

A Student's Look at SIO During the Very Early 50's

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1951-54 Scripps Institution of Oceanography

As a result of my acceptance at Scripps, my dad had gotten a job with the Navy Electronics Lab on Point Loma, San Diego, CA, and we went there for our first home in CA. My wife and I arrived in La Jolla in September, 1951 and we lived with my parents on Point Loma where dad worked for Vic Anderson at the MPL. I commuted to La Jolla and Scripps. In due time we found and rented a small house in central La Jolla. We moved into the shack right north Casa Cove, across the road from the Ocean, on Pearl St.

I could go across the road and down to the beach, an 8 foot drop, and swim out through a gap in the reefs to look for seafood for supper. There was a strong rip through that slot as the waves came over the reef and out through the narrow opening. The tide pools occasionally gave us lobster for supper. We lived there for a year or so until we moved to Pacific Beach, farther from La Jolla but not as cramped. We endured several small earthquakes, awaking to the tinkling of glass in the china cabinet and the swaying of the light fixtures.

I began classes at Scripps. I was totally unprepared for the math and physics, having had no calculus or physics with calculus. I got my second "C" of my college career (after Cornell) at Scripps, in Physical Oceanography. I registered as a Ph.D. candidate at SIO planning to do my dissertation on marine geology (submarine geology), with Fran Shepard.

Life was not easy during this period. Joan was pregnant with Keith. Typically we were paid as graduate assistants and my wage was a princely \$3900 a year plus what I could make selling abalone and weeding lawns. I did many things but was primarily a field assistant to Shepard and developed and constructed mechanical oceanographic instruments for his division.

Living from the sea at SIO



One of our first attempts to harvest natural protein for my family involved taking a kitchen strainer to the surf zone where Donax clams (bean clams) were congregating in huge numbers. As the sand washed thru the sieve, I collected hundreds of bean clams. I then boiled them to get the tiny fragment of meat in each one but soon found that unrewarding so I went to the broth that resulted. I strained it thru a good handkerchief and tried it but the finest silt made it thru the weave and no matter how I did it, we had grit in the broth. Thus ended my first marine harvest.

I got a good deal of protein, in the form of small fish, pan size, near the Pier and some rocks

to the north. We stuck with kelp bass, cabezone, California sheephead (a distant relative of Florida hogfish, and just as tasty, but wildly different in coloring), scorpionfish, related to the Florida scorpion fish. Although they had poisonous spines the flesh was excellent. We ate Pacific barracuda, halibut when we could find them, plus sheep crabs and California spiny lobster (which looked almost exactly like our Florida spiny lobster except that they were fairly bright red before cooking). I also harvested abalone which were sold to the bar girls in local bars, and the abalone /bar girl association provided me with some of the desperately needed cash to support a growing family. I'd offer to clean the abalone which I sold to B-girls for a buck. Mostly they'd say yes. Then I'd pile the gut sac in the shell and give them a nice piece of white abalone meat. "Do you want the shell?" "Ugh, no!" So I'd take it out, dump the guts and sell the clean shell for another buck to another B-girl.

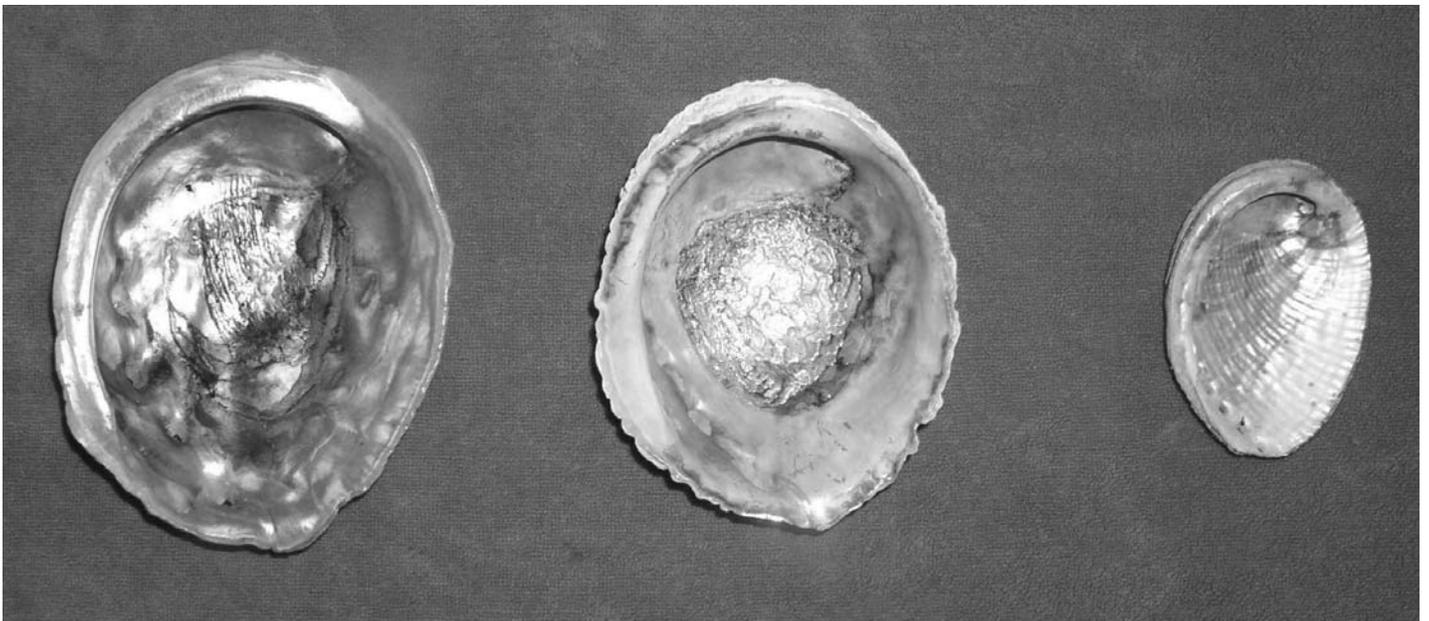
As a poor graduate student making \$3900 per year, we ate mostly protein out of the ocean. And, of course there were the ABALONE! There were several varieties of abalone in California and Mexican waters.



Red abalone

green abalone

black abalone.



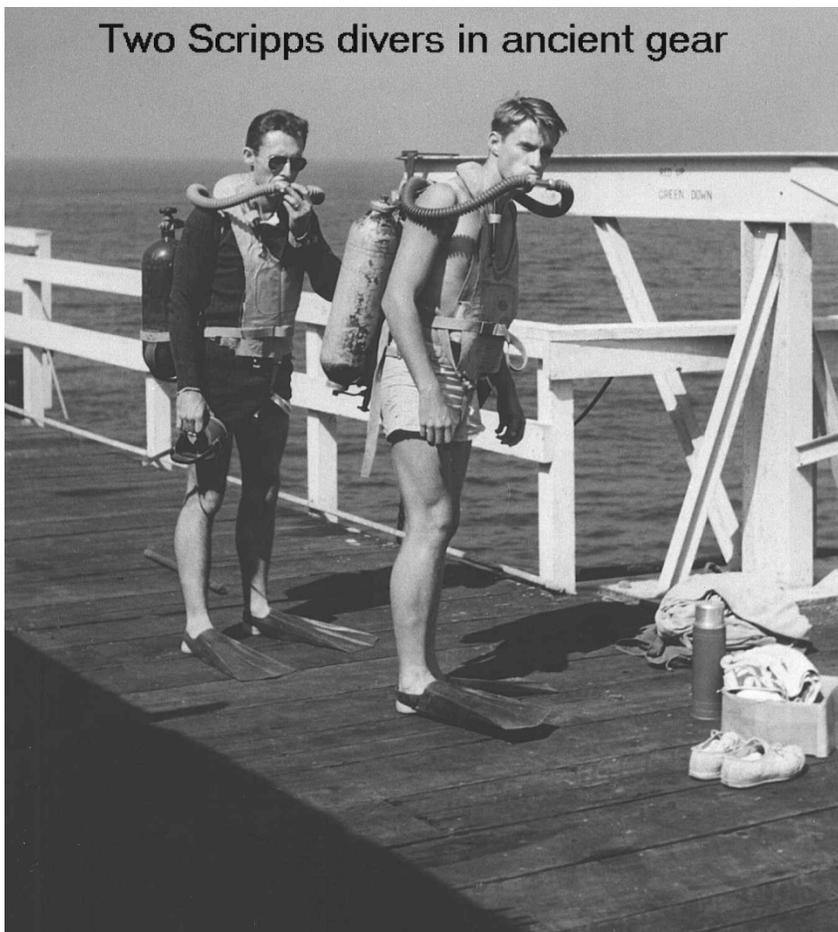
The pinks and greens were excellent eating but the large reds were the abalone of commerce. All had beautiful shells which were coated with mother of pearl inside. The shell had evolved so that the opening was so big that the abalone looked like a soup bowl. The coil of this huge snail (and the conch is a snail too) is very much flattened on top of the shell. It sucks to a rock when disturbed and is VERY hard to dislodge. We used ab irons made of aircraft stainless or from tire irons to pry them off a rock where they were busily munching the algae growing there. I have known a diver to pull the shell off the critter before it let go of the rock!

Boy did we eat abalone and if I ever see another abalone on my plate it will be a week too soon!

