ANGEL SKIN

My Discovery and Mining of Precious, Deep-Sea Corals in Hawaii

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Introduction

A Jewelry manufacturing company in Hawaii provides a free one-half hour tour to showrooms where the story on precious corals found in the islands is narrated, including a version of a "story" on the deep-sea, coral known as Pink Coral - also now known as Corrallium Secundum. In this version, the narration omits to credit or report on who, really discovered this precious deep sea coral and successfully mined it and sold it to the company - from which a new and very profitable jewelry industry begun in Hawaii and elsewhere around the world. The present account documents that I was the one who discovered this precious deep sea coral in 1965, then subsequently begun mining it and selling it to jewelry manufacturers in Hawaii, USA, Asia, Europe and Japan. The following is rather detailed account of this discovery and of the many difficulties I faced mining it from great ocean depth. The venture was an arduous and difficult enterprise that seriously endangered my life and, at that time, stretched to extremes my limited financial resources. Also, since my lure for this precious deep-sea coral awakened a desire for other quests around the world in search of other precious stones, a brief summary of such subsequent quests and misadventures is provided.

My discovery of the precious coral took place in 1965 about 12 nautical miles off the southeast coast from Makapuu Point, off the island of Oahu, in Hawaii, where the depth of the ocean was about 1,200 to 1250 feet. It resulted after the reading the proceedings of the famous "Albatross Expedition" and from paying particular attention to a description of the 1907 survey conducted in the vicinity of the Sandwich Islands (Hawaiian Islands). In this segment, there was mention that a small fragment of an unknown coral species was dredged from great depths of the ocean's aphotic zone. Since this coral was unknown and there was no Limnaeus classification for it, the Latin name "Corallium Niveum" ("new coral") was assigned. Also, the brief description stated that this deep-ocean coral had high density and similarities to the precious coral that the ancient Romans obtained from shallower depths in the Adriatic Sea and used it for jewelry. I changed the name of this precious coral from "Pink Coral", to "Angel Skin", because only a small fraction of it was pink, most being slightly pink or white. Most of the coral presently designated as pink by the jewelry industry, is color-enhanced under high pressure and temperature

But first I need to explain the background work that I was doing at the time, which led to my review of the Albatross expedition proceedings and to my subsequent efforts to mine this

precious coral from one of the roughest regions in the Pacific - the Molokai Channel - known for high winds, frequent storm waves and strong currents. Mining this coral turned out to be a tortuous ordeal that I would not have ordinarily undertaken, if I had better sense and judgment. But at that time I was still young, foolish and undoubtedly an incurable romantic looking for some form of adventure as well as for a way to make money. So this is the background work that prepared me and led me to this difficult and very risky task.

Background Work

1964 had been very busy year for me with numerous projects at different stages of completion. I was a Ph.D. graduate student in Oceanography, supporting myself by teaching Chemistry Lab classes and by working on different projects at the Hawaii Institute of Geophysics (HIG) of the University of Hawaii. Our research work at HIG was mainly financed with contracts of the U.S. Navy's Offices of Naval Research and Intelligence and of the National Science Foundation. Professor George Woollard had just taken over as Director of the Institute and secured additional contracts. One of the projects was to monitor the French nuclear tests in the Tuamotu Archipelago that had begun in 1961 and, later in July of 1966, the first of atmospheric test at the Mururoa atoll. Another project involved an ocean seismic survey to find a suitable site to drill through the earth's crust to its mantle. The project, code-named "Mohole", was the U.S. effort to find the part of the oceanic crust, somewhere along the Hawaiian Crest or Trough, that had buckled under the weight of the Hawaiian volcanoes - and thus was thinner. The intent was to eventually drill through the earth's crust to a depth below the Mohorovicic discontinuity - where the seismic waves had much higher speeds - and thus learn of the mantle's physical/chemical composition and, perhaps, something more of the earth's primordial evolution. At the time, we were in a racing competition with the Soviets, who were also working with the same objectives, but somewhere on the Asian continent rather than in the ocean.

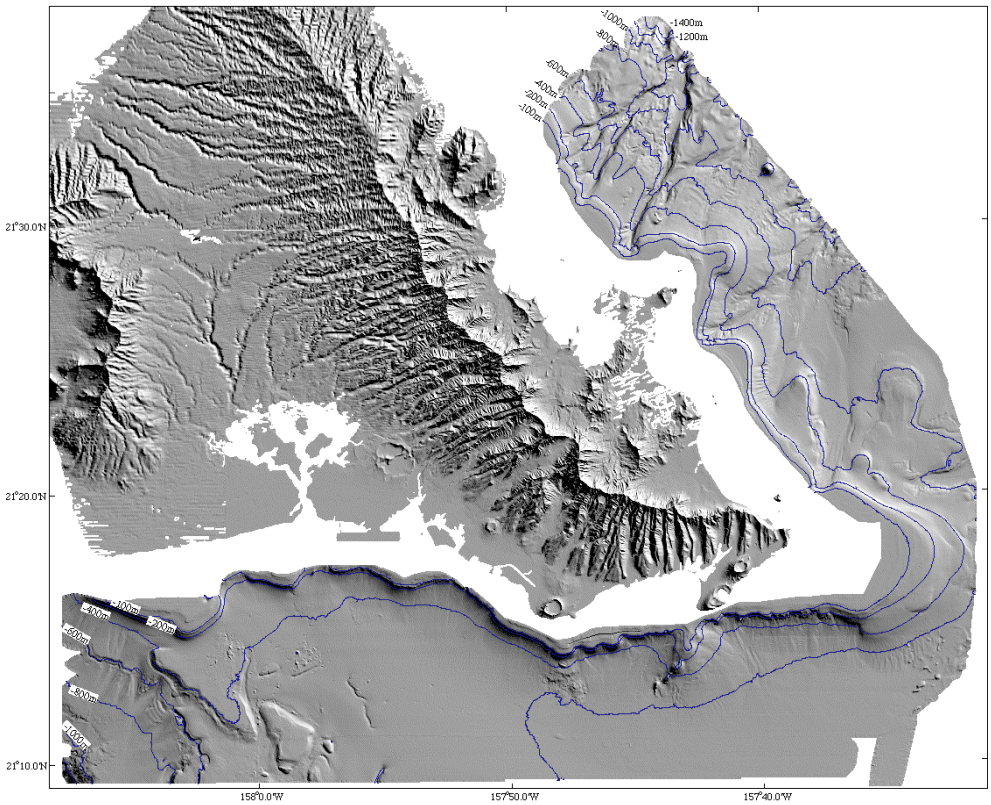
As part of the "Mohole" project, we conducted extensive seismic surveys of the Hawaiian Archipelago's Arch and Trough. For these studies we were using a converted Alaska fishing boat named "Neptune". The boat was essentially a floating death trap, top heavy and unstable, but it was the only one we had and could afford at the time. Loaded with tons of high explosives, mainly TNT, we sailed "Neptune" for weeks at a time, risking life and limp out at sea under very dangerous stormy conditions, with gusts often up to 60 miles an hour, with waves often as much as 20 ft in height, and in mortal danger of the boat capsizing, when its listing would often reach close to 45 degrees. Because of my fear of the boat capsizing, on rough nights I would often prefer to sleep, not in a cabin below deck, but on a sofa in the deck cabin and close to the doorway leading to the ship's open deck. We held watches around the clock on "Neptune", four hours on four hours off, exploding on the sea surface our TNT charges every minute, 24 hours a day, and recording seismic reflections from the bottom and layers below by trailing hydrophones in the water. I was one of the blasters who prepared and exploded the charges - sometimes in the middle of the night, in heavy seas and often while very seasick - which led to some near disasters. In the middle of a night, for example, one of my TNT charges tied to a balloon, a primer and a lit fuse, got dangled in the boat's railing below. Fearing a chain reaction of explosions that would result in the ship's demise - and mine as well - I had no choice but to climb over the railing in

twenty foot waves and break the charge away from the ship, seconds before it went off. The blast almost knocked me to the waves below but I managed to hold on to the railing and climb back on deck. After a series of similar close disasters, the crew of the ship would usually get extremely nervous and quit. Almost after every cruise and after every mishap, we e had to find new crew. However, graduate students like myself could not quit - not if we wanted to get a degree - so we kept on blasting, learning and paying our slave dues. But there was also pride in our persistence not to quit. We were pressed for time and results and this was a race we did not want to lose to the Soviets. This justified the hardships of these early days. We had serious accidents, serious injuries and setbacks. Some of the graduate students sustained extensive burns, others loss of hearing and eyesight, but fortunately we did not lose any lives during that time. "Neptune" did not capsize, as I feared. It got on listing up to 45 degrees, and then righted itself. However, a few years later, another of the University research ships, the "Holoholo", capsized and everyone drowned, including my good friend Dr. Robert Harvey with whom I shared an office at the Hawaii Institute of Geophysics. I had slept late that morning and I missed getting on the ship that fateful December day that the ship was lost - but the "Mystery of the Holoholo" is another long story, about which I will write some day.

At the time I was also involved in some other equally precarious projects - like diving in the middle of the ocean to recover instruments attached to cables 100-120 feet below the surface. However, as graduate students we had not choice but to participate in such precarious escapades. After all we were, cheap labor and perhaps a disposable, replaceable commodity - I don't know. Some of us were also suffering from a "macho" complex and would not admit that we were really scared. Thus for a while, I served also as blaster of explosives in the Kaluanui swamp, the remnant of the caldera of the Koolau volcano on Oahu. I would walk through tall, skin-cutting saw grass in the swamp, in waste-deep water, towing a small boat behind me full of explosives. I would also, carry a flag on a twenty-foot tall pole so observes from surrounding hills could mark my location and that of the blast site. I had terrible experiences in the swamp, as often I could not get away fast enough after setting the charges. Some of the charges went off too close and the shock waves would hit me, like tons of bricks - causing damage to my eardrums. But all of these were good learning experiences, which prepared me for the worse that still laid ahead - the search for the precious coral. And this is the reason why I give this detailed account.

But not all of our work was that of coulee labor. Some of it could qualify as being cerebral. In early April of that same year, and in between "Mohole" surveys and the blasts at sea and in the swamp, I had participated in a survey of the Great Alaska earthquake with contract support of the U.S. Academy of Engineering. I was working with Professor Augustine Furumoto - a seismologist - on a final report on the source mechanism and the analysis of Rayleigh waves of this great earthquake. It was the greatest earthquake ever recorded in the Northern Hemisphere. Also, I had started work on the bathymetry of the Hawaiian islands and Archipelago, reconciling early surveys and boat sheets of the U.S. Coast and Geodetic Survey and producing new contoured charts. Based on the bathymetric charts I was developing, I was preparing reports on the submarine and coastal geomorphology of the Hawaiian islands, mapping its undersea canyons and other features of the deep. During the course of this early work, I was fascinated by the potential of mining manganese nodules from the deep ocean, or anything else that could be harvested, including gold or even radionuclides - possibly with huge bags of ion exchange resins placed

in areas of strong ocean currents. Also that year, I had a chance to participate in a coring survey off the Orange River delta in southwestern Africa, where alluvial diamonds had been found offshore by deep core sampling. However, I could not find the time to participate in that survey and had to decline.



Map showing Oahu Island's hypsographic relief and surrounding ocean bathymetry, but only a small portion of the Molokai Channel to the southeast.

My subsequent interest in the Albatross Expedition Proceedings was purely accidental. As part of my dissertation for the degree in Oceanography, I was researching at that time the concentration and substitution of Alkaline Earth Metals (calcium, strontium, barium) in the calcareous skeletal materials of some recent and fossil corals. Specifically I was investigating the substitution of barium and strontium, ions of greater ionic radius that partially replace calcium in the carbonate mineral structure by a crystallographic inversion of aragonite into calcite with 8% volume expansion - even under conditions of higher pressure and temperature. This was really a paradox that had surprised me, as the denser aragonite near the surface converted to the less dense calcite at depth - rather than the other way around. For this research work, I had collected samples of deep cores of coral deposits on the island of Oahu, as well as live corals - some by diving in the waters of Kaneohe Bay on Oahu, the breeding grounds of hammerhead sharks. It was my search of the literature on corals that brought me accidentally to the proceedings of the Albatross Expedition and led to my subsequent interest to search and mine potentially precious deep ocean corals. The following is a brief description of the ship "Albatross", what this early expedition was all about, and of what I did with the information that led to my discovery and successful mining of the precious Angelskin and Gold corals.

The Oceanographic Ship “Albatross"

The three-masted ship "Albatross" was the most modern oceanographic research vessel of its time. It was built in 1882, for what was then called the U. S. Fish Commission, which, in 1903, became the U.S. Bureau of Fisheries - presently known as the National Marine Fisheries Service. For nearly forty years, the “Albatross” operated in the northern Atlantic coast, the Caribbean, the Pacific coast of the U.S., Alaska, Hawaiian Islands, Japan, and the Philippines. The ship was equipped with the latest scientific equipment of this era and had strong wire winches. On board there were several laboratories, storage space for specimens and sophisticated dredging equipment. It was the first U.S. government ship to be furnished with electric lighting, which allowed sorting of specimens and related collection work at night. According to the records, the Albatross collected more marine specimens than any other ship. Most of the material that was collected was subsequently deposited at the Smithsonian Institution, but some can also be found at other natural history museums.

The three-masted oceanographic ship "Albatross" *(National Museum of Natural History)*

The "Albatross" Pacific Ocean Expedition

In August of 1905, the “Albatros”, left San Diego for a lengthy research expedition of marine life in the Pacific Islands. Leader for this segment of the expedition was the well-known scientist, Alexander Agassiz, son of the equally famous Swiss scientist Louis Agassiz. The ship spent about three years in the western Pacific and scientists on board researched the mysteries of the ocean, bringing to the surface many different species that were unknown until then.

