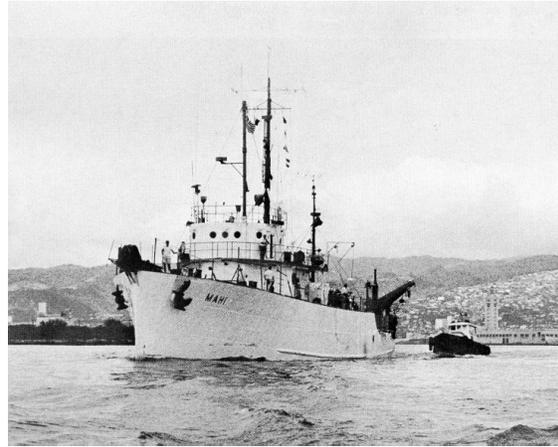
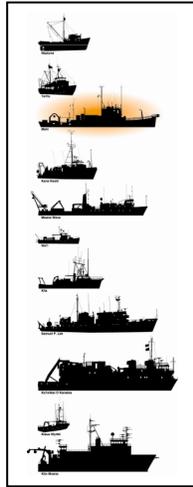


13.3. R/V *Mahi* (1968-1971)



The R/V *Mahi* joined the UH-HIG fleet in June 1968 on a charter agreement with the ship's owner, Dillingham Maritime Services in Honolulu. Dillingham Corporation had purchased *Mahi* in March 1968 and reconfigured it for research at the Dillingham shipyard in Honolulu. Despite having a Hawaiian name ("mahi" is the Hawaiian common name for the pelagic fish *Coryphaena bippurus*, also known as dophin (or dorado) fish; "mahi" also means strong or energetic) and home port of Honolulu, the vessel was registered in Nassau, The Bahamas. At that time, Richard Longfield – who would later become a key figure in UH marine programs – worked for Dillingham.

The R/V *Mahi* was a converted US Navy mine-sweeper, 186 feet in length and 800-ton displacement (Figure 13.6). According to marine technician Pierluigi Pozzi, "*Mahi* was the only vessel in the Pacific with four stacks – The Queen Mary only had three stacks!" This, presumably was a holdover from the vessel's previous military mission – the greater the number of stacks, the harder it is to bring the ship down.

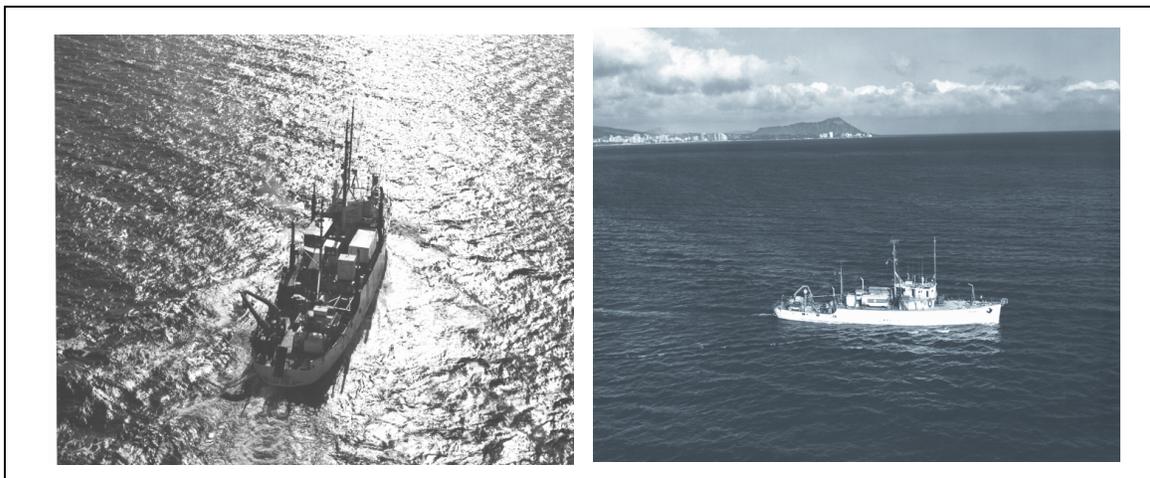


Figure 13.6: R/V *Mahi* at work off Oahu Hawaii. (from SOEST archives)