On one of my trips to the Coronados with the UDT, in an LVP, or small landing craft I saw a lobster back under a ledge. He was so big he scared me. I decided to pass him by until I saw one of the UDT divers at the other end of the undercut and guessed that if I did not try for the lobster, they would tag me for a wimp and not take me out again. So I worked my way around behind him and grabbed. To my total surprise this lobster did not try to get away or stretch its antenna toward me. Maybe it was so big it did not fear me or anything else. In any case I grabbed it, pulled it tight against my chest so the tail could not flap, and headed for the landing craft. I swam up onto the bow ramp, which had been dropped down into the water to make diving easy, and threw the lobster into the well deck. The UDT guys clapped me on the back and made a big thing about it. When we got back and weighed it, it was 19 lbs., the largest lobster I ever caught. I got a 15 pounder off Devil's Slide and rode it back thru the surf using it to protect my stomach from the rocks.

I did anything legal and some, like selling green and pink abalone, which were not legal, to make money to support my family. Here I was with a master's degree in geology weeding lawns for a buck an hour. We somehow always managed. One of our graduate students, Ted Chamberlain, ate everything that came from the ocean and almost everything that came from the land. He and his wife were typical "POOR" graduate students in all respects. They would eat whatever they could get. Most of us were a touch more finicky. It got so we would inquire what was on the menu when asked to Ted's house for supper. It might very well be a "road kill", a coyote, rattlesnake, goat, or??? He brought back 40 lbs of wild burro liver from the hills of Baja California one time and they ate it for a week or more.

Scuba diving at SIO, 1952-3



SCUBA diving was in its infancy. The Navy was using SCUBA and a few hardy souls had made regulators of a sort from surplus aircraft oxygen demand regulators. I did not succumb to that temptation, since I had heard of quite a number of casualties caused by failure of these devices. My only previous diving experience had been with a homemade diving helmet in 1939, when I was 16. Somehow I survived that. Now there was SCUBA.

Very early in my stay, probably in September, 1951, I saw Connie Limbaugh and Chuck Fleming go out in the DUKW (amphibious 2 ½ ton truck) to go diving. They headed out through the surf into La Jolla Bay. I begged for a trip. After a couple of days of this, with the DUKW, skippered by Ted Ansted I guess they said OK to get another set of hands. After a trip or two I haunted them for permission to try the Aqualung. They got tired of my pestering them and brought an extra set along one day which they said I could use. Instructions were extensive. "You know

how to put the gear on, so after we are down, come down in our bubbles. Don't push your ears too hard or the drums may rupture. Oh, and don't hold your breath when you come up; it could kill you." Then they were gone. I got the gear on with Ted's help and over I went. At 20 feet my ears hurt excruciatingly and I was forced to stop. The next day, by taking it slow and easy, with serious ear hurt, I managed to make bottom in 90 feet of water in La Jolla Bay, on a sand bottom. I believe we were looking at a dummy mine there. I was hooked on a

lifelong hobby!

A short time later, on my third SCUBA dive, I went into the Scripps Branch of the Canyon with Connie and Chuck. The depth at our dive, by echo sounder, was about 140 feet. Because of the characteristics of an echo sounder signal, it may well have been significantly deeper. I had a triple French tank rig with small tanks manifolded together, and they had large American or Canadian triple tanks, banded together with stainless bands and with plastic foam between the tanks. I'd guess they had three times as much air as I had. They told me to let them know if I returned to the surface before them. I had never run out of air before (two whole previous dives) and when it began to get hard to breathe, I was following them down the Canyon and about 20 or so feet behind. When it got so hard to breathe that I knew there was trouble, I sprinted for them to let them know that I was going up, but could not catch them and, in extremis, started up, whistling all the way, to prevent trapping high pressure air in the lungs. I came out of the water like a Polaris missile and threw off my mask, gulping air. The DUKW picked me up. It turned out that there was an air reserve on the bottom of the French triple unit which I had not been told about, and that it took 6 turns of the valve to get air.

SIO DUKW Circa 1952



red rubber Japanese mask and my fins were trade named "Duckfeet", and later "Churchill". We had no buoyancy compensators (Mae Wests), no non-return valves in the two hose regulators, and weight belts were often war surplus cartridge belts with weights stuck in the pockets intended for ammunition clips. It was very primitive. We pulled one guy out of the kelp beds, DEAD, and his side was scratched raw where he was trying to undo a cartridge belt weight belt, with no success. It cost him his life.

In those days, at Scripps Institution of Oceanography, we dove mostly out of the WW II DUKW, or "Duck". It was an ugly amphibious 2 1/2 ton truck, of the kind that was used in WW II. Running in salt water, it was very hard to prevent rust and there was a standing joke that if a big piece of rust came down where we were diving, get the H out from under the Duck cause it would probably follow! I made all my early dives from the DUKW. Our equipment was a hodge podge. The regulators were French, and a few months later, Canadian. They were "Aqualungs". My faceplate was a round,



Walt Scott in La Jolla Beach and Tennis Club pool, training for Scuba Diving 1952-3

I convinced Connie that we needed a training program for new divers, because others were beginning to show an interest in this fabulous research tool. I felt that "Don't hold your breath on the way up or it could kill you" was not enough training for the use of SCUBA for scientific purposes. We started using the La Jolla Beach and Tennis Club pool for training and I developed a course of instruction which was not too primitive even by today's standards. Scripps gave me "Instructors Card #1", handwritten and maybe 4 inches square, maybe the first civilian instructor's card in the US, about the middle of 1952. It was great to have the job, but I did not attempt to laminate the card or otherwise preserve it, and when

I went from Texas A & M to Bermuda, I lost it! Too bad.

All Scripps divers had to take a US Navy physical, so we gathered at one of the Navy sub tenders in the harbor at San Diego. I believe it was the USS Sperry that conducted our test. We were given a battery of tests which all of us failed. Some were colorblind. Why it mattered down where everything is in shades of blue and green, I never knew! Some failed because of concussions or operations which left scar tissue, the potential sites of bubble accumulations or bends. Some were too big or too small, etc. I failed because of the operation on my right knee to remove a joint mouse, a loose fragment of bone in the joint, and a youthful hernia operation. Navy divers have got to be the most perfect specimens available. Somehow they missed my sinus problems. Then they put us in a chamber with oxygen masks and took us down to 60 feet on pure oxygen. One guy started twitching and was instantly put back on air. The test was for oxygen tolerance and most of us passed it, although I would not consider diving to 60 feet on pure oxygen. Too many good men have died that way, especially the British "charioteers" who rode human guided mines or torpedoes, under the submarine nets which guarded the Nazi battleships and cruisers in Norwegian fjords and German harbors.

Our training in the La Jolla Beach and Tennis Club pool was so new it was intriguing to their patrons some of whom, sitting by the pool, would ask me if we were real "frogmen". I always allowed as how we were, then said I was needed at the deep end where my students were practicing buddy breathing. I would swim underwater to the group, buddy breath with them for 5 minutes or so, then swim back to the shallow end, break water and pant heavily. The five minute "breath hold" always impressed them. The cloud of bubbles ruffled the water enough that they could not see what I was doing.



Bob Dill and underwater camera in the La Jolla Beach and Tennis Club pool, 1953

After about a year some student complained to Connie that I was being too hard on them. I absolutely demanded that they "safety" the D ring straps on the tank harness. It was next to impossible to get out of one when wet, if the end of the strap went through the D ring and lay flat. I made them reverse it through the D ring so that an end stuck out. That way if they got in trouble, a simple pull on the loose end and the tank came off. Connie told me he did not want me to teach that way, implying that it was sissy. I told him that it was that way or he could teach the course himself. He did for perhaps 6 months until one day, with a horrendous hangover; he called and asked me to take over again. I said "Yes, if I can teach it my way!" He agreed, and I taught SCUBA until I left Scripps for Texas A and M. Regretfully, during that 6 months he taught Bev Morgan to dive and Bev developed the Kirby-Morgan hard hat rig.

I met Bev and his gorgeous daughter at DEMA or the Tech Dive show in New Orleans and she absolutely adored Connie. Tough luck.

When I became the "first SIO diving instructor" at SIO, I had all our divers fill out detailed reports on everything they saw, with many key words to help them remember. I accumulated a stack about $\frac{3}{4}$ of an inch thick and then, stupidly, sometime about 1993, gave them to a guy who wanted to do marine biologic work in California, using diver reports. Later, the SIO Archivist asked me to send her anything that I had from the early days at SIO and I tried to get them back but the guy that I sent them to never replied.

One problem that we ran into was what I have heard called "respiratory fatigue". When you get cold enough the diaphragm muscles refuse to work, much like doing pushups. There is a final pushup that you can in no way do. Well it hit me off the end of the Scripps Pier. I came up, unable to inhale. Luckily I was close to

the surface and was able to roll onto the float and lay there trying to inhale for what seemed like an eternity, before the frozen muscles relaxed enough that a breath finally came. This would have been fatal at 60 feet. Another problem we had was reverse block of the ears, when pressure was trapped inside the ear while coming to the surface. It happened to one of our divers one day. We took him to an ENT doctor who decided to treat him, using psychology I think! He pulled out a hypodermic needle which was originally devised to give an elephant a flu shot. It was huge and a terrible instrument to behold! Then he showed it to my buddy and told him he was going to insert it behind the ear, into the Eustachian tube, relieving the pressure. He stepped out of sight and the ear blockage opened up in one quick spasm. Psychology!

