900 conference that we really knew what the hell we were doing. That being settled, we welcomed bosses aboard, and went into a longish huddle.

Within an hour, we were a determined and grim group, fighting the battle shoulder to shoulder, our line of attack clearly-drawn, our losses accepted. We hastened to our task. A new batch of helium (500,000 cubic feet) must be procured; pressure must be maintained in SEALAB II to avoid inboard leak; a new plan for smooth lowering must be agreed upon; and our procedure, to commence 24 hours later, must be flawless.

So we worked through the day and into thenight, set the watch, and arose early for a do or die attempt this day.

Shortly after eleven o'clock, we commenced charging again with helium. Our plan was to overpressurize, accepting the gas loss, and stopping at 60 feet for about an hour's diving work prior to final rapid lowering. Today, however, gas leaks were worse than before. On reaching 50 feet, I could see that I would use up all of my helium before getting to 100 feet, if we made the 60 foot hold. Accordingly, I bounded out of the fantail to do battle, while Walt growled imprecations over the phones. Tom Blockwick quickly saw our predicament, and agreed to belay the shallow stop and drop the habitat, which was descending smoothly, to 165 feet, where divers would quickly cap the leaking port vents and release restraining lines, permitting final descent to the bottom before a pressure differential could blow out a port, and destroy our project. It was risky, but our only chance and we took it. With a whirlwind of action and a storm of profane orders and counter orders, all issued via bullhorn into obliging TV microphones, the deed was somehow done. At 1508 hours, SEALAB II came to rest on the bottom, in less than ideal attitude (bow up, port list) but dry, with ports intact, and all systems working. We made a single attempt to reposition in a flatter stance, but came near to a tragic pressure differential, and I decided to go with what we had. This we have done; it is not at all bad; and tonight we are in business.

Oscar Wilde said it best for me and I quote, "And every day is like a year, a year whose days are long." This has been a long day.

29 August 1965

In Bat Cave, N. C., this Sabbath is a day of rest, worship, meditation and relaxation; in Bat Cave, North Carolina, that is. On board the BERKONE, however, our philosophy is much more avant garde. We work on Sundays; or at least we surely did this day. Yet it is a relative thing, for surely ours is a labour of love.

Somehow, I arose on the dot at 0500, as per my old SEALAB I schedule, and staggered up the shin-breaking steel treads to the head. The shave was less than a roaring success, thanks to a faulty blade; but at least it woke me up--as loud cries of pain are wont to do. After a soapless shower, I climbed to the trailer to relieve Walt, who reported a quiet and well-controlled night, then pitched off in search of further gainful work to do as a substitute for sleep. I settled to a vigil before the TV monitor, listening to the helium mutterings of my Aquanauts as they rolled out of comfortable bunks, by ones and twos, and made their way to the coffee pot. To the unaided eye, they looked like any other group of U. S. sailors; but I guess I see them through the affectionate perspective of a father, or grandfather yet. I found myself counting them anxiously, and knew that, day and night, I would count these sheep for a long time to come.

By 0700, I found a temporary relief, and took time for an enormous breakfast of flapjacks, cereal, eggs, sausage, and the like. Soon I was back in my command post, communicating with one and all on every conceivable circuit, in both helium and plain language. Things were going, as they say, swimmingly. The tremendous task of internal and external housekeeping was being tackled in a systematic fashion, and slowly reduced to mere gargantuan proportions.

Among the many visitors from the fourth estate today was a female type, early fortyish, and wearing a head dress that would make Hedda Hopper's look like a skullcap. Her invariable response to all situations and statements of fact was "Oh, dear!" Try as I might, I could elicit no more lucid response. She odeared my announcement that Scott Carpenter was about to wash the luncheon dishes; that Tuckfield had suffered a HOOKAH casualty, and had to retreat to the habitat; to the announcement that chow was being served; and finally to the P.A. announcement that ladies could use the officer's

head, under suitable escort. I never read a word of her copy in the days to come, and suspect strongly that she got sidetracked on her way to a wedding or fashion show. In any event, there is no spot for a reporter of the distaff side on board the twin barge, BERKONE.

Finally, at 1700 hours, all assembled below for a minute of prayer. I read the SEALAB prayer over the intercom, and was personally moved, though I cannot speak for my Aquanauts.

Much later tonight, work ground to a halt, and the calm of an evening watch set in. Now is the time for leisurely communication, rumination, and general relaxation. And so goes Sunday with the project.

30 August 1965

This morning commenced in good order when I arose at 0415, after a good night's sleep, interrupted only by occasional pit stops generated from a high rate of tea consumption. Relieved Walt at 0600, to start the day with a longish confab on the unscrambler.

Walt reported a quiet night with the Aquanauts, who now are beginning to become acutely aware of the water temperature. Sorties are made only when fully clad, even if they are to be of brief duration in the shark cage. The wet suits which they wore for entry into SEALAB II have not re-expanded, and are difficult to don, as was predicted. The suits sent down in the habitat quickly re-expanded, but being 3/8" thick, require a lot of lead to hold them down. We have a ways to go in the direction of divers' thermal protection, although the CO₂ loaded, and electrically-heated suits have not yet been tested.

It occurs to me that it was just one year ago today when I was invited to Admiral Galantin's office and offered my present job in SP. Lots of water under the bridge since that day, some headaches, and a fair

amount of fun. Upon reporting, I was shown my full budget for the fiscal year--One-hundred and thirty-eight thousand dollars, of which forty thousand dollars were already committed. Since that day, I have managed to spend nearly one and three quarter million dollars, and now have the SEALAB II show on the road.

Now comes today a horde of scientists and scientist-helpers, each with his own program, each demanding time, space, and direct communication with my Aquanauts. I am sure that all of this is necessary, but it is hardly conducive to orderly progress on the bottom. My people are desperately trying to complete their ambitious plan of the day, and each interruption over the phones immobilizes at least two men, and slows half a dozen more in pursuit of useful tasks. It is disturbing to think that many of these calibration tests might have been run before today. Admittedly, however, most had to await a cooperative occupancy; it's just that they barge in with no apparent concern for my own critical requirements. Oh well! These things will pass, like the cup.

Today, word came again in regard to the Benthic Lab, the will o' the wisp of the house of electronic marvels, the phantom of the Anderson Lab, the miracle of multiplexing around which we built our own complex network of data recording. This same Benthic Lab will not arrive today, but perhaps tomorrow.... And I say perhaps it will not work, once it does arrive.

And yet withal the program is smoothing out, and infinitely faster than was the case after we got the men on the bottom off Bermuda--our teamwork is vastly improved, morale both topside and below is very high, and performance excellent. In short, I am pleased with our state of affairs.

Yesterday evening, I called Margit, and was surprised that I remembered our phone number. Already, it has been nearly 2 months since we were together, and possibly two more to go. Honest Injun, though, this is the last long one.

From here on out, I'll sit further topside and enjoy the show as a visiting fireman. This job is wonderful, exciting and enjoyable; but I've about paid my share of the tab. It's time to get off of the stage and into an orchestra seat,--after October, that is.

Today, Scott and his boys worked like dogs to complete the cleaning of their front yard, despite nearly continuous harrassment from topside. Shortly I'll receive a SITREP, and expect that almost all of the plan of the day will have been executed. Tomorrow we start the scientific program in earnest, and hopefully settle into a steady routine. I cannot help but reflect how secure and confident I feel, once the men are on the bottom, and the surface flail is over. I like to believe that this is a tribute to our long and careful years of work in the laboratory. The ocean is still a hostile environment, but we are taming some of it, bit by bit.

31 August 1967

Up at 0400 this a.m., and being 15 minutes early to relieve Walt, I lay back down and soon fell fast asleep. I dreamed of being at the New York Yacht Club with Cortez Enloe, who appeared to be hosting a two-man extra dry martini party. The third martini was so dry I choked a bit, and in doing so, woke myself with a start, late for relief. If I staggered a bit going up to O deck, it must be remembered that I am readily affected by the power of suggestion; besides, the seas were running. At any rate, I quickly shook off the ill effects of the dream and climbed up to relieve Walt on station, that we might both be fresh for the morning dive.

From 0500 until 0700, I whiled away the time listening to our FM broadcast, intended to quiet the restless natives of SEALAB II, and writing messages in pig-German to Dr. Sonnenburg, who had the watch. Despite his darkly knit brows, Bob has quite a sense of humor. I hope he keeps it

when in my company, for he is fearsomely large and strong, quite capable of laying waste, committing considerable mayhem, and that sort of thing.

The late evening and early morning hours are surely the most pleasant, and often the most interesting, of all time spent in the command shack. These are the hours when the hustle and bustle of work is over, and everyone is tired, satisfied with the fruits of their labor, and ready to chat about the big and little events of the day. By coincidence, these are the hours when Walt and I are most refreshed and least irritable, since Walt sleeps by day and I by night, with early reliefs the rule. And so the pattern is set; a pattern which suits us both, and permits each to do a seventeen-hour day with no strain.

At 0730, in anticipation of a deep and fairly long dive, I stoked away a sizeable breakfast, then returned to the trailer for another three hours of intercom talk with Scott and other Aquanauts, log-writing, and conversation with incoming scientists and visitors. Trolley-loading went smoothly under the guidance of Chief Price, and shortly it was time for our dive.

At 1115 under the watchful eye of movie, TV, and still cameras, Walt and I rolled off the end of the diving platform into the chill green of the Pacific, headed for a rendezvous with our Aquanauts two hundred feet below. For convenience, and to spare our helium-oxygen gas supply, we rode the diving bell down a considerable distance before casting off to swim the final reaches to SEALAB II. As we descended, dutifully popping our ears, the green water grew darker, then nearly opaque. Water temperature was about 49° F, and very little marine life until we reached about 10 feet above the gray-black bottom, where we were surrounded by small fish of every variety. Ahead of us loomed the great white bulk of SEALAB II, lying along an inclined sweep of

ocean floor, her shark cage settled somewhat in the silt, the whole beginning to take on the patina of the surrounding seascape. I paused for a moment in my final descent, projecting an image of her appearance on the day of return to the surface, when she would look more like a denizen of the deep than the sleek white land creation we lowered last week. Hurrying on, I tunneled through silt behind Walt, removed my flippers in the shark cage, and struggled up the steps to the entrance well. Inside, unseen hands assisted me, removed my bottles and I was inside SEALAB II.

The handshakes and grins were as vigorous and warm as if we had been apart for months; but each face wore a puzzled look as we began to talk. My aquanauts, down about four days now, had learned to accomodate their speech to the helium atmosphere; but Walt and I, freshly arrived, could not be readily understood. No matter; we were among friends.

After a bit of fumbling and search, Billie Joe's shipping-over contract was unearthed, and at length the appropriate words were spoken. Time passed as we congratulated him, and moments later came the call from topside, "Time's up--get out!" The penalty for disobedience of that command was too great, so we hastened to slip on bottles and flippers while Skidmore tried desperately to quell a balky strobe light which was ruining his still shots. Then we were out of the shark cage, swimming up to the bell for seventy-three minutes of decompression, which indeed took a very full and cold 73 minutes. Back on the surface, we showered and ate a steak dinner with onion rings made of fried teflon gaskets. The milk was delicious.

Later this afternoon, Walt returned to his nap, while I held forth with visiting dignitaries, and Bob Thompson held down my post and sought to repel boarders. At length, boats carried people away, Walt awakened, we squared away the day's final Aquanaut work, and sat in the cool evening to a self-prepared meal of pineapple, melon, grapes, plums, nectarines, and pears--that's

how we seek to remain svelte.

I wound up my part of the log, picked my teeth, and was properly relieved by Captain Mazzone at 1930. A pretty full day. Oh yes! The final crowning event was completed before dark. The Benthic Lab arrived, and was lowered beside SEALAB II, for final hookup in the morning.

And so to my room in the bilges, to write a bit.

1 September 1965

Another early start today--up at 0400 for a long joint morning relief with Walt. Considerable electrowriter chit-chat last night, as is usually the case. And once more I note that something about the writer--Lord knows what--seems to bring out whatever vestiges of humor reside deep in the soul of a taciturn Aquanaut. This morning it was Tom Clarke's turn to be the verbal clown, and that he did right well. The lean bespeckled scholar, whose oratory is generally limited to monosyllabic affirmations or denials, suddenly blossoms out at 0450 as a clown of prose. This is all to the good; indeed, the electrowriter may be a prime psychotherapeutic tool, for all we know at this stage of the game.

The prime job for this morning is to get the Benthic Lab hooked up. Following this, it is essential that we commence erection of the Ocean Weather Station. Since we are nearly through with general house and yard keeping, it is hoped that more time can henceforth be allocated to straight scientific studies.

I have just completed a series of tape recordings, which I might entitle "The Sounds of SEALAB II." There is a clearly defined tempo to the sound symphony arising from SEALAB II and emanating from the Bogen intercom, the helium unscrambler, the FM radio, internal commercial TV, Krasberg warning buzzer, the ARAWAK pumps, and general background chatter. Add to this the topside cacophony of the 12-station topside intercom, the pair of adjacent telephones, the relatively quiet electrowriter, commercial TV, bullhorn, and the ship's 34MC broadcast. Then to all of this include the babble of visiting firemen within the trailer, and the pot-pourri is complete. At any rate, I have taped the entire symphony, from the still small clam of daybreak hours to the mad frenzy of 1100 hours, thence through the ebb tide of afternoon

traffic and a return to evening drowsy sleep time noises. Quite a symphony--reminiscent of Ivan Ivanov's Caucasian Sketches--especially the Cortege du Sardar.

This afternoon, I am listening to the long 2-channel tape I have made of the operation from day one, to see if it is fit for reproduction and for duplication. Thus far, I have identified only one spot which will not stand public exposure. This incident relates to my displeasure with the manufacturer of the recorder, which perversely reverses itself at the slightest pro-ricator, and its heirs and assigns would scorch a dragon's whiskers, so I shall delete this section for direct transmission to the Concertone Company.