The reconfigured vessel was equipped with a heavy duty Pengo wire hauler for deep sea coring and dredging, sparker, air guns, magnetometer, gravimeter, 3.5-kHz and 12-kHz transducers, precision depth recorders, piston corer, and water sampling devices; the normal science complement in addition to the crew was 17.

The R/V *Mahi* provided HIG scientists with a much needed, long-endurance vessel for remote Pacific Ocean exploration. For example, in January 1969 HIG scientists completed a 17,000 nautical mile, 100 days-at-sea research expedition to the South Pacific. Loren Kroenke (see *Box 13.1*) and George Sutton, both from HIG, served as expedition leaders on legs 1 and 2, respectively. Much of the time was spent in and around the Solomon Islands, the Line Islands, and the Marshall-Gilbert group, conducting crucial geophysical measurements in support of the relatively new theory of seafloor spreading.

Approximately one year later, a second South Pacific geophysical expedition was conducted with George Sutton in charge. Other lead scientists were Jim Andrews, Alex Malahoff, Loren Kroenke, John Rose, and Augustine Furumoto (Figure 13.7). The voyage was to last from April to December 1970, 8 months of intensive field research. This would be the largest expedition yet undertaken by UH scientists – 48,000 nautical miles, scientists from 50 institutions and a price tag of approximately \$1 M. In a *Honolulu Star-Bulletin* newspaper article published on 6 April 1970, HIG Director Woollard called it the “monster cruise.” He went on to say that “every type of measurement will be done, except biological.” The cruise was funded by ONR and NSF.

The monster cruise was a grand success. One UH marine technician, Pierluigi Pozzi, was aboard for the entire 8 months of research (Figures 13.8 and 13.9). Pozzi was in charge of sediment coring and helped with explosion seismology (see *Box 13.2*) on the expedition, and when interviewed at pier 18 after the 8-month long historic voyage he said, “I’m ready to go back.”

According to a *Honolulu Star-Bulletin* account of the voyage written by Helen Altonn on 17 December 1970, oceanographic history was made during the expedition when the Russian ship *Vityaz* made a rendezvous with the *Mahi* at sea for 8 days of collaborative seismic research; this was, after all, the height of the cold war (see *Box 13.3*). UH Dean of Marine Programs John Craven called the US-USSR open sea meeting “quite symbolic.” We can’t seem to work together on land, but marine research was something very different. Chief scientist Malahoff, who was Russian by birth, said “we tried to avoid discussions of politics....we went about our business professionally.”

The R/V *Mahi* remained in charter service to UH-HIG until January 1971 when it was replaced by the R/V *Kana Keoki* (see section 13.4). There was certainly a need for both vessels, but the funding for ship support had not kept pace with escalating operating costs. This was a very difficult decision for HIG Director Woollard, given the potential negative impacts on UH’s expanding marine expeditionary research mission, but the decision was made not to renew the R/V *Mahi* charter agreement.

Box 13.1: Loren Kroenke: The Iron Man of UH Expeditionary Marine Research



“There is nothing more enticing, disenchanting and enslaving than life at sea.”

*Joseph Conrad
(1857-1924)
“Lord Jim”*

Loren Kroenke joined HIG in 1963 as one of Woollard’s “hand-picked” sea-going colleagues; in fact, he was a superb complement to Woollard who had a tendency for sea sickness! Loren was appointed into a “faculty position,” technically a junior geophysicist (R-1), and came up for tenure while still a graduate student in geology and geophysics! As the story goes, he was denied tenure in 1971 because he didn’t have his Ph.D. The following year he completed all graduation requirements and was reinstated in good standing.