Louis Agassiz, Alexander Agassiz's father *(National Museum of Natural History)*

Side view of "Albatross"*(National Museum of Natural History)*

On 7 September 1907 the Albatros reached latitude 21 North and longitude of about 157 West, near the Hawaiian Island chain - still known as the Sandwich Islands - and begun dredging the ocean floor and recovering specimens from the bottom. Among the marine specimens brought up to the surface from a depth of about 1500 feet was a small fragment of a very strange type of hard coral. This coral was unlike anything sampled previously from shallower depths. The scientists on board were unable to identify this deep ocean coral with any known species, so they gave it the Latin name "corallium niveum" - which translates literally as "new coral". In the Proceedings, which I read, there were comments that it resembled the precious red coral that the Romans used to mine from the Adriatic Sea, from which they made jewelry. According to the report the new coral was harder than that of the Adriatic and its color had a pink hue to it. Also there was a comment about its similar potential use for jewelry. Other than these initial comments in the Proceedings, the new coral was forgotten and no one ever mentioned it or sampled again.

The Quest for the Precious Coral

The reading of the Proceedings of the Albatross expedition got me very interested, particularly the section that described the dredging of the fragment of the unknown coral and the comment that it could be used for jewelry. I knew that the ancient Romans prized the red coral mined from relatively shallow depths of the Adriatic Sea. I wondered if this deep ocean coral that had been sampled in Hawaii, could be used for the same purpose - jewelry.

The Proceedings included the geographical coordinates of the location where they had found this fragment of the unknown coral. It was in the vicinity of the Molokai channel - a rough body of water with frequent strong winds and high waves. I had just completed bathymetric maps for this ocean area, so I had an idea of what the bottom topography was like. It was in an area where I would have expected to find manganese nodules - in the form of manganite - an authigenic mineral of strategic significance and of great value if one could find a way to mine it from the deep ocean. So there was an additional incentive for my wanting to search the ocean floor in that region. I could look for manganese nodules and for the precious coral. A deep diving submersible, the Asherah, had been introduced in 1964 and was being tested at the time in Hawaii. If I could only get a chance to dive at the location that I was interested, at least with the submarine's lights I could perhaps look for manganese nodules and even have a visual of this deep ocean coral. But the Asherah was costly to operate and each dive required the support of a surface vessel. I could not get permission, particularly to look for this coral species. In spite of the restriction, I managed to hitchhike a ride to the ocean bottom one day, but it was not exactly at the location where I had hoped. I saw nothing and I was discouraged. I had nothing more to go by. Just an entry in the Albatross Proceedings, a possible location, and nothing more.

Formidable Challenges

I convinced myself that I should not give up but find a way to search for this precious deep ocean coral. After all what kind of Oceanographer would I be if I gave up quickly without really trying? The challenge of discovering this coral had gotten me excited, as well as the prospect that I could make some money mining it. There was a treasure waiting for me on

the bottom of the sea and I was going to find it and get it. However, the challenges facing me were formidable - particularly if it turned out to be a wild-goose chase. What I needed was a fast, seaworthy boat and proper equipment to do a proper search. It would take a very sizeable investment on my part - money I did not have - to purchase the right kind of boat. The boat needed to have a strong, reliable diesel engine that would cover the 70 nautical mile round trip from the Ala Wai Yacht Harbor and could work continuously without stop for 15-20 hours or more. It would need to have large enough tanks to carry sufficient diesel fuel. Furthermore, it would be difficult to find the coral again, particularly if the coordinates given in the Albatross Expedition Proceedings were inaccurate. To make matters worse, there was no guarantee that I could find this precious coral and harvest it in a large enough quantity to cover my expenses or that I could find buyers for it. Finally, no matter whatever kind of boat I could get, it would have to completely retrofit for the intended task.

There was also the problem of how to get the coral from such great depth, while being tossed around in heavy seas and blown by the wind. I would need to devise the right equipment to dredge the ocean floor. This darn precious coral - if indeed it was there in sufficient quantity - could be anywhere from 1200 -1500 feet down and I would need to let out a scope of cable that would be at least 2,500 feet long or even more. I needed winches, pulleys and at least 3-4,000 feet of strong cable, as well as back up to replace it. If the dredge got stuck on the ocean floor, I would need to cut the cable quickly to free the boat. I could easily loose the dredge, nets and cable - and risk loosing not only the boat but my life as well. Also, the boat would need to have an A-frame built in the aft. A strong, fast winch was a necessity, but it could not be electric as there would not be sufficient battery power to lift the dredge. I would have to purchase an electric generator and a diesel or gas-powered winch with a big enough drum to handle the long cable. Finally, choosing the right weather would have been essential in mining the coral. The waves in the Molokai channel were usually 6-8 feet, but they could peak quickly to 20 feet or more. The trade winds were usually strong at 15- 20 knots but could often gust to 40 knots or more, particularly after the sun came up. Sudden squalls occurred frequently in the area. To dredge for the coral, I would need to start very early in the morning and be at the desired location before sunrise to begin work.

In spite of the difficulties, I did not get discouraged. I would not give up on the precious coral without trying. Being an oceanographer I had convinced myself that I should not be scared of big waves and storms. I had already experienced them on the long voyages on "Neptune". However, my main obstacle was my limited income and lack of savings. Furthermore, I could not convince anyone at the Institute to help me look and find this coral. Indeed the challenges were formidable.

"Orpheus"

Having limited income and unable to afford a fast powerboat, my subsequent decision was to try to look for the precious coral by using my sailboat. The previous owner of this boat had named it "Merrimack" and had sailed it from San Pedro, California to Hawaii, on what was supposed to be a first leg of a trip to the South Seas. However, after reaching Hilo on the Island of Hawaii - known also as the Big Island - his wife did not want to continue. When the great tsunami of May 22, 1960 from Chile struck and destroyed Hilo, "Merrimack" was

anchored in the harbor. However, the huge tsunami did not sink it. Instead, the waves carried it inland for a great distance and deposited it, almost without damage, in somebody's back yard. The destructive 1960 tsunami and the seasickness of his wife forced the owner to abandon his dream of sailing the boat to the South Seas. Dr. Harold Loomis, a professor of Mathematics at the University told me about it. I was able to make an offer and buy "Merrimack" for a good price on an installment payment plan. The boat was repaired, re-floated, and given new life. Subsequently, "Merrimack" was sailed to Honolulu where it became my home at the Ala Waii Yacht Harbor in Waikiki. Although considered bad luck, I decided to change the boat's name. Since "Merrimack" had gone to Boat Hell and back I decided to symbolically name it after my mythical hero "Orpheus" - the son of god Appollo who, in his effort to reclaim his beloved Euridice from the Kingdom of the Dead, went to Hades and charmed Pluto with his music on the lyre. I thought the symbolism was appropriate in renaming the boat "Orpheus" since it had gone to Boat Hell and was saved from destruction. And that is how my floating home got its name.

"Orpheus" at Berth 418 of the Ala Wai Yacht Harbor in Honolulu.

“Orpheus”, was a 38 ft, wide-bodied, double-planked ketch (a Dutch Shallop design) that sailed fine downwind but not so good upwind. It did not have a deep keel or ballast. To minimize lateral drifting when sailing upwind, it had a large centerboard that could be lowered with a winch to provide directional stability. Lateral stability was provided by its extra width. The boat would have been excellent for the shallow and tranquil canals of Holland, but not so good for the Pacific, where a deep-keeled displacement boat could ride the waves

much better and could sail into the general direction of the wind at a lesser angle of incidence. Even with its large diesel engine, I figured that it would take me several hours to sail or motor "Orpheus" the 30 or so nautical miles to where the precious coral was supposed to be - and that would be on an upwind sail in the open sea under difficult conditions. Since "Orpheus" was also my home where I lived with my four dogs - strays that I had picked up - I would have to risk loosing everything. However, being young, foolish and hungry for adventure, I decided to use "Orpheus" anyway for my quest of the precious deep-ocean coral.

Preparations for the Search with "Orpheus"

During the next few weeks I prepared for the search with "Orpheus". I bought 3,000 feet of nylon rope, pulleys and reinforced the boat's aft cleats. Subsequently, I devised and welded a metal dredge that could be dragged along the ocean floor to break the coral. To catch the coral after breaking it, I attached eye loops to a heavy metal bar of the dredge with bundles of heavy strings of fishing nets I purchased from the Washington Net Factory in Seattle. In designing the dredge, I had to make sure that it would not act as an anchor for the boat and that I could indeed be able to drag it along the bottom by putting the diesel engine of "Orpheus" in forward gear and advancing its speed accordingly. However, there were still too many unknowns whether my scheme would work. I had absolutely no idea whether I could indeed find the precious coral, whether my dredge would actually work, whether the nets would actually tangle some of the coral that would break, or whether I could bring some up to the surface. I had no electric or any other type of winch on the boat that I could use. I would have to lower and lift the dredge by hand using old fashion block pulleys and making sure that about 3,000 feet of nylon line did not tangle. Also, I had to figure out the buoyancy of the nylon line and determine whether my dredge weight exceeded it so that the bottom of the ocean could be reached. Wire cable would have been better, but 3,000 feet of cable that I would need would be too expensive to buy and I had no power winch installed on "Orpheus" that could handle such a long cable. At the time, there were too many obstacles and simply too many unanswered questions. I could only proceed by trial and error.

"Orpheus" - in search of "Euridice"

To make matters worse, the weather was not favorable at that time of the year. The trade winds were strong, the waves were high and "Orpheus" was a small boat, slow and very vulnerable. I did not know if I had enough horsepower in the diesel engine to pull the dredge I had designed. Furthermore, and as mentioned, I was not sure if the Albatross expedition coordinates were correct and whether they had been taken with celestial navigation or by triangulation, using visible distant coastal references from the islands of Molokai and Oahu. The charts used around the turn of the 20th Century were not very accurate for the Hawaiian Archipelago. Depth measurement was also inaccurate. They were taken sporadically with line and lead - a very difficult process in those days. The Proceedings did not give specific information. Regardless, I decided to try to search anyway for the precious coral - to see if it really existed and in large enough quantity to mine it effectively. Already, I had given up on the manganese nodules - it was the precious coral that I would go after.

The first of my searches for the precious coral with "Orpheus" to the location reported in the Albatross Proceedings turned out to be a near disaster that almost discouraged me from continuing. The day I sailed, there were strong winds and big waves in the Molokai channel. It was not a good day to leave the harbor but I had to take advantage of the weekend. Also, I did not want anyone to know the location where I was heading, so I limited my crew to my girlfriend and another young woman - a choice I later regretted when things got really tough and needed muscle power. Another of my mistakes was taking my four dogs with me. I tied them with short leases on the deck so they would not be swept over the side by waves in case things got worse. But as we headed out towards the Molokai Channel - even before the waves got bigger - the dogs got frightened and seasick, so I had to move them for their protection to the cabin below.

Rounding Diamond Head on the way to the Molokai Channel, the faithful canine crew of ""Orpheus"" - Skipper, Puppy and Aris (in the lifeboat). Lydia cannot be seen. She is taking a nap in the lifeboat.

It took several hours to sail and motor "Orpheus" upwind against the strong trades. I stayed clear of the Coco Head peninsula where the current was strong and against me and there were standing waves from strong reflections off the cliffy coast. I headed on a course ranging from 110 - 118 degrees on a southeast direction, as the trade winds would allow me.

Whenever, there would be a shift in the wind, I would try to do as much easting as possible, but "Orpheus" could not point well into the wind - its gaff rig and its lack of proper displacement would not allow it. The best I could do was 45 degrees and then try to tack. I decided to keep on going on the approximate course of 115 SE, then try to use the engine to do the easting - and this is what I was finally forced to do. Put the sails down and use the engine alone to go upwind. Without the steadying of the sails, the ride got rougher and rougher with "Orpheus" bouncing like a cork. When I finally got to the approximate location described in the Albatross Proceedings, somewhere in the middle of the Molokai Channel, the wave conditions were just too rough to allow me to take horizontal sextant bearings to determine and plot the boat's position. Furthermore, the sun was going down and it was getting darker. I could hardly see land points on Oahu or Molokai for the needed triangulation and determination of latitude and longitude. GPS positioning had not been invented yet. Discouraged by the adversities, I decided to seek refuge for the night on the protected West coast of Molokai and so I sailed "Orpheus" towards Kolo Harbor. I decided that I would return to this same location in the early morning, before the winds picked up speed.

It was almost midnight when we got to Kolo harbor and had trouble finding the channel markers leading into its safety. It was a moonless night which made things more difficult, but I winched up the boat's centerboard and shined my flashlight on frothing breakers on either side to make sure that I did not go off channel and "Orpheus" did not run aground. When finally I made it into Kolo harbor, there were no other boats - only one abandoned barge. This small harbor was only a loading facility for barges bringing sand to re-supply the eroding beaches in Waikiki. When I finally tied the lines of "Orpheus" to the pier, I was exhausted. We had dinner, and then I set the alarm for 5 in the morning and went to sleep.

"Orpheus", tied on the dock of the Sand Pile at Kolo Harbor in western Molokai.

To Hades and back to the World of the Living

The following morning, the girls made coffee, I fed the dogs and let them run on the abandoned harbor. Then we motored "Orpheus" out of Kolo harbor and headed in a NE direction. The sun had not as yet risen. Motoring to the desired location was much easier this time as the winds were favorable and not too strong. The height of waves ranged from 5-6 feet so dredging would be doable. As we got closer to the desired location, my girlfriend Jean steered the boat and I begun to take horizontal sextant angles to plot our position. Makapuu Point on Oahu was visible in the distance and so were Kaneohe Bay and the westernmost point of Molokai. I had no fathometer to measure ocean depth so I relied on the depth shown on the chart, relative to the position of the boat. From time to time I would refer to the contours of the bathymetric charts that I had prepared at the Hawaii Institute of Geophysics to estimate the approximate depth on the submarine slope of the SE Koolau volcanic rift zone below. With corrections in steering and with all the sails down, I continued to power "Orpheus" towards the coordinates that I was aiming for and from time to time I would repeat the triangulation and the plotting on the chart. When we finally reached the position indicated in the Albatross Proceedings, I got ready to lower the dredge to the bottom of the ocean. First, I threaded the rope though the heavy pulley I had attached to the boat's chain plate and then connected the heavy dredge that was lying on the deck with the strands of nets hanging behind it. Slowly I begun unraveling the heavy nylon rope from the big spool I had attached to the deck and I begun to lower the dredge with the boat's engine in neutral so that the rope or the nets would not tangle the propeller. Then I raised a small jib to give me downwind movement away from the dredge's line. It took about an hour of slow unraveling of the rope and I was not sure whether the dredge was on the bottom, but most of the rope from the spool was gone. I had no more rope to let out. I hoped that my calculation was correct and that the rope did not provide more buoyancy than the weight of the dredge. The moment of truth had arrived.