In all, however, this has been a trying day on my Aquanauts. Far too many people got into the communications act, and the resultant breakdown in critical message relays shortly became manifest. There were failures to notify SEALAB II of our impending trolley run, and failure to pass critical messages to Papa Topside. Long-winded conversations apropos of nothing useful often immobilized men who had better things to do; and unnecessary questions from topside required lengthy and meaningless answers. I sought to intervene with notable lack of success, for by now the scientist's helpers had got into the act. Having arrived on the scene with untried and uncalibrated equipment only a couple of days before, they spent a goodly bit of time trying to bring their sophisticated gear to a peak of performance in a single afternoon, without consideration of any of the other elements of the program. For hours, these boy electronic geniuses held forth on every available channel to the habitat, the electrowriter not excepted. Malfunction and delay followed trial and error as day follows night. And all the while stood Bob Sonnenburg gusseted with electrodes, rectal probes, and wires leading nowhere, resembling nothing so much as the famed Prometheus Bound, or that

joker all tied up with snakes, named Lackawanna, or something similar. At length I rebelled, and called the whole miserable act off the stage. Bob proceeded solo with his cold exposure and recorded his visually acquired data, and the whiz kids were sent home to brush up on their circuitry and such. And so the mixed up day blended into a quiet evening. I blocked all access to communications, and let my Aquanauts have a well-deserved respite from the slings and arrows of topside.

3 September 1965

This day started right, and darned near went right all the way. At 0430, I was awake and rearing to go. Walt and I started our joint early watch at 0530. For an hour and a half, we talked of the night's work and messages, and of the personalities of this team.

We are both justly proud of this bunch of men, and of the way they are doing a job. There has been no slackening of motivation or enthusiasm for plain, dangerous hard work. On the contrary, morale and teamwork have increased, if this is possible. How I was so fortunate as to have such an overall outstanding group of men, I cannot say. I am only thankful that it is so.

By daybreak, several of the Aquanauts began to rouse, and a lively exchange of messages took place via the blessed electrowriter. Some wished to know weather conditions topside, after noting that the weather on the bottom did not change very much from day to day. Others shaped up some rather extravagant grocery lists and a miscellany of desired items, many of which had to be expunged from the list on account of our puritannical code of Aquanaut behavior, coupled with our space limitations in SEALAB II and a firm stand on hot-bunking. Nonetheless, the trolley line began what was to be a long day of work.

A rotten ugly specter rears its head at this point which has become a matter of major concern to Walt and me. It is the matter of gradual but clearcut invasion of the privacy of the Aquanauts and their topside control by our eager psychological colleagues of the behaviorist school. It was my original and firm understanding that the role of the psychologist teams at the Benthic monitor stations would be that of passive observation of activities inside and outside SEALAB II. It is now apparent that outside long distance phone calls are being monitored. This I will not tolerate. Any and all of the outgoing Aquanaut calls

are absolutely their personal affair, and that is final. Further, the electrowriter communications between the Aquanauts and topside watchstanders (Walt and myself) are personal and private, and not releasable. I intend to have a conference today to clarify this point for once and for all. Any violations will result in cutting off all Benthic communication lines, whereby all scientific disciplines will suffer, and fur will fly.

Today, the Scripps scientists propose to place another weather station on the bottom. This time a unilateral decision has been made to have the placement managed by our Aquanauts, who will inflate four bags attached to the uprights, make the clooge near neutrally buoyant, then manhandle it into place. The bottle supplied for this inflation was a single 38 cubic foot bottle; and when Tom Blockwick and I saw this set up, we exchanged furtive grins, since it was certain that this would not suffice to inflate the bags at 200 feet, however well they worked at 20 feet. Doug Inman was so sure of himself, however, that we said not a word. Sure enough, later in the day an urgent cry came up from below asking for additional source of buoyancy. With straight faces, we sent down a set of double 90s so that the show could go on.

Now came our first minor equipment casualty. The MK VI gear, which had a performance batting average of only .500 at Bermuda, had functioned flawlessly for seven days of rough usage with no failures. This afternoon, Earl Murray's gear flooded out, forcing a return to the habitat. The cause is as yet undiagnosed, but in a sense, I am pleased that it happened. Earl was close to the SEALAB, and so in no danger; but tonight every Aquanaut will mentally rehearse his casualty bill, knowing full well that this could happen at a considerably greater distance, requiring cool skill to return alive.

The problem of the anchovy-filled PTC is as yet unresolved. Scott does not wish to have the lights turned out, and where there are lights, there too will you find anchovies, first by the gross, then by the curt, and finally by the ton. It further follows as does day the night that within hours you will find dead anchovies, putrid anchovies, and a thoroughly distasteful mess. This mess, having migrated up through the lower grating, presents a very real problem, since the PTC should be at all times ready for occupancy, which it surely is not at present. We plan to flood the chamber by a few feet, then attempt to blow the whole rotten mess through the grating and skirt, and out to sea. Then after repeated sousing, maybe Scott will go along with shutting and lightly dogging the PTC lower hatch--the only possible solution. Somehow, this is a diving job for which no one is volunteering.

As it now turns out, a few hours later, Dr. Sonnenburg was nominated for the cleanup job, which he undertook with vigor and zeal if not relish. After about 90 minutes, Bob and his buddy diver had done their bit for the cause and the final cleanup team sallied forth to gather the last unwholesome morsels. On return, Bob wryly opined that the odor in PTC was no more than an order of magnitude raunchier than his berthing area, a remark which cast grave doubts on the housekeeping capabilities of our Aquanauts. These doubts were quickly dispelled, however, when Bob loyally amended his statement to "a little worse than a pigpen."

Much more took place this day, but these few highlights may serve the purpose of revealing a typical daylight scene on the bottom of the Pacific. Tomorrow is another Sabbath, but I must anticipate a bit of impiety here and there, conditions being what they are. And lest we become unctuous, let us remember that even Aquanauts are God's creatures also.

5 September 1965

A second Sabbath day for our Aquanauts on the bottom, but somewhat different from one week ago. To me this seems to recall the opening chapters of Jules Verne's Mysterious Island, in which the castaways were so desperately concerned with bare survival that Sunday worship was confined to a hastily muttered prayer, and no day of rest was allowable. As they improved their situation, however, the inhabitants of the island gradually were able to set aside a day of rest and worship, to be maintained throughout their stay on the island. And so it is with our first team of Aquanauts. Last Sunday, the urgency of critical house preparation items did not permit the luxury of a Sunday holiday routine. Today, however, although the job is far from done, they all recognize the necessity of physical and mental rest. And so it is that strict communication silence will be maintained through most of the day, save for about a half hour, reserved for church services.

The morning service, held at eleven o'clock, would have gladdened the heart and hackles of any bona fide preacher. Two hundred odd feet below, a completely captive audience of Aquanauts huddled before the loudspeaker, and under the all-seeing eye of an OEC TV camera, which dutifully recorded every twitch, yawn, and shuttered eye. Above, I commandeered the P. A. system, stopped all ships' work, and had control for nearly a half hour. From the opening rubrics, I could sense that we were together, giving thanks for success of a worthy but dangerous cause. After a brief version of the Service of morning prayer, I took a few minutes to tell the story of Earl Hill, my tragic bulbar polio patient who lost grip of every worthwhile thing and quality in life as he lay in an iron lung, there found his soul, his courage, and his Creator only three days before he died. It happened almost exactly twenty years ago; but as I told the tale, I saw every scene of those agonizing months in my

mind's eye with warm clarity. The story of Earl Hill was told, and over. The service concluded with the SEALAB Prayer.

All of the rest of this day, we dealt with one another a little less harshly; and as we worked, we rested.

6 September 1965

As if a day of rest was all that was needed, my Aquanauts hit this day with verve and precision not seen for several days. Good humor had returned; they were courteous and compliant. We swapped jokes on the electrowriter and over the phones. The Aquanauts even feigned to forgive me for commencing the venerable Twenty-Third Psalm with the words, "P. Topside is my shepherd..." This, of course, was a base canard; but I could not find it in me to be put out.

After a longish SITREP and plan of the day discussion with Scott, the morning series of sorties began. Work included outfitting of the underwater weather station, continuing the fish census (too many scorpionfish for my liking!) and general exploratory sorties. Team after team went out on time. The trolley line functioned smoothly. Skidmore took hundreds of feet of documentary movies, and work inside the habitat moved at a normal pace. Even the communication systems performed without failure.

At about 1300 came our day's visitors: a reporter from Time magazine; a TV commentator; "Pete" Kidd, of the Royal Canadian Navy; Captain Jack Kinsey, and many others. We visited at length as we planned for the event of the afternoon--Dr. Sonnenburg's birthday party.

For this event, Bob's wife Pat and his mother came aboard, after a long and somewhat bumpy ride from Quiviera Basin. Pat, ebullient as ever, bore a large Devil's Food cake, complete with SEALAB II decorations, all nested in a gay hat box. But she was near to tears when the box was opened, revealing a shattered masterpiece, made so by the incessant pounding of the AVR-10. Nevertheless, she bravely packed the cake and cards in our pressure pot, posed for the TV and other cameras, and sent it on the long journey to SEALAB II.

In the shark cage, Skidmore waited patiently to film the immortal scene

of the festive pot sliding down the trolley, being disengaged, and raised triumphantley into the habitat. Then, scrambling up the ladder and doffing his ARAWAK gear, he resumed his role of the day, covering the balance of the procedure with skill shots. Bob posed with the shattered cake, installed his 28 candles, and dutifully tried to light them with matches in this oxygen-poor atmosphere. Over the Bogen intercom, we sang "Happy Birthday" mercifully drowning out the ribald remarks of his fellow Aquanauts, and the party concluded with a two-way conversation between Bob and his lady visitors.

The last water event of the waning day was a submerged test of the EKG monitor-telemeter system, using Fred Johler as a subject. In keeping with the success of the day, the damned thing finally worked, at a distance of 100 feet! After nearly ten days of repeated failures, this was indeed a welcome surprise.

In closing today's chronicle, I feel that a word is in order relative to new developments in the area of underwater telemetering of biophysical data. With this project, far too many of such data aquisition systems have been injected into the program with salesmen assurance that they are tested, tried and true, will work the first time, and are automatic and sailor proff. In 99 cases out of 100, this is pure unadulterated hogwash. Almost without exceptions, the systems provided us by university groups and industry alike have been laboratory prototypes which have a reliability factor near zero under ideal pampered conditions of the cloistered campus atmosphere, and which are years away from trustworthy operational application. Once on the scene, the instruments require constant maintenance, calibration, and rebuilding by the host of technicians who accompany the brain child, all of which ties up our critical communications, wastes our time, and clutters up valuable space in

our cramped quarters. In addition, the instruments topside become seasick, as do the operators; and the sensing packages below don't like helium, or can't function in salt water. Finally, in an effort to correct these major flaws, the technicians invariably proceed to add more unreliable and highly sophisticated components, rather than to strip the basic gear to its jock strap for simpler operation. The result is chaos, short tempers, and interference with useful undersea operations.

And if I have railed in the past against the callous disregard of quality control on the part of American industry, I must likewise level an accusing finger at the university groups who seek only to get their brain-child, however mongoloid it may be, aboard a successful operational experiment, so that they may rush into professional point with a first, gaily riding the coattails of other, more solid, work. A plague on such philosophy say I --and my subjects echo "A Plague!"

All in all, this was a quite successful Monday, 6 September 1965.

8 September 1965

And channel fever has set in with the Aquanauts. Talk of the beach and upcoming liberty is rife; but little do they know how sparse their moments of leisure will be. Two days of hospital and laboratory investigation, one day and night of liberty, then back on watch as surface support divers. Tough luck, but that's how the Project's got to go. Come to think about it, the old Principal Investigator and his cohorts Walt and Tom, not to mention our Master Diver, are doomed to longer days of hormonal desuetude than any of our Aquanauts. In fact, we will all have qualified for at least novitiate status in any of the many monasteries hereabouts by the time we again hit the beach. Somehow, though, we've received no invitation to join such a celibate group. Maybe we should obtain a charter for the Chaste Order of the BERKONE, or some such. On the other hand, it's probably not a very good idea.

Today, a great deal of energy will be expended on the man-killing task of rigging a preventer-anchor hookup to SEALAB, presumably to prevent the latter from falling into the canyon. This possibility is so remote as to be unthinkable; nevertheless, the hookup is deemed desirable by personnel on the bottom, so it shall be. To date, however, we have seen the messenger line fouled on every damned object on the bottom, often to the peril of the Aquanauts, and I am unhappy about the unilateral decision to use this clooge.

In addition to this somewhat useless task, however, a great deal of important work is being accomplished by the Aquanauts. The Ocean Weather Station is 70% complete, and all elements are so far functional. Marine biological experiments are going at a good rate. Excursion dives to the safety perimeter of 233 feet are being made routinely. The motor skills and strength tests are well underway; and other oceanographic studies are proceeding apace.

To a large degree, the first team has been cheated of the fruits of their toil, inasmuch as they have been stuck with the burden of the house-keeping duties as well as with the problems of bottom equipment setup. The joys of leisurely sight-seeing on the ocean bottom are not for them; even the simple pleasure of relaxation in a well ordered undersea house is forbidden, for every waking moment must be spent in rearranging, patching, and planning another skirmish in an uphill fight. Then at long last, when the habitat, outside grounds and avenues, power plant and outhouses, are all in apple-pie order, Papa Topside will order them all, save one, into the PTC for a long ride back to the world of dry footing and bright sun, with scarcely time for a backward look.

Now comes a team number two, hell-bent to produce a maximum of physiological and other scientific data, and seemingly oblivious to the preceding hard labor which provided their comfortable platform. This will surely be a period to test the iron self-control of Scott Carpenter, as he endures for awhile the callous indifference with which these interlopers accept their new quarters and well-marked landscape. And if Scott should backslide a bit and permit himself the luxury of a group chewing out, or even a mild temper tantrum, it will be accepted philosophically by those of us who are privileged to watch our colony grow from a floating point of vantage. In good time, however, team two will commence their own uphill fight against the hostile environment and the strictures of SEALAB II life, and the widening spiral will continue until the day of departure late this month.

Finally, the third team will enter the now venerable home of the Aquanauts. I think that as they approach SEALAB II near the end of their descent, they will first be struck by the appearance of their new house. No longer a pristine white with gleaming metalwork, SEALAB II by now will have become a natural part

of the seafloor topography, a slate-gray mass, surrounded and partially inhabited by swarms of marine life, and blending so perfectly into the bottom seascape as to almost escape identification. Once inside, they will note that the house has a definite lived-in countenance, and gives evidence of persistent molding in the hands of her former tenants. Just as each generation of ancient cavedwellers left indelible and revealing marks and patterns of occupancy and culture so will it be with SEALAB II, shelter and haven and undersea cave of mankind seeking dominion over the sea.