From 27 February 1962 to 19 June 1963, Kronke participated in eight back-to-back NSF-sponsored legs of the USNS *Eltanin*, from Bayonne, New Jersey, USA to Deception Island, Antarctica to Talcahuano, Chile, and many ports in between. After his arrival in Hawaii, Loren conducted research aboard UH research vessels *Neptune I*, *Teritu*, *Mahi*, *Kana Keoki*, *Noi’i*, and *Moana Wave*, as well as the drill ships *Glomar Challenger* and *Joides Resolution*. He served as chief scientist, or co-chief scientist, on many expeditions including *Glomar Challenger* leg #59, *Joides Resolution* leg #130, and on the Honolulu-to-Pago Pago-to-Suva legs of the 1970 “monster cruise” aboard the R/V *Mahi* (see section 13.3 and *Box 13.3*).

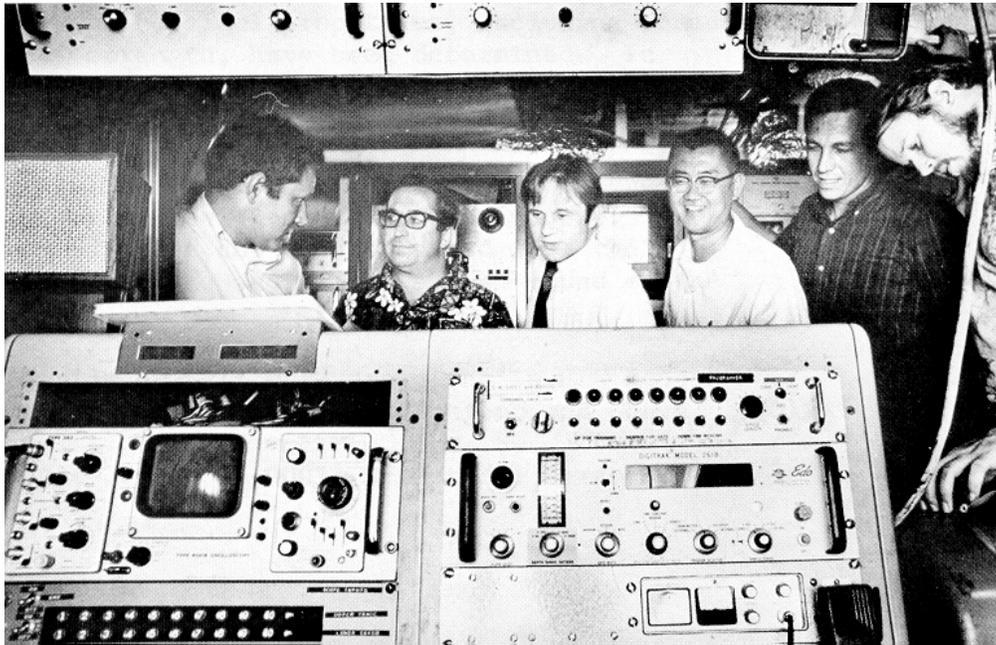


*Loren Kroenke at sea
(left) circa 1970 and in his
HIG office between
cruises. (from SOEST*



During his more than four decades of expeditionary marine research, Loren logged in excess of 4½ years at sea, rightfully earning the title of “iron man of UH expeditionary marine research.” Few, if any, other scientists at UH, with the possible exception of Don Hussong and Fris Campbell, can match his remarkable achievements of dedication and endurance.

After retirement from the UH fleet, the R/V *Mahi* supported several marine research projects in and around the Hawaiian Islands but was not called on again for the global ocean mission begun with her by the UH-HIG scientists. With time, the vessel fell out of repair and eventually became one of many derelicts in Keehi Lagoon (Figure 13.10). *Mahi* was eventually towed offshore and sunk where it now serves as part of an artificial reef. So even in “death,” the *Mahi* continues to support Hawaii’s marine resources.