The dredge must have been on the bottom because the boat would no longer move downwind. It seemed that we were now anchored in the deep sea. I started the boat's engine, put it in forward gear and slowly increased the throttle. The boat jerked forward but then stopped. I gave the engine more throttle and there was another jerking motion forward. Indeed the dredge must have been on the bottom and dragging. But was there any coral at that location or did I drift too far? I continued this tag of dragging the dredge and jerking the boat with power, but the nylon rope was acting like a big rubber band and would pull "Orpheus" backward. It was a tag of war I did not know who would win. Would I be able to continue dredging, would the rope snap or would the pulley hold with all that strain on the mizzenmast? I was getting frustrated and to make matters worse, the wind begun blowing harder and harder as noon approached. Finally, after one more jerking motion the boat got stuck again as the dredge must have hooked to something. We were now permanently anchored and there were sudden wind gusts. I put the boat again in forward gear and increased the throttle but nothing happened. I had no idea what to do next. Cut the rope to free the boat and loose the dredge or gun the engine to maximum rpm in forward gear and risk loosing the boat's chain plate and possibly the mast. I decided to take an alternative course. I could not back up because the propeller would tangle the rope but I could rotate 360 degrees around the pivoting point on the ocean floor and try to free the dredge from the opposite direction. I tried that and begun turning the boat around into the wind. The boat was

now upwind from the dredge. I gave the engine more throttle and after another rough jerking motion the maneuver finally worked. The dredge was finally free but I needed to bring it up or risk loosing it. Exhausted from all the work, I begun to pull the dredge by hand trough the heavy pulley. I used some mechanical advantage by wrapping the rope around the drum of the anchor winch in front of the boat. But this was a slow and backbreaking process. Every so often I had to stop to tie a couple of loops of the rope around the winch drum, secure it and take a rest. The girls could not help me. I wish I had some guys with me to help me with the lifting and pulling, but it was too late now. I had made most of my mistakes. And so for the next two-three hours as the winds were getting stronger and the waves greater, I struggled with the rope and the pulleys. It was very late in the afternoon when I finally pulled the dredge to the surface and over the side of the boat. The front bar on the dredge was bent but holding. The bridal I had rigged to pull it was broken on one side. Obviously my design was flawed. I would have to have less spacing on the bar so it would pivot rather than the bridal caught on rocks below. The strands of the fishing net nets were there but appeared to be shredded to pieces. I did not see any of the precious coral that was supposed to be on the bottom. Obviously, I had to use different size heavier nylon nets that what I had rigged. I saw some glue like red substances on the nets, some sea fans, but nothing more. I was devastated by the failure. Moreover, the weather was turning nasty and there was no time to head for Honolulu. The sea was frothing in all directions, as the gusts got stronger and stronger. Slowly my landmarks disappeared from my view as darkness set in. All I could see now was the sea going on forever, grey now in all directions. Apparently things would get worse and Orpheus could be in imminent danger. Quickly I piled the nets and the dredge at the back of the boat and laced them down. I decided that given the circumstances and my degree of exhaustion, the best thing to do was to try to take refuge again for one more night at Kolo Harbor, hoping that the weather would improve. So I took a bearing from the chart and using the compass, headed for the westernmost side of the island of Molokai once more. As we got closer to the island, the darkness of the night had set in. As we got closer to where I thought Kolo Harbor was, I looked for breaking waves, hoping that we were still in deeper water. Finally, I saw the harbor's A-buoy and headed for its channel, in almost total darkness. I shined a flashlight on both sides of the channel to make sure we were safe from getting caught by the waves that were breaking waves on both sides of the channel. Although we were now safe in the protected side of the island and hopefully in the middle of the channel where the water was deeper, I could still hear the wind howling and whistling above the hills. But we were safe now, I could see the channel buoys on both starboard and port sides. I decided we could try to cross the damn Molokai channel in the morning regardless of weather. We had no choice. We all had to be at work on Monday morning.

Between Scylla and Harybdis

I tied "Orpheus" to the same pier as the night before, next to the same sand stockpile. The barge was still there and so was a tugboat that would pull it. Again, we did not see anyone on board. I assumed the crew of the tug must have hitched a ride to Kanakakai while waiting for the weather to improve. Then I listened to the weather report on the radio. There was a tropical storm somewhere to the northeast of the islands and there were small craft warnings for the Hawaiian waters. The report mentioned gusts of up to 35-40 knots and waves ranging

form 12 -15 feet in the channel. Certainly that was not the proper weather to cross the channel but I had all kinds of things scheduled for Monday. The girls had to go to work as well. If we stayed at Kolo, there was nothing to do. I decided to wait until morning to make a decision as what to whether to wait or go.

I had crossed the channel earlier in July and there had been no problems. Of course the weather had been great in July when I sailed ""Orpheus" across the channel and around the lee side of the island of Lanai. Also, I had plenty of help. We had sailed all night long and had arrived in Lahaina, on Maui the following morning. We had tied to a buoy and taken the dingy back and forth into town where we had a great time. On July 4th, we had sailed "Orpheus" to Kaanapali, dropped anchor there and watched the fireworks. The next morning we sailed through the Maui channel and had crossed both channels to Honolulu in less than seven hours. It was a great sail and there had been no problems. Of course there were no small craft warnings that day and the waves were only 4-6 feet. So why, should be much different now? I tried to convince myself that "Orpheus would have no problem. I tried to reason it, but I could not entirely convince myself. I would wait until morning to make a final decision. The problem was that there was no town and no stores at Kolo harbor. There was no public telephone to call anyone in Honolulu. We had no means of transportation to get to Kanakakai.

I let the dogs off the boat to run on the pier, and then we had dinner. I explained to the girls that things could be somewhat rough in the channel if we sailed across. We agreed to wait until morning to decide whether to wait or make the crossing. Getting some rest and sleep was our main priority at that time. I was exhausted from the day's hard work, I was hurting all over from the effort of pulling up by hand the dredge, and needed to get my strength back. We had dinner and right after we all went to sleep. I woke up only once during the night and went on deck. I could still hear the wind whistling above.

In the morning, the wind was still whistling above us. The sea seemed fairly flat offshore, but we were on the protected lee side of the island. The waves could get high in the channel. I figured that twelve to fifteen foot waves could not be that bad if they had long periods, but the high wind bothered me. I had experience much higher waves while sailing on "Neptune", but "Orpheus" was a much smaller boat. We decided to leave anyway. We had breakfast, walked the dogs, and took some photos of "Orpheus" from the other side of the pier, then begun getting ready for the crossing. I secured the dingy with ropes, tied down the dredge and the nets, got the two sea anchors out and placed them near the boat's stern, close to the wheel within my reach. Then I replaced the larger canvas jib with a much smaller storm jib and I furled the main way down to its lowest position. I decided that there would be no need to raise the sail on the mizzenmast - not with the wind blowing so hard. The jib and the furled main would be more than enough. Then I laced safety lines from the front of the boat all the way to the back to have something to hold on or hook if I needed to go forward for whatever reason. Having finished the preparations, I started the engine, pulled the lines from the pier and steered "Orpheus" out the channel of Kolo harbor.

Exhausted but steering "Orpheus" towards the open sea.

Everything looked great and we were moving downwind very well. After clearing the channel, I adjusted the main and changed to a northwest heading for Honolulu. For the next half hour, as we were still in the area sheltered by Molokai everything was going very well. However, as we lost our sheltering protection the winds begun to blow harder and the waves were higher. "Orpheus" was sailing well at its maximum hull speed, although the ride got increasingly bumpy. I decided that we did not really need any help from the main. The storm jib appeared more than adequate given the high wind. So, I decided to lower the main and secure it. While Jean was at the wheel I did that. It was a timely decision because minutes later I saw a huge squall approaching the boat from the Northeast. I returned to the wheel, and asked the girls to put life jackets on and go down into the cabin and close the hatches. The dogs were already down. I hooked my harness to a safety line and held on tight to the boat's wheel.

On the way to Scylla and Harybdis

Minutes later the squall reached and engulfed us. First the gusty winds then the heavy rain. Frothing at the tops, waves begun breaking, "Orpheus", with only the jib up was now surfing down the steep wave faces. I had no choice but to abandon any notion of keeping on the initial course towards Honolulu. Besides I had lost sight of the island. My main concern now was the breaking waves building up in height behind us. "Orpheus" was no longer sailing but surfing down the steep faces of these waves. I tried to quarter down the wave slopes so as to keep "Orpheus" from breaching and taking waves broadside - which could certainly capsize us. It was difficult. I would ride the crest of a wave for a while, until it passed underneath, then I would be way down in the trough of the next wave looking up on the next frothing crest coming down upon us. But the boat's stern would rise and then I would have another surfing experience for a while. In spite of the short sail, the boat was still moving fast enough, but I was very worried. I could steer away from the tops of the breaking waves, much like surfers steer away from breaking waves near the shore. But, with each wave I could feel the pressure on the boat's rudder and I was worried that it might break. I tried not to fight the rudder but simply make small corrections as needed, but things did not look very good.

Near the crest of a huge wave, quartering and surfing down its steep slope.

Suddenly, a huge wave with a breaking top appeared behind the boat. I tried to steer away but I could not get away in time. The wave came down on "Orpheus" with immense force and drenched the boat and me completely. I heard the hatch of the engine room break and I

saw water pouring into it in huge quantity. The dingy on top of "Orpheus" got knocked hard but the strapping lines held. For a minute it appeared that "Orpheus" would breach and capsize, but it righted itself up again. With help from the rudder, I begun quartering again away from a second breaking wave, but this one too struck "Orpheus" with the same force. More water begun to pour into the engine room. If that kept up, it appeared that we were doomed. I yelled to the girls to get me a mattress from one of the bunks and pass it to me through the hatch of the flooding engine room. Jean was able to get one and stuck its end through the broken hatch. Quickly, I folded it and jammed the opening, as a third wave crushed upon us. The mattress held in place and only a small amount of water came into the engine room and the cabin this time. But much to my dismay, the pressure on the rudder had decreased. What I had been afraid of had happened. The rudder had partially broken, as the third pin near its support was gone. However, a portion of the rudder, about a foot and a half, was still in the water so I had partial steering. I was hoping that the other two pins would hold but I was very worried. Quickly, I tied the end of one of the sea anchors to the starboard side on the stern of the boat and deployed it over the side to keep from broaching. With the storm jib pulling and the sea anchor dragging, at least I could maintain some directional stability. Subsequently, I deployed the other sea anchor on the port side and begun pulling the ropes on either side to see if that would give me the ability to steer if I lost the rudder completely. I was unable to steer that way. The lines needed to be attached to the more forward cleats so there could be pivoting action to help steer. However, the girls were unable to help and I could not un-strap myself and leave the steering wheel. I needed someone to steer.

I was frustrated, wet, exhausted and scared. How long would this damn squall last? Would the rest of the rudder break away? Would "Orpheus" make it across the channel? I could not see the island and there was not way I could stay on a compass heading. All I could do was ride the waves in the direction that was easiest. The ordeal lasted for more than an hour, then the rain stopped and I could see Oahu in the distance. I could see Coco Head. We weren't too far off course. Perhaps all was not lost. The wind was not as strong. We were still surfing down the waves but the storm jib and the sea anchors were doing a good job on keeping "Orpheus" from broaching. Even with less surface area, what was left of the rudder was still functioning. I could steer the boat. I just had to get to more protected waters on the other side of the channel.

Slowly but steadily "Orpheus" continued in the general direction I wanted to steer - downwind and closer to land. To gain speed, I pulled the sea anchor from the port side. An hour later we were offshore from Sandy Beach and a little later we passed Hanauma Bay. The wind was much less now and the waves had diminished in size. I was relieved. The girls came back on deck. They had been crying. Jean took the wheel and I went down to assess the damage. There was lots of water in the engine room. In the main cabin the water was over the floorboards. I did not want to use the electric pump because I wanted to conserve battery power to start the engine - provided it would start. I used the hand pump instead and the water in the main cabin was now below the floorboards. The level of the water from the engine room was also coming down as it drained into the main cabin. I asked Cathy to help with the pumping and went into the engine room to assess the damage there. I was worried that seawater had gotten into the engine's oil pan. I checked the oil dipstick. Miraculously seawater had not mixed with the engine's oil. I checked the voltage on the engine's starting

battery. The meter read 12.8 volts - still good for starting. I waited until the water level inside the engine room dropped below the height of the engine's flywheel, then cranked the starter. There was a click on the solenoid but the starter's bendix did not kick in. I tried again and again, but without luck. I took a hammer and pounded the solenoid, then tried again. The starter spined this time but the bendix did not engage the engine's flywheel. I tried again and again but the bendix seemed to be stuck. I hammered the starter again, cleaned the starter terminals and gave it one more try by crossing them with a screwdriver. This time the flywheel engaged and the engine begun to purr the way it was supposed to. Elated now, I came back on deck, relieved Jean and steered "Orpheus" towards Diamond Head and the Ala Wai Yacht harbor. We got into the harbor by one in the afternoon. Our ordeal across the channel had only lasted about six hours, but it had seemed more like an eternity. I had no precious coral, but at least we were finally home safe and though the boat was damaged, it was not seriously.