But shortly this impression will fade for all save Bob Sonnenburg, who will feel persistent nostalgia, and team three will characteristically tackle the hardware and salvage problems for which they have trained so long. Under the exceptional leadership of Bob Sheats, they will bring to the scene a degree of competence, efficiency, and selfless effort which may seem to eclipse that of the previous groups, if only because of increased outside working times, and proficient use of hardware of the salvage trade. For these will be the salvors, the equipment operators the practical mulehaulers who will carry on their trade against any odds the sea may produce. They, too, will accomplish their assigned tasks, and more; and though they may appear unappreciative of the man-made comforts and safeguards which surround them, such is not really the case. One day in October, they will file out of SEALAB II one at a time, to greet and to be greeted by surface dwellers. But I'll bet that each will have his own private farewell look, and will say, "By God, that was a good job, well done!"

In days, and months, and years to come, twenty-eight men and their surface support crew will often return to the days in SEALAB II, on the edge of Scripps Canyon, off La Jolla, California. The men, the deeds, the place, and the time will not be forgotten in our lifetime.

11 September 1965

This day, like a few before it, started quite early. I was up singing at 0400, to the dismay of all sleep-loving individuals in my sector of No. 3 hold. Undaunted by shouts, missiles, and vile imprecations, I skipped up various ladders leading to the solitary officers and mess cook's shower. Often as not at this hour, the bath will be occupied by a rigger fresh in from a night on the beach, seeking to revive the flagging spirit with a cold rinse. But today, my luck held, and it was not necessary to evict anyone from the washbasin or shower. I revelled in the solitary splendor of the head and its accessories. Shortly, I emerged gleaming, and completed my toilette and first mug of tea simultaneously. By 0500, I was on joint watch with Walt in the trailer. After a couple of hours of chit-chat, Walt packed off to sleep until early afternoon, when we planned to charge the PTC with a suitable gas mix for lift-off procedures on Sunday.

At about 0700 came the first call from Washington, D. C. It had to do, predictably, with a story published in the New York Times, and which had caused a bit of consternation in high circles of the Navy. How all of this came about is classic, and deserves explanation.

On Thursday last, I was asked if I would submit to an interview by a Times reporter. I made a special effort to comply with this request, since I had heretofore always held the "NYT" science reporting in high esteem, and felt that an honest job of reporting our project to the American public would be assured. This trust was, I was soon to find, horribly misplaced.

At about 1030 hours, the AVR-10 came alongside to discharge her daily first load of tourists, dependents, workers, and journalist, among whom was a slight bespeckled gent carrying a reportorial credentials from the New York Times. At the time, he seemed scholarly enough; and when he announced he

was here to write only the straight scientific facts of the project, without sensationalism or reference to birthday cakes, I took him at face value. For nearly 90 minutes I answered his sparse questions with detailed and frank appraisals of the scientific views and achievements of our program, confident that the message would be safely transported to Garcia. But the Marines are right; some jerks never get the word. And such was the case on that sunny morning.

As I spoke with this malnourished functionary of the fourth estate, it gradually dawned on me that a little item known as comprehension was lacking. His questions were inane, naive, and unworthy of a Junior High School reporter. He had never heard of SEALAB I or any other undersea venture; didn't know a Continental Shelf from the third row in a Safeway store; and apparently identified a white blood count with the segregationist movement. In growing horror, I realized that my accurate scientific gems of wisdom were being reduced to paste imitation in the weak intellectual switchboard of the pencilpusher facing me. At last, in desperation, I suggested that I should perhaps blue pencil his copy, to assure best quality for the article. This recommendation he brushed off as he left the ship, saying that he would telephone me if items were encountered which he did not understand. At that, I squalled that my greatest fear was for the stuff he thought he understood--but too late; he departed without a backward wave. I thought of a good remedy for the situation; but BERKONE had no small arms locker, and by the time I uncovered my own musket under a pile of dirty clothes, he was out of range; and the egg, as it were, was on its way straight for the fan.

The article which appeared subsequently provided a permanent blot on the scutcheon of an otherwise good newspaper. In all of my encounters with

press stories, I have nowhere run into a more flagrant case of stupid and irresponsible journalism. According to his account, our program was nearly wiped out by failure of thermal protective garments; we were inundated by an unexpected plague of poisonous scorpionfish; the subjects, already debilitated by painful and incapacitating ear infections, were developing a new and unexplained blood disorder; the Aquanauts were in constant fear of rolling into the depths of Scripps Canyon; and I was quoted as saying that no useful information had been derived from last year's Bermuda experiment. All of this utter rot and distortion had been freely passed by the "NYT" editor without question or any check on validity, and Navy officialdom and the American newsreaders alike given a massive bit of misinformation. I could only curse and gnash my remaining teeth. An official protest was lodged, at my urgent request; but no newspaper will ever repudiate an entire article, and so the damage was done.

In retrospect, perhaps I should not deal too harshly with this reporter, but rather with the incredible judgment which caused his deployment on the mission. It now turns out that the poor uninformed wretch was in fact the Society and Drama correspondent for the paper! But I will not soon forgive the insulting editorial attitude toward our important scientific project. Today, the article was posted on our event blackboard, for all visiting journalists to see and digest with care, along with my own somewhat earthly comments. So much for those who labor for the daily bladders.

To date, and by conservative record, a total of two hours and fifty-three minutes have been spent in discussion of the frailties, principles, and proper functioning of the pneumofathometer system designed for SEALAB II. Now a pneumofathometer is a stock in trade item with all hard-hat divers, and its principle derives from the observations of Sir Robert A. Boyle, which go to

the effect $P./V. = \frac{P_2}{V_2}$, give or take a "p" or "v". Anyhow, it says that if you have a rubber hose filled with air, and extending to any depth, a gauge reading the pressure of the air in that hose will tell you exactly how far down the hose the air column extends. So far so good. Now, if one gradually increases the air pressure in the rubber hose by admitting more air, the air column in the hose will extend finally to the end of the tube. It's that simple.

Yet, somehow, it became horribly complex as Walt and I alternately tried to explain the system to CDR Scott Carpenter. As Scott first put the problem to us, he had tried the pneumofathometer, and the pneumo had indicated a depth of 20 feet shallower than the depth gauge. Of the two, Scott said he considered the wrist gauge accurate, and the P. F. wrong. Not so, sez I. The pneumofathometer, properly used, is always as accurate as its own gauge, whereas wrist gauges are not consistently trustworthy. At this point Scott sensed a criticism of his manipulation of the pneumo, which was frankly the case, and launched into an amazingly detailed description of each nut, bolt, and air molecule in the clooge. Next came requests for additional gauges, reducers, clamps, etc. I tried to assure Scott that he already had all of the essential elements for proper operation, and no added paraphernalia was required. This encouraged another long check list of on-board inventory, plus a recapitulation of operating procedures, this time including something which had previously gone unnoticed. It seemed that Scott had been flowing gas at a good rate through the pneumo tube, and taking readings as the gas continued to flow. Naturally, such a reading is of no value, but somehow I could not make this point with CDR Carpenter, who got off on a tangent about "line loss"--which means exactly nothing in a static or stationary column of gas. In desperation, as time flew by, I strongly recommended turning the whole job over to my master divers topside, who had cumulative experience with

pneumofathometers equalling 40 years. This was an unacceptable solution to Scott, who countered with more requests for added hardware. I turned the phones over to Walt, who was still alternately talking and listening when I quit the scene. A while later in the day, the subject was simply dropped as a lost cause for the time being.

This is not to say that Scott Carpenter was being rigid, unyielding, obstinate or disbelieving, although these adjectives did present themselves subliminally to my battered psyche. It is just that being of aviation training, he believes in instruments with dials, and we underwater buffs have long since learned that divers' wrist gauges are not to be trusted, whereas a pneumofathometer, properly backed up by a recently calibrated gauge, is sure and foolproof. Even in this uncertain world, some things must be taken on faith, and until Boyle's Law is repealed, I shall insist on pneumo readings as being my criteria of depth determination.

As much as anyone, I favor a full explanation of all procedures and decisions; but when such discussions reach filibuster proportions, some other, perhaps more important business must suffer at both ends of the line. Thus it is that on occasion the Principal Investigator must say, it shall be so; and so it shall be made. Arbitrary, but necessary.

Tomorrow, I intend to preach on the subject of Faith.

Continuing the day, we had a few minor contretemps. If I remembered to write about it, one will recall that last evening the PTC was raised and placed on deck for a thorough cleansing and deodorizing, as the anchovy remnants had not all been removed, and the stench was, to put it mildly, unbearable. In any event, as we began the lift, I remarked to Bob Sheats that, in such an operation, I could never recall making a drastic and unwilling change of plan such as this, but that I had later said "Thank God I did;"

for invariably, when the deed is accomplished, one will find three reasons for so doing, upon close inspection. And so it was in this case. As we prepared reluctantly to raise the PTC, we learned from an inspecting diver that a shackle pin was missing from one leg of the lifting bridle. That could have been a serious matter with a fully-manned lift off. As we repaired the damage in time, I said to Sheats, "That's one." Now the lift went smoothly, and the PTC was deposited in her retaining rack without mishap. Bob Sheats walked slowly around the hull, then called me over. "And there are two and three," he said. Sure enough, one fitting on our emergency escape system had been snapped off by our free swinging bridle on the bottom, and the underwater phone connection was battered beyond function. It took all night to repair the damage and deodorize the PTC to a point of human safety, but the job was complete this forenoon, and she was returned to the ocean floor in good working condition.

The balance of the day was spent in transfer of groceries, equipment, and personal belongings. Tomorrow, we exchange teams one and two, the former to endure the hazards of linear decompression, while the latter group meets the challenge of a hostile, dark, and cold environment.

Walt and I ask for God's special help in the hours and days to come.

12 September 1965

I give you now a long and busy Sabbath day, from beginning to end, and some slopover at both ends. In terms of all-round accomplishment, it would be mighty hard to beat this day of work.

After finishing a belated chronicle and newsletter to the Aquawives last night, I fell on the canvas bunk and into the arms of Morpheus without delay. Unfortunately, as is usually the case here on the BERKONE, my daily intake of thirty or so cups of tea resulted in numerous semicomatose journeys to the top-side head; yet on the whole, I rested well until 0400 hours, my usual waking hours.

In the trailer an hour later, I was pleased to note a flat calm sea, an unusual East wind, and a pretty clear sky. All in all this felt like the day. Could be that I whistled a tune or reasonable facsimile thereof. This would be the day of days for the early part of the experiment. Here it would be that the sheep and the goats would meet a parting of the ways; and, this being a celibate venture, so would the men and the boys. Walt and I rejoiced together over the promise of the day, and agreed on minor details of the decompression procedure. Breakfast came and was disposed of, while Walt went below for 1.5 hours of sleep. I contemplated the morning and readied three divers of team two to go below for 6 hours of intensive physiological studies while keeping CDR Carpenter company and awaiting the final cross transfer of teams one and two.

Barth and Buckner entered the water at 0845, with our blessings and farewells. Soon thereafter, we commenced a long series of final checkouts of the PTC, location of the fish cages, and bottom sorties, interspersed with many more "trolley" runs to transfer dirty clothes, personal effects, and a number of obscure items which, unwanted by SEALAB II and topside alike, are destined to ride the trolley pots forever on round trips. One of these, as I recall, is a 1927

Captain Billy's Whiz Bang joke book; the other, an old set of Mah Jong, with missing pieces, both unclaimed. Nevertheless, things moved along until the 0930 trip of the AVR-10 arrived alongside and debouched a gaggle of journalists, military persons, TV camera crews, and one very seasick female of chartreuse complexion and wretched countenance. Now the deck bustled with activity. In a secluded corner outside my trailer window, Dr. Sem Jacobson's three ravishing female helpers chattered happily in Norwegian as they fussed over 5 beaming Aquanauts, placing electrodes in appropriate areas of the scalp and chest, while ignoring requests for Swedish massages and the like. On the fantail, groups of reporters queried everyone who looked like a diver, while my trailer was overrun by a motley group of the morbidly curious flotsam which eddies around at time of potential marine disaster.

At 1225, all was in readiness for a final inspection of the PTC prior to loading team two. CDR Carpenter had scheduled himself for this job, and so dropped through the hatch to make the short sortie. Less than a minute later, he appeared on the TV screen, being assisted to the berthing area by two fellow Aquanauts. I smelled disaster all over the place.

The bad news came soon enough. Scott, in passing through the shark cage, had inadvertently touched a large scorpionfish with his left hand. The reaction of the Scorpaena Gruttata was swift, predictable, and venomous. Three or four spines pierced Scott's index finger, resulting in excruciating pain, spreading an anesthesia elsewhere in the limb, and followed by rapid swelling and disability. In these cases, shock and respiratory failure are quite possible, so Dr. Sonnenburg went into the plan of action which we had previously laid out with care. Scott was placed in a head-down position on his bunk, intravenous antihistamine was injected, a decent dose of pain-killing narcotic followed, and cortisone was given intramuscularly. Meanwhile, the hand was chilled, and anti-shock medications readied for instant use.

Over the public address system, I issued a bulletin, explaining the cause of the hold, the nature of Scott's injury, and offering assorted phrases of reassurance not personally experienced by the author. One hour passed, then two, and Scott was definitely in no danger. The decision was reached to leave him on the bottom, an acting deputy team leader was selected (Barth), and the show resumed.

In a smooth 40-minute operation, nine team #1 Aquanauts were lifted from the ocean floor into the PTC and ultimately transferred to the DDC for continuous decompression ascent to the surface.

Two hours later, delayed by an unforgivable design error in the DDC mating trunk which was overcome in an expensive fashion, the PTC was again resting outside the shark cage and a new set of Aquanauts began the descent to SEALAB II, one pair at a time. As I waved them a brief farewell, I marvelled that the scene was now a routine, no longer a spectacular event.

Tonight, we go with mighty little sleep; but by midnight tomorrow, the even tenor of the operation will be resumed. This is a small price to pay for such results.

My church service, held at 1130, contained a message relating to Faith. At this midnight hour, I believe my words all the more.

13 September 1965

This was a day of waiting and juggled sleep schedules, up at 0400, after three hours of catnap, I relieved Bob Thompson again until noon, slept another hour, then prepared to lock in the decompression chamber with Dr. S. J., to visit the boys and stand by while EEGs were to be taken on all Aquanauts.