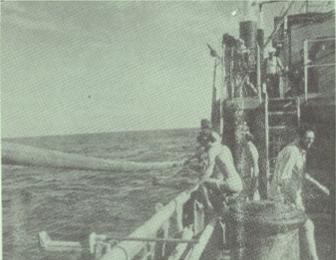


**The
green
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A UNIVERSITY OF HAWAII FACULTY NEWSLETTER

Activities aboard the Mahi Photo by William Peterson



Research Ship Sails Home From Historical Encounters

History is often made on a university campus, of course . . . sometimes it staidly in silence, often it comes with flamboyance and fanfare, but almost certainly behind it are great preparations and diligence and plain hard work by a great many people.

History has been made by a Research Ship called the Mahi and a group of UH scientists from the Hawaii Institute of Geophysics.

Now safely home, the courageous Mahi is completely worn out and will die a natural death. But the 58 or 59 HIG scientists who coordinated and sailed the 48,000 miles on her appear stimulated and excited by the whole long research voyage of nine months. It was the longest and most expensive research venture so far undertaken by HIG.

The scientists who took part in it are all busy re-drafting maps of the area they covered, writing reports, making appraisals and analyses, writing new data.

Giant charts, almost as large as the room, were lying on a table, filled with tracings of the Mahi trek. "The Research Cruise was done in five legs," one of the scientists explained, "with 16 people on duty during each leg. The territory covered was from Hawaii to Samoa and Fiji; Fiji to Rabaul in New Guinea; New Guinea to Guam; across the Pacific and return to Guam; then Guam back to Hawaii."

Each group of 16 was composed of a chief scientist, assistant chief, graduate students, undergraduates, and specialists. The chief scientists on the various legs were: Don Husoong, John Halunen, Loren Kroenke, George Sutton, Alexander Malahoff, Gus Furumoto, and James Andrews. Leonard Kroenke, assistant director of HIG, was the logistic coordinator—known amongst the crew as the "Bombala-based trouble-shooter."

... Significant purposes of voyage . . .

The five Mission Impossibles the scientists undertook . . . and made possible . . . were:

To study and chart the until-now uncharted Canton Trough near Canton Island, the deepest area of the central basin of the Pacific Ocean.

To study the flow of heat out of the earth near Fiji, which is, scientifically speaking, one of the hottest areas on the globe and therefore excellent for this phase of study which gives information of the earth's crust.

To take seismic refraction measurements—that is, after making their own explosions and sound wave recordings, the men could determine the thickness of the crust, and study the history of the formation of the Southwest Pacific Islands.

To make a reconnaissance of the Central Pacific, looking for the origin of abyssal hills and manganese nodules and stratigraphy of the Central Basin.

To work, in cooperation with the Russians, in the area north of Marcus Island, which was of international importance.

Continued on last page

Figure 13.7: [Top] A few of the many HIG scientists and staff who contributed to the “monster cruise” aboard the R/V Mahi in 1970. Shown from left are: Loren Kroenke, George Sutton, Alex Malahoff, Gus Furumoto, John Halunen, and Jim Andrews. [Left] Monster cruise makes front page news on “The Green Sheet,” February 1971, a University of Hawaii faculty newsletter. (from SOEST archives)