After tying the boat and washing it down and helping with the cleaning, the girls left. I took the dogs for a long walk, and then when I came back I started untangling the nets from the dredge and pulling some strange wood like fans and other miscellaneous marine life that had been caught by the nets. Suddenly, my hands began swelling and getting red. My face begun to burn as well and became very red. I had a sudden and unexplained allergy to what I was pulling off the nets. Quickly, I stuck my hands in cold water and took a break. When the swelling went down, I put on rubber gloves and continued the cleaning of the nets. I threw away the wood-like fans, not realizing at that time that what I was throwing away was a coral later named "gold coral" that became highly prized for its use in jewelry. I took a water hose and begun to wash the nets when suddenly, out of the corner of my eye I noticed something that looked like a rock stuck in the net. I reached for it and much to my surprise it was a fragment of the precious coral that I was searching for. Just one small fragment and nothing more. Needless to say I was excited. I had found a fragment of the precious coral, but where was the rest? Why didn't I get more? Was there more? Was there enough on the ocean floor to make it profitable or was I just wasting my time? I was excited and disappointed at the same time. So much effort and so much risk for just a small fragment of this damn coral. My use of nylon rope and hand pulleys, had failed miserably. At considerable cost I had purchased and spliced almost a mile of nylon rope, which, because of its buoyancy and elasticity was useless. Raising the dredge with hand pulleys and by hand had been physically exhausting and time-consuming. Also, I wondered if I had been looking for the precious coral at the right location. Perhaps the coordinates given in the Albatross Proceedings were wrong. Also, they only had dredged a small fragment. Perhaps there was very little down there. I was puzzled, perplexed and confused. Perhaps I was a fool to think that there was a treasure at the bottom of the sea waiting for me to find. With mixed emotions as to what I could do next, I decided to wait for a while and, if I had another chance, to try again, but not with "Orpheus" next time. I needed a fast powerboat with a strong engine. I needed a power winch and cable, I needed to redesign the dredge and get heavier nets. I needed perhaps to look somewhere else besides the location given in the Albatross Proceedings. I needed to go deeper perhaps. Perhaps the coral was in greater abundance at another depth zone. But more than anything, I needed some money to do all these - and I had none. I was elated by my discovery of the fragment - in spite of my predicament - however, what I needed most that day was sleep. I went to sleep early that evening. I had to be at work at the University in the morning.

Analysis of the precious coral fragment

In the next few days I pondered what to do next. In spite of the small fragment I had brought up from the deep, after going through the horrendous ordeal in the channel, I decided that I could not search again for this coral using "Orpheus". The boat was my home and too much was at stake. Since I did not have the proper boat, I thought that perhaps I should look for someone who did - to help me. I wondered if anyone would take me seriously if the only thing I had to show were this small fragment of coral, which I claimed to be precious. I had no choice but to wait and try again at a later time, with someone's help or perhaps, after I got some money and could buy a proper boat of my own.

In observing over and over the small fragment of coral I had brought from the deep, I was both puzzled and fascinated. On its surface there was an orange like skin which apparently was the colony of countless marine organisms that thrived on this very substantial skeletal material, but all dead and dried by now. I marveled on how these tiny organisms were able to live in the, cold, dark and hostile environment of the deep ocean floor and build their skeletal materials on which they replicated themselves through eons of time. These tiny microscopic coral organisms were able to do something even more remarkable. They were able to extract from the sea's primordial soup the dissolved ions of positively-charged alkaline earth metals such as calcium, strontium and barium, as well as the negatively-charged ions of carbonates, consisting of carbon and oxygen, and combine these ions into molecules of solid matter. Then, they were able to build, molecule-by-molecule, layer-by-layer, solid forms of inorganic skeletal materials on which the colony would expand and thrive. Furthermore, these dense crystals that these microorganisms created had unique and distinct mineralogical geometry and composition. It was truly amazing.

Apparently, when these organisms died new ones would form on the surface of this skeletal material to continue the building process over a period of time extending for hundreds of years. I estimated that at that depth it would take about was 200 years for the skeletal material to grow one inch. There were no changes of season down in the deep. The same hostile conditions persisted. The same lasting darkness and coldness throughout each year. The high density of the coral skeletal materials must have resulted from the high water pressure. At that depth the pressure was about 50 times greater than the atmospheric pressure at the surface. In brief, I concluded that the small 4-inch fragment, which I had recovered, could be from a coral colony that may have been established several hundred years ago - perhaps 800 years ago. It was truly this miracle of nature that I was seeking to comprehend and learn more about - and perhaps get rich by mining. Indeed, as a scientist I had the urge to learn more about this deep-sea coral, but since I was also seeking to profit, I wondered about myself. Was I a knowledge-seeking researcher or simply an opportunist trying to exploit this miracle of the sea? Perhaps I was a little bit of both. I decided to put aside all moral questions on my incentives for time being and to simply concentrate on learning more about these rare coral organisms and the skeletal materials on which they made their home in the deep sea.

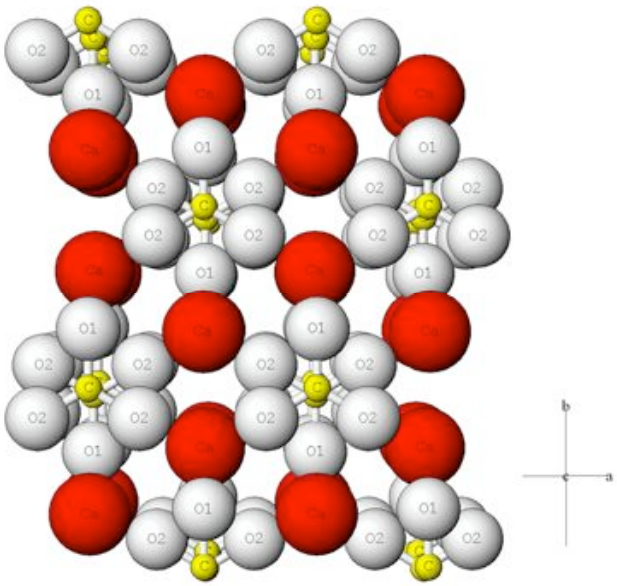
Since at the time I was working on a research project involving the barium content in the calcareous skeletal materials of some of the recent and fossil corals of the Hawaiian Islands, I decided to extend my study on this coral fragment that I recovered and do a mineralogical and chemical analysis to determine if there was anything more special about it - besides its

high density and relative hardness. Specifically my research at the time also involved the investigation of the crystallographic inversion of the skeletal materials of recent corals which were deposited in the form of aragonite and their conversion to the calcite crystal structure, as well as the selective substitution of calcium by other alkaline earth metals - such as barium and strontium - which had greater ionic radii. I believed that the crystallographic ratios, and perhaps the inversions were dependent on the substitution of barium and strontium by calcium and that the fossil corals at depth were slowly being altered from aragonite to calcite, paradoxically with about 8% volume expansion. I was trying to determine whether a quantitative relationship existed between the strontium (mainly) content of the corals and their aragonite-calcite ratios. My preliminary results indicated that indeed there was such a relationship. I wondered if could determine a similar relationship in the skeletal material of the deep-sea coral I had obtained. I wondered if I could find barium and possibly radioactive strontium 90 substitution in the aragonite structure.

At the time there was proliferation of nuclear testing in the Pacific so strontium-90 was abundant as well as other radionuclides. Since 1945, the nuclear powers had exploded more than 2,000 nuclear devices and there had been major radioactive fallout, particularly in the Pacific region. The United States had been carrying bomb testing on Bikini Atoll since1954. The Soviets had begun major testing in 1964. The French had begun mostly atmospheric tests at the Moruroa Atoll that same year. In view of all that nuclear testing, there was a strong belief that there was radioactive contamination of many regions of the Pacific, as far South as New Zealand. But could the strontium-90 from atmospheric nuclear testing have been up taken by this deep ocean corals? This was a question that I was interested in answering. Certainly the recent surface corals could uptake radioactive nuclides, but given the depth of the water and the slow growth rate of the skeletal materials of this deep-sea coral, perhaps it was too early for strontium 90 to show up in the structure. Nonetheless, I was determined to find out, anyway - if I could.

I had complete access to the Chemical Oceanography Laboratory at the University. Professor Brian Pasby had given me access to all the equipment and instruments there. Also, the late Professor Harry Zeitlin had given me access to some of the instrumentation of the Chemistry Department at Bilger Hall, where I had been a PhD. graduate student. Also, he had provided me with ion exchange resins so I could concentrate trace elements in my samples, for subsequent controlled analyses using gas chromatography, X-rays and other analytical methods.

In the following days and with great reluctance, I cut a section off my small fragment of the precious coral, immersed it in Clorox to destroy the organic ingredients, had it cleaned and properly dried to avoid contamination, grinded it up, then begun a mineralogical investigation. As I suspected the crystal structure of my precious coral turned out to be a very dense form of wonderful aragonite. No calcite was present. It was pure aragonite, the orthorhombic polymorph of $CaCO_3$. Its density being D_x (g/cm^3) 2.93. It was indeed a miracle of nature. Each of the aragonite's millions of individual structural units, repeated in all directions and formed a wonderful, compact geometric pattern - in the orthorhombic crystallographic system. Much like a diamond of the sea - but of course not as hard. But what was amazing about this coral is that it was a miracle of order and structure, created by living marine organisms.



The Aragonite Crystal Structure of the Precious Deep-Sea Angelskin Coral

I decided that I should study the skeletal material of the precious coral further, in the same way as I had done for my other coral samples - first qualitatively with Meigen stains and subsequently quantitatively using X-ray, and other techniques. I wanted to proceed with the strontium and barium content analysis, but that would have meant sacrificing more of my small fragment of the precious coral - and I did not want to do that. I decided that I should wait until I got more, so I did not proceed with extraction and concentration with ion exchange resins. I needed to focus on getting more of this precious coral. But how was I going to do that? Carefully, I went over the navigational charts of the offshore region, then over the bathymetric maps that I had prepared to publish as an HIG report. I decided that I should look deeper for the coral than where the Albatross had reported sampling a fragment in 1907. I reasoned that there must be areas of higher concentrations of this coral on the ocean floor. Perhaps in areas of stronger ocean bottom currents. But again I needed a proper boat and some money to continue with my search.

The Big Break - The Day I died.

Since lack of money prevented me from getting a proper boat to search further for the precious coral, I decided to find some way to supplement my income. An opportunity presented itself when Bill Marsellis, a scientist with Marine Advisors - a California Company - got a contract to do a study of coastal circulation near an outfall on the North side of the island of Oahu. I don't remember what was supposed to be coming down the outfall and into the sea, perhaps it was sewage or fertilizers, but there was concern that polluting effluents could end on the shoreline - particularly under the extreme wave conditions that occur during the winter months on the north shore.

Bill hired my 18 ft. ski boat, to conduct a near shore investigation to determine the circulation patterns, and me as well as the alongshore and rip currents under extreme winter wave conditions. I was going to use color dies and floating cards to establish the near shore circulation trends. The color dies would indicate the flow patterns. However, the use of dies required simultaneous photography from the air, which was expensive, as an airplane would be needed. Floating cards was a less expensive alternative. The cards would be dispensed near the outfall and recovered along the beaches of the north shore in subsequent days. Both methods would indicate what would happen with the outfall polluting effluents - in other words if the outfall was doing a good job or not in disposing effectively to the deep the unwanted toxic materials. However, the extreme waves arriving from storms in the North Pacific and the Gulf of Alaska in winter months could affect the usual near shore circulation and the toxic materials could end up on beaches. This is what I was hired to find out. How extreme waves affected the near shore circulation in the vicinity of the outfall - and this is what I proceeded to do.

The area where I begun my study was Kawela Bay to the west of Turtle Bay, where the Hilton hotel is now located, and to the east of Waimea and Sunset beaches where monstrous waves of 30+ feet are not unusual in the winter months. This where the world surfing championships are held every year. Earlier that week, before the predicted arrival of the big waves, I had taken my 18 ft. ski boat on its trailer to a ramp near Kawela Bay where I lunched it. I had a good time camping and even managed to do some snorkeling where I saw many of the sea turtles that come to this area. However, the following day, further out near the outlet of the outfall, while fortunately on the boat, I saw a large size tiger shark - perhaps a 12-14 footer. He seemed to be territorial.

Everything went smoothly the first couple of days but then, as predicted, the big waves begun arriving from the north. The waves progressively got bigger later that day and were breaking on both sides of the bay, with heights in excess of 20 feet. The quantity of water piling up on both sides of the bay by the onset of these huge waves, created alongshore currents that were flowing like fast flooded rivers to the center of the bay feeding a strong rip current that was flowing out to sea. I had the ideal conditions for my investigation and I felt somewhat safe as long as I stayed within the Bay where the waves diminished in size. However, that day the alongshore currents within the bay got much stronger - as much as 6-7 knots. That was not a problem since I had sufficient horsepower on the outboard motor to go against them. I had no problem getting around, as long as I remained within the bay. What happened a few minutes later that day proved that I had a false sense of security.

As the breakers got progressively larger, my boat began being tossed around like a cork by reflections bouncing off the rocks on either side of the bay. Suddenly, out of nowhere, a huge, rogue wave reflection off a small rocky island to the west broke on top of my boat, completely filling it. Immediately my boat begun to sink, with the aft where the big heavy outboard engine was, going down first. Desperately, I grabbed my swim fins and managed to put them on. I was now in the water, but only 100 feet from the shore. The whole boat was submerged but the bow had air trapped and was still floating near me. I grabbed the boat's bowline and puling it, I begun to swim towards the shore, hoping that I could make it and salvage the boat. I had my fins on and therefore I thought that I could tow the boat to the beach, which was so close to me. In spite of my efforts I was unable to pull the boat. The alongshore current was like a fast moving river that was taking both me and the boat out towards the stronger rip current in the middle of the bay. I tried for several minutes to tow the

boat but there was no use. Finally, I abandoned my efforts and tried to save myself. I swam as hard as I could with my fins on, towards the beach, which was still very close. In spite of my efforts I could not make any headway. The current was just pulling me out towards the rip current in the middle of the bay. For several minutes, I tried to swim across it, but it was no use. The current quickly took me to the middle of the Bay, then the strong rip current caught me and I was taken out fast towards the open sea. I knew the circulation patterns so I decided not to fight the rip current. I would let it take me out to the open sea, then I would have no choice but to let the huge, monstrous breakers push me to shore. My only hope was to get caught by these breakers and try to ride them without drowning. Keeping my head out of the foaming, frothy water would be the problem with breathing.