At about 1445, the ebullient Norseman joined me in the outer lock, babbling questions as we descended, and incidentally forgetting to equalize his ears. Shortly, his pain was sufficiently severe as to shut his mouth for a bit, but I

kept flowing in the gas regardless, as I grimly contemplated his misery. Prior to descent, I had sought to explain the basic principles of earlifting, but Karl Wilhelm interrupted with "Not necessary, Gorch, I have flown the X-15." Now flying the X-15 is a worthwhile accomplishment, and shame to the man who dares gainsay it; but the maximum range of the X-15, in terms of pressure differential, is less than that experienced in a dive 33 feet down--and we were going at least to 60 feet. Sensing that logic would not prevail, I had grumpily ceased talking and loaded S. J. in the outer lock without further ado. And now, at thirty feet, S. J. was in trouble. His elongated Nordic countenance grew longer by the second; tears welled in his eyes; great veins corded in his red neck as he blew vigorously on his honker; and all to no avail. Remorselessly, the pressure continued, and S. Jacobsen's eardrums bulged inward. Now he danced from one foot to another, as if barefoot on hot asphalt, tugging at his ear lobes and emitting Scandinavian yelps which were drowned in the 112 decibel noise of incoming air. At length, Karl's white hair arose on his pate and trembled like the vibrissae of an eager insect, while his bristling eyebrows semaphored distress. In compassion, I secured the blow, and inquired after his health. S. J.'s response was a vigorous nod of the head, a slow foxtrot, and a word that sounded like "fine." Later, it developed that the word was some Norwegian slang for gawdawful; but down we went nonetheless. In a moment, the inner hatch opened, the jig ceased, and we entered a dank, sweltering sewer pipe peopled with dripping Aquanauts.

The next 70 minutes were consumed in taking EEGs, screaming Norwegian expletives to the girl technicians outside, praying silence and stillness, and conversing with my team number 1, minus Carpenter. The issue was confused, but the visit enjoyable, and our brief stay ended all too soon. After shoosng stowaway Aquanauts out of the outer lock, S. J. and I ascended to the 10-foot stop, took 8 minutes of decompression and returned to sea level. I resumed the watch in the

trailer, and Sem returned to his hideaway to nurse his ears and charge his recorder. Much later, he declared cryptically that the run had been a valuable experience. I could truthfully say as much for any close brush with disaster.

Later that evening, after an hour-long SITREP with Scott, I shaved for the occasion and was standing by the outer lock with Walt and others when midnight struck. The hatch opened, and the disheveled Aquanauts streamed forth to face the TV lights and curious press. Somewhat later, we had coffee together, and agreed to meet on the 0 deck for a formal press conference at 0800. And so to bed for a 2.5 hour snooze, or so I thought.

At 0300, nearly midway in my siesta, I was awakened by Chief Price with news that 3 Aquanauts reported knee pain. With the news, I scrambled from my bunk, stepping on Walt's face in the process. Being some hours behind on his legitimate sack time, my colleague didn't even change the measured cadence of his snores.

Back in the diving locker, I was faced with three mildly apprehensive, recently decompressed Aquanauts. Each complained of moderate, nonescalating pain in the muscles of the lower thigh, aggravated by motion, and non-boring in character. It seemed significant to me that these were three of four characters who spent the last five hours on their hunker bones in the DDC, playing cribbage. In my drowsy state, and with a natural aversion to many more hours of treatment watch, I made an immediate diagnosis of genu cribbaticus, and ordered a deep sleep for all hands. Turns out I guessed right; by daylight, they were cured of their affliction. Obviously, it never pays to make a hasty decision, however clearcut it may seem and especially if it threatens the rest and recreation cycle of the attending physician. I too returned to bed and slumber.

15 September 1965

Yesterday and today have sort of blended into a continuous entity, so alike

have they been. Early rising, the overnight report, a day of observation, reports, log writing, sunshine, visitors, one meal, thirty cups of tea, more writings, and bed time. With the steady progress of the Aquanauts and the increasing competence and yield of the experiment, one gains a sense of confidence almost approaching security. This is a dangerous point, for the same attitude could well be conveyed to the Aquanauts below, with potentially fatal results. We all know this; and yet it is a difficult spell to break. At such a time, if a close call does not occur spontaneously, we must create an illusion of near catastrophe, for the safety of the program.

And so tomorrow, we must simulate a situation to test the defenses of our Aquanauts.

16 September 1965

There will be no need to simulate any casualties with respect to SEALAB II, at least for the time being. Even as I wrote yesterday's Chronicle, events were taking place that would test the mettle of a Spartan Chieftain.

First, Iley was not considered by CDR Carpenter to be in sufficiently good physical condition for MK VI diving. In his judgment, I concur, since Glen had failed miserably to live up to his promise of last winter to get squared away on the overweight bit. By the time I saw him at Long Beach, it was too late to train another, so I could only hope that P. T. could help. On Sunday last, however, when he missed zippering his wet suit by a full four inches, I shuddered perceptibly. Indeed, there was a serious question in my mind as to whether he could pass through the 48" square entrance hatch to SEALAB II. Now I had to go along with Scott. Glen Iley would probably be doomed to a somewhat sedentary existence in the habitat, with only occasional forays to the shark cage as a subject, or to retrieve the pots and baskets from the trolley.

Next news was more serious. George Dowling, who had been virtually living in the experimental heated suit, appeared to have developed a sensitivity to same, and so was hors de combat with swelling and rashes of the extremities, together with an apparent infection of one foot. Bed rest, antihistamines and supportive care were prescribed.

And now comes news of frightening import. On a swim yesterday afternoon, one Aquanaut, wearing insufficient weights, became uncontrollably buoyant, and was saved from a hasty and fatal ascent only by quick action of his diving buddy, who hauled him down and back to SEALAB II. I realize that our Aquanauts do not wish to be so heavy that they must crawl among the thousands of scorpionfish on the bottom; but surely they know full well that a state of positive buoyancy is likely to result in a fatal rise to the surface.

Following this entry, a few more clear-cut items of carelessness. One Aquanaut returns to the entrance to ask if his control block is open! Still another diver loads his CO₂ absorbent canister with a sealed package of baralyme! My suspicions of gross laxity are plentifully confirmed. The system of buddy checks has commenced to go by the board.

A long discussion of this sad state of affairs took place with my Aquanauts' team leader, and I was assured of a rigid tightening of the rules of the game. Still, it came as no great surprise to me when Buckner received a sting on the foot from a scorpionfish, and a deep (250') excursion dive was commenced with half-filled bottles, and no reports were given of exit and entry times. There is a daily increasing evidence of the type of independence which strikes terror to the heart of the topside watchstander. The intercom calls which go unanswered for long minutes; the electrowriter messages ignored for as much as a half-hour, because all written messages are considered "drivel" and the fact that the 2000 situation report is not given until 2300, and is oftener than not incomplete--

these are all large straws in the wind which I cannot ignore. At a risk of alienating the team leader, I am forced to insist on compliance with orders of the Principal Investigator, even at some personal discomfort, and this without an interminable argument and requirement of justification.

So much for the problems of the day. There will be others; that much is certain. Yet I think that we have overextended ourselves in assurances of, and special provisions for, complete autonomy of the Aquanauts. The day has not yet arrived when the judgment and planning of the topside control can be ignored or modified substantially by the subject in the habitat.

This morning, Tuffy, the porpoise, was brought forth for a command performance before the press and TV observers. For long minutes, he rolled on or near the surface, bestirring himself only to snap up hunks of frozen mackerel and to leer at the audience. For nearly thirty minutes, his playmates below shivered in cold water outside SEALAB II, alternately sounding their homing buzzers and cursing the entire porpoise family. At length Tuffy was returned to the habitat to thaw. Half an hour later, Tuffy gave a return performance, near the fantail of the BERKONE. In due time, he flipped over and headed straight down for SEALAB II. Four and one-half minutes later, he was on the surface, looking disillusioned and anxious to depart the scene, which he did. Later, the Aquanauts reported that he reached bottom, took a long horrified look at the ungodly array of threatening hardware on the ocean floor, and fled ignominiously. Tomorrow, we will try again. Tonight, however, I have an even higher esteem for the Tursiops known as the bottle-nosed dolphin--The SEALAB complex scares the hell out of me, too.

Sufficient unto the day is the evil thereof.

17 September 1965

It is apparent that we must provide better protection against the scorpionfish which literally blanket the seafloor around SEALAB II and are packed into

every cranny around the habitat itself. Eradication, or even thinning out techniques are obviously impossible; therefore, we must provide some foot protection for the divers, such as a neolite inner sole to be fitted into the fins or attached to the suit soles for mechanical protection. Tomorrow, we will have Dick Young out to check the feasibility of putting protective soles or partial soles on the suits which are not so provided. This aspect of the hostile environment represents more of a painful nuisance than a real threat to the Aquanauts, although a sting on unprotected flesh at a distance from the laboratory could be very serious indeed. In any case, the show will go on, but some ingenuity will be required. Already, it seems to me that the measly 40 K set aside for marine biological work is an inadequate annual sum for the job at hand.

This morning, Tuffy really lived up to his advance billing. At precisely 0924 today, he answered a buzzer call from an Aquanaut 205 feet below. With an insouciant flip of his tail, Tuffy took off. Within a minute and a half, he had greeted Conda, and carried a safety line from that Aquanaut to Reaves, the stricken man, some sixty feet away, laterally. After that, he really put on a show, with seven payload-carrying runs all told, until we called it quits, suitably impressed. As luck would have it, only one newsman and no TV cameras appeared for the event.

Three days ago, I had the pleasure of a thirty-minute under water frolic with Tuffy. Our friendship was immediate and I hope enduring. While Bob Sheats shot photos, I scratched Tuffy's back and stomach, which he genuinely enjoys. As before, though, I was struck with the appearance of his eyes as he gazed on me, forty feet down. This was the same look I have seen in the eyes of every old and wise people as they watch young children at play. Somehow, it is not right for the Principal Investigator of a million dollar scientific project to be self conscious in front of a ten year old Tursiops Truncatus. I must also confess to sharing

with others who work with Tuffy a conviction that, in his mind at least, it is he who is training us, and not finding it a simple job. In truth, though, Tuffy has taught us to feed him when he says certain chattering words or makes appropriate gestures. The fact that we enjoy his noises and actions is of no importance, as he seeks continually to improve the repertoire of those stupid men-fish who can't even talk at thirty-eight thousand cycles per minute, and swim at only 0.8 knots.

Problems with TV cameras continue apace. Conservatively, we have had failures in nearly a dozen cameras so far in this project, despite the fact that we are using the finest underwater cameras available, and have constant and superb maintenance from the company and our own technicians. The fact is that these are underwater cameras and as such are impervious to water and high pressures. They are not, however, designed to stand high pressures of helium, a gas which diffuses through almost any substance; consequently, they leak inside SEALAB II, become internally pressurized, and then fail. After battling the problem these many days, a flash of genius struck me, about as follows: The OEC cameras were designed to work underwater; therefore, let us put them outside SEALAB, peeking through the portholes and in seawater. Dizzy with the brainstorm, I ordered an external camera carried to a part for demonstration. Within an hour the job was done, with complete success. Tomorrow, we'll have trouble-free TV, I hope.

Tonight, the boys below are dog-tired, and unquestionably irritable. Likewise topside. I prescribe a full night of sleep and here I go.

19 September 1965

By mutual agreement of subjects and topside control alike, this is another day of rest, recreation, and repair. Consequently, no reveille was called, and an air of indolence pervaded the otherwise busy TV screen. Topside, we maintained a

relative communications silence, lolled in the sun beside the trailer, and caught up the log and other most despised bookkeeping chores. The sea was calm; our solitary sea lion slept on a spud buoy by our bow; and the clear blue water had at last come in from the Pacific depths to improve visibility and raise our spirits.

At about 1000, the first boatload of visitors arrived, made up largely of old hands, Navy types, and beachcombers, with a sprinkling of females--not the pick of the litter, in my judgment. Nevertheless, we plowed through the amenities whilst I prepared for the morning church service, scheduled on the air and under the water at 1100 hours sharp. Search though we might, no church flag has come to light on board this parthenogenic barge, nor do we have a bugler to blow church call. Somehow, I must make do with our public announcement system, which has all of the characteristics of a circus spieler's horn. Considering my congregation, however, this may be the appropriate call to worship.

Generally speaking, the service went very well. After rendition of a skeletonized version of Morning Prayer, I talked briefly of the example of the example set by my old and dear friend, the Reverend Richard Vause, who truly walked by Faith and not by sight alone, and his philosophy of "can do, can help, can stand-anything." Again, it was easy to go through the service and sermon facing only a microphone and a p.a. system. From the opening sentences of the Call to Worship, I was again in the Church of the Transfiguration at Bat Cave; and the story of Richard Vause flowed easily before my mind's eye and out of mouth. It is not likely that I shall ever forget the opening chapter in a teacherage near Drunkard's Flat in Polk County, and the slow climb to his victorious success of today. These are the memories that make Sunday Services

a pleasure to me and, I hope, to my Aquanauts. A little light on basic theology, perhaps, but the lesson is always there to be learned at will.

By noon, all preparations were complete for lowering the NOTS tripod TV camera outside SEALAB II. The camera was placed about 20 feet abeam of the habitat, and aiming at SEALAB II. A great deal of particulate organic matter was in the water, and within minutes the scorpionfish began to congregate, until quickly the ocean floor was blanketed with the damned things. Shortly, a pair of black-suited fishermen swam into view, removed the cable which had inevitably become fouled on the tripod mount; and drifted off to an unnamed rendezvous in the murky depths beyond, toward our underwater weather station. We took some movies, then returned to the scenes of survival on the ocean floor.

A moment ago, I made mention of a fouled cable; and perhaps this phenomenon deserves an additional word at this time. Certainly, if Murphy's Law (if aught can possibly go wrong, it will) holds true on the earth's surface, one must consider that in undersea situations, the law is at least true to the third power. Since commencement of this project, I have faithfully recorded the fate of every object lowered to the bottom. Without exception, each and every item has become fouled, sometimes on lines at least 50 feet distant. The question is never, "Is it fouled," but rather "What is it fouled with?" Surely, the fouled anchor device which we proudly wear on our uniform caps speaks a world of truth for naval operations, past and present.

Another item of more than passing interest is the observed fact that objects of known location on the ocean bottom are not in fact there, but more often are eventually found at some considerable distance away, and on a new azimuth. This might be termed Bond's corollary to Murphy's Law³, though I do not recommend such designation. Yet it is a solid fact that, though we have

been moored over SEALAB II, an object nearly the size of a small submarine, for about a month, we still don't know where the habitat lies, nor on what heading. Surely we must one day build locating devices oriented only to ocean floor topography, and bearing no relation to Polaris, or even Betelgeuse.

After lunchtime, the tempo of underwater life picked up, albeit still below the daily norm. Electrically-heated wet suits were tested, TV cameras installed, marine biological studies continued, and psychomatic arrays laid out. By 1700 all Aquanauts were again at rest, and shortly the quiet watch was turned over to Captain Mazzone, who so often knits the ravelled sleeve of care through the long night hours.