Much of the recreational diving, in those days, was done from paddleboards. These were often homemade of wood and shellacked till waterproof. They were like full sized surfboards for beginners, with a fair amount of floatation. We would put tank, regulator and speargun under a piece of netting held on with two lengths of automobile inner tube. Each paddleboard carried a small killick or anchor, which was very light since it didn't have to hold much. We'd squirt out in a rip current, drop down in the kelp, place the anchor and go hunting. If we were out of the kelp, we'd take the board with us since it didn't have any drag to speak of. We'd often come home with a dozen abalone, or a nice grouper, some kelp bass, or other delectables for supper.

During lunch breaks we would often body surf the huge breakers that came into the Bay from the N and S Pacific. It was a real challenge to body surf in 50 to 60 degree water in underpants or, occasionally, in swim shorts. Another thing we would do was to go to the beach near Devil's Slide and strip to underpants or to the buff and go out and get an abalone or lobster for supper. When we returned to the beach we were bright red and wide awake for the afternoon. Often we had no towels so we air dried. Fun then, but no way I'd do it now!

Cold water protection at SIO

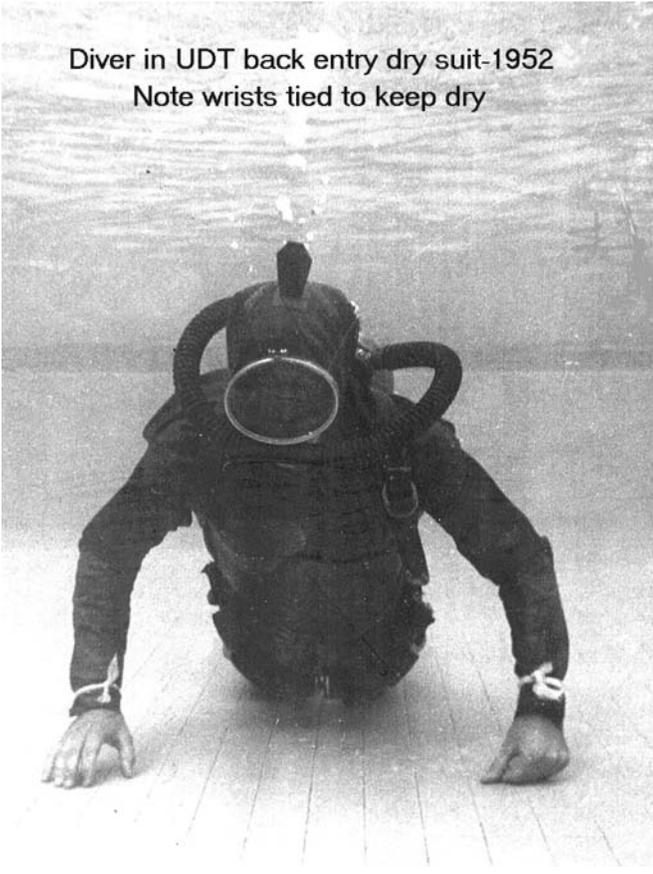


Scripps diver in 55^o water off the SIO pier, 1952

All our early diving was in boxer shorts. No protective gear at all. A typical return to the surface from 55 degree water was by a diver shaking with cold, almost hypothermic, and often trying to swim in a fetal position and hold the regulator in his (no gals then) mouth with a hand shaking so badly that it almost pulled the regulator out. One time I brought a candy bar for quick energy after a dive. One of my buddies yelled "Look at your chest!" I was so cold I was chewing my tongue and blood and chocolate were flowing down my chest. I am not a drinker, at all! So when another guy offered me a hip flask of Scotch after a dive, I chug-a-lugged the whole thing, at least several shots, and never felt any reaction from it. (Usually my rare shot of vodka made me slightly light headed.) I tried diver's long john woollies. They helped some but we were still hypothermic at the end of a dive.

Then we got some Italian Pirelli dry suits, of thin rubber. We had mostly waist seals. The seals consisted of a ring of grooved hard rubber over which the upper and lower halves of the suit were stretched and a rubber ring held them in the groove. With these "dry" suits we could be sure of one thing. They followed Murphy's Law. They WOULD get snagged on something and a stream of icy water would flow inside. They helped a lot though. Next I bid on 10 surplus US Navy UDT "dry" suits, entered through a back entry which was rolled up

Diver in UDT back entry dry suit-1952
Note wrists tied to keep dry



and clamped off. These were less easily snagged than the Pirelli suits but usually leaked around the arms and face. They sealed tightly around the wrists and face but always leaked. I swapped one for a Cressi spring gun which fed my family with fish from the La Jolla Bay for three years. If the three tined spear hit a snapper or grunt just behind the gill plates it often took off the head and guts and there was a meal for Joan or one of the kids. I took many panfish with that gun.

The others I sold to class members for what I had paid for them. They were entered through the back and after entering, a clamp closed the large opening. The opening for the mask etc., supposedly sealed around the face, but always leaked. It was better to be warmer with water that my body and body fluids had warmed up than exposed to the cold Pacific waters, so we used them a lot. One of my most embarrassing moments was the day when we came in with the DUKW and stopped it between the two big buildings and after climbing out with sea water elephantiasis, the others grabbed me in my UDT suit and, in front of a crowd of students that always gathered to watch the intrepid frogmen", they turned me upside down so the water and urine flowed out around my face. I quit screaming when I felt the warmish flow and tasted it! All

this happened in front of 15 or 20 students and staff who would gather to see us come in. The divers were big stuff at that time.

Later I managed to get hold of an exposure suit that the US Army was developing for soldiers in wet winter foxholes. It was about 3/8ths or 1/2 inch foam plastic and it took 40 lbs of weight to get it underwater, and as it descended, it compressed a lot so one became heavier and heavier, dangerously so. I used it one time to monitor a bunch of divers doing a 225 foot dive in the Scripps Canyon head. I was warm and toasty on the surface but with no hope of going down to the rescue if needed.

Finally, in about 1953 came the ultimate coldwater protection. Dr. Hugh Bradner, at the California Radiation Laboratory, was experimenting with protection of humans immersed in a tank of water that could be cooled to very low temperatures. He constructed three suits of foam rubber (or neoprene?) for his experiments. When he was done he gave them away, one to Dr. Wheeler North, a biologist, one to UDT Chief Gianotti at Coronado, and we never did find the third. I begged them from the two recipients, (Gianotti thought wet suits were sissy) and the smallest one fit one of our divers, Jim Moriarty, like a glove. We dove off the end of the Scripps pier in the winter. When we came out I asked Jim how he felt and he said "great". I pulled out the back of his wet jacket and shoved an icy hand into the furnace. Everyone had to try that while Jim screamed at each frozen hand.

Shortly afterwards in 1953, Bradner formed a company, Engineering Development Co., EDCO for short, and EDCO wetsuits took California by storm. I hocked everything I owned, sold poached abalone to bar girls and bought EDCO serial # 57. To put it on, since it was slick rubber on both sides, we used tire talc or powdered cornstarch to lubricate it. We were real happy when rubber compounds that slipped on easier were developed some years later.

One of my most agonizing problems was how to solve the "hard to get into" aspect of the new wet suits. I found an industrial zipper that was about 24 inches long and made of brass. It was too long for a straight up the front closure but worked nicely from the hip to the throat. I split my wet jacket and sewed the zipper in after gluing it with Black Magic suit cement. Boy was I glad it worked! The nylon thread lasted forever even if the sewing was crude. And soon all of our handful of divers was sewing zippers into their wet suits. They made diving in California waters at least possible and by the standards of the early days, without wetsuits, even relatively comfortable. By way of information, Hugh Bradner was on the Internet under People Find, some

years ago.

I started a dive club in La Jolla. It never met except for a dive and had only one rule or by-law; if one of the members called another for diving, you had to say yes unless a major block was present. "My wife doesn't want me to come today" was not sufficient, nor was "I stayed out late last night and am going to sleep in!" We followed the rule and I still remember a Marine, Vern Fleet, and Mort Richardson, who ran the World Dredging trade magazine, both of whom were members.

Soon things got real sissy. The non-return valves for Aqualung mouthpieces came along about 1953 and there was no more flooding both hoses and having to drink salt water to get air, although we had discovered that pulling the hoses above the head collapsed them so that if one quickly brought them down to the mouth, the expanding rubber hoses sucked air from the tank and the diver was back in business. We found US Navy inflatable life jackets and cut them down for diver's emergency flotation. Better faceplates and fins followed, and in a few years everybody was diving.

And we ate abalone. We ate almost everything that came out of the sea. Abalone, lobster, sheephead, cabezone, scorpion fish and barracuda were prime protein. We also ate a lot of small snappers and grunts that congregated at the Pier. Three or four of them would make a meal, shot by my Cressi spear gun.

I needed cash and weeding lawns was a tough way to earn it so I approached some other students. We now had wet suits and could stay in the ocean for a while without freezing. We decided to fish commercially for abalone. To insure that there were enough abs to make it worthwhile we went out sport diving for them. We got 10 dozen in no time in the kelp beds offshore of Point Loma. That did it. We all chipped in and bought a compressor and two hookah rigs. We dove every day for a week and our best haul was 18 red abalone. That barely paid for gas and air. The problem was that we had hit one small spot that the other commercial divers had missed.