The current had already taken me out for almost a mile to the open sea. It was now late in the afternoon. The sun was setting and soon would get dark and I would not be able to see anything. I must have been in the water for a fairly long time because suddenly I saw a helicopter searching the bay. Somebody must have seen my boat sinking and probably called the Fire Department at Kahuku. The problem was that the helicopter was searching on the other side of the bay, far from me. I waved my hands in the air but no one could see me at that distance. No one could see my head in the frothy, agitated water. It was dusk and soon would be dark. The helicopter was flying low but not in my direction. I had no choice but to ride one of the huge breakers and begun swimming towards them. I got caught by big wave and begun my ride towards shore. I had a great deal of difficulty catching a breath now and then because the foaming waters completely covered my head. I kicked hard with my fins to raise my head above the frothy foam and catch a breath, and then rode the big wave part of the way in, until the next monstrous wave caught me. The third wave carried me all the way in and pounded me against the rocks of the small offshore island to the west of Kawela Bay. I tried to hold on to the rocks but the backwash was just too strong. It tore my grip and carried me back into the sea. I was now terribly scratched, banged and bleeding at my hands, my chest and my legs. I tried for a second time to land on the rocks and hold on, but again it was impossible. The backwash would toss me around, grind me on the rocks and take me out again. After about fifteen minutes of being banged by waves, my energy was slowly draining. I was totally worn out by the struggle. I wondered if the tiger shark that I had seen the previous day was still in the area. I feared that my bleeding would attract him. I briefly wondered if the shark would be foolish enough to enter the huge waves in the breaker zone for a meal. Then, suddenly, I noticed that the helicopter was leaving the area. Desperation set in. It was now dark and I was still in the water struggling to take breaths of air in the foaming sea. When the next monstrous wave pounded me on the rocks, I lost one of my swim fins. By then, I felt that I was definitely doomed. The next wave that caught me was even bigger. It carried me again towards the island and tossed me against the rocks. With bleeding hands I grabbed again the rocks to keep the backwash from tearing me off. I managed to stick one of my feet into a small crevace and brace myself for the backwash. This time my grip held. I was able to hold on and soon as the backwash passed me, I climbed up on the rocks to higher ground. Again I grabbed the rocks, braced myself and held as the next wave struck, and then climbed again a little higher. I was now away from immediate harm's way, but totally exhausted. I was banged, bleeding and hurting all over - but I was alive. I rested for a while then tried to think how I could get off the little rocky island and back to shore. I was only 50-60 feet away from the beach but the same strong current that had carried me out was flowing through this narrow passage at high speed. I

waited for a while, trying to regain my energy, then I had not choice than to jump into the sea and swim again towards the beach. The current begun again carrying me towards the middle of the bay, but this time I made some headway towards the beach and about a quarter of a mile further down I was able to reach its safety. There was no one around to help me. All the spectators I had seen earlier were gone. Slowly, I walked to my car, disengaged the trailer, and then drove back to Honolulu.

The next morning I got up late. Later, when I got a newspaper, I read about a boat sinking on the north shore of the island, of a man drowning, and of a failed effort to find either the man or the boat. I assumed that the drowned man must have been myself, so I called the newspaper to report I was alive. My boat was never found. However, a week later, Marine Advisors compensated me for my work and in full for the loss of my boat and motor. Indeed, the day presumably I died turned out to be my big break because, now I had some money to buy another boat and had another opportunity to search for the damn, evasive, precious coral in the bottom of the sea.

The Purchase of "Argo"

In the following days after I got the money, I begun going to the different small boat harbors on Oahu, searching for a fast boat with a powerful motor. Since my budget was limited, I would have no choice but to settle for a small boat. Finally, an opportunity presented itself right in my own backyard when my neighbor at the Ala Wai Yacht Harbor - a fisherman of Portuguese origin - decided to sell his boat since he was getting too old.

The boat was a diesel-powered Admiral's barge that the old man had purchased from a junkyard on Sand Island after the Navy had auctioned it. The yard was going to take it apart and recover whatever bronze there was. So the old fisherman bought the boat for only the scrap value but subsequently fixed the engine, made repairs and was using it for coastal fishing and for setting lobster traps. Although the boat was only 28 feet long, it was heavy, had a deep V-keel, and had a large Buddha diesel engine that could easily push it 8-10 knots and could get me to the middle of the Molokai Channel in about three to four hours. The only problem was that the boat was open and had no cabin. Although risky for my intended open ocean work, having no other choices, I decided to buy this admiral's barge and try to fix it. The engine was good and spare parts were readily available from the Sand Island junkyards. I made a deal with the old man, had the title transferred and the barge was mine. My next decision was what to name it. I thought for a while of what name would be appropriate and finally decided on one. I was going to name it "Argo", after the mythical ship that Jason and the Argonauts used in their search for the "golden fleece". The use of the name seemed appropriate - except that my "golden fleece" - the precious coral I was searching for - was not at some distant shore but on the bottom of the sea. And this is how my admiral's barge got its new name, "Argo".

Outfitting "Argo"

The obstacles of preparing "Argo" for the intended search for the precious coral appeared endless. It would take me many weeks - if not months - just to properly retrofit it. Since the boat was small I needed to design a dredge that would be heavy enough to break the coral but not too heavy and act as a permanent anchor on the ocean floor. Furthermore, I would

have to make sure that if the dredge got stuck on the bottom, the waves would not capsize the boat.

There was a lot of work that I had to do before taking "Argo" out to sea to dredge for precious coral. Immediately I begun to work hard on weekends and evenings, but the days turned into weeks and the weeks into months. Reinforcing the boat turned out to be the first of the major undertakings. The hull was lap-streaked and thus stronger and less likely to leak at the plank seams. Some of the boat's hull ribs - particularly near the waterline - were either cracked or broken. I begun to reinforce them by laminating with fiberglass thin strips of hardwood that I could bent to the shape of the hull and clamp down after applying epoxy resin. In this fashion, I built, layer upon layer, sister-ribs and then attached them with screws to the existing ribs that that were either broken or cracked. I wanted the boat to have lateral strength since I was planning to do heavy dredging of the ocean floor by gunning the engine at high throttle. I did not want the boat to break apart by the stress and strain of the dredge on the ocean floor or by waves tossing it around.

After reinforcing the boat's ribs, I begun building heavy beams across the boat's width with tresses in between, intended to support a deck that would not pull apart. When finished with the framing of the beams and the deck support platform, I cut and screwed ¾ inch marine plywood to the beams. The next project was to build a small cabin for shelter and protection from rough weather and to have space to store tools for repairs, the nets and a couple of extra dredges - in case I lost one. The final job was to fiberglass the deck and the cabin, put nonskid paint and install an emergency pump. After completing these tasks the boat was now totally closed and could be topped by waves without taking water in. However, it was still far from being complete. I still needed to construct a strong, steel A-frame in the aft to handle a heavy-duty metal pulley from which I could thread cable and attach a dredge.

For the next few weeks, in addition to the boat building and carpenter skills I had to learn, I also learned how to weld. From an iron yard I purchased heavy-duty galvanized pipes, angle iron and welding materials. I had to cut the steel, drill it, weld it to the desired shape, and finally make brackets for the boat deck to attach the A-Frame where a pulley could be attached. The major stress would be on that pulley. I needed to keep a low center of gravity and make sure that the A-frame was not too high so that the boat would not pivot and capsize if the dredge got stock on the bottom, or if the waves got steep.

While doing all this work, I was also looking for a suitable winch. A hydraulic winch would have been ideal but expensive. Finally, I located and purchased from a construction company a winch with a large drum and a gasoline engine. Next, I needed to find and purchase a long and heavy enough cable to put on the drum. Finding a continuous 3-4,000 ft. cable would be next to impossible. There were no such lengths of cable available. Several sections of cable would need to be spliced to get that length. Then, I got a lucky break. The University's boat "Neptune" was replacing one of its winches and I could have the old hydrographic cable from one of its winches. I could have it for nothing - so I went to storage space at Kewalo basin with a friend's pick-up truck we loaded the cable. I now had 7,000 feet of strong hydrographic cable for my winch's drum. I mounted the whole winch unit in the middle of the deck and reinforced it with long bolts to the cross beams. Then, I wound the drum with the cable. By now I was almost ready, but needed to construct several dredges of different sizes and weights. Lastly, I needed heavy nylon nets, which subsequently I ordered from the Washington Net factory in Seattle. I was now ready to begin my search for the coral, using "Argo".

Searches with "Fiesta" - The Wackiest Ship in the Army

But while retrofitting "Argo" and making preparations, I did not sit idle all these weeks and months. I looked around for someone that already had a boat to help with my search for the precious coral so I could determine if there was enough for a commercial operation. At the time, I was part of the University of Hawaii team that was involved with pioneering research in the USA on tsunamis. I was working with a fine group of scientists, oceanographers, geophysicists and mathematicians, like Professors Augustine Furumoto, Doak Cox, Bill Adams, Harold Loomis, Gordon Groves and Martin Vitousek, to name a few. We were investigating alternate ways that we could use to develop an effective Tsunami Warning System for the Pacific. At the time, I was co-co-authoring a paper with the late Professor Martin Vitousek on how atmospheric shock waves and disturbances in the earth's ionosphere - generated by great earthquakes along suduction zones - could be monitored with instruments and be used as warning precursors of potential tsunamis. In the process of working together, we had become friends. Also, Marty, as he liked to be called, had a great boat, the "Fiesta", later featured in the movie “The Wackiest Ship in the Army”, starring Jack Lemmon. Marty agreed to help me with "Fiesta" in my search for the precious coral. “Fiesta” was a great schooner built in Panama and still had Panamanian registry. It was a solid boat, about 72 ft. long with a powerful engine and a large working deck. It was the ideal boat.

Martin climbing on to "Fiesta"

Martin Vitousek was a remarkable person. He was a geophysicist at HIG University of Hawaii's Institute of Geophysics, but also he was an inventor and researcher who at the time was developing deep ocean gauges to measure tides and tsunami waves in the open sea. The Vibrotron deep ocean gauge that he later developed was one of the first advances of the Tsunami Warning System in the Pacific. In previous years when he was field chief of the Line Island scientific program during the International Geophysical Year, he had sailed "Fiesta" with supplies to stations on Palmyra, Jarvis and Fanning islands. Also, he had participated in the Northern Pacific Experiment, which was part of the International Decade of Ocean Exploration. He had directed magnetic, seismological and oceanographic studies. He had been also credited with the development of weather and ocean recording equipment to forecast climate changes. Marty was not only a good scientist but also an adventurer who flew solo his own single engine airplane to a University of Hawaii research outpost on Fanning Island, some 1,200 miles from Hawaii. I don't know how he was able to fly over such a long expanse of ocean, with no place to land if there was an emergency, and how he could find Fanning Island, a small speck of land in the middle of the greatest of the earth's oceans. I had just finished myself the Sanderson Pilot course, had gotten my pilot's license and had volunteered to fly with Hawaii's Civil Air Patrol on search and rescue missions - mostly as observer - so I was very aware of how difficult and risky it must have been to fly all the way to Fanning Island. But apparently Marty did not have any fears.

Marty agreed to help me out with my search for the precious coral. Thus, I wasted no time in moving my dredges, pulleys, nets and ropes to the “Fiesta” and getting ready. There were a lot of things I did not have but, fortunately for me, Marty had great skills that compensated for my deficiencies. He rigged up an electric pulley for the dredge, with lots of cable on the drum - still left from the North Pacific Experiment. Since we did not have a fathometer to measure the depth range that I needed to find the coral, Marty put together small explosive charges - primers essentially - rigged to fuses and frictional triggers. We were going to set off these primers at the surface, and then record the echoes of the small explosions from the ocean floor with the seismic equipment and hydrophones Marty had onboard. Thus, we had solved the problem of not having a fathometer of great range. We would simply convert travel times of the echoes from the ocean floor to distance, which then we could convert to depth. It was really quite an ingenious method and, knowing Marty, had no doubt that the measurements would be accurate.

The following Saturday, myself, Marty, his lovely wife, Paige and myself sailed "Fiesta" off the Ala Wai Harbor. Since we were going right into the wind, Marty decided to motor the boat the whole way rather than waste time sailing by zigzagging on wind tacks. In less than four hours, we were at the approximate location I had previously marked on the chart when I had used "Orpheus". Marty begun setting off the explosive charges, monitoring and measuring the reflections and converting them to depths. I was busy trying to take land bearing, plotting our position and correcting our course towards the desired coordinates. Paige was in the galley making sandwiches. After a while we reached the location on my chart and Marty gave me the depth. Indeed, we were right on target where I had recovered previously my fragment of precious coral when using "Orpheus".

We lowered the dredge, dragged it on the bottom and, half an hour later, the dredge and nets were lifted back on the deck. Bingo, there were fragments of precious coral in the nets. Not much, but enough to raise my enthusiasm. We dropped the dredge again with a new set of nets and repeated the process. More fragments of coral were recovered. We repeated the

dredging a couple more times but then the dredge got stuck. We powered the engine and broke loose.

Dr. Martin Vitousek making sure that "Fiesta's" engines and generator worked well

Dr. Martin Vitousek tending to the recording instruments

By that time the sun was setting, a squall hit us and hard rain had begun. I put foul weather

suit on and took Fiesta's helm, heading back towards Honolulu. Marty and Paige went below. It was a great sail in heavy wind and rain but I was thoroughly enjoying it. There I was, master of my own fate with no sight of land anymore, drenched by rain, windblown in a storm, but happy to get some precious coral. All problems of life seem to go away when one is out at sea in darkness and in storm. Nothing matters other than survival. Sailing "Fiesta" in that night squall was an experience and a memory that stayed with me over the years. Drenched in rain, sailing in darkness with only a compass heading showing me the way home was fantastic. When the rain stopped, I could see in the distance the lights of Honolulu and corrected my heading towards the direction of the A-buoy of the Ala Wai Harbor. We arrived in total darkness and there was no one to greet us or catch the lines.

The following morning I went through the nets and picked the fragments of the precious coral. There was not much and I did not know how much what we got was really worth. No value had yet been established and I was not sure if anyone wanted to buy it and at what price. I wondered if it would sell and pay at least for the diesel fuel we had burned looking for the precious coral. I offered to pay for "Fiesta's" fuel, but Marty would not hear it. So, I simply gave him some of the coral we had dredged.

Searching Markets for the Precious Deep-Sea Coral

My next goal now was to find out what price I could be set for the precious coral - given the difficulty, danger and cost of getting it. In the next few days, I visited jewelry-manufacturing companies in Honolulu and showed them what I had - to determine if they would be interested in purchasing the coral - omitting details of where I had found it. One of the companies was "Maui Divers". I knew its president, the late John Stewart who also lived at the Ala Wai Yacht Harbor aboard his boat "Vida Mia" - a great classical yacht similar to the Presidential yacht on the Potomac. John was immediately interested. I gave him a small piece of my coral and he had one of his workers cut, shape and polish it into a beautiful cabochon, ready for mounting on a ring. A couple of days later, John called me. He was excited and wanted to buy my precious coral - whatever I could provide. I told him that I wanted about $50 per ounce that I did not have very much, but that I was planning to get more. Also, I approached another company named "Sultan" and they were also interested. Then, I begun researching potential buyers abroad and found out about auctions at Kobe, Japan, and of coral jewelry manufacturers in Düsseldorf, Germany and in Tore del Greco, Italy and elsewhere. Having established that there was some interest and potential demand for my precious coral, I got more excited about the opportunity of making money. My only problem was that the damn precious coral was still out of reach in the bottom of the ocean. However, encouraged by the responses, I continued the work in retrofitting "Argo" and getting it ready for my subsequent quest.