By 2100 this obedient servant was asleep.

20 September 1965

And what a night's sleep that was! Finally awakened at 0345, in time for a leisurely shower, shave and two cups of tea before reporting to the trailer at 0430 for a joint watch with Walt.

Of all the hours of the working day, these are unquestionably the best, and frequently the most productive. Conversations with the Aquanauts are limited to terse, often humorous, notes on the electrowriter; and it is a pleasure to observe the quiet scene on the TV monitor. Meanwhile, plenty of time to shoot the breeze with Walt, to see the program at a distance, and to swap ideas without interruption or kibitzing. Somehow, these easy hours take me back to the pre-dawn watches that Walt, Bob Workman and I used to have in 1958, as we toiled on weekends over the precious rat experiment which slowly and painfully led to our present operation. In those days, we laughed at ourselves for being presumptuous; yet certainly we all felt it would somehow come to pass one fine day. And so it has, up to this point at least. A lot of water over the dam since those days for sure.

Of late, two items have come to be of some concern to Walt and myself. The first has to do with a minor degree of dichotomy between topside control and SEALAB II team leader and crew; the second relates to minor physical complaints which emanate from the habitat.

Scott Carpenter was selected as training officer and team leader for the first two teams because of his excellent powers of observation, traits of leadership, positive attitude, and infinite curiosity. These are all qualities desired in our leaders, and there was never doubt of their presence in Scott's makeup. On the bottom, however, where autonomy is stressed, and personal responsibility of the team leader is a heavy burden, some of these sterling qualities have become a source of irritation and occasional outright friction

between topside control and the team leader. And the problem becomes gradually magnified with the passage of time and the inevitable accumulation of frustrations and personal discomforts which attend such a long stay in a cold, dark and hostile environment. In any event, Scott's natural curiosity seems frequently to generate excess questions, with every decision handed down from topside challenged by demands for infinitely detailed explanation. In and of itself, this is no great problem; but the time consumed in these lengthy defenses of each topside decision are horribly time-consuming in a situation where time is precious. By actual count, we have now expended more than two hours discussing the deficiencies of the pneumofathometer assembled in SEALAB II and found to be leaky and potentially dangerous. And although I ordered abandonment of this item, with substitute use of a reliable topside controlled instrument, I must each day go through an ordeal of rebuttals, defenses, and renewed demands that the condemned equipment be used for highly experimental and dangerous excursion dives. In addition, there is an apparent reluctance on Scott's part to delegate any real responsibility to highly trained members of his team. In the broad sense of leader responsibility, this may be good; but it frequently stifles initiative and obscures the talents of men who are divers of very long experience. Finally, some decisions which can only be made by topside control relative to atmospheric mixtures are challenged--and this is not permissible. This morning, I devoted long and precious minutes to a completely technical explanation of why I ordered a change from 4.25% oxygen to 3.5%. This I did not mind at all; but it is a fact that some of us have devoted several decades to learning our business in high pressure physiological programs, and our judgment simply must be taken on faith.

To tell the truth, the day of complete autonomy for Aquanauts has not yet dawned, and ultimate decisions with respect to safety and well-being of subjects below must still remain with the Principal Investigator and his skilled assis-

tants. We have been in business for much longer than fifteen or even thirty days.

The second matter of concern relates to complaints that the atmosphere "just doesn't seem right," and of a high percentage of reported headaches. These vague but disquieting factors do not lend themselves to easy diagnosis or correction. We are using the most sophisticated techniques available to assure minimal toxic contamination of the breathing mixture; and our daily physiological program looks at nearly one hundred parameters of body function and states of health. Neither of these watchdog systems have uncovered the slightest cause for alarm; and so we are forced to assign a psychogenic factor to the complaint, while maintaining a steady vigilance. Nevertheless it is disquieting.

Team number three, composed of men with considerably more diving experience under adverse conditions, and led by a different personality type, may yield a markedly different portrait. Time will tell that very soon.

23 September 1965

Certainly this morning started well enough, with an early arousal after a hard sleep, a splendid situation report from Walt Mazzone, marred only by the fact the oxygen control had got out of hand during the wee hours, permitting a rise above my experimental level of 3.5%, which I had hoped to maintain for 48 hours. Still, this was a matter of only grave concern to me, and not a truly killing item. My spirits were quite high as I puttered about the trailer, alternately cursing the dunderheads who couldn't watch their gauges and filling the pages of a fresh log book with meaningless minutiae. At last, my mealtime relief appeared, and I swooped galleyward to engulf my only sizable daily meal. With lips asmack, and a bit of drooling, I paid my sixty five cents and nervously clattered my tray in feverish anticipation of a splendid fare. Then, following exchange of the coin of the realm, the blow fell as surely as any headsman's axe. Poached eggs, lying in deadly pallor on limp toast, garnished

with a rasher of cold canned beans, and topped with a splash of garlic-flavored yogurt-this was my breakfast, a feast destined to carry my tortured flesh through eighteen hours of watchstanding and letter-writing, not to mention six hours of sleep. I recoiled in horror, and sought the author of this grim travesty. Gabriel, who had sponsored the monstrosity, leaned across the kitchen range, rolled his eyeballs wide, and said in a hoarse whisper, "Cap'n this here's what Mr. Horrible done ordered for today's breakfast; and thass what I'm a-ser-vin!"

Now Mr. "Horrible" Smith is my diving officer on SEALAB II Project, a man of sturdy talents, possessed with a two-tone set of tormented vocal cords and occasional craving for strong drink. After three unsuccessful bouts with the latter, Smitty must have felt a requirement to punish his recalcitrant gut, and hence had prescribed the above mentioned death potion in unsteady passage from beach to bunk. I seriously considered giving the wretch a choice between plank-walking and trying to devour his own concoction, but decided I could not bear to see the agony of his hangover, so I performed a kinder act. Covering the revolting mess with a soothing blanket of ketchup, canned cream and sugar, I scraped it into a G. I. can and made a cup of strong tea. Consideration of Smitty's fitness report would be inappropriate at this time.

Topside, I shed my cares long enough to read the column of one of my favorite journalists, Judith Morgan, who invariably gave the project good press. Today's column started innocently enough, purporting to describe the trials of an attractive female reporter on board the BERKONE. At about the second paragraph, Papa Topside appeared on the scene as the official escort of Judy's day at sea. Assisting her up ladders and over scuppers (it read) I managed to pop buttons on her garments, lead her beside fresh paint, and to anoint her countenance with grease in the presence of her rival journalists. Somewhat later, it was alleged, I led her over turbid waters to a pen where Tuffy played,

there getting her splashed by my pet porpoise. In final tribute to her stamina, it was alleged that I attempted to boost her from a bobbing skiff to the BERKONE deck some ten feet above, clutching only those portions of her anatomy which on that day were not protected by a girdle. The resultant black and blue handprint, she vowed, would meet the requirement of the most meticulous Bertillon expert; and her sole satisfaction lay in the fact that an overstressed panty garter popped me square in the face. A closing paragraph dealt with her retentive experiences all day long on a ship without a ladies rest room; but I was too stunned to read it. Considering that this winsome girl's husband is some manner of an all-round athlete, I can only hope he never reads the rash hyperboles of his attractive wife. In any event, I have ascertained that deep-sea diving is not one of his accomplishments.

So this was the shape of the day to come. And more good things were to follow, as does the day the night.

Lunch was finessed out of consideration of my delicate gastric state, and the work of the day continued apace, with the Aquanauts making plans for another attempt at the 266 foot mark. Now came a long discussion of the use of the pneumofathometer as final criterion of depth attained. I strongly urged that only one pneumo--our own topside job--be used. This met with countersuggestions that the private pneumo of SEALAB II, long since discredited by us, must be taken along, presumably for sentimental reasons, and so on, ad nauseam. Out of weakness, I capitulated. As an afterthought, I received information that all communications had been lost in the PTC--a point which would be discussed at a later date. Further, I was advised that a few fish had infiltrated a loose area in the fish screen, and that the odor in PTC was a bit high. As I framed an explosive reply, my Aquanauts dropped the phone, and took off on the deep sortie.

Four hours later, the miscreant had returned to the habitat and left again several times, with no report of the famous journey. I suspected they had goofed the mission, and couldn't face me with a report. For awhile I lingered in the trailer, then, wishing no further disquieting news, I lurched to shower and bed.

My Sunday selection just might be taken from the Book of Job.

25 September 1965

And so we come to the final hours of bottom stay for team number two and their leader who has completed a full month at depth. Today will be largely devoted to inside cleanup and to sorties to the canyon edge for all hands.

Walt and I lit off with an early joint watch, during which we completed last minute arrangements for liftoff, decompression routine, a telephone call from President Johnson, and news conferences in the days to come. All in all, it looks like a rather busy stretch of time ahead of us.

In the early hours, the first two Aquanauts made a fast transit to the canyon edge for a short-lived period of wonderment before returning to the drab surface world. What a shame that a full twenty-nine days had to be spent in a black, cold mudhole before reaching an important goal of the program--the awesome Scripps Canyon! And yet this goal could well have been reached many days ago, save for the interference of time consuming and often inconsequential programs which held promise of neither success nor merit. Indeed, if I were to condemn any individual elements of the SEALAB II schedule, it would surely be those psychomotor studies designed only to satisfy the curiosity of the instigators, and which had little or no connection with the reality of underwater living. In my humble opinion, more insight is to be gained into the

psyche of an Aquanaut through listening to a description of first view of the Canyon, than through a ton of questionnaires or hours of fiddling with gadgets which resemble nothing so much as childrens' toys, and have an even shorter span of life in the sea.

Typically, and almost universally, a description of a sortie to the canyon might be condensed in a single narrative which goes as follows:

After a tedious and tiring process of struggling into wet, wetsuits inside SEALAB II, my Aquanaut swim-buddy and I drop into the black coolness of the exit hatch with a sigh of relief. We are nearly weightless, and pleasantly cool, although well aware that the chill will soon pervade our bones, and make the final minutes of our dive a real agony. We try not to think of this now, as we go through the meticulous routine of checking each other's gear for any flaws, leaks, or malfunction. Weightbelts are locked against accidental release, since positive buoyancy would be fatal in all cases; smooth function of exhaust popoff; normal bypass operations; open control block (remember Tiger Manning's near death); and finally, proper buoyancy, and all safety gear checked in place. Now to the psychologist's work bench, alongside the shark-cage. First, the strength test--not bad, that test; he-man stuff. Next, to the two handed coordinator. But watch it; there are two big scorpion fish on top of the gadget; no stings today, please. And so through the triangle assembly--to what purpose, we wonder?

After 15 minutes of impatient fiddling with these devices, we are free to start our journey. Down to 1800 lbs. of gas now, and must save enough to repeat the tests, plus 600 reserve. We start off, hooked by a buddy line, following the polypropylene strand that shines in the lead diver's light. Visibility is reasonably good--about six feet. The mud bottom is studded with hundreds, even thousands, of scorpionfish, their poised hackles erect and awaiting a careless

touch; elsewhere, schools of anchovies, croakers, and occasional cabezon swim escort with us, further obscuring our pitiful light.

With every kick of our flippers, a dense cloud is raised so that, if we must stop, our visibility is reduced immediately to six inches or less. But we **are** not stopping today; approval has been granted for a sight-seeing tour to the canyon, and we aim to make the most of it. We take a bearing on an electric ray lying beside our last way station, veer to the right, and commence to glide down an irregular 40 degree slope. Two hundred and forty feet now, and still nothing ahead but gray mud and drab bottom life. Then, abruptly, something happens to the water ahead. Now the dark layer is overhead, and for about 20 feet above the bottom, the water appears almost crystal clear. It appears that the light is all coming from the seafloor, while the overhead scene is the never-never land. It is a strange reversal of the usual scene, but somehow comforting, as if we are now in the safe zone of light, life, and safe water, while the environment above is in our enemy. We swim ahead to meet the friendly stratum of existence.

Abruptly we are at the brink of the canyon, probing with our lights over the precipice, and startled with the sudden increase in visibility, up to forty feet. Strange to describe a clear blackness, but that's the only word for it. Now, on every hand, we see immense boulders, densely covered with plant life of all kinds, and of infinite beauty. Gorgonian fan corals wave in the slight current, and a world of color comes alive under our lights. This must be the first time we have seen living plant colors since leaving shore days ago. Around us, the variety of fish life is amazing; and so far as our own vision probes along the canyon rim and wall, new and beautiful forms of rock and life appear. Far below us, the canyon floor is narrow and unseen, perhaps to be

probed by men in our lifetime; but not on this trip, nor by this pair.

Our depth gauges, forgotten for the moment, read 268 feet with the pneumofathometer reading the same. Watches show twenty minutes of elapsed time since leaving the psychologist's gadgets. Our time is up long before our visual search is half-begun. We drive marker stakes, look over our shoulder and start back along the trail of nothing, leading nowhere. And so back quickly to the work platform, to grind through the tests, teeth chattering on our mouthpieces, and shivering uncontrollably with the bitter cold we did not feel at the canyon's edge. Just get the damned things over, and reach those hot showers.

Later as we slowly warm, we think again of the empty black vistas which separate SEALAB II from a beautiful spot on the ocean floor. This has got to be learning undersea geography the hard way. And now two Aquanauts are going out to check the weather station. We feel instantly sorry for them; their day will not equal the few minutes we had on the verge of Scripps Canyon.

This is a big part of the story of SEALAB II, and I hate to have to have to write it through eyes other than my own. The day is now ended for me, and the tour ended for 10 Aquanauts, with only a passing glance at those things on the ocean bottom which make living there worthwhile.

26 September 1965

This has been another day of truth for Aquanauts and topside workers alike. It has been a good day, a happy one, and occasionally a hilarious span of time.

Off to an early start. I was up at 0400 hours, bathed, shaved, and ready for the ordeal of the press and the tension of double transfer of my Aquanauts. For his part, Walt conceded about three hours of sleep to the cause, and prepared himself for the long vigil on board since 0500, were drilled and ready. Below, the Aquanauts were nearly through with their final checkouts, and hot

to trot.

At 0700, the press and TV reps flowed from the gunwales of the AVR 10 in a seemingly endless wave of faces and forms, to take up perches in various and sundry dangerous spots on the BERKONE, daring the sweep of a headache ball or pennant and shackle. For awhile I lingered in the trailer, communicating in all directions and assuming the fierce dictatorial mien reserved for decompression day and children's parades.