Then we decided to try the huge purple sea urchins to pay for our gear. This urchin, *Strongylocentrotus purpuratus*, was about 10 inches in diameter across the spines. We would fill burlap bags with them and bring 4 to 6 bags per trip. When we hit the dock I would drive to the Italian-Portuguese section of San Diego and go door-to-door seeing if anyone wanted to buy sea urchins, which are a delicacy to many people. The door knock at the first house I came to was answered by a man who looked in my bag, turned and shouted "Maria!" A beautiful dark haired girl came to the door, reached into the bag and broke an urchin in half with her hand. Ignoring the spines she scooped out the egg masses and ate them. They then proceeded through the whole bag while I stood, in my wet suit, dumbfounded. Halfway through the man said, "Don't worry, we'll buy them all!" They took the last one out in the backyard, broke it and asked me to try it. It was great! It tasted like tapioca dipped in iodine. I got 15 cents apiece for them, or enough for the whole bag to pay for my gas delivering them. We gave up on commercial abalone and commercial sea urchin fishing.



Incidentally, when we cleaned the first day's catch of 10 dozen, I selected the two best red abalone shells to give to my wife as bonbon dishes. The shell is shown at left. The guys razzed me. "We'll get much better shells over the next month. Don't waste your time on those." Well we didn't get any more, to speak of, and of all the wives she probably is still the only one with two nice 10-11 red ab' bon bon dishes in her house.

Abalone were on the menu so often that if I never see another California abalone it will be a week too soon. They always seemed to me to be an excuse for eating fried bread crumbs and egg. We ate greens, pinks, occasional reds and a few black abalones. We made abalone irons out of stainless steel strut material from Convair planes that we procured from the Bottom Scratchers who worked at Rohr Aircraft and at Convair. If a moray eel was close by an abalone, we would tap it on the head with an ab iron and drive it back into its hole, then take the abalone, scare the moray again and swim away. A hungry grad student with a family to feed did not worry about the fearsome (and erroneous) reputation of the moray.

The scorpion fish were very interesting. When we cleaned them their flesh was often greenish blue. But when cooked it turned white and was excellent eating. We got an occasional halibut too.

After diving we would come back in time for classes and often sit in a classroom, so cold and shivering,

that our notes were illegible. I still have some such notes at the office. But we were young and foolish. I would not even consider diving in 50-55 degree water today. One day I sat in the lab with my feet in a soapstone sink, running "warm water" into the sink to help warm up. One of the guys came in and asked me what I was doing. I told him. He said I would burn myself and felt the water with his hand. Then he called me a damn fool and said I was running cold water in the sink. I told him I knew warm water when I felt it. He turned the other tap and, sure enough, I was sitting in cold water which felt hot because it was warmer than my body temperature.

I will have to look at my records, as skimpy as they are to tell who I had classes with. I don't remember who the outstanding teachers were, either. Doug Inman took us on a boat trip to the submerged delta of a stream that came into the ocean just south of the Mexican border. As we sorted through the gravel we found brachiopods, the first live ones I had ever seen. Since I was very familiar with the fossils from my childhood in the Devonian rocks of upstate New York, I tried to push in and get a better look, but Doug himself was too interested to let us get close. I got to know Shepard, Johnson, Zobell, Fox, Menard, Hamilton and Dietz and a lot of others. Dietz was a sort of mentor, partly because my wife worked for him at the NEL facility on Point Loma, and partly because, I was told, she looked like his ex-wife.

My work at SIO



Coring tube on deck of E.W.Scripps, 1952

I worked "half time", which usually meant about 40 hours a week for most students. My work, on my assistantship was on API Project # 51. We were studying two environments along the Gulf Coast of Texas with the idea that "the present is the key to the past". I designed and built much of the equipment used for sampling on the project and sometimes for sampling on Scripps expeditions. I would build them and teach the field personnel to use them on cruises off the California Coast. They would then go to the API study areas and take the samples. On one of our cruises, R.J. (Bob) Brown, later a famous pipeliner for the oil industry, was a guest on the research vessel. He watched us core and asked me a lot of questions about the coring tube. Quite a while later he told me he had patented it. I was shocked and

upset but he said he did it so if he ever wanted to use a similar coring tube, he held the patent and nobody could stop him. He said he'd never use it to stop anyone from making a similar device and as far as I know, he never did.



Ball breaker and gravity corer on the deck of the RV Spencer Baird 1953

Part of my work involved designing and building coring equipment including a long conventional piston corer from 30 foot lengths of drill pipe, which was used on the TransPac Expedition, I think, to take sediment cores. They were used on at least one expedition between CA and Hawaii to core both deep water sediments &, in one case, on or near the top of an abyssal hill where the core nose came up with rotten basalt in it.

One of my most interesting inventions was a coring tube with a compass on top. The compass card was allowed to stabilize after the corer had penetrated, then was locked to show orientation of the core for geomagnetic studies of the earth's magnetic field at the times when the sediment were deposited. I also built shrouded orange peel samplers, a huge Von Veen sampler and other devices.

Another was a simple piston corer which would eliminate some of the dangers and some of the difficulties in rigging cores for deployment. This one followed an incident on the E W Scripps, when a corer was being

brought inboard on a rolling ship and, with one end on deck, the heavy end swung violently toward H. B. Stewart, a fellow grad student. I yelled at Stew to get out of the way and he avoided the heavy corer which took a gouge out of the house on the Scripps research vessel. Stew was quite unhappy with me for yelling at him in front of the rest of the students on that class cruise. Eventually he got over it. If I had not yelled he could well have been seriously injured or killed.

In any case, my new corer, shown in the photo, had a square weight stand so it would not roll as easily on deck, plus a simpler release mechanism, and a ring in the end of the piston to attach a pull down line so one did not have to do a tortuous job of shoehorning the piston leather into the core liner.

Another instrument was the ball breaker, in which, upon the coring tube or sampler reached bottom, a slack wire release let a heavy steel cylinder fall upon a glass fisherman's net float and implode it. The implosion resulted in the equivalent of a small charge of explosive and made a sound clearly heard on the ship's hydrophone. At that point we could stop lowering instead of depositing hundreds of feet of steel cable on the bottom. One of the pre ball breaker runs brought up the largest manganese nodule I know of, caught in the tangle of steel cable. This was potentially very destructive of expensive steel cable. In another case, the implosion blew off one of the legs off the ball breaker, a welded 1/2 inch steel bar.

We experimented with the sound of the implosion by dropping weighted 100 watt light bulbs in the La Jolla Canyon and listening to the sound. At least one made 600 feet before imploding. We knew the glass fishnet floats would do a great job in deep water.

I also designed and built a "C & D" coring tube (Cheap and Dirty), by modifying ordinary plumbing pipe components, for those who could not afford expensive coring tubes. Noriyuki Nasu, a Japanese grad student that we liked very much, later wrote about the C & D coring tube in a Japanese geological journal. Another of my devices was a Trident coring tube with three barrels about 18" apart, in the same frame. It was a gravity corer designed to 1) get some idea of variability in an area, and 2) to retrieve enough sample for several different investigators.

I also built several underwater cameras or rather, I designed them and the Scripps shop built them.

Underwater photography

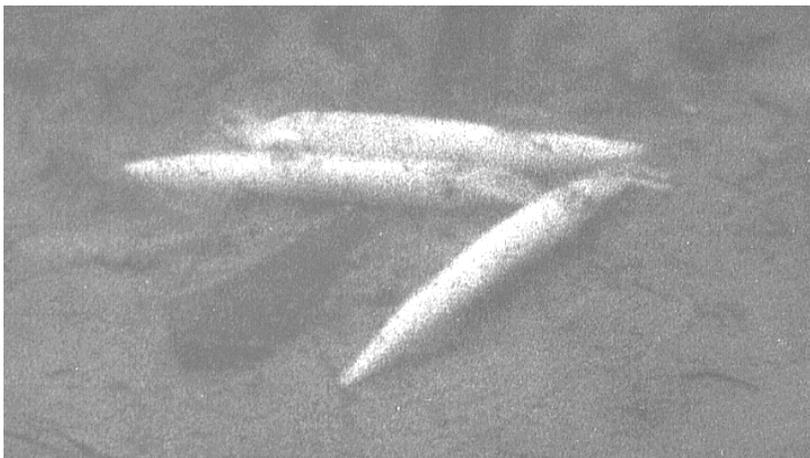


Underwater Stereo camera case used at Scripps. Camera was a Stereo-Realist

About this time I had begun experimenting with stereo photography. Well why not take it underwater? Thus, another of my designs was an under water case for a stereo camera, built in the Scripps machine shop of Lucite. With it I took pictures of the underwater rock, sediment and critters off La Jolla, Pt. Loma and the Coronado Islands of Mexico and in the Scripps submarine canyon. I still have some of them. I took a good many stereo pairs, in color, for Dr. Shepard.. They are typical stereo format pictures, with a square 35 mm picture on

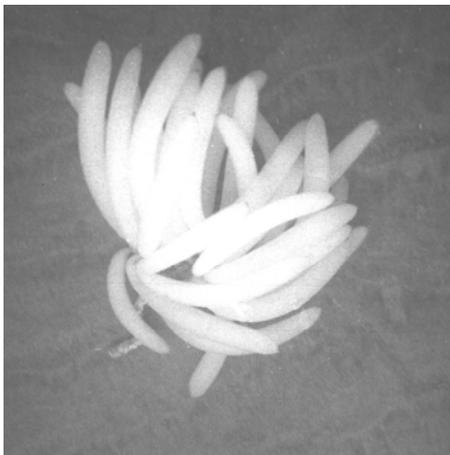
each end. These particularly included shots of the sub marine canyon head.