The First of the "Argo" Searches

In April of 1966, preparations on "Argo" were completed. The engine was working well, the deck was completely watertight, the cabin erected, the A-frame in place, the dredges and nets ready and the gasoline winch, with a drum full of cable, well braced on the deck. The

only problem was that I had used all my money. I could not to buy another auxiliary outboard motor, a radio, or a survival raft. In spite of these limitations, I decided to go out anyway at the first opportunity, when the weather looked good. For my first "Argo" outing, I decided to invite my friend, the late Professor Walter Duing to help me. Walter was a visiting professor of Physical Oceanography from the University of Kiel in Germany. He and his Greek wife, Soula, had become good friends. Walter had a lot of experience at sea as he had participated in many expeditions in the Baltic, the Northern Sea and the Arctic. The big waves of the Molokai Channel did not bother him. He turned out to be an invaluable help. Cool, collected and a good sailor.

Dredging in the Molokai Channel on a good day with the island of Oahu seen in the distance. Efforts to free Argo" from stuck dredge on the ocean floor.

The first of the outings on "Argo" was just as memorable as that with "Orpheus", because it could have been the last - given what happened that day. Although I had planned to take the boat out when the weather was good, there was work at the University during the week and only the weekends were free. My big mistake was not to check a little better on the weather and rushing for an outing to take advantage of our free-of-work weekend. We left the harbor at daybreak and headed out, hugging the coast, past Diamond Head, towards Coco Head and Hanauma Bay. I kept "Argo" some distance from Coco Head where I knew from experience that wave reflections created confused sea conditions and standing waves - when opposing the incoming waves. We also tried to avoid the current known as "Molokai Express" as that too created confused seas. When we reached the area offshore from Sandy Beach, I headed out on a southeastern course of about 100 degrees, towards the middle of the Molokai Channel. The waves were only about 4-5 feet high, but as the sun came up the winds picked up speed, gusting to 25 - 30 knots. Dredging under these weather

conditions was still doable so I continued determined to get at least three dredgings before heading back.

Using "Argo"s winch to coil about 3,000 feet of cable to bring the dredge with the precious coral to the surface. Outline of the Koolau mountain range in the background (telephoto from a spying boat)

As expected, "Argo"s reliable Buddha diesel brought us to the approximate area where I had found coral before. We had no fathometer and no way of determining ocean depth, so I had to rely on taking good shore bearings to determine our position and on the accuracy of the depths shown in the charts. To make sure I had the right depth and had a somewhat understanding of ocean floor relief, I had brought the charts that I had prepared - still unpublished - which showed the ocean bottom topography with contoured iso-depths. This was a great help as my charts showed the slopes and configuration of the ocean floor in greater detail than the nautical chart, and I could easily correct the direction in which I should dredge, either deeper or shallower. When satisfied that we had good bearings and positioning location, Walter had the dredge lowered and we begun dredging the bottom. Everything was going smoothly - exactly as planned. I gunned the engine forward and I could feel resistance on the cable, interrupted by small jerking vibrations. We were breaking something down there. I hoped that it was precious coral.

Another telephoto from spying boat of my dredging for precious coral.

After half hour on the ocean floor, we started the little gasoline engine of the winch and raised the dredge and the nets. The nets were badly torn, but this time there was coral in them. I did not want to waste time cleaning them and getting the coral out, so I put new sets of nets on the dredge and lowered down again for a second run. We repeated the process and again brought the dredge up and recovered the nets. Indeed there was precious coral in them again - considerably more than what I had gotten when I used "Fiesta".

We were able to get three or four good dredges with quite a lot of coral that day, before the weather and the waves got really bad. During the final effort, the dredge got stuck on the bottom and suddenly "Argo" was permanently anchored. Desperately, I tried to free "Argo" by gunning the engine and making circles, first clockwise then counterclockwise. There was no use. "Argo" was permanently stuck and pivoting around the dredge on the bottom of the ocean. With every wave there was a great deal of stress on the A-frame and the aft was being pulled down, with waves topping us. It became a dangerous situation. I gave the engine more throttle, but it was no use. The aft of the boat was again being pulled down as the waves were picking up in height. We were in danger of capsizing, or of the steel A-Frame ripping off the deck of "Argo" along with the winch on deck. I had no choice but to free "Argo" from its permanent mooring in the rougher sea. Reluctantly, I took a handsaw with a metal cutting blade and started cutting the cable. After several minutes in the rolling sea, I was finally able to cut the cable. I had lost a couple thousand of feet of cable and about $400 worth of nets but the boat was now free. We were no longer in danger of capsizing or of the aft of the boat being pulled down below the waves. We could now make it safely back home. I put the engine in forward gear, gave it throttle and started surfing down the big waves, quartering away from the breaking tops, which were now flushing down over "Argo's deck. As we headed towards the direction of Makapuu Point, faintly seen in the distance, we hang on for dear life to the metal A - frame, as there was no safety railing. Again we had been defeated by waves and weather, but on board I had this time nets that were full of precious coral. I had to wait until we were back safe in the Ala Wai Harbor to see what the catch had been that day and whether the gain was greater than the losses. When we finally reached the harbor, we were completely soaked wet and exhausted. Soula met us at the

pier, and then drove off home with Walter. I did not check the nets until the following day. It had been a very good catch and I was pleased.

Hide and Seek in the Open Sea.

Walter joined me for a couple more successful outings on "Argo", but then he had some traveling to do, so I was left without someone to help me. I started looking around the harbor to see whom I could trust to take out with me as crew. The choice was really limited. Finding reliable crew became a big problem. Finally, I compromised and hired two young guys that were anxious to come out with me. The only problem was that these two smoked pot, and I could not go out to sea with people that could be high and thus unreliable. Having no other choice and after a long and strict talk, I hired them. However, I made it clear that they could not smoke pot on my boat or anywhere near me. They could do whatever they wanted when they were not working for me, but on my boat there would not be any pot smoking or beer drinking. Our lives depended on having responsible people - so I made that point clear. I also told them that they should not tell anyone about the location where I was dredging the coral. They agreed, so I hired them on a trial basis.

In calm sea, with the two new members of my crew. taking a rest between dredgings in the Molokai Channel

On the first outing with this new crew, everything went smoothly. I kept my navigation chart hidden and took my land bearings without revealing our location to these two guys. We got back from an outing on "Argo" with a good amount of angelskin coral and of another coral that looked like wood and which I threw out, thinking it had no value. As it turned out this

wood-like coral, which I was, threw away, turned out to be the "Gold Coral", with which manufacturers later begun to make additional beautiful jewelry.

On the next outing with these two guys, and as we headed towards the middle of the Molokai channel, I noticed two tuna fish boats behind "Argo" heading in the same general direction. Immediately I got suspicious. Where were these two commercial fishing boats going? Were they following me? It was not tuna season. I decided to change my heading in a southern direction and much to my surprise these tuna boats also changed their headings. Obviously they were following me and were trying to find out where I was dredging the precious coral. I changed again direction but the boats behind me also changed direction. It was no use. I questioned my crew on whether they had told anyone what we were doing or where we were going. They claimed that they had not spoken to anyone about the precious coral. There was no use in trying to head for the precious coral grounds. I made a large turn, then steered "Argo" back towards Honolulu and the Ala Wai harbor. It was a wasted day. The following weekend the story repeated itself. Another commercial fishing boat from Kewalo Basin begun following me out in the Molokai Channel. I simply could not stop and begin dredging. They would definitely mark my coordinates. So again, empty-handed, I headed back to the Ala Wai Yacht harbor. Another wasted day of playing hide and seek.

With the dredge stuck on the ocean floor and hanging on to the A-frame for support.

After these failed attempts to dredge for coral again, I was very frustrated and did not know what to do to keep my secrets, secret. It seemed to me that the word was out that I was getting precious coral from the bottom of the ocean and was making money selling it. There were people out there trying to find out what I was doing and to compete with me. I decided that I had to change my outing tactics. Instead of leaving in early morning, I changed my schedule and routing. For the next outing I decided to leave the harbor in the afternoon rather that in the early morning and hide somewhere to spend the night. And so, the next Friday, we left the harbor in early afternoon and headed east towards Makapuu Point. By five thirty in the afternoon we had rounded the Point and its lighthouse and headed for the lee side of Manana Island - a bird sanctuary. We dropped anchor at about 30 feet of

water, had dinner and soon as it got dark we tried to get some sleep. Sleeping on the deck was not exactly comfortable.

At five in the next morning we had some lukewarm coffee, lifted anchor and headed for the precious coral grounds. When we got there, I could not see any boat in the distance, so we lowered the dredge and begun our work. Everything was going smoothly and there was coral in the nets. I had a second set of nets installed and had lowered the dredge to the ocean bottom, when a small plane approached from Oahu, then begun circling above us. Obviously they were taking land bearings and marking "Argo's" position. I was furious but there was nothing that I could do. We continued to work until dusk, and then headed for home. Obviously, my security had been compromised. My crew continued to claim that they had talked to no one, but I was not so sure any more if they were telling me the truth. These guys were just not reliable and had begun to give out information as to where I was getting the coral, the design of my dredge and other information. With Walter away, I had no choice but to keep them working for me a little longer.

On the deck of "Orpheus" with the catch of a day. Precious deep ocean coral from which more than one million ($1) worth of jewelry could be made.

Two weeks later, when we were out again on the channel and while the dredge was down on the bottom, we were approached this time by what appeared to be a sailing vessel crossing the channel. It was not. The boat was a spy ship. It was the "Messiah", a large sailing vessel that had been charted by Maui Divers, the people I was selling coral to. The photos of "Argo" that appear with this account were taken that day with a telephoto camera,

by someone on the "Messiah" who gave me the prints a year or so later. Indeed, my secret was out. The location where I was dredging the coral, was now known to my clients who suddenly became my competitors. My only consolation was that it would take them several months to duplicate what I was doing and that their expenses of dredging for coral would be much greater than mine. Thus, I had a window of opportunity of about a year until the competition could catch up and get any coral. My next step was to stockpile as much of the precious coral as I could for as long as I could and to seek new markets aboard.

Precious Angelskin and Gold Corals drying in the sun on the deck of "Orpheus".

Rejected by the U.S. Department of Interior

The idea occurred to me that perhaps I could protect my find of the coral grounds by leasing this offshore area from the U.S. Government. Thus, I wrote a letter to the Department of Interior in Washington DC giving the coordinates of the offshore block of submarine real estate which I wanted to lease for the exclusive use of my business. At that time Maurice Udall was the Secretary of the Interior. He was a nice guy and an environmentalist. A couple of weeks later I got a polite letter from the Department of Interior telling me that I could only lease an offshore area if there was competitive bidding. I was also told that living marine organisms, such as coral, could only be harvested within the 3 mile offshore area, provided there was minimum environmental impact for which I had to file a statement. However, if I was mining inorganic material, a mineral as I claimed, I had rights to secure a lease up to 12 miles offshore, but only after similar competitive bidding. The economic zones of offshore areas had not as yet been expanded to 200 miles.

The Interior Department's response to my request to lease an offshore area off the island of Oahu was in essence an outright rejection. I had not convinced them that the coral was a mineral. Also, since the coral was outside the 12-mile zone, the issue was really mute. The area I had hoped to lease was in international waters and anyone could exploit it. Besides, even if I had a lease, who was going to police the area? Certainly not the Coast Guard. Commercial exploitation in international waters was anyone's game. I had no valid claim and no way to limit anyone from capitalizing on my discovery. I was disappointed, but realized

that it was only a question of time before others jumped on the opportunity to mine the precious coral.

The use of precious corals by the jewelry industry

The existing coral jewelry industry in the 1960s was supplied with a species of coral that came from Japan and Okinawa. However that coral was not as hard and had none of the gem qualities of the precious coral that I was mining. The coral being used was softer and dyed to give it a pink or red hue before cutting it into stones and making jewelry that was being sold at very high prices. A small market for black coral jewelry had developed in Hawaii and was being sold mostly to tourists visiting the islands. Divers at relatively shallow depths ranging from 60 to 200 feet harvested this black coral. Divers were selling this black coral for about $15 - 20 per pound. A diver, if he was lucky and dove in a good spot could make as much as 200 - 300 dollars per day. That amount of money is not significant now, but it was in the 60's. No one ever was mining precious coral from great depth as I was doing. All the coral was taken from shallow depths. However, there were jewelry industries in Germany, Switzerland, Japan and the USA, which were using coral, so I decided to explore these potential markets. My next step was to form a more credible business and market for the angelskin coral I was mining.