From the start, the affair moved smoothly, with no hitches discernible to the practiced eye. One at a time, the ten Aquanauts of team two ducked through the exit hatch of SEALAB II, and, holding their breath, skinned over to the PTC, reporting promptly on arrival. The capsule was buttoned up, and the rise to the surface got underway. Overhead, a helicopter circled and hovered, blasting the visitors with salt spray and drowning out all commands issued by the boss rigger. Nevertheless, the PTC finally emerged from the water, was deposited in its cradle, dropped ballast, and mated smoothly with the pressurized DDC, all in an amazing 26 minutes. Minor difficulties developed at the point of disconnecting the two, but these were resolved by inadvertently blowing the "O" ring far out in the Pacific. No casualties were noted among the spectators who thought the episode to be a normal part of the show.

By 1030, the PTC was again safely outside the shark cage, and the three Aquanauts of team three, left overnight in SEALAB II, requested a four hour respite from visitors, to permit further housecleaning and badly needed replenishment of expendables, victuals, and life support hardware. During the wait the residual Aquanauts exposed their anatomies to the sunlight from which they would be hidden for more than a forenight.

My private line rang at about 1130, with a call from Mr. Jack Valenti, of the President's White House staff, to inform me that President Johnson would

like to call Scott this afternoon, to express his interest in the SEALAB Program, and Scott's role therein. After a period of understandable confusion, we checked out a telephone patch with Scott in the Deck Decompression Chamber, and I awaited the important call, savoring to the fullest my part of interlocutor in the exchange.

At 1300 sharp, my private unlisted telephone rang, and I sprang into action, a model of efficiency. Like the conductor of a great orchestra, I bade cease the tumult about the deck, summoned into activity a tape recorder, and brought Scott Carpenter into play, all with a single gesture and some occult button-pushing. Having introduced myself to the two telephone operators involved, I suggested that one of them should speak directly with CDR Carpenter, whilst I modestly lingered in the wings to cue either party, should lines be forgot or lost. The results were nearly disastrous.

The local operator opened the gambit with an innocent question, "Commander Gordon Cooper, Astronaut, would you speak a few test phrases to check our circuit?" The reply, typical of the intellectually fastidious approach of Scott, started about as follows, "Negative! This is Aquanaut Scott Carpenter; Astronaut Cooper was last heard of in Tanganyika; would a test phrase in Swahili do as well?" From this point forward, Scott may have lost his composure a bit, for the balance of his conversation, delivered in pure helium speech, seemed to harbor some painfully explicit directives to the harrassed switch-board novitiate. Toward the end, some of the colorful phraseology may have been mercifully obscured by a sudden coughing fit of the Principal Investigator. In any event, the operator advised me that surely no one would be allowed to talk to the President of the United States over such a garbled circuit. In moderate desperation, I carefully explained that the circuit was blameless; rather, she was

listening to CDR Carpenter as he breathed a synthetic, or artificial, gas mixture while locked up in a decompression chamber. There was a long moment of stunned silence, then my operator tearfully reported to the Presidential switchboard that CDR Carpenter was in a (sacrificial?) gas chamber, but still wanted to speak to the President.

I sat slack-jawed as this dramatic tableau degenerated before my eyes and ears into a grade D rendition of "The Last Mile." Gone was the magnificent and spontaneous picture of our Commander in Chief pausing in his crowded day to pay personal tribute to a brave man and crew, and to praise a worthy program. In its place came the revolting spectacle of misguided former nation's hero babbling incoherent pleas to higher authority as he awaited the drop of the cyanide pellet. Mortal flesh could bear no more; hara-kiri was clearly indicated for the P. I. Then came the warm, friendly voice of Mr. President, and the sun shone clear on blue waters.

The conversation went superbly, although the non sequiturs bore testimony to my suspicions that neither party was able to grasp the trend of thought at the circuit's end. Nevertheless, it was good. Since I am perhaps the only man alive who really could interpret what was said, considering my Southern raising and philological agility in helium speech, I intend to withhold further comment until the heat of the next campaign. It is a regret that shore control saw fit to attach their recording "bug" somewhat prematurely to my private phone, since they seem to have recorded a lengthy conversation with a blonde philosopher acquaintance in San Diego, which discourse was not at all germane to later developments; solely because of its historical value, I intend somehow to recover the earlier recording.

Later this day, things smoothed out, and I remembered to log a visit by Congressman Wilson, Rep. California, and his entourage, not to mention other

dignitaries of note. Life went well in SEALAB II, the remaining Aquanauts descended without incident, and decompression of team two proceeded nicely. At midnight, I retired for a three hour siesta, not unhappy with the events of the day.

28 September 1965

With termination of this morning's massive press conference, the operations of Team Two were at last temporarily terminated, and we may now turn our attention and time to the work and management of Team Three, under leadership of Chief Bob Sheats. A recapitulation of the past two days is in order.

Sunday, we settled into the dual tasks of decompressing one team while getting another settled with respect to habitat and program. As always, this meant a considerable sacrifice of sleep for both Walt and myself, but most especially for Walt, who is superconscientious in re his responsibilities beside the DDC. In the trailer, I could get the occasional relief from communications and other duties, although Dr. Larsen had to work at double and occasionally triple tasks of gas analysis in the habitat, the DDC, and in the PTC as well.

The day and night went well enough, with Evening Prayer Service at 1730 for the Aquanauts in SEALAB II, but not for those in the DDC, thanks to inadequate cross-communications. In the wee hours Monday, I caught three hours of sleep, then returned to the trailer to ride out the last hours of decompression and to cope with the onslaught of press and dignitaries who would soon arrive to witness the exit of Scott and his team from the DDC, originally scheduled for 1545.

The early arrivals commenced at about 0800, and problems of camera locations

and priorities began to arise. Word had got around that Life Magazine had clandestinely installed cameras in the DDC, and I was soon harrassed by rival photogs, both amateur and professional, for equal treatment. This, of course, involved repetitive operation of the medical lock for equipment transfer, which, in turn meant interruption of the linear decompression. By noon, I was a bit irritable, and our exit time had slipped an hour. Accordingly, when asked by a reporter-photographer why we had permitted such a delay, I coldly informed him of the cause, and suggested that more interference by johnnie-come-latelies would delay the procedure further still. Thereafter, no further demands were heard, save from suffering editors who had now missed an afternoon deadline.

At about this time, my faithful chamber corpsman La Voie cornered me near the trailer, conveying the disquieting information that Scott was complaining of pain in both knees, at a chamber depth of 44 feet. Walt and I decided to go in for a look-see.

Within the pressure lock, Scott lay on a bunk, somewhat concerned, but not in severe pain. His complaints were of cramps in both quadriceps muscle groups, with diffuse, unchanging pain in both knees, not localized and worsened by activity. Physical examination revealed nothing of note, but upon questioning it developed that he had sat more than an hour in an acute yoga sitting position on a bunk, and that the pain had commenced thereafter, at about 0500 that morning. I was certain that it was not classical bends, largely basing my diagnosis on the fact that two kneejoints had been involved simultaneously, plus the fact that he had come nearly 45 feet nearer the surface with little if any change in the intensity of his symptoms. Under the circumstances, such a rise would ordinarily have completely incapacitated a bends victim, and would likely have resulted in additional "hits" in other joints, or in the spinal cord.

Content with my own reasoning, I ordered a mild painkiller, some activity, and a resumption of decompression. Walt and I locked out of the chamber, to resume our separate watches. Naturally, within minutes, I was queried by newsmen about the bends in Scott Carpenter's knees.

At 1743 sharp, the chamber hatch opened, and the Aquanauts of team two emerged to cluster about the entrance for group photos. Two wives were present to ~~kiss~~ their spouses, a few words were spoken for the record, then my Aquanauts were off to the showers.

Some minutes later, we were medicating both Scott Carpenter and Howie Buckner, the former for general leg cramps and pains, and the latter for muscle strains resulting from chamber acrobatics. Although I was unable to convince Scott that his were not neglected bends, Howie accepted his lot without complaint, and trudged to bed with his pills. Scott required further medication during the night and in early morning, but improved by the minute as he walked the length of the pier and up the inclined road to the auditorium.

In preparation for the press conference, I had been required to write out my opening remarks, and to read the same, since they would be handouts to the gentlemen of the press. In something over thirty years at podium and pulpit, man and boy, I have never written a line in advance, and all papers relating to my narration have been after the fact. Nevertheless, this day was to be different, though not at all to my liking. Late the night before, I had reluctantly dictated my deathless prose over the phone, with dire admonition that spelling must be 100% accurate. I was reassured that the PIO's were real professionals, and equipped with dictionaries to boot, and that no such blunders could occur. Considering that I have never seen a naval document of more than three paragraphs without a misspelling, I could not buy that; yet I quailed at the

thought of orthographic errors going out under my byline. Accordingly, on arrival at CIB, I snatched up a copy of my address, and immediately spotted two misspellings on the first page. Gathering the shards of my reputation, I quietly left the building.

The conference itself went quite well, with all Aquanauts speaking well, followed by CDR Carpenter, who spoke at greater length, and to the point. At one point, however, he dwelt on the need for more autonomy on the part of the bottom-dwellers. Recalling some of the events of the past thirty days, in which more autonomy would have been fatal to the Aquanauts, I cavilled a bit at that one, but only to myself. I could not help but remark to myself, however, that the degree of autonomy in SEALAB II, a new and unsophisticated program, was at least an order of magnitude greater than that available to the space-twins of the Gemini Program, many years older and infinitely richer than my own.

An hour later, Walt and I fled the scene to return to the quiet of the BERKONE. Yet even here it was not so quiet. Dr. Sonnenburg called to say that he had a reading of 200 parts per million of carbon monoxide on his Draeger test kit--a shocking though unlikely bit of news. Unlikely, because the men were still well; shocking, because of the possibility that we have a CO producer, aside from man himself, inside the habitat. I ran a hasty CO test on our MSA kit, and got less than 100 p.p.m., still far too high, but considering the extreme crudeness of my MSA test procedure, probably far higher than a true value. A repeat, more meticulous test yielded a level of only 20-30 ppm. This value is compatible, even at 7 atmospheres of pressure, with good health. Nevertheless as a precautionary step, I am forwarding gas samples to the Chief Chemist at Linde Laboratories, and securing blood samples for carboxyhemoglobin levels on

the people who persistently had complained of headaches. Concurrently, a supply of hopcalite was ordered for use in the scrubber, and a careful monitoring system set up.

I am sure that this, when reported, will cause a flurry in Washington, largely because of the conflicting opinions obtainable on the subject. Much of this was threshed out in my committee on Hyperbaric Oxygen, months before the advent of SEALAB II. In fact, CO effect on a mammal under pressure is not proportioned to the pressure; yet it is somewhat increased over similar exposure at sea-level. And that, by God, is all that is definitely known at present! Having been in the middle of this hassle throughout preparation of our book, I'm as well abreast of the prob as some of the experts back East, and would wish to be alone with my problem.

But I'm sure it will not be so.

1 October 1965

Thirty days has September; and this is one month I'll remember. So started the 1 October log, and so commenced a busy two-day period.

Early start yesterday morning, with news that the CO levels in SEALAB II were now reduced to 15 ppm overnight. This was good, but not good enough; for by now the hounds of Washington have taken up the chase in full cry. Apparently within minutes of receipt of my SITREP, persons were busy seeking out the experts, and I was shortly getting all manner of gratuitous advice re: safe or permissible levels of CO for prolonged human occupancy at 7 atmospheres of pressure. Inasmuch as these experts, plus some who are experter, are well known to me, and since the problem of CO under high pressure had long since been given careful consideration by my committee on hyperbaric O₂, I was not suitably appreciative of the activity back East. Add to this the fact that no one has yet done and reported the laboratory work required in this case, and my irrita-

tion may be justified. I believe in experts, and use them to the fullest extent practicable; but, in the practice of medicine, I pick my own, and am not influenced by lay advice, however well intentioned. Hopefully, one day it will be understood that a reasonable amount of long-term planning has gone into the predictable hazards of this experiment. In the case of CO, this was quite thoroughly explored, since we did not contemplate scrubbing CO from the SEALAB II atmosphere. Accordingly, when the level reached 25 ppm by our tests, and headaches were reported, the following steps were taken immediately: 1. A gas sample was dispatched to Linde Laboratories for best possible analytical study; 2. Aquanaut blood samples were dispatched to a special technician at USNHS for carboxyhemoglobin studies; and 3. Hopcalite was procured for incorporation in the SEALAB II scrubber system.

Finally, exasperated by Washington advice that CO levels in SEALAB atmosphere should not exceed 23.5 parts per million, I let my temper peek through in a SITREP which stated loud and clear that nobody knew the exact safe level, implying my conviction that Sencroy's figures were unimaginative hogwash.

Next began more work in the salvage area. Of high priority in this portion of the program was the use of a foam-in-place technique. This work is accomplished by the Aquanauts, who insert the nozzle of a squirt gun into a compartment of the structure to be salvaged, then squirt a premixed solution in the space. The solution immediately forms a buoyant foam which adheres to the inner walls of the object to be foamed, and solidifies into a rigid sponge, giving sufficient buoyancy to raise the object of salvage. The concept is new, expensive, but apparently quite safe, and ideally suited for an operation such as this one.

In actual practice, as is so often the case, things did not go so smoothly in the real ocean-floor operation.

Early in the foaming operation, the beautiful expensive material began to flow out of hitherto unseen cracks in the fuselage, limiting and then eliminating the diver's vision. Next, the adhesive characteristics of the foam particles started to live up to the advance publicity. Gradually the Aquanaut's wet suits built up an increasing layer of the white stuff, until they were almost totally covered. Now the purpose of this foam is to increase the buoyancy of the object to which it adheres, and my Aquanauts were no exception to this rule. Since buoyancy is synonymous with unpleasant death for the saturated bottom dweller, Sheats and Meeks beat a hasty retreat to the habitat, working hard to stay near the bottom. About half-way back, the final unpleasant blow struck. Like glue, the foam fastened itself on Meeks' exhaust valve, and sealed it as nicely as you please. The pair limped home one flipper's length ahead of serious accident. So much for the highly touted foam. It is indeed efficient and will undoubtedly prove to be very valuable; but we must learn to foam-proof the men who use it.

After fall-back and regroup action, Sheats' indomitable workers attacked the salvage problems with new respect and added vigor. The foaming was successfully completed, using double 90s instead of MK VI breathing gear, and the initial trials of explosive-driven stud guns and cablecutters were completed in jig time. Back in the habitat, the Aquanauts ate, rested, and prepared for a late night sortie to the Canyon.

This night, asleep, I dreamed of going to another canyon--the Linville Gorge. It was a nice trip and a sound sleep.