Another time I used the stereo camera was when John McGowan and I went into the La Jolla Canyon one night and I took a bunch of B & W flash pics of the squid (*Loligo opalescens*) spawning in the canyon; which Cousteau and his men "discovered", with very little credit to McGowan, for a special many years later. Here are two of these pictures showing large egg masses on the bottom and dead squid after spawning. It was an interesting time with every predator in the area eating squid around us.



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I also took a bunch of UW pictures of my training classes in SCUBA in the La Jolla Beach and Tennis Club pool. I was the first Scripps diving instructor, for Connie had given me a typewriter written card, saying "Scripps SCUBA instructor #1", with my name hand written on it. 40 years later, Jimmy Stewart said they had no record of that card,



which does not particularly surprise me, since we did very little record keeping in the early 50s. I had taught a number of the early Scripps divers, including Bob Dill and probably Bob Fisher, Bob Bieri, John McGowan, Bob Gilkey, Walt Scott, etc.

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We dove to learn what the underwater geology was like in and around the submarine canyons. We could stand on the two sides of the narrowest head of the Scripps Canyon with the slot beneath us. It widened as you went down the Canyon. Harris Stewart and I got the idea to photograph the Canyon walls from the surface. I designed and built a horizontal camera rig, which we lowered from the DUKW in the center of the Canyon at depths over 300 feet and usually less than 1000 feet. As it rammed into the wall, it compressed a spring loaded nose and a Robot cameras took a picture of the wall using two flash units attached to the frame. Stew never did use the pictures in any report that I know of, but I wrote it up for the American Geophysical Union Transactions, V. 38 (3), pp 318-319, July 1957, "Photography of Submerged Vertical Structures".

Since we usually got 6 or 7 pictures per day, I hit upon a scheme to have some fun. I took the Robot camera home and put it in my bathtub. There I carefully focused it about 2 feet away. I mixed a handful of mud and some coffee into the tub, placed a flash bulb behind the camera and a small plastic model of a plesiosaur (swimming dinosaur) at the two foot mark and took a picture. Then I returned the camera to the canyon photo rig and we went out again next day.

On one of the runs I sang out that the camera rig had hit something but that it was not a solid hit. We went ahead and hit the canyon wall and at the end of the day I took the film in to the Scripps photo lab for processing, then went down the hall and waited. John MacFall came screaming out of the lab about 30 minutes later. He had the film in his hand, still wet! He was almost beside himself and when I came running, showed me, and others who heard him, a picture right in the middle of the roll, of a part of a plesiosaur, not particularly sharp. Well the DUKW driver remembered my soft hit and that was that. Although it never was published as a scientific paper (did they suspect me?) it sure got a lot of attention at Scripps for awhile.

My dissertation

Dr. Francis Shepard my major professor at Scripps Institution of Oceanography was a famous marine geologist who really defined the study of Marine Geology! An author, a seagoing geologist, he was as good an observer as one could find. One day while offshore a few miles, in a small boat with K. O. Emery, then a graduate student, later another famous marine geologist, they saw a head rise up out of the ocean not far away. They both describe it as 15 feet high, shaggy, reddish brown, with large eyes. Except that they were extremely cognizant of the gray whales so common in California waters twice a year, I'd have guessed it was a spy-hopping gray whale but they are gray and relatively smooth skinned, not shaggy. What was it?

Although I wanted him as my thesis adviser, I got very little guidance or encouragement from Fran. We were as good friends as professor and grad student can be; we sometimes ate at the Shepard's. Elizabeth Shepard was a wonderful hostess. Indeed, years later we were able to repay the kindness when he visited me in Bermuda. He took home my most beautiful sea fan (yes, I raped the reef in 1960 or so), although it was so big it occupied all three seats in the plane.

Shepard gave me a rare opportunity at one point. Dr. Ph. H. Kuenen, author of Marine Geology, nearly the only text/reference in the field until Shepard wrote Submarine Geology, was coming to Scripps on a visit. Shepard was not too happy with Kuenen for the latter's ideas on turbidity currents were bad news to some of Shepard's ideas. Fran was generally a very nice guy but on Kuenen he was not very collegial. Instead of picking up Kuenen at the airport, he sent me. I had a wonderful visit with the soft spoken & very nice Kuenen & was able to sit in on most of the later conversations. And Kuenen convinced me that there were two sides to the story.



El Boqueron Volcano Revillagigedo Islands, 384 km SE of Cabo San Lucas, 1954

Somewhere about this time I got chance to chance to ride a military bomber/reconnaissance plane to the Revillagigedo Islands 384 Km SE of Cabo San Lucas. Being a crazy young student, I jumped at the chance to visit this volcano which had erupted in August of 1952. We flew around the volcano and I got some excellent pictures of the cone and a classic lava delta down the side. We were hundreds of kilometers offshore and it is doubtful if we would have been rescued if we had gone down at sea.

I decided that I wanted to do a Ph.D. dissertation on the La Jolla Submarine Canyon, with Dr. Francis P. Shepard as my advisor. I participated in many echo sounding runs over the Scripps head of the Canyon, using the DUKW as a sounding platform and locating it with several surveying instruments that Shepard had set up along the coast. These would give

regular cross bearings to the DUKW operator and locate it very accurately. The soundings would show us changes in the canyon and slopes surrounding it. Using this setup we discovered "New Valley" the day after a small earthquake apparently shook loose a huge amount of sediment on the flanks of the canyon, which cascaded into the Scripps Canyon head and probably initiated a turbidity flow down the canyon to the Loma Sea Valley, thousands of feet below. It left a large bowl on the shelf adjacent to the canyon head which was named "New Valley".

We dove in and observed the Scripps Branch of the La Jolla Submarine Canyon, which came in to less

than 40 feet of water just north of Scripps Institution of Oceanography. The upper end was a rock cut, almost sheer walled, narrow enough that a diver could straddle the cut, which was about 15 feet below the rim. The bottom was filled with sand and decaying kelp most of the time but every so often an earthquake (or something else) would start a flow of this material down the canyon. They call such flows turbidity currents. When that happened, the bottom of the cut went to 20 or more feet and the walls of rock were scoured clear of any growth. My stereo photographs of the canyon walls etc., which were taken at that time, went into Dr. Shepard's files where I presume they are today.

I was a marine geology graduate student and decided that I would make a turbidity current. First I sat on the sand slope above the canyon rim and pushed sand with my fins. It cascaded into the canyon but was ineffectual. Then another geologist and I made a 55 gallon drum with a base and a big paddle inside, plus a trapdoor latch which dumped the entire contents out the bottom. We set it on the rim of the canyon and he started turning the paddle while I scooped sand into the drum. When he could barely turn the handle, I popped the latch and 55 gallons of sandy water cascaded into the canyon. We waited for turbidity current to start. Nothing happened, which was just as well, for later we learned that such currents suck in water (and dumb divers) from all around them and we would probably have been carried to the Loma Sea Valley, miles away and more than 6000 feet deep. We should not have been surprised since Shepard and his hired hard hat diver, Frank Haymaker, as I recall, tried to trigger a turbidity current with explosives some years before I got to SIO. This did not end my attempts to measure turbidity currents in the Scripps Branch of the La Jolla Submarine Canyon!

Next I built a long thin cylinder with Archimedean spiral fins, to lie on the Canyon floor and slowly rotate as sediment shifted down Canyon. I had used a lally column, like they jack up sagging porches with, modified it with sharpened steel ends, and screwed it well into the soft sandstone of the Canyon walls. I attached the rotating sensor cable to it and ran the cable back to a recording package on the Pier. For weeks I did not get a single turn out of the instrument, except when I went out and dove down and made sure it was working. Then, one day the recorder showed an absolutely flat line. On diving into the Canyon, the instrument, some of the cable and the column screwed into the walls of the Canyon were all GONE. We had had a sediment slump, or flow or a turbidity current which cleaned out the Canyon head and my instrument. To me it was proof positive that turbidity currents, initiated by sediment slumps into the canyon, had carved the several branches of the La Jolla Submarine Canyon!