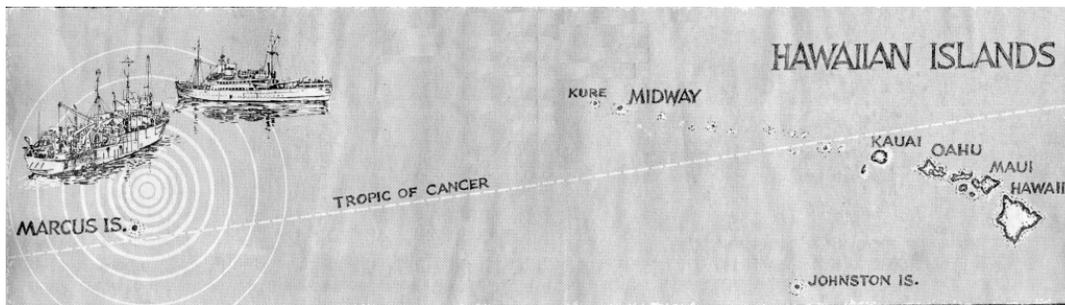


Figure 13.8: [Above] The “monster cruise” made history when UH and Soviet marine scientists conducted a 2-ship collaborative operation north of Marcus Island in the western Pacific Ocean in fall 1970. Shown at left is marine technician Pierluigi Pozzi who was aboard for the entire 8-month expedition, and at right one of the expedition chief scientists – Alex Malahoff – reunited with his daughter after the historic *Mahi-Vityaz* leg of the “monster cruise” expedition. ([Top] from *Honolulu Star-Bulletin*, 18 January 1971 and 17 December 1970 articles by Helen Altonn. [Center] photos by *Honolulu Star-Bulletin* photographer Terry Luke). [Below] Three “surviving participants” of the monster cruise – Pierluigi Pozzi, Loren Kroenke, and Bob Mitiguy – gathered to honor Ralph Moberly at his retirement celebration in September 2003. (photo by D. Karl)





Figure 13.9: R/V *Mahi* approaching pier 18 (left) and back home with well wishers (right) after the successful 8-month long “monster” cruise. (from SOEST archives)

Box 13.2: The “Big Bang” of UH Marine Research

In the mid-1940s it was discovered that low frequency sound waves would penetrate the seabed and reflect from the sub-seabed layers. These reflections provided invaluable insights into the nature of the sediments and the underlying seafloor. Seismic reflection profiling is an extension of the echo sounder principle, except that a more powerful sound source is used and reflections are obtained not only from the seafloor, but also from prominent layers within the sediment and seabed rocks.

Later, marine scientists began using explosives, some with timed fuses that were designed to set off the charge at a specific depth. This soon became a “cottage-industry” in marine geophysics and there was always an interest in setting off larger and larger explosions to produce sound waves with greater penetrating potential. In 1977 DuPont ceased domestic production of dynamite – the preferred explosive – and switched to safer, “water gel” explosives like Tovex[®], that were used extensively in UH seismic research.



UH marine technician Pierluigi Pozzi doing his “thing” aboard the R/V Kana Keoki circa 1973. (from SOEST archives)

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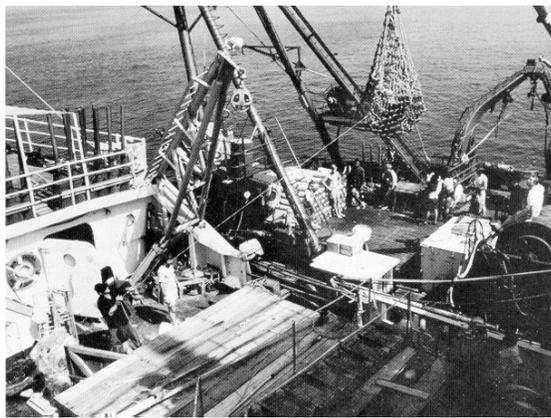
Box 13.2: The “Big Bang” of UH Marine Research (continued)



UH marine research technician Bob Mitiguy posing with a one-ton package of explosives on the fantail of the R/V Kana Keoki circa 1970, and surface manifestation of a successful shot (from Bob Mitiguy)



In February 1972, the R/V *Kana Keoki* from UH and R/V *Yaquina* from Oregon State University (OSU) conducted a joint expedition to the Nazca Plate. Both vessels were to load explosives for seismic refraction work in Callao, Peru. When Peruvian authorities would not allow the explosives to be loaded aboard the ships in the country’s primary harbor, they were ordered to go to the port of Ancon, Peru, approximately 30 miles north of Callao to re-supply. According to a first-hand account by OSU scientist Peter Kalk, that appeared in the L. Burt and M. Ludwig book, *Oceanography at Oregon State University: The First Two Decades (1954-1975)*, the local authorities did not allow the R/V *Yaquina* to receive any explosives because of incomplete paperwork. Not to worry – the *Kana Keoki* took all they could, about 4000 cans of Nitromon – 2 truckloads full. The next morning the R/V *Kana Keoki* came alongside the R/V *Yaquina* and used their crane to move the *Yaquina*’s share of explosives – and off they both went.