Early Saturday morning, Walt and I watched and photographed a beautiful sunrise. This was to be the day of communication between my Aquanauts and the

Oceanauts of Captain Cousteau, separated by some 7000 miles of land and water. Cousteau's Conshelf 3 operation involves a 6-man crew, with the habitat situated at 99 meters, off Cap Ferrat. Scheduled for a 14-day bottom stay, the Oceanauts were in their 10th day; and, after considerable difficulty, a telephone hookup between the two projects had been established. The hour of the voice exchange was planned for 0900 our time. The program would not only be bilingual, i. e., in French and English, but also in air, helium-oxygen, and neon-oxygen. The possibilities of the combinations were staggering; and so, it turned out, were the results.

At 0830, I made my second brief trip to the beach in 50 days or so. As before I noted the disagreeable rolling motion of the pier and terra firma around the campus. Not wishing to embarrass my Scripps hosts, I abandoned the urge to call Dr. Richter, who must surely be noting the unsettled condition of the land mass at this time. Arriving at the SEALAB II Command Information Bureau, I could not but note that its state of disrepair had grown out of proportion to use rate during the past few fortnights; indeed, a full sized earthquake would prove a blessing to that lowering pile. We assembled briefly, and repaired to the bomb shelter which harbors the nerve center of the Benthic Lab.

Here all was a-bustle. Bearded and sandalled graduate students sat frozen before the TV monitors, studiously watching my Aquanauts, and logging all butt-scratches and other socially condemned motor activity. In a dark corner, a professorial type with a preoccupied air was pacing purposely in circles, as he listened to tapes of the night's conversation inside SEALAB II. On occasion, he would pause and scribble furiously on a nearby bulkhead as a new and fanciful anecdote of bedroom lore issued from the speaker. I ventured the suggestion that more dramatic stories might be found on the walls of Grand Central Station men's

room; but he silenced me with a vacant stare, then resumed his dreary task and pace. I did not have the heart to disturb two hollow-eyed psychologists following movement of a ouija-board beside the computer station.

Promptly at 0930 came the call from Conshelf III, with André Laban on the line. Speaking without benefit of neon, André got through a few words to Al O'Neal with a heavy helium accent, the gist of which was that he was happy to converse with Mr. Al O'Neal. Off to such a fresh and original start, the conversation fell into the doldrums of banality very soon. Accordingly, I seized the instrument from Al, and greeted Andre in ringing tones of Swiss French. Unprepared for this, André thought some European interloper was on the line, and delivered himself of some choice phrases which took me back to my days in the gutters of Paris. These were intercepted by the girl operator in Monaco, who took umbrage, and responded in kind. At this point, I made an important scientific discovery. In French, as in our tongue, the classic but socially unacceptable words break the helium barrier with ease. Gradually the conversation sorted itself out, and I relinquished the phone to Scott Carpenter, who thought he was talking to Captain Cousteau's son, Philippe. André, still on the line, thought he was again addressing Al O'Neal, since the language had reverted to English. For awhile the conversation languished, until Philippe came on the line, speaking excellent English, heavily flavored with neon. At length it was established that Scott was happy to talk with Philippe, and by remarkable coincidence Philippe in turn was gratified to speak with Scott. Affairs marched well, though without significant scientific breakthroughs. Sensing that time also was marching, I broke in to announce to Philippe (in French) that Bob Sheats, team leader of No. 3, wished to speak from the profondeurs de la mère Pacifique. Seven thousand miles away, the phone was returned to André, and Rick Griggs, who speaks French, took up the conversation on Bob's behalf. André, hearing again his native tongue, assumed that I was on the other end, and began

to chide me, in the patois of the Left Bank, for speaking book French. Rick could only wail, "Repêtez, s'il vous plaît. Je m'appèle Rick. J'ai la plume de ma tante. Comment allez-vous?" And other similar stirring phrases. I admonished Rick in French to speak more slang, whereupon he thought Philippe was on the line, and so on for many multilingual minutes, like the ancient saw of the crosseyed judge and three crosseyed prisoners. At length, I crashed through with more observations and questions, terminating the whole sorry mess with a heart-warming "LaFayette, nous y sommes!" and "Vive DeGaulle," forgetting the late unpleasantness between Monaco and France. The conversation ended abruptly.

Later, comparing notes for a press release, we summarized the following informational exchange: (1) The oceanauts and the Aquanauts were well; (2) The Oceanauts congratulated the Aquanauts; (3) The Aquanauts congratulated the Oceanauts; (4) the water in the Pacific was dark and cold; (5) the water in the Mediterranean was dark and cold; and (6) We did not understand each other very well.

In retrospect, there is much to be said for the post card as a medium of scientific exchange. Aside from its cultural value, and stimulating effect on national economy, the telephone has little to offer.

Back at the end of the pier, awaiting transportation to the BERKONE, I was approached by a middle-aged woman of foreign extraction, who inquired as to the class of ship lying in moor near the staging vessel. Obviously, she was asking about the GEAR, an ARS with the jet fuselage sitting on her fantail, awaiting further salvage tests. I told the little broad that she was looking at a new pocket aircraft carrier, and that although our top-secret arresting gear had permitted a safe but hairy landing on the 18-foot flight deck, we couldn't figure how in hell to manage a takeoff. At this point my small craft arrived and I scooted seaward, having provided aid and comfort to the enemy and a lively

bridge conversation peice as well. I firmly believe that, in the long run, such spicy bits of misinformation make this world a happier resting place.

On the BERKONE, the Saturday complement of visitors and newshawks were filtering aboard. Judith was not among them, so my 0400 shave, shower and deodorant were largely wasted. On the spot, I concluded that most women are fickle, and the great majority of husbands are unreasonable. I whiled away the day waiting for a tattoo artist, who never showed up. And so finally to bed with an unmarked pelt.

3 October 1965

Again a day of rest topside and about the GEAR, but not necessarily in the habitat below. For the Aquanauts, a day of rest means a loose schedule, many canyon dives, marine biological prospecting, and bottom photography.

At 0500, a fairly lively electrowriter and helium unscramble conversation with the SEALAB watchstanders. As usual, good humor prevails. It appears that team three has generally been the happiest of all Aquanaut teams. This may be a function of team composition, but more likely is related to daily schedule accomplishment. Certainly it is the easiest team to work with, from a topside point of view. Two good SITREPS daily, a little conversation several times daily, and all jobs are done, with no hassle and a minimum of detail-threshing.

These early morning conversations are a thoroughly essential part of our undersea program, since they afford the nearest thing available to a common philosophical meeting place of Aquanauts and topside control. The upcoming work of the day having been dispensed with, we generally lapse into an unhurried discussion of life below the surface, and sometimes in the quiet trailer above, we are led on a fantastic journey of the early morning seascape, seen through

the eyes of television and narrated by the Aquanaut observer.

This morning, as we talked with Bob Sheats, he casually asked if we would care to see the Aurora Borealis of the ocean atmosphere. Unbelieving, we scoffed an assent, whereupon he darkened the lights in SEALAB II and directed our attention to the large porthole, currently empty of fish. In a few moments, at the upper corner appeared a swirling mass of light which resembled nothing so much as the pictures of spiral nebulae illustrated by the astronomers. As it grew in size and intensity to fill more than half of the port's vista, Bob began to describe its luminous qualities, and peculiar patterns. Going further, he spoke of eating a handful of these euphausiids the day before, and finding their flavor excellent. Plans were developed for a plankton soup dinner later in the day. Being a forager by disposition and training, Bob could easily live off his environment, on the ocean floor as readily as he did years ago in a Jap prison camp. It strikes me that undersea living in the total sense calls for a great deal of woodsmanship which is not easily imparted to a person who does not truly love natural phenomena and who has not spent a great deal of time testing self-sufficiency in the woods. Herein lies the tremendous value of men such as Bob Sheats in our program.

At 1115 came time for our weekly Church of the Sea services, which I truly enjoy, and which seem to have become a part of our way of life in the program. After an abbreviated service of Morning Prayer, I talked for a bit about the neglected value of emotions in making useful judgments and in arriving at solid points of personal philosophy. Feeling rather strongly on this score, I am sure that I rambled more than a little, though I heard no subsequent complaints. Perhaps it is unfair to use these minutes as a sounding-board for my personal convictions and philosophy; but somehow it serves to give my people a better insight into the motivation of Papa Topside, and this we need.

The balance of the pleasant day went smoothly, with more excursion dives and marine biological studies. Despite the cold water, the efforts of the past work week, and the difficulties of dressing, water entrance and egress, our Aquanauts piled up nearly 500 minutes of bottom work time. Later in the evening, Bob reported excellent success with pancake fabrication and consumption. The secret, it seems, lies in the use of an ultra-thin batter. Topside, we drew a last long breath for the stretch run.

4 October 1965

This day came dangerously close to the classification of routine, if such can ever be said of seafloor living. Commencing with a 0500 weather report and a leisurely chitchat with Bob Sheats, Walt and I next reexamined the question of atmospheric contaminants at some length.

Maintenance of a safe and breathable gas mixture inside any completely closed human habitation will always be the most critical aspect of the venture, whether it relates to spacecraft or to undersea houses. In space travel, however, the permissible margin of error is reasonably broad, since in this case a swing of 5 per cent in oxygen content is quite tolerable, and CO₂ levels of even 6 per cent will not constitute any appreciable hazard to the astronaut. In high pressure living, however, this luxurious latitude is not permissible. At a depth of 600 feet, oxygen levels must be maintained at one per cent, with virtually no margin for error; and carbon dioxide must now be scrubbed down to about six hundredths of one per cent. At depths greater than this, oxygen (the breath of life), becomes no more than a trace contaminant, with CO₂ tolerable levels less than those of pure country air!

Of additional concern in any pressure experiment is the matter of trace toxic contaminants in the atmosphere. These toxic substances, largely derived

from the family of volatile hydrocarbons, are a source of deep concern to any investigator. Their presence in the captive atmosphere is inevitable; and the variety and numbers of these invaders is incredible. A classic example of this statement may be found in a recent Air Force report of a 56 day chamber exposure in which heroic measures were taken to exclude atmospheric contaminants. Near the conclusion of this run, gas sampling revealed the presence of about 170 contaminant gases, of which more than half were toxic to human beings, and ten per cent of the latter of known but undetermined toxicity.

The sources of these dangerous contaminants are varied and, in some cases, completely mystifying. The occupants of the habitat contribute a fairly large share of the metabolic castoffs; nearly every fabricated item in the habitat can be counted on to yield a generous share; and many of the seemingly inoffensive articles of equipment, such as electrical motors and relays, will add to the toxic burden.

To the Man-in-the-Sea investigator, this poses a horrendous problem, since identification of these toxic contaminants is a tedious and imperfect art, and elimination is only partially possible. The final, and most severe problem is this: literally nothing is known about toxicity increase due to elevated pressure. It is possible, or even probable, that the toxicity of many of these compounds is a function of their partial pressure, rather than relative concentration. We have no current answers to the problem; and it is distressing to contemplate that a single pressure-toxicology complex, costing more than one million dollars, could not give all of the answers within our lifetime, or that of the next generation. Obviously, we approach this problem with a philosophy of calculated risk.

Such was the tenor of our talk this morning, as the sun burned through the

fog, the support vessel came to life, and our aquanauts below readied themselves for another assault on our friendly adversary, the sea.

As the day wore on, our aquanauts continued to perform their salvage tasks with accurate dispatch. Three separate scorpion fish stings were inflicted on Bill Meeks, who responded rapidly to therapy. Explosive penetration devices were successfully utilized by unshielded divers; and exploratory canyon dives were made to 305 feet. On this day, too, I lost a front pivot tooth in a garbage pail.

And so to bed, after evening relief.

THE LAST DIVE

7 October 1965

This was to be the day for our dive to visit the third team of aquanauts. It was certainly to be our last dive on SEALAB II at La Jolla; and it could well be our last dive together to any SEALAB site, since the project would be going deeper next time, and we were growing older. I felt that somehow this trip had a special significance--not a farewell to diving, but a last look at a scene I had come to hate and cherish with equal intensity, depending on the circumstance. This day I would learn to fear it.

Walt and I had agreed that, for this visit, we would not enter SEALAB II entirely, but rather would just stick our heads up into the entrance hatch, shoot the breeze with our aquanauts, then duck down for a leisurely inspection of the SEALAB II hull, a few pictures, and a slow return to the world of sun.

At 1300 hours, I squawked a loud reveille to Walt over the loudspeaker in our cramped quarters, then passed word to the diving locker that we would be ready to suit up in thirty minutes. On time, we arrived to be helped into our suits and diving gear, in painful contrast to our aquanauts, who could not afford the luxury of such help in the crowded confines of SEALAB II. Our gear had been assembled and checked: double tanks of 75-25 HE-O₂ mix, proper weights, knives, compasses, watches, cameras; a buddy line. These are the required accoutrements of a deep scuba diver, once the hated wet suits are donned.

We flapped our awkward way to the diving station, were exposed to cameras, and rolled off to swim to our descending bell, scheduled to transport us within four fathoms of the SEALAB II habitat. Inside the bell, we checked our gear mutually, and passed the word to lower away. The dive now commenced in earnest.

With the whine of the lowering cable, we drop quickly through the upper lucid layers of the Pacific. For a matter of seconds, we can see schools of anchovies, and other unnamed fish hordes, which approach and even appear to attack our open bell, only to disappear from sight as we lower into the black, colder void below. In less than two minutes, we have reached one hundred and eighty feet, and the free ride is over. A long scan of the underwater scene reveals a dim light below and at an azimuth unknown to either of us. It must be SEALAB II, or a portion thereof; but which end or which side we know not. Walt nods to me and I respond with a thumb down. We commence our free dive downward, despairing of the descending line, long since fouled on an object far above us.

Down, straight down we swim, suddenly very aware of the syncopation of our fin-beats and exhalation sounds, so loud in this silent, black world. And now, as we approach the bottom, a strange and beautiful phenomenon becomes apparent.

Above two fathoms off the ocean floor, we suddenly break through the murky wall down which we have been sliding. Below us, the bottom looms clear, and free of all turbidity. Visibility jumps from inches to many feet, and SEALAB stands clear in its entirety. Light seems to emanate from the ocean bottom, while above us all is black. On a mutual impulse, Walt and I roll on our backs to stare up at the world from whence we have come--it is no more--only a forbidding black curtain lies above. Only here below is light and safety. Surely this our refuge, and our home. We stare at one another, each reading the identical thoughts of the other, disoriented in space, time, and philosophy. This is the "breakaway" phenomenon of undersea existence, and a

very profound experience for the divers fortunate enough to have such exposure.