Rip Currents

There was a prevailing rip current in the middle of La Jolla Bay. The waves approaching the Bay would be refracted by both curving sides and bend so as to concentrate water and energy in the center of the Bay. This rip was very strong and dangerous. One day a man with three kids, one about 5 and two twins about 3, I'd guess, got too close to the rip and one twin was washed out to sea while the man struggled to hold on to the other twin and the 5 year old. With some help he got them ashore and went to look for the third child who had disappeared. A major search was instituted by plane, helicopter, and small boats. In addition, another Scripps diver and I went into the rip with SCUBA gear, intending to look for the body on the bottom. When we got into it we were carried seaward so fast the bottom, only a foot or two away was a blur. We never found the kid nor did the Sheriff's helicopter nor the father, who walked the beaches for weeks. We then tried to convince the City to put up warning signs but they refused, saying that it was bad for tourism. Today the City would be sued for millions. The poor father walked the entire shore of La Jolla Bay for several weeks but nothing was ever found. This began a long interest in and consulting practice with rip currents, incorrectly called "undertow"! The rip at La Jolla was the result of a curving, crescent beach. Waves approaching at almost any angle were refracted into the middle of the beach where the excess water ran out to sea in a prevailing rip. It was so strong that it had carved a channel completely through the beach sediment and into the boulder clay and gravel under the beach.

Other Activities at SIO

I taught a short course "Basic Physical Geology" for Scripps students taking Dr. Shepard's "Submarine Geology" but who had had no previous geology. This was a side issue and uncompensated. Of course there was

the SCUBA diving course as well until Connie Limbaugh got mad at me and took the course away from me. More about that later! I also taught a course "Introduction to the Physical Sciences" at California Western University on Point Loma. I developed the course notes, taught and graded the students and advised the scientifically oriented class members for the princely sum of \$4.00/hour. In my spare time I lectured to schools, churches and clubs on popular scientific subjects. This was to get familiar with talking on my feet, for I still remembered the postwar "WW II Welcome Home Auditions" after WW II, where I was so scared there was cold sweat running down my legs.

Our guys and gals would go on expeditions every year. On one of these they went to Baja California to collect. They had a very old version of the Aquaflex underwater movie camera. An enormous manta ray, they swear it was 25 feet across, swam by. They got in the outboard powered tender and chased it to get pictures of it. After a few minutes and about 100 feet ahead of it Connie Limbaugh rolled over the side with SCUBA gear on. He waited as the manta approached and one of the giant "wings" brushed him, knocking him cold and the camera out of his hand. Fortunately both the camera and Connie floated and he quickly came to. After he was rescued, Chuck Fleming chewed him out for his stupidity, grabbed the camera and rolled over in front of the manta. They picked Chuck up a couple of minutes later, still groggy, and recovered the camera. No one else volunteered to take manta movies!

On one trip to the Gulf of Panama, another student and I went collecting in a rowboat. I rowed, barefoot, while he stood in the bow collecting. "Go right", "Straight ahead", "Hold it", and thump, the specimen would be in the boat. After three or four attempts I looked down and there, between my bare feet, was a sea snake, deadly venomous, although they are not aggressive nor are the fangs very long. I damned near dumped us both in with the swimming sea snakes as I jumped up on the seat. We established some rules for collecting together after that.

Another time, two divers, Bob Dill as I remember and a buddy, were taking some of the earliest movies underwater off Guadalupe Island, Mexico! One of them saw his buddy, who had the camera, looking at him with horror. Before the first diver could move, he felt something come down over his head, with a wetsuit hood on it, and gently squeeze. He froze. The squeeze happened again. Then in a tremendous swirl of water, the elephant seal that had taken him from behind, left without doing any physical damage. The second diver, with the movie camera, had not touched the trigger during the entire episode. He thought he was going to see brains spurt in all directions from his buddies head, and pictures were not important.

On the Scripps cruises there were a lot of spicy paperbacks. Ed Hamilton, finishing up his Ph.D. at the time came up with some wild parodies of the sexy novels and my favorite sentence was, "And her razor sharp breasts cut his pajamas to shreds!" We chuckled over that one a lot. One of the excellent staff at the Institution was Frank Snodgrass. He had a reputation for being able to fix anything. Frank was an outstanding machine shop operator cum instrument designer. He had found out that ordinary rubber condoms were excellent for waterproofing small instruments and parts. He ordered a case of condoms from a local supply house and when they came, one package was missing from the case. He called the supply house and got a pert young lady. He complained about the missing package but was shut up completely when she said, "We are so sorry, Mr. Snodgrass. The missing package will go out today. I hope we did not spoil your weekend!!" We teased Frank about this one too!

Some of us took every occasion to dive, for SIO and for fun and for protein for supper. I left a color slide of Phil Jackson underwater, trying to do something with a sediment trap which we built, about 6 feet high, and emplaced on the bottom in 85 feet of water in La Jolla Bay, at SIO when I left. The surge from the long Pacific swells was so strong we could barely stay within sight of the trap. Plans for the trap are among the documents I still have in my files!

When not diving for Scripps we used paddleboards, which we made of wood and shellacked till waterproof. They were like full sized surfboards or windsurfers with a couple of strips of inner tube rubber stretched over the forward end, and a piece of fishnet sewed to the rubber. We carried a tank and speargun under the rubber, got in a rip current, squirted out to sea and put on our gear. A light line pulled the paddleboard with us wherever we went and our catch was shoved under the net for the trip back home. I did not know why the paddleboard had not caught on in SE Florida where the reef is only a mile or two offshore. Later the scuba kayak became a preferred method of launching from a beach and paddling to the reef at a relatively low cost compared to owning a bigger boat!

Sea life was always present around Scripps, too. We saw sea lions, gray whales, all kinds of fish of all sizes, crustaceans, occasional killer whales, etc. One of my most memorable encounters, fortunately from far away, was with two female sea lions and a killer whale. I was up on the cliffs at Devil's Slide, near Scripps. Just off the La Jolla Beach and Tennis Club was a swimming float. This day there were two 600 lb. female sea lions sunning themselves on the float. All of a sudden they became very agitated, running around on top of the float. At that point a 4 foot high fin came out of the water and circled the float, going like a bat out of Hell! The sea lions were really upset. Finally one of them made a dash for it and just as she hit the water, there was a horrible crunching noise, the water turned red with blood, and the sea lion disappeared as did the killer whale. I was 300 feet or more away when I heard the bones crunch.

Harris Stewart at SIO

One of our graduate students, Harris B. Stewart, decided to do a dissertation on Falcon Island, named by HMS Falcon during a south Pacific voyage in the early 1800's. Harris Stewart was a very sagacious and capable grad. Stew was going to do a dissertation on Falcon Island, in the far Pacific. He confided to me that it was unlikely that anyone would ever have time to go to Falcon Island to check up on him. It did not particularly bother me because Stew's standards were so high he would have done it right. When the R/V Spencer Baird got there, on the Capricorn Expedition, there was no Falcon Island. It had been a cinder cone several hundred meters tall and had been eroded down to a bank at about 150 feet deep. The entire diving qualified portion of the crew dove on Falcon Bank and collected everything they found for identification on deck. When they came up with a bunch of burlap bags full of goodies, Roger Revelle took over the identification duties. "This is a tunicate, and here is a solitary coral, and this is a crinoid" and so on. When he came to Walter Munk's bag he started identifying and pulled out one specimen which squeezed between his fingers. "Good God, Walter," he exploded, "Don't you know shit when you see it?" Walter had dutifully picked up a specimen flushed from the Baird, above him. He never quite lived that one down. I believe this was the cruise on which Mason, a world renowned geophysicist, dragged a magnetometer in a towed fish for about 10,000 miles behind the ship. When they got back they found that there was a large steel bolt in the fish which, very close to the magnetometer, strongly influenced the entire record.

Harris later got his dissertation on Scammon's lagoon where the gray whales breed, off the Baja California coast. He was also the author of some great poems about oceanography. I remember one he did about Project 77, the American Petroleum Institute's investigation of the present ecology as a "key to the past". It had verses like "Oh the depth ten miles from shore is a dozen feet or more" and "The samples of the oozes we bring back in our shoeses." Later Stew put them together as "The Id of the Squid" by Arch E. Benthic! He never admitted that he was Arch E. Benthic, but we all knew the true author of the verses.

The Bottom Scratchers at SIO



Connie Limbaugh at Scripps underwater 1953

Connie Limbaugh, and possibly Chuck Fleming, were members of a local diving club that deserves mentioning. It was one of the earliest and most exclusive dive clubs in the USA and was called the La Jolla Bottom Scratchers. Most of us wanted to belong but I was unable to pass their initiation rite because of Eustachian tube blockage and sinus problems which made every dive painful and left me with a faceplate full of blood from broken sinus capillaries. Indeed at our first diving physical, the doctor told me NEVER to dive again. That was in 1952. Needless to say I ignored his advice.

The La Jolla Bottom Scratchers Dive Club's initiation rite was a bear! I couldn't do it because my ears would kill me on a

free dive. The requirements were to take 5 abalone on one free dive and to catch a hornshark with your bare hands, freediving. The hornshark is a small rough skinned shark like a nurse shark; about 3 feet long and has a spine like a bears tooth on the dorsal fin. It is easy to catch. When, several years later, I got a mask with a nose in it so I could perform the Valsalva maneuver, I could have easily done both of these tricks. I actually went 67 feet and picked up a dropped weight belt the first day I used my nose mask. I was glad to see the surface that time, though. The weight belt was HEAVY.

One day, as I sat on the "steps" of the Casa Cove, in awe of a couple of the Bottom Scratchers on the next ledge up, I heard a shout for help just north of us. It was a scuba diver who was unable to get back to shore through a strong rip, running through a gap in the reef. I waited for the Bottom Scratchers to do something but they just said "He's OK, let him sweat a little!" Finally I couldn't take it any more and ran to my house a little north of the Casa Cove and grabbed an inflated inner tube. I ran down to the water, about 200 feet away, jumped down the cliff face and pushed off in the rip to help the guy. When I got there, the three Bottom Scratchers who had gone out, grabbed the tube and knocked me off. I invented some choice epithets that day and finally got an arm over the tube and we all came back to the beach. That dampened my awe for the Bottom Scratchers a bit!

