Memorial to Harry Stephen Ladd
1899–1982

FRANK C. WHITMORE, JR.
U.S. Geological Survey, E-501 National Museum of Natural History,
Washington, DC 20560

JOSHUA I. TRACEY, JR.
U.S. Geological Survey, National Center, Reston, Virginia 22092

Harry Stephen Ladd, retired geologist of the U.S. Geological Survey and research associate of the Smithsonian Institution, died in Bethesda, Maryland, on November 30, 1982, after an illness that had confined him to his home for several years. He will be remembered as a major contributor to our knowledge of the geology and paleontology of the islands of the Pacific, to the understanding of coral reefs, and as a founder of the modern science of paleoecology.

Harry was born in St. Louis, Missouri, on January 1, 1899, the son of Charles Pomeroy Ladd and Alice Ring Bemis. He was a naturalist from the time he was a young child. His first love was ornithology, and as a boy he collected bird skins and acquired a set of A. C. Bent’s Life Histories of North American Birds. His parents encouraged these activities. His interest in the sea dated from summers spent with his family at Bar Harbor, Maine, where he collected invertebrates at low tide on the bar that connects Mount Desert Island with the mainland. This enthusiasm was focused on paleontology during his undergraduate years at Washington University in St. Louis, from which he graduated in 1922.

Harry went on to graduate work at the University of Iowa, where he earned the M.S. in 1924 and the Ph.D. in 1925, writing his doctoral dissertation on the fauna of the Maquoketa Shale.

During his college years, Harry developed an interest in the islands of the Pacific that was to continue for the rest of his life. In an interview with Clifford M. Nelson of the U.S. Geological Survey (October 26, 1977), he said,

I had seen the so-called coral reef in the Devonian of Iowa and was intrigued by it, but I can’t tell you when I first had the idea of going to the South Seas, as they called them. It was very early. I know that much. And, when I was nearing the end of my graduate school, I wrote to every geologist that I could find out about in America who had done any work in the Pacific. These included Dr. Dall, W. H. Hobbs, and others. I also wrote to W. M. Davis and R. A. Daly, both very active in coral reef work. I asked where I should go in the Pacific with the hope of finding some paleontology and interesting island geology. Professor Thomas, my professor at Iowa, had been to Fiji. He recommended Fiji. W. M. Davis came to Iowa and I visited him in his hotel room, and he approved of Fiji but wanted me to study physiography. We didn’t agree even in those days.

Harry applied for fellowships from Yale and the Bernice P. Bishop Museum in Honolulu, and receiving them, he went to Fiji in 1925. During the next 10 years he put in
almost 3 years of fieldwork there. He went out to Fiji to work alone, planning to pick up local helpers. His first year was spent in this way, but in the course of it, by chance, a collaboration began that was to continue for the rest of his life. In 1925, J. Edward Hoffmeister of the University of Rochester was on his way to Tonga as paleontologist with an expedition from the University of California. He wrote to Whitmore (December 5, 1922):

The first stop on the way to Tonga was Suva, Fiji, where we had to change ships. I was walking around the pier when a good-looking young fellow came up to me and said that he had heard that I was a geologist. He said his name was Harry Ladd and that he also was a geologist, working in Fiji. And that was the beginning of something grand!

Grand it was. Harry went on to map the island of Viti Levu in 1925 and 1926, and in 1934 he and Hoffmeister returned to Fiji and joined forces in several island groups. Hoffmeister writes: "Probably the most extensive program was our last, which dealt with the islands of eastern Fiji, the Lau