The spell is abruptly broken by a sharp pressure on my right arm. I spin about to face one of my aquanauts, sent out to save us from wandering past the security of the SEALAB vicinity, and the limited range of our compressed breathing mixture. We swim slowly to the shark cage, guided and protected by our aquanauts, to whom this part of the continental shelf is a familiar front yard. Graciously sweeping aside the poisonous scorpion-fish from the steps to the entrance hatch, these undersea experts and friends bring us to the marvelous gas-water, dark-light interface which marks the only safe two foot square area for miles around---the entrance hatch to SEALAB II.

Thrusting our heads through Alice's looking glass of the undersea habitat, we are greeted by a ring of friendly faces at the periphery of the hatch. At the moment, I cannot help but reflect that all aquanauts have countenances, rather than faces. We exchanged banalities, with the undersea men suppressing laughter at our unadapted and squeaky voices in the helium atmosphere. A word or two, a handshake around, and we were ready, with our limited gas supply, to commence the return journey to the refuge of our diving bell and nearly one hour and a half of cold decompression.

According to our prearranged but dangerously unwise plan, Walt and I would part company briefly, to accomplish individual photography, then to meet in our bell. Accordingly, I swam along one side of SEALAB, while he covered the other. After one sweep, approaching the shark cage, I spotted a nylon line which angled toward the black world above. I concluded that this line had been rigged by an aquanaut, a guide to the diving bell. Blindly, I began an upward ascent along my life-line, confident that a few

fathoms above I would find refuge from the hostile environment and a breathing supply to replace my dwindling gas bottle .

I found neither. As I ascended the line, no bell was in sight; for that matter, nothing was in sight, since I had again penetrated the black world. Venting of my middle ears and common sense told me that I had ascended several atmospheres--far above the level of the bell. And now my gas was nearly gone, and would quit altogether if I tried to retrace my route. In a moment, my God had forsaken me. I was alone in limbo, and thoroughly frightened. I commenced the return trip on the line, convinced that my gas and luck had simultaneously failed.

As I once more broke through the water overcast, a hand seized my flipper, and another took my arm. A lateral swim of ten yards, an upward thrust, and I swam the last fathom to the bell and safety. Walt was waiting, and anxious. We started our ascent immediately, as I tried to explain my inexcusable blunder. Shortly, I lapsed into introspective silence while we completed the oxygen phase of our decompression. Only now, it occurred to me that I had made no gesture of thanks to the aquanaut who had saved my life.

Topside, Walt and I undressed, showered, and ate in silence; thence to our respective and adjacent watch stations in the command van, to resume our normal monitor functions. About an hour later, Walt came over the intercom: "That was an all around weird run; and you're a lousy diver, George!"

It was a strange and wonderful day. And I never knew who guided me to safety. Today, I'd rather not know.

THE LAST DAYS

October 6-11

As we come to the end of this forty-five day experiment, I am impressed with the efficient routineness of each twenty-four hour span. It is as if so many of the rough edges of undersea existence have been ironed smooth, the breakice period completed, and the whole expedition has a real feel for the job. By now we know almost precisely how long it takes to do a given task and how much work will be accomplished on a given day. The operation is certainly smooth, if not exactly easy.

However gratifying it may be to note this complete shakedown of functional teamwork, it is somewhat disturbing to reflect on the number of days which were required to effect the transition. It is understandable, though, when we consider pertinent factors in an operation such as this one. At the very onset of the experiment, the aquanauts were physically and emotionally fatigued from the strain and confusion of the last uncertain days of habitat, outfitting, and placement on the seafloor. Once actually inside SEALAB, the first week was a continuous spectrum of frantic activity aimed at setting up all of the paraphernalia necessary to safe and productive life below. Psychologically and physically, this represented to all aquanauts an abrupt exposure to an environment more hostile and demanding than ever before experienced by divers; and this was so, not for a few minutes or hours daily, but for twenty-four hours a day, seven days a week.

To further complicate the lives of the aquanauts, the topside control team was equally beset with fatigue, fear, and equipment failures. Anxiety for the safety and well-being of the SEALAB inhabitants resulted in far too much chatter

on the overburdened communications circuits; and too many of the irritating orders from topside must have seemed whimsical and arbitrary, if not downright sadistic. Inevitably, during this shakedown period, there were small equipment failures, both topside and in the habitat; these had been anticipated, and for this reason redundancy of systems and elements had been liberally provided. Thus, if a single TV camera went sour, or one element of the voice communication system should fail, necessary repairs or replacements could be done routinely and on company time. Such was not the case, during the first few weeks of the experiment. Topside, we felt that any hardware failure, however minor, threatened the safety of the experiment. Therefore immediate correction of any deficiency was the order of the day--and of the night as well. Personal discomfort of the aquanauts, and disruption of their routine received little consideration. The job must always be done at once.

A final disturbing factor of some magnitude concerned integration of the many projects planned for simultaneous operation, each project being accompanied by its own cadre of undersea and topside functionaries and assorted technicians. And although a rank order of priority had been assigned these elements beforehand, plans frequently tended to fall through the cracks, for too many of the projects, which called for long hours of work by aquanauts and topside personnel alike, resulted in partial or total failure. Sadly enough, some of these failures were shrugged off or even unrecognized, with the result that many a tired horse was finally flailed to death.

The root of this problem lay squarely in the fact that time did not permit us the luxury of a leisurely and thorough checkout of the entire

sequence of operation in shallow water prior to the deep run. In such a fashion, we would have debugged the entire complex; discovered and discarded those projects which yielded spurious or no data; and final reshuffle of the reconstituted deck would have resulted in a better and more playable set of poker hands. So much for hindsight; we have learned a lesson: An experiment which requires over a year for preparation and costs nearly two million dollars can easily afford a few weeks of proper shakedown, under realistic environmental conditions.

DAY FORTY-FIVE

October 12

The job is all but done. Four hundred and fifty man-days of life and work on the ocean bottom have been accomplished, without serious accident. More than a half-million items of specific information have been punched on cards, or else processed through the undersea multiplexor, for direct computer analysis. Correlation and cross correlation of these data will be in process for months to come. From these data will come our guidelines for further extension of man's exploitation of the continental shelves; or beyond, down the continental slopes--perhaps even to the abyssal plains. Who dares to postulate a barrier?

And yet, to me, the memory circuits of the computer will not truly tell the story of SEALAB II. This is a story of brave and adventurous men--a new breed, whom we call aquanauts. These men are the true story of our experiment.

With few exceptions, I was able to select each aquanaut for this venture. In the case of our military personnel, they were without exception men with whom I had dived and worked for upwards of seven years. Our civilian aquanauts were not so chosen; but it was made clear to all of them that a black-ball during the training phase would mean a drop from the program. Fortunately, people who volunteer for such a program are, as I said, a different breed; consequently, our civilian scientists and engineers were aquanauts from inception, and team members from the start. Substantially, this gives support to my thesis that none but the greatest will volunteer for the program, at least in this early and experimental phase.

Well, the days have passed gainfully, and I am deeply satisfied, as are all of us who stood the topside vigil. Now comes our last transfer and decompression. As always, I fear this phase of our operation.

Transfer of personnel from the habitat to the ultimate comfort of the decompression complex is always a thoroughly frightening procedure. The routine sounds simple enough. The aquanauts swim freely from SEALAB to the nearby Personnel Transfer Capsule, enter therein, and after a careful systems checkout, close the lower hatch, and prepare for liftoff. From this time forward any valve leakage or wipeoff of an exposed gas line will result in almost immediate death of all ten PTC occupants. Considering the inevitable function of Murphy's Law of the Sea, it can be understood why the principal investigator views these transfers with deep-felt horror. Yet they must be done, albeit with antiquated handling methods.

This morning, as we commenced our final PTC liftoff, a well-intentioned journalist turned to me and said: "Well, Captain, I guess you've got yourself a no-hitter." I could only reply, with a shudder, "Don't say that until the last out!" In our parlance, a "hit" is a diving accident, be it embolism or bends. The reporter, unaware of this semantic hazard, was never aware of his faux-pas.

The PTC came clear of the water, and was swung across to the deck area where the ballast would be dropped. The sea state was nearly zero; nevertheless, the pendulum action of the thirteen-ton capsule was frightening. After ballast drop, we swept the capsule and its inhabitants over to the mating area of the decompression chamber. With some difficulty, the mating process was completed, and my aquanauts transferred to the relative

safety of the large chamber, still under high pressure. The tedious process of decompression began.

In this last decompression, Walt and I had agreed on a total time of 33 hours, since we anticipated several stops which would elongate our schedule. By and large, all went well for the first 24 hours. At an approaching depth of about 60 feet, however, trouble struck.

Bob Sheats, age 50 and team leader, called me on the intercom at about 0300 hours, with the unhappy information that he had developed bends. I locked into the chamber to verify the diagnosis, although I knew full well that Bob Sheats would never be wrong. He was bent; he had a severe central nervous system bend which involved his right leg. A decision was in order.

The problem was clear. Nine of the ten men in the chamber were within a few hours of release to sea-level living. It might be necessary, however, to carry Bob Sheats to 500 feet or more, to treat his bends. If I elected to place the other aquanauts in the outer lock of the chamber for their final hours of decompression, Chief Sheats would be isolated in the inner lock, and could not be reached for medical assistance. If I played it otherwise, all of this team might have to go to 400 feet or deeper, with nearly a week of decompression.

I made the decision. Tiger Manning, my thoroughly competent HMC locked in with Bob Sheats, and the other nine aquanauts were sequestered in the confines of the outer lock, to be finally decompressed by Walt. I undertook treatment of Bob Sheats. By grace of God, and prepared wisdom of

Bob Workman, all came out smelling like roses. Bob's bends were cured in six hours, and our nine aquanauts were safely decompressed in less than three hours. Our problems were over, and the experiment ended at long last.

There remained only a press session at Scripps Institute. This occupied more than two hours of our time, but we lived through it all. As I looked at all of my aquanauts (save Bob Sheats) I was immediately proud of this group of men. It is very possible that we will never see their like again in our time. I have been deeply honored to have such a team; and I love them, one and all.

18 October 1965

And now, I guess, the shooting is about over; the trumpets of the heralds are muted; the work of packing up the carnival for the next stop is in the hands of the aquanauts; and the banquet and chit-chat circuit looms ahead.

For a brief five days after the final press conference and ceremony, I made a point of travelling fast and incognito, and so gained a march on friendly enemies and a long shot at regaining a semblance of sanity. From 1300 hours, Tuesday the 12th, until 1800 hours, Sunday the 17th, I was a nomad, stopping at unannounced spots, and occasionally staying the night at a hostelry whose name I never bothered to learn. It was my best approach to the process of unravelling, and I think I did a good job of it. Once daily, from a pay telephone or motel room, I would call in to verify my existence, and to assure myself that the world went well without my guidance. Almost every day, I touched base with some activity within reach of the interests of the Man-in-the-Sea program, but always as a bird flying through the lighted walls of the festive room --- no point of departure, and no forwarding address. And for five great days, the world was kind, allowing nothing serious to happen.

Surprisingly, I drank very little during this period, although I made certain that alcohol was always at hand. I spent time seeing new vistas, slept prodigiously, enjoyed looking at the female face and form, and visited several Navy laboratories and activities incognito, for reasons best known to myself. Two wonderful hours were spent in the massive San Francisco park, watching animals, and savoring the green grass and trees. Again, I drove back and forth along the Pacific beaches, and explored the lesser ranges of hills to the East. The clock unwound smoothly, and I returned to the starting point

of this chronicle --- the Outrigger Inn, of Long Beach, California. As I entered my motel room, the phone rang, and the rat-race began once more.

The call was from Ivan Brown, and relative to the International Symposium on Hyperbaric Oxygen Therapy, scheduled at Durham about a month hence. A few days previously, I had sent him a wire, announcing that Scott would be available as a panel member at the evening session devoted to undersea life. Having given up hopes of this welcome addition, Ivan racked the telephone networks to chase me with thanks. Locating me as I stood with one sock off, and in desperate need of a pit stop, Ivan poured on the conversational coals, as only this wonderful guy can do. As I stood a slave to the receiver, dancing from one foot to another, but barely beyond reach of the head, Ivan gave me a blow-by-blow account of the forthcoming activities, chapter and verse. I finally signed off with an incontinent attitude, wondering briefly just how he had located me, after all those days. But no matter --- it is always good to talk to Dr. Brown, however pressing the circumstances.

And now came a brief period of tub-bathing, clothes-changing, and a visit with some aquanauts, before a Chinese meal and a long night's sleep.

My early morning call was for 0630 hours, but Washington has a different time. First came words from organizations to which I owed talks, long since cancelled and replaced by wire or telephone. Word had got out that Sealab II was successfully completed, therefore it was assumed that I could drop all and come East for a talk. It was not easy to explain that the wrapup of a \$1.8 million exercise requires a bit of time; but it was somehow accomplished, and the substitutes were back in. Next, and of greater consequence, came calls from my home office in Washington, with sudden demands for a command performance at the Pentagon, this of all weeks! I tried desperately to forestall the inevitable requirement, but to no avail. Bob Sheats, Scott Carpenter,

Walt Mazzone and I were required to appear at a Pentagon "Nooner," at 1200 hours, Thursday 21 October, and that was the official judgment, promulgated by the Secretary of Navy himself. We would, of course, comply.

To put it mildly, this created problems of some magnitude. Hopefully, we could have wrapped up our West Coast activities in a mere two weeks. Now, the situation had changed, and not for the better. At home, I had the required Blue uniform, and Walt was suitably equipped here; but Bob Sheats had to fly to Seattle for his; and somehow, I must locate Scott, and divert him to this new task. Since both Bob and Scott were to receive the Legion of Merit from the hand of the Secretary of the Navy, it was of some importance.

Eighteen hours later, the deed was done. By virtue of no less than 50 long distance phone calls, with three trips to the shipyard, all four parties were suitably informed, and ready for assembly. Scott was a bit difficult to locate, and Bob Sheats had to fly 2000 miles askew to get his blues, but otherwise, all was quite smooth --

At the Pentagon, the ceremony and news conference were dignified and well-managed. Scott, however, did not appear, being grounded by fog in New Hartford. On two occasions, the SecNav referred to me as Admiral Bond, an on the spot promotion which I stupidly neglected to accept. At long last, however, we were free. After a drink at my house, we boarded a return flight to Los Angeles.

Somewhere over Colorado, I composed a poem, the opening lines of which were: "I shall not pass this way again. This way I loved so well!!" And thus I end another chronicle.