I understand that the earliest attempts at spearfishing with a gun were with compressed air guns. I made one from a small carbon dioxide bottle and some metal tubing but it made such a cloud of bubbles that you could not see where the spear went, and it almost had to be a free spear so I lost several before I quit that type of gun. Somewhere during their experiments, Jack Prodonovich made a rubber band gun with which, I had been told, one day a band stayed hooked in the spear and slung it back at him, punching through his faceplate and putting out one eye. This was the story they told me but I never saw the bad eye so it might be just a story. Indeed the pictures of Jack, head-on showed what appeared to be normal eyes. The rubber gun developed into the La Jolla Long Rifle. It had a micarta tube under the barrel with 100 feet of nylon line in it and at the back end a part of a bicycle inner tube, often bright yellow for visibility. The line was fast to a pull inflator which triggered a carbon dioxide cartridge when all the line was out and, inflated, came to the surface to mark the location of the fish.

I think this was the sort of gear that Chief McLarty used to take a Pacific black jewfish weighing over 700 lbs. He did it free diving in the Coronado Islands, repeatedly going down and knifing the fish, which had holed up in a cave, until he had damaged it enough that he could unwedge it and bring it to the surface. Back in the good old days when Skin Diver Magazine was for divers and told it straight, they had a cover shot of McLarty with the fish on one early issue.

Even without being a member I was still accepted peripherally by the Bottom Scratchers. As a result I was able to get a La Jolla Long Rifle, one of the early rubber powered spear guns capable of taking BIG fish. That is a tale by itself.

A couple of the Bottom Scratchers worked at a large aircraft plant in San Diego, Convair as I remember. They assembled aircraft from parts kept in bins and bays in a large building. One of the guys drew up plans for the various parts of the Long Rifle, to be made of aircraft quality stainless steel. He ordered about 50 of each part and had them in bins, not sequentially numbered. The handle, the trigger, the trigger guard, the sear, etc. were each a separate piece. If you were one of the favored ones, they collected the parts from a closely guarded list of part numbers and you received a bag of stainless scraps which a stainless welder could make into a speargun. You provided the stock made of local wood, and the rubber bands. Mine took a 550 lb. grouper or jewfish off Grand Isle, LA, in the late 50's. I probably still have the stainless parts in one of the boxes I've been carrying around for 30 years, unopened.

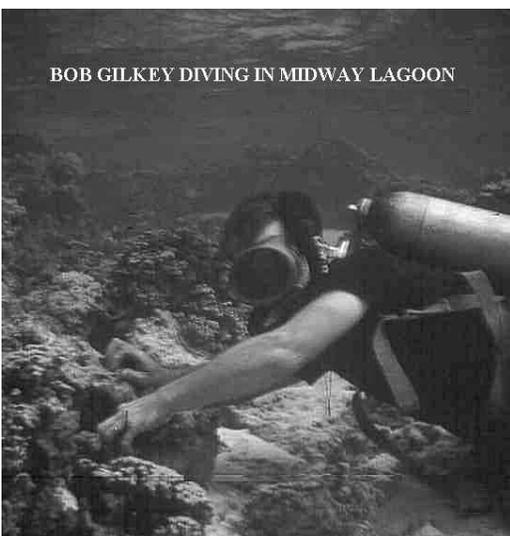
Trans-Pac Expedition at SIO



RV Spencer Baird 1953

In the fall of 1953 I served as expedition marine geologist on one leg of the TransPac Expedition, on the R/V Spencer Baird, a converted US Navy ATA or ATF. We had some real adventures on this cruise. We took SCUBA gear, by now much improved, with us. Our first dive was in 2000 fathoms of water in the deep Pacific. The water was so clear that I lay on the surface and saw a Nansen bottle, bright yellow and 30 inches long by 3 inches in diameter, on the hydrographic wire about 80 m below the surface. That's about 260 feet down; the clearest water I have ever measured. Diving to 90 feet, with 11,910 feet of water below us, we could see the entire research vessel, the R/V Spencer Baird, at one time and she was about 180-200 feet long. When we looked down, the water got darker and darker till, straight down it was almost black. The worst part of it was the huge eyes and teeth of the monsters of the deep that we could almost see below us. Imaginations runs wild in that situation.

It was on this dive that I almost bought the course. As I came to the bosun's ladder hung over the side, I felt a sharp pain in my left calf. I came aboard and the pain got worse and worse. My lymph nodes in the groin and under my arms both began to hurt. I scraped my calf with a dive knife to see if there was something there that I could not see. Sure enough, I found two little cells on the knife, like tiny eggs with gray yolks, about an eighth of an inch across. They were probably siphonophores, related to the Portuguese Man-O-War! If there were only two cells and they gave me that much systemic involvement for more than two hours, imagine what twenty or thirty cells would have done! Things like that do not happen often but when they do....watch out.



We put in to Midway Island and dove among the beautiful corals of the lagoon. At one time I saw a shark while diving with several other divers. Soon there were two sharks, then three, four, five, and six. With each shark a diver would return to the boat. That meant less of us in proportion to the number of sharks and soon there was only Bob Gilkey and myself. He had a piece of steel hex bar that was sharpened at one end so I felt safe. I was taking stereo color shots of small butterfly fish. Just as I clicked the shutter one time, a great gray shape came over my shoulder and filled my screen, three feet away. I believe I beat Gilkey back to the boat, although we really could not say that the sharks were aggressive toward us. There had been shark attacks in the waters outside the lagoon, however, if we could believe the locals In Japan we put in to Kobe and to Yokosuka.

A group of Japanese geologists took some of us to dinner and the usual toasts followed, in warm sake. "Kampai" (down the hatch), "dozo" (if you please, fill it up), more kampai and more dozo until they were reeling.

I managed to avoid the repeated dozoes and was the only sober one in the crowd. After the meal we walked, arm in arm (mostly to hold up our drunken friends) through the Yoshiwara (red light district) where, thankfully, we did not stop, to a commercial pottery district nearby where some of the most exquisite ceramic ware was on sale at preposterously low prices. In bins, in straw, were delicate lacework bowls of white and blue, bon-bon dishes in natural clay, glazed on top in dark green, with orange crabs for handles, etc. some for a few cents each.

I wanted to buy \$1000 worth and take it back and make a major killing in the States, but had only a few dollars available. The dishes I bought included the ones mentioned above and a set of glazed scallop dishes which Joan gave me when we parted ways, many years later. Very much later I checked on this market and found that the canny Japanese had discovered that this ceramic ware was worth money. The major bargains were no longer available.



Nori Nasu & family at sukiyaki dinner for the scientific party from TransPac 1953 McAllister at far right

One of the grad students at SIO while I was there was Noriyuki Nasu. Nori spent a great deal of free time at our house where he was always welcome. Nori Nasu's family had prepared a great banquet for us, undoubtedly spending money he could not afford. We were all seated in a great hall, upstairs in a restaurant, with a geisha for every two or three of us.

We were served a variety of dishes, followed by the main course of sukiyaki, which was delicious. The girls were high quality waitresses and left nothing to be desired. After the usual toasts to the President, to the Emperor, to the various scientists and to Nori and his family, we went away sated, leaving Nasu-san contemplating his devastated exchequer.



Jidai Matsuri 1953

We got a chance, at Kyoto, to watch the Jidai Matsuri or Festival of the Ages, which was a splendid pageant in which for every hundred years of some 2000 years of Japanese history there was a group of marching soldiers, archers, horsemen, etc. in the correct costume for the age. It was a very impressive pageant of which I probably still have some pictures. The warriors costumes were totally authentic and varied from century to century and the bows, crossbows, arrows and lances made us hope no warrior still resented WW II for if they had wheeled and shot at the reviewing stand, few would have left alive.

We were each presented with a 15 inch ceramic Japanese doll which I still have. I suspect it is or was worth some serious money to a collector.

As we left the pier a madam and her girls said goodbye. They had apparently had a great working relationship with the crew and scientists.

When we left Japan, we had Dr. Hiroshi Nino with us for the leg home. He had been to sea on many vessels, for many years with no problems, but got so violently seasick that we had to put in at Midway Island so they could fly him to Hawaii on a hospital plane before he died of dehydration and malnutrition. They carried him off the plane. He survived. Clearly, for the first time in his life, the resonant frequency of the Baird and of his inner ear matched perfectly. He recovered in the Air Force Hospital as Hickham Field, in Hawaii, after flying there in a hospital plane sent specifically for him. He wasn't the only ones seasick on that cruise!

We went into the far N Pacific, into a holiday area, a thousand miles from the nearest land where there were almost no soundings. We went through a north Pacific line squall with winds of hurricane force. Everyone but Bob Bieri and I were seasick. We were too scared to be sick. The second mate was holding the ship into the seas because our life depended on it. The chief engineer was lying on, and upchucking through, the grates outside of the engine room, and Bob and I were on top of the wheelhouse, holding on to the radar mast so we would not be trapped below decks when the Baird sank. Not IF it sank, but WHEN! As we stood on the house top, later found to be 55 feet above sealevel, and when we were in a trough of the humongous swells generated by the storm, we were looking up 45 degrees to adjacent crests. We estimated the wave height at 80 feet, the highest I have ever personally encountered. It was almost quiet in the troughs and howling like banshees on the crest. Why Bob and I had decided to swim when she went down, I don't know. Where we were there was zero chance of rescue and it would have been more merciful to drown below decks than to die floating in cold water after a day or so.

Obviously we survived with a helluva story to tell, and got back to school at La Jolla in due time. I should note that not all was work and expeditions. We did find some recreation too.

Recreation at SIO

One of my favorite dives off La Jolla was at Boomer Beach. Just south of the La Jolla Cove, is was a classic winter-summer littoral drift site with sand moving to the south end of this small beach in winter when waves were more from the north and to the north end of the beach during summer south waves. We would dive there and sometimes saw the giant fish, just at the limit of visibility, which several of the old timers said were black sea bass. They would come out of the murk, scare us and disappear again. Some of the UDT at Coronado occasionally speared this same species at the Coronados Islands off Mexico. An early Skin Diver magazine (back when it was a divers mag (and not filled with copy extolling resorts and gear that advertised in the mag) had a cover showing Chief McLarty of the UDT with a 700 lb. Sea bass which he speared and landed free diving!

We had a very nice aquarium at Scripps. The curator was Sam Hinton and we became friends. I was allowed behind the scenes, so to speak, and soon became acquainted with most of the critters in the tanks. One of my favorites was Beelzebub, a 9 foot (leg span) cold water octopus. I'd reach in and let him stroke my arm, staying clear of areas where there was hair on the arms but gently sucking to the hair free areas. Sam caught me one day and made me promise not to do that again unless he was there. Said I might possibly be pulled in and drowned. One of my favorite fish was the ocean goldfish, *Hypsypops rubicundus* or Garibaldi, named after the Italian patriot, Gusippe Garibaldi, who always wore a red gold coat. It was a beautiful fish. In addition there were a lot of others that I learned to recognize!

I tried to get Joan to learn SCUBA diving because she was a water-baby at camp in Benton Harbor. She simply would not have anything to do with it until Bob Dietz asked her to. She tried the rig in his pool and seemed to enjoy it. That was the end though until Bob Rosof persuaded her to try it in Boca Raton, many years later. Again she did it for Rosof, in the pool and was good at it but would not do it with me! What a shame for she never learned what she missed.

During the day we would sometimes take time out at lunch and go down to the cliff near the La Jolla Beach and Tennis Club. On the beach, under the cliff, not too well exposed to public view, we would strip to our shorts and go out and get a couple of abalone for supper. In 15 minutes we were out of the 60 degree water, red as beets and not likely to fall asleep in afternoon classes. If we got the abs, that was a plus for none of us had enough money for protein for the table and, as stated above, we ate mostly ocean protein.

We would also body surf the big breakers that rolled in off the Scripps pier. Some of them would scare

the typical South Florida surfer who is used to 6 foot swells. Body surfing swells that big (12 to 15 feet were not uncommon) was probably somewhat dangerous but we were young and indestructible and had a great time.

Right off Scripps there was a spot where the San Dieguito Indians had held a ceremonial event of some kind. On the bottom were "killed" stone bowls, net weights, etc. Killing them meant breaking them or putting a hole in them. We never knew exactly why but found a large number of these artifacts in that one spot only. We may have been the first underwater archaeologists in the US. My stone bowl ended up in the SIO Aquarium.

Some Other Recollections of SIO Personages

I remember some of the graduate students, faculty and staff at Scripps. Ted Chamberlain and his wife epitomized the "poor grad student". Apparently they would eat almost anything that came their way including "road kill". We would always ask Ted what they were having for supper when invited to his house. Rattle and other snakes, coyotes, and once, after a trip to Baja California hills, he shot a wild burro and brought home 40 lbs of burro liver which he said carried their protein requirements for a couple of weeks. Like the rest of us they also ate out of the ocean and sometimes ate inexpensive horsemeat. We liked them but had serious doubts about their eating habits.

Bob Fisher was also one of the group. Bob could be abrasive if he wanted to but no one denied his brains. He was married to a lovely gal and regretfully it did not last.

Bob Bieri was the young man who stood on top of the house of the Spencer Baird with me during a far N Pacific line squall. Outside of that I primarily remember one day when he got a face squeeze and had, not only hemorrhages on his face under the mask, which went away fairly soon, but also all the capillaries in his eyes were broken and for several weeks until the blood was absorbed we, sympathetically, called him "squid eyes"!

Willard Bascom was not as well liked as most others at SIO. He was quite aloof and we were particularly galled by his refusal to let anyone near his Fenjohn underwater camera case with an 8 mm military gun camera in it. I may have mentioned that Chuck Fleming (in the Scripps Archives I think it was Walter Munk who tells this story) was at Bikini Atoll with Bascom, and while collecting specimens in the lagoon before the A-bomb blast, saw Bascom taking movies of him. He says he thought "He's not so bad after all. He is taking movies of me!" then, TILT, he realized that there had to be some other reason and looked around and saw a huge shark hovering over him, probably to get at anything that Chuck spooked from under the rocks he was turning over. He said he was sure Bascom was trying to get the first authentic pictures of a shark biting a man. We were told that Bascom was dying of cancer and to be easy with him. Although we did not quite believe it we did make allowances accordingly. There was no doubt that his career had been quite spectacular and we acknowledged that. 40 years later I was to meet Bill Bascom in Florida. He had not died of cancer.

Bob Dietz was a sort of mentor to me. He hired my wife to work for him at The Navy Lab on Point Loma. He also treated her very well and we were sometimes invited to his house on the beach at La Jolla, as I remember. While at that job Joan (my wife) had a sort of run-in with one of his student assistants.

I called Bob Dietz, one day to see if we couldn't use loaned Navy helicopters to do quasi synoptic studies of the La Jolla Bay area, taking BT's, Nansen water samples, etc., from the chopper at a very rapid rate. Bob Dill intercepted the call because Dietz was busy. He thoroughly pooh poohed the scheme as totally useless. My wife sat just behind the divider from Dill and soon realized that he was talking to me. As soon as I hung up, Dill called Bob Dietz. "Bob, I have a great idea. Why don't we use helicopters to do quasi synoptic studies of bodies of water locally?" When Joan came home, she was ready to kill. She hated Dill with a purple passion after that and little that he did subsequently changed her mind. All of this just increased Dill's feelings that he would get to Joan.

One day I came in from a local several day cruise just as the NEL Christmas Party was in full swing. Dill was Santa Claus. He was giving out presents and kissing the female recipients. I was told that this was going on and came to the room and waited behind the door. Just as he reached Joan and started to kiss her, I stepped out with a small bottom sampler raise high and stood behind Joan. Dill recoiled. I was a startling apparition with old dirty clothes and several days beard. He never forgave me for that.

His wife, Gloria was a doll. They had twins that must have been insured by Lloyds of London. They got into every kind of mischief possible. Once one put the other in the clothes dryer and turned it on. Gloria heard the commotion and saved the kid. Another time they threw every bit of furniture in the swimming pool at a

friend's house. And there were other stories.

Bob Dill also ran into Harris Stewart over much the same problem, Harris' wife. At a party Bob crawled under a long tablecloth draped counter to get at Stew's wife at the far end and met Stew halfway along under the counter, crawling towards him. I doubt that Bob ever forgave Stew either.

Dick Mills was another of our grads. I remember him mostly for his diving with us. I photographed Dick and Bob Fisher on Scripps Pier in dive gear. It was one of my best pictures.

Bill Riedel was the microbiologist at the time. I think his specialty was diatoms but am not sure.

Dick Morita worked for Claude Zobell. Dick was developing ways to culture deep water bacteria, under pressure and in the dark and 0° C water. The devices were to take the samples at depth and lock them in the container under pressure and quickly refrigerate them. A later project was to culture oil digesting bacteria that could be used to seed an oil spill. We liked Dick, a great member of the grad school group.

Cadet Hand was there too, but I do not remember much about him. Bob Gilkey was a diver with me on the Trans-Pac Cruise. I have stereos of him at Midway. I have already told the tale of Gilkey and myself and the sharks at Midway Island.

Fran Shepard was not a very good thesis adviser. Every time I'd go to see him with an idea, mostly revolving around the La Jolla Canyon, he would sit tapping his front teeth with his fingernails and looking out the window. I got very little guidance or encouragement from Fran. We all respected and liked Ed Hamilton of NEL or MPL. Ditto Bob Dietz and Bill Menard.

Sometime late in my third year, with all the requirements for a masters degree in marine geology completed, as well as my Ph.D. orals out of the way, and heading for the Ph.D., and still making \$3900/year, with two kids by Cesarean, and giant doctor's bills, I received an offer from Texas A & M College (now University). They offered me \$4500/year and away we went, Ph.D. incomplete! An improvement in my student assistantship, from \$3900 a year to \$4500 a year was too much to resist!. Peanuts now, but vital to someone with two kids and a wife back then. For the rest of my professional career I regretted not finishing the Ph.D. at Scripps or getting an MS which they said I could not have because I had signed up for a PhD.