A ring with Angelskin Coral

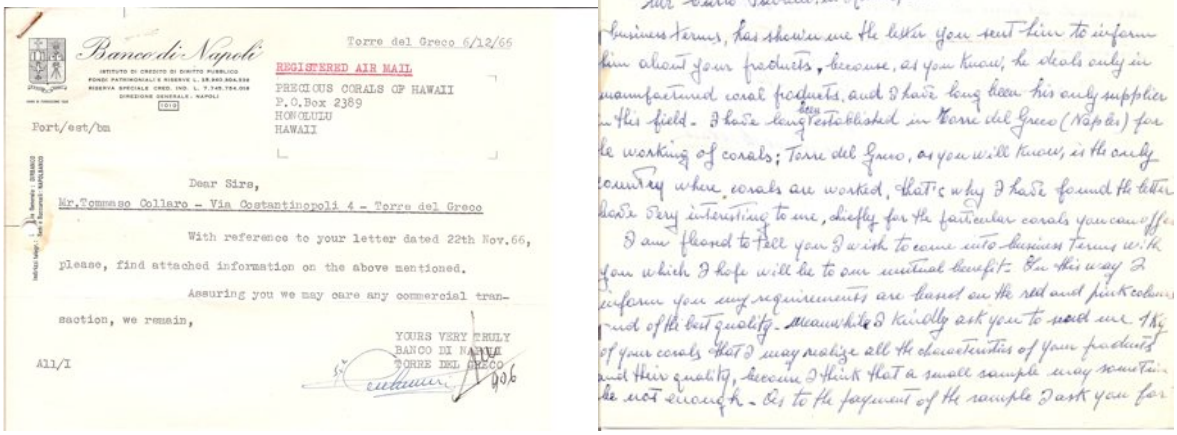
A necklace with Angelskin Coral

The Birth of Two Businesses - Precious Corals of Hawaii - Ocean Mining and Engineering

Since I had a window of time to operate without competition, I continued mining and selling the angelskin coral locally and save some money. It was really a novelty for me to have for the first time in my life more money than I needed to survive from week to week or even day-to-day. With the extra money, I bought more nets and fabricated more dredges. I was even able to substitute my old Volkswagen bug with a beautiful Mustang and later with a convertible, baby blue, Austin Healey 3000. As the coral mining continued, I developed also a storage need. I could no longer store everything on the deck of "Orpheus". Already the boat looked like a floating junkyard with all the miscellaneous gear in full view of people spying on my operation. Since I had begun marketing the precious coral in Hawaii and abroad I needed also an address for an office so I could project an aura of legitimacy and permanency. So my next move was to form and register a business with the State of Hawaii, apply for excise tax license, print stationary, purchase office equipment and open bank accounts.

Also I formed and registered two businesses. The first I named "Precious Corals of Hawaii", and this was my precious coral business. The second I named "Ocean Mining and Engineering", and this was my consulting business for oceanic support, services and studies. I designed letterheads for both and had them printed. For "Ocean Mining and Engineering" I designed a special logo. It was an Athenian trireme with the acronym "OME" across its sail. I was now ready for marketing my coral, my consulting services and the use of my little oceanographic vessel. Subsequently, as orders for the precious coral begun coming in, I contacted the international department of the Bank of Hawaii to run checks on

foreign clients and to learn how to close sales through the use of letters of credit. My next move was to rent an office. I found one with a prestigious Kalakaua Avenue address that also had adequate storage space. The only problem - it was on the second floor of a building and I had to carry all the heavy stuff, up a flight of stairs.



Tommaso Collaro
IMPORTAZIONE PERLE COLTIVATE
Via Costantinopoli, 4 - Tel. 862342
TORRE DEL GRECO

Nov. 11th 1966

Messrs Precious corals of Hawaii
Honolulu, Hawaii

Dear Sirs,

I am very glad to come into touch with you, hoping to establish mutual business relationships with you.

Mr Carlo Pacillo, in Roma, with whom I am in close business terms, has shown me the letter you sent him to inform him about your products, because, as you know, he deals only in manufactured coral products, and I have long been his only supplier in this field. I have long established in Torre del Greco (Napoli) for the working of corals; Torre del Greco, as you will know, is the only country where corals are worked, that's why I have found the letter here very interesting to me, chiefly for the particular corals you can offer.

I am pleased to tell you I wish to come into business terms with you which I hope will be to our mutual benefit. By this way I inform you my requirements are based on the red and pink colour and of the best quality. Meanwhile I kindly ask you to send me the of your corals that I may realize all the characteristics of your products and their quality, because I think that a small sample may sometimes be not enough. As to the payment of the sample I ask you for

Banco di Napoli
ISTITUTO DI CREDITO DI DIRITTO PUBBLICO
FONDI PATRIMONIALI E RISERVE L. 35.840.804.536
RISERVA SPECIALE CRED. IND. L. 7.745.784.018
DIREZIONE GENERALE - NAPOLI

Torre del Greco 6/12/66

REGISTERED AIR MAIL
PRECIOUS CORALS OF HAWAII
P.O.Box 2389
HONOLULU
HAWAII

Port/est/bm

Dear Sirs,

Mr.Tommaso Collaro - Via Costantinopoli 4 - Torre del Greco

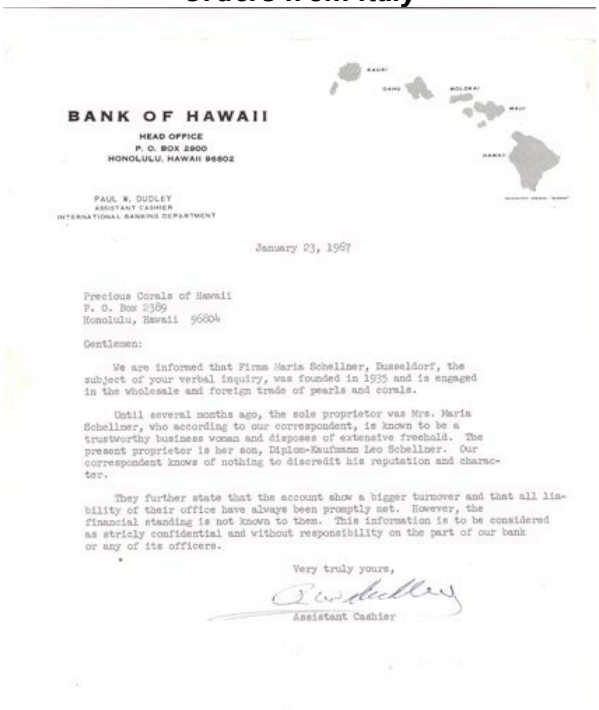
With reference to your letter dated 22th Nov.66, please, find attached information on the above mentioned.

Assuring you we may care any commercial transaction, we remain,

YOURS VERY TRULY
BANCO DI NAPOLI
TORRE DEL GRECO

All/I

Orders from Italy



BANK OF HAWAII
HEAD OFFICE
P. O. BOX 2900
HONOLULU, HAWAII 96802

PAUL N. DUDLEY
ASSISTANT CASHIER
INTERNATIONAL BANKING DEPARTMENT

January 23, 1967

Precious Corals of Hawaii
P. O. Box 2389
Honolulu, Hawaii 96804

Gentlemen:

We are informed that Firma Maria Schellner, Duesseldorf, the subject of your verbal inquiry, was founded in 1935 and is engaged in the wholesale and foreign trade of pearls and corals.

Until several months ago, the sole proprietor was Mrs. Maria Schellner, who according to our correspondent, is known to be a trustworthy business woman and disposes of extensive freehold. The present proprietor is her son, Diplom-Kaufmann Leo Schellner. Our correspondent knows of nothing to discredit his reputation and character.

They further state that the account show a bigger turnover and that all liability of their office have always been promptly met. However, the financial standing is not known to them. This information is to be considered as strictly confidential and without responsibility on the part of our bank or any of its officers.

Very truly yours,

Assistant Cashier

Orders from Germany.

Juggling all of these activities, in addition to going out to sea on weekends, increased tremendously my working schedule, since I still worked at the University and continued on my Ph. D. graduate studies and the research projects. However, twelve to fourteen hour working days was not a big problem then, since I was still young, full of energy and drinking lots of coffee. I even found time to finish my degree in Oceanography, an equivalent of the Navy's diving course, take flying lessons, get a pilot's license and join as volunteer Hawaii's Air Patrol - occasionally flying on search and rescue missions, mostly as an observer on an old L-19 tail dragger. Life was full and exciting. All week at the University and on the weekends out at sea, struggling with the waves and unfriendly weather but getting precious coral and making money. With international sales of precious coral coming in from Europe and Asia, and even after purchasing a new car, I now had surplus of money and a growing savings account. What more could a person want? And so life continued in such a busy of experiences pace for the next two years - but then things begun drying up, for reasons I will explain.

Renaming the precious coral from "Pink" to "Angel Skin"

I had already stockpiled quite a bit more of the precious coral, but my buyers were high grading my coral - demanding more of the pinker variety. There was simply not enough and calling the precious coral pink was not a proper name because most of it was only slightly pink. I decided that such selective high grading was not good for me as it would limit the demand just to the coral that had a more intense hew of pink. What would I do with the rest that was not as pink but equally beautiful and would take as good of a polish when cut for jewelry. This is when I decided to market the coral not as pink but with a new name - Angel Skin. So this is what I named it and had it promoted and marketed - Precious Angelskin coral.

Pandora's Box Opens

As previously mentioned, my quest and successful mining of precious coral lasted a little over two years. By then all my secrets of where I found it and how I was mining it, had been revealed. My competition hired a boat named "Messiah" to come out to spy and get the coordinates where I dredged the precious coral. They surprised me by intercepting "Argo" in the Molokai channel before I had a chance to raise the dredge and move away. Furthermore, my young crewmembers blubbered, bragged and gave exact descriptions of my dredge designs, dredging techniques and of the location where I found the higher quantities of the precious coral. Subsequently, one of my Hawaii customers became my competitor. The company known as Maui Divers had more money, more resources, were better organized and had a need to get the coral and generate publicity for their marketing of finished jewelry. Subsequently, they bought a small, deep-diving submarine with mechanical arms and used it to harvest precious coral from the same location that I did. However, their operation did not seem to be cost-effective. The sub could only be used when the wave conditions were extremely good - which were rare in the Molokai Channel. They could not

harvest the precious coral as inexpensively as I could with my low overhead operation. Most of the time the submarine would sit idle at a pier near Sea Life Park. Also there appeared to be high maintenance costs, for both the sub and the support vessel, in addition to payroll for a larger crew. However, it was good publicity for the company's promotional efforts to advertise the use of the sub. Eventually the competition could not continue mining the coral but they were able to buy from elsewhere an alternate type of coral - most of which appeared to have been colored-enhanced. Subsequently, after John Stewart died, Avon Cosmetics bought Maui Divers and the company did very well financially over the years. They are still doing good business in Hawaii and elsewhere, have showrooms with displays of the Angelskin and Gold corals and provide presentations on its discovery. Of course, in none of the stories, I am mentioned as the discoverer.

The Beginning of the End

Although I lost the Hawaii market, in the subsequent two years I managed to make sales of the Angelskin coral to foreign customers from the stockpile I had accumulated. I was even able to send shipments to the auctions in Kobe, Japan. However, this market begun drying up as well. Eventually, the foreign customers begun also to buy the alternate color-enhanced variety of coral from the Orient and elsewhere. Although, I had managed to make quite a bit of money from the sales of the precious coral, it appeared that my ocean mining business was quickly coming to an end - but not my thirst for new discoveries and adventures. Some sort of a bug or virus must have bitten me, as I needed to take new risks. I was still young and foolish and needed something different to do that would stimulate my adrenaline and my run-or-perish instinct of survival. Chasing rainbows had become an addiction. So, subsequently, I took far greater risks with my life and, foolishly, I managed to lose all the money I made from the sales of the precious coral. What followed in the next two years is another long story that probably is irrelevant since it has nothing to do with the precious corals of Hawaii - other than how foolishly I lost all my hard-earned money in hopeless escapades.

EPILOGUE

Two years later, after I stopped harvesting the deep sea coral, I decided to roll the dice again and seek new treasures elsewhere. The new activities of Ocean Mining and Engineering had nothing to do with the sea. My next mining operations were mostly on land. So in 1968, I burned all my bridges in Hawaii, quit my job as Oceanographer for the U.S. National Ocean Survey, sold "Argo" and "Orpheus", and invested part of my hard earned money from the precious coral, in a new venture.

Seeking new treasures in Sierra Madre Occindentale - With my four trusted crewmembers of "Orpheus" - the stray dogs I had found on Sand Island in Hawaii - I ended up in the mountains of Sierra Madre Occidentale, in Mexico. My headquarters for my new mining venture were far from the sea, inland in El Fuerte, at the old house of the Governor of Sinaloa before Mexico's independence from Spain. From there, I launched surveys of the mountains - again risking life and limp - checking abandoned Spanish silver mines and searching for old Spanish treasure and new experiences about which some day I could talk

to my grandchildren - provided of course that I survived long enough, settled down, got married and had children who repeated the process.

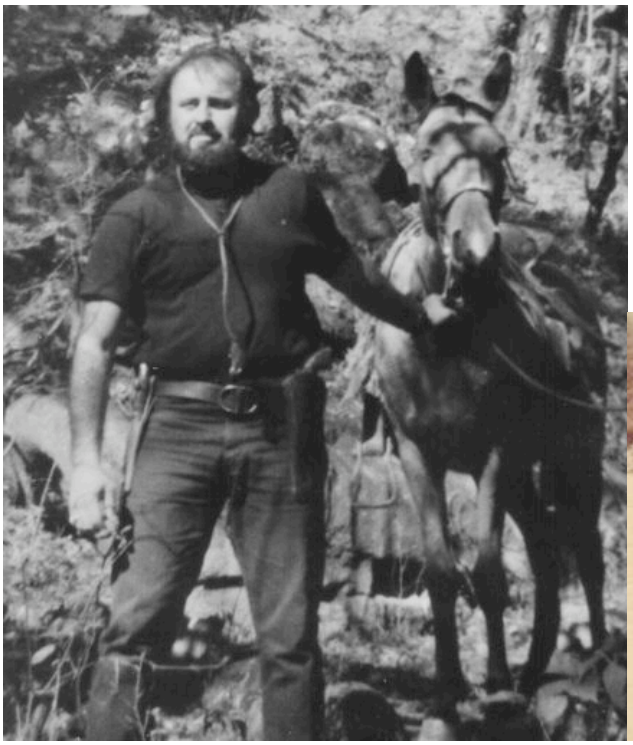
.

With my Indian guide Manuel searching for Rosario Mine's "El Poso de los Muertos" and its alleged Spanish treasure.

Initially, I started searching for old silver mines worked by the Spaniards two, three hundred years previously. So I combed, mostly on horseback or mule back, the mountain areas of Sierra Madre Occidentale, in the states of Sinaloa, Sonora and Chihuahua. In the process, I found dozens of potentially good sites with high concentrations of silver, some gold as well as lots of lead and copper. The only problem was that most of these prospects were in mountain areas that were inaccessible by roads. Finally I settled on a Spanish mine called "Las Gollondrinas", bought a Caterpillar DC8 bulldozer, as well as compressors, guns and mining equipment from Joy Corporation, the Mexican branch of Denver Mining Equipment Company. Shortly afterwards, I hired about 150 Tarahumara Indians, a couple of foremen that had opened tunnels for the Los Mochis-Chihuahua railroad, and a lumberjack from Oregon to help bring the heavy equipment up the mountain - since he was an expert on moving big trees.