Transferring explosives from the R/V Kana Keoki to the R/V Yaquina at Ancon, Peru. (from SOEST archives)

In March 1973, during project “Narino,” scientists aboard the R/V *Kana Keoki* fired 19 one- and two-ton explosive charges along a line from Malpelo Island to Tumaco off the coast of Columbia. Later a record was set with the detonation of several five-ton (10,000 pound) charges; this was the “big bang” of UH marine research. According to reliable eye-witness sources, these explosive charges were contained in 24x55 gallon drums, packaged and wired together (below). As Pierluigi Pozzi described it, “They were wide as the A-frame and more than 2 m high.” They were deployed from the fantail of the R/V *Kana Keoki*, and detonated at a depth of 80-100 m. All personnel aboard – and for miles around – sensed the excitement of this research!

Box 13.3: Historic Research at Sea: The meeting of the *Mahi* and the *Vityaz*

During one leg of the “monster cruise” in 1970, the R/V *Mahi* and the UH scientists aboard made history by conducting the first ever joint oceanographic study with Soviet scientists aboard their vessel *Vityaz*. The common scientific objectives were to study the ocean bottom near Marcus Island, a site adjacent to the junction between the Marianas and Japan deep sea trenches. Research performed near that location just a few years prior to the *Mahi-Vityaz* expedition suggested that this might be the oldest seafloor yet discovered, some 150 million years old, or older. The at-sea rendezvous was arranged by HIG Director Woollard and was implemented by UH oceanographer Alex Malahoff and his field team. This joint research program was a first for any American university, and by any measure was a huge success.



The two ships involved in the historic US-USSR joint expedition near Marcus Island in 1970; R/V Mahi (left) and R/V Vityaz.

According to newspaper accounts of the collaboration – which appeared as several feature articles by Helen Altonn published in the *Honolulu Star-Bulletin* – Don Hussong and Mark Odegard, two UH marine scientists, boarded the *Vityaz* in Japan while all other Americans were aboard the R/V *Mahi*. Once on site, there was a two-way exchange of scientists on both a short-term and longer-term basis so in addition to the science that was conducted there was also ample opportunity for cultural exchange among the scientists.

According to Hussong, in a 8 December 1970 *Honolulu Star-Bulletin* account of the event, “Everybody visited each other’s ships and had toasts together – whiskey on our side and vodka on theirs.” (note: Back then, most research vessels had no explicit alcohol policy, at least not for the scientific parties. Today most vessels have “zero tolerance.”) This historic scientific encounter took place over Thanksgiving so there was even more reason to celebrate!

The R/V *Vityaz* was, by all accounts, a remarkable vessel and many of the UH scientists found it hard to leave when the at-sea work was done. The *Vityaz* was built as *Mars* in Germany in 1939 as a dry cargo vessel – initially carrying fruit. During World War II the vessel was converted to a personnel transport ship; immediately after the war, the vessel was claimed by England and renamed *Forward Empire*. In 1946 it was transferred to the Soviet Union, renamed and converted for a science mission. The R/V *Vityaz* was an enormous vessel, 5500-ton displacement with 14 laboratories, eight deep-sea winches, and a science party of 70. The *Vityaz* was in service from 1949 to 1979 during which time it conducted 65 major research expeditions. After retirement in Kaliningrad, the *Vityaz* was converted into the Museum of the World Ocean (<http://www.vitiaz.ru/english/>).