Subsequently, with a book on mining engineering in hand for quick reference, I cleared and secured the entrances of some of the old Spanish tunnels, opened ventilation shafts, got access to good ore veins, and begun mining operations at seven tunnels, with three shifts around the clock and at least two dynamite blasts on each shift. In the next few months I had

enough high-grade ore mined, which then I had it trucked to the railway station in Hermosillo to be loaded on train wagons. Soon after, I shipped two trainloads to smelters in Cananea and Chihuahua and waited to get my money to continue with operations and payroll. The only problem was that this money from the sale of the ore was never paid.



Being lost in the mountains is not really different than being lost at sea. Crossing a river without a bridge.

Bricks at Ten Paces - Subsequently, bandits broke into my storeroom where I had stored high quality malachite, azurite and other semiprecious specimens and trucked everything away. Also, while I was briefly traveling, other mountain bandits stole my bulldozer, the compressors and the other equipment and were asking for ransom money. I asked the Mexican Army in Culiacan and Chihuahua to help, but they wouldn't. They told me that they would address the problems with the bandits in the area sometime in the future, but would not commit to when. I had no choice but to take action on my own - which I did - and after a night encounter with the bandits in the mountains, my loyal employees and I managed to recover my bulldozer and most of the equipment and truck it down to a safer location. The chief of bandits in the area, Leonidas Castro and eighteen of his brothers - most from different mothers - threatened to kill me. I suggested a reconciliation, and when that offer was refused, an alternative in settling our differences - perhaps an old fashioned duel with Leonidas himself - my version being "bricks at ten paces". Eventually, in accordance to international agreements with the Nixon administration and as part of the operation code-named "Condor", the Mexican Army moved in the area to stop the massive marijuana operations and Leonidas was killed during one of the engagements.

Fourth of July Fireworks - But my troubles were not over. And it was not the mountain bandits that prevented me from continuing - I could have handled them - but the damn

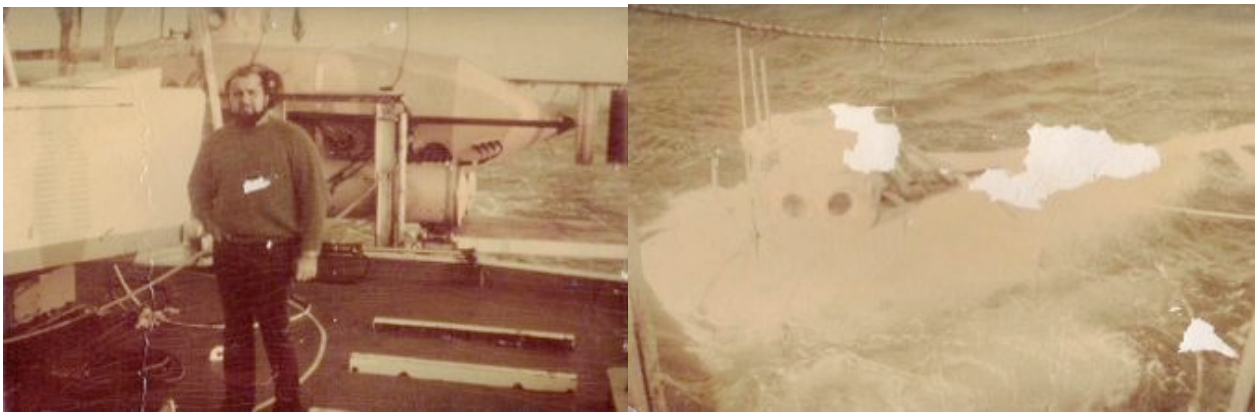
lawyer in Mexico City. He had conspired with the smelter managers to keep the money in the escrow accounts, presumably to make payments on the equipment I had purchased. Also, I found out that he had begun negotiations to sell the property that I had developed to investors in the UK. With no money coming, my funds were quickly used up. My friend Tasso - the great white hunter from former Tanganyika - who had come from Chicago to participate in this venture, decided to get married and leave for New York. I was left behind holding the bug with all the problems of this great mining venture but without money to continue - and an expiring tourist visa. So, I had no other choice but to also jump ship - but without a life jacket - and leave Mexico. Thus, one afternoon, I hid my Caterpillar DC8 bulldozer in a wooded mountain area, placed most of the equipment I had recovered from the bandits near the seven entrances of the mine, placed and fused nine cases of old dynamite and blasted the hell out of everything. I watched the fireworks from a distance, smiled, and when it was all over and the dust had settled, I watched the sunset, then drove my Jeep Wagoneer all night long, across the U.S. border to Nogales, Arizona.

I had no idea where to go from there. I had lost everything and I was without money again. I had left two of my remaining dogs with a family in Navojoa but I had every intention of coming back for them at a later time. My other two dogs had been killed by Leonidas hoodlums for retaliation. So for time being I was a stray dog myself. I had not idea where to go or what to do next. I was alive and that was good. Also, I had enough money left to at least fill 3-4 times the gas tank of my Wagoneer. But how far would that take me and what would I do when I got there - wherever "there" may have been. I called my stock broker in Chicago to see if I could liquidate any of the stocks he had invested my money. I could not find him. He no longer worked there. Another broker informed that all my stocks had been de-listed and there was no residual value. With the Vietnam war scaling down, all the CIA companies (Diversified Devices, Flying Tigers etc.) had folded. Fortunately, I still had in my possession a don't-leave-home-without-it, American Express card. So, I stored the Wagoneer in Tucson and headed for the airport. Greece sounded like a good place to go to. My mother was there and I would have a roof over my head and three square meals a day. What could a grown up, responsible man possibly want, other than some help from his own mother.

Looking for Precious Angelskin Coral in the Atlantic - I was never able to accept the defeat I had suffered in Mexico, but I decided to keep on trying. Certainly, suicide was not one of my options. In the late 1970s, after meandering aimless first in Greece then around the world, I salvaged myself and rose from my ashes again - like Phoenix, the mythical bird. Subsequently, I got married, got a job as the Oceanographer for the New York District of the U.S. Army Corps of Engineers and, afterwards, as research oceanographer for the U.S. Coastal Engineering Research Center in Washington DC.

However I had not been cured from my fascination for the Angelskin coral or the other treasures of the deep sea or of the dry land. So, while in charge of studies pertaining to the effects of ocean dumping in the New York Bight, I had the use of small, deep diving research submersibles and dove in the vicinity of the designated ocean dumping grounds, but also down the Hudson submarine canyon towards the Atlantic's abyssal plain. While at the same depth range where I had found precious corals in Hawaii, I looked to see if there was anything similar in the northern Atlantic. Even though I dove to the same depth range where

the temperature of the water was the same, I did not find anything that resembled Hawaii's precious coral. Just wrecks and miscellaneous junk from ships torpedoed during World War II. Also, I managed to get the little yellow submarine tangled in loose wires on the ocean bottom, but managed to get loose, other wise this account would not have been written.



With a yellow submarine in the Atlantic

"Romancing the stone" - the New Game - In the following years, I relocated again in Hawaii with a new job. However I spent my yearly vacations at different remote areas of the word, seeking new discoveries and trying to recover from my Mexico losses. So, while in the streets of Santiago, Chile, in late 1973 - shortly after the Allende overthrow - and while dodging bullets after accidentally being in the streets after the sunset curfew, I decided that Colombia was a much safer place to spend one's vacation. Besides why would FARC be interested in kidnapping me since there was no one to pay a ransom. So I flew to Bogota, primarily to check on another story that I had read about in a book called "Green Fire" by Peter Rainier, a Frenchman who became manager of the old Spanish Chivor emerald mine in the Boyaca district in the Andes, after its rediscovery around the turn of the 20th Century. According to historical accounts the Chivor mine had produced some of the finest emeralds, which helped, finance some of Spain's wars against the Ottoman Empire. A lot of these great emeralds had ended up in Tehran, at the Bank of Melli museum - which I managed to visit in 1979, just before the ousting of the Shah.

The book had an interesting account of how the Chivor mine had been discovered following an investigation of the Archives of Seville. At that time, I was also examining the Archives of Seville with the help of someone I had hired and I had found a wealth of information about tsunamis and earthquakes going back to 1541 - which substantiated some of the accounts of a French historian, Montessus De Balore. In the Seville Archives there was also a description of the Chivor emerald mine location in the mountains - where between two peaks, one could see the llanas (flats) of the Orinoko, the great river that separates Colombia from Venezuela. The description had certain intriguing similarities with what I had discovered in Hawaii about the fragment of the precious deep-sea coral, by examining the proceedings of the Albatross Expedition.

The Boyaca District in Colombia

Since I still had a week's of vacation time, I did not need much more information or encouragement before plunging in this new quest. So, I flew to the Eldorado airport if Bogota, then I took a bus to a small village near the Chivor emerald mine about 90 miles northeast, in the Boyaca district in the Eastern Cordillera. I wanted to see for myself the llanas of the Orinoko.

While exploring the mountainous areas around Chivor, I was approached by some Boyaca Indians who showed me a few cut and uncut emeralds. I bought some of the stones without yet knowing much about them and, in fact, I even traded my watch and camera as part of the payment. What I did not know yet was that this initial purchase of emeralds was the beginning of a new long passion of "Romancing the Stone" - long before the movie with Michael Douglas was made. As I discovered much later, my trip to Chivor and subsequently to the Cosquez, Muzo and Sogamozo emerald mines had certain similarities. After this trip, I had a new fascination to replace that of the Angelskin coral - the lure of emeralds. And a lure it was because of what happened subsequently. I engaged on new ventures, the "House of Emeralds" and the "International Emerald Corporation". But this is too long of a story and out of context with the account on the angelskin coral - so I will skip it. I think the photographs below, at least give part of the story of what happened next.

One of my two "House of Emeralds" stores in Honolulu (at the Royal Hawaiian Center). The decorator: Moi-même, inspired by the furnishing of Franz Joseph's palace in Vienna, which I photographed and had them reproduced in Hong Kong. The chandeliers are of silver crystal that I purchased in Venice.

Moi-même - taking a break at my office at House of Emeralds

Brazil, Australia, Indonesia, Siberia - Dodging Bullets in Mindanao, Basilan, Jolo Islands and along the Cambodian Border - The fascination with gemstones continued. Subsequent purchases of emeralds, imperial topazes and Santa Maria blue aquamarines were made in the State of Minas Gerais and in Bahia in Brazil, where I even found beautiful gemstones of imperial topaz. Also I combed the Amazon areas in Peru, Colombia and Brazil, but found nothing there. In Mindanao, Basilan and Jolo islands, I had close encounters with the Abu Sayaf guerillas, got shot at, managed to keep my head on my shoulders with a narrow escape, but came back empty-handed.

I purchase beautiful black opals at the Cooper Pedy mines of Australia. In Siberia, I had a chance to get rough diamonds from the lake Baikal region, but with the KGB watching at close range, I decided that it was not worth taking any risks. In Southeast Asia - along the borders of Thailand with Myanmar (Burma), I got beautiful pigeon-blood color rubies and beautiful star sapphires. In India I was able to find rare cornflower blue Kashmir sapphires. My excursions with five armed bodyguards, through checkpoints north of Chantaburri, near the Cambodia border, three miles away from the Khmer Rouge forces, turned out to be the most exciting and dangerous of my journeys. I did not know who to fear more, the Khmer Rouge or my armed bodyguards, but I managed to return to Bangkok, in spite of some close calls for early departure to the heavens. Everything turned out fine and I ended up with a nice collection of both rubies and sapphires - including beautiful green sapphires.

With stones from my trips, I subsequently manufactured jewelry for my two stores in Rio, Hong Kong, Bangkok, Greece and Cordova, Spain. A subsequent armed robbery of my Eaton Square store, practically wiped me out of most of my inventory so I had to sell my properties, get money, and start all over again. In subsequent years, I had a brief reversal of fortune and managed to acquire a beautiful house with swimming pool, a yacht and even begun collecting antique Rolls Royces. But I did not heed the advice of a very rich friend

from Carmel who recommended that I keep a low profile as to not attract attention from people that would want to find a way to separate me from my hard earned wealth. And right he was because in subsequent years there were indeed urban bandits in three-piece suits that separated me from a good part of my earthly processions. These clowns were more difficult to handle that the mountain bandits I had encountered in Mexico. So, there were two or three more cycles of reversal of fortune, which I survived, but had to start again from the beginning - finding some comfort in Kipling's verses:

.....*If you can dream---and not make dreams your master;*
If you can think---and not make thoughts your aim,
If you can meet with Triumph and Disaster
And treat those two impostors just the same:……

……If you can make one heap of all your winnings
And risk it on one turn of pitch-and-toss,
And lose, and start again at your beginnings,
And never breathe a word about your loss:……..

…. If you can talk with crowds and keep your virtue,
Or walk with Kings---nor lose the common touch,
If neither foes nor loving friends can hurt you,
If all men count with you, but none too much:….

The Rediscovery of Angelskin Coral - And so the adventures and the new beginnings continued for many more years, but at a much slower pace as old age slowly crept upon me depriving me of physical strength. And everything eventually became a faded memory, scorched by time, until recently. I was at my Florida home opening stored boxes full with books and personal papers, when I came across a box that rattled when I moved it. Curious, I opened it and there, in front of my very eyes was a shipment of precious angelskin coral that had been returned almost 40 years earlier from an undelivered order that I had sent to Geneva, Switzerland. I now had in my hands precious coral that I thought I had lost forever. I had not even kept a fragment and what I had in Mexico had been stolen by the bandits. I looked at each of the individual pieces of the angelskin coral and each piece brought back memories of another life, of a struggle I was no longer sure I had lived.

Slowly, every fading memory came back to me with renewed conviction that indeed the search for the precious coral and the enormous risks I took in getting it, had been indeed part of my early foolish life. With haste, I looked also for boxes with old forgotten photographs and found them. I looked at them and slowly remembered, the hardships and the excitement. And thus I wrote this account of this particular segment of my foolish, earlier life. What else can an old man do at this late phase of his journey, other than look back in time at what happened and wondered at what it may have been - if a different path had been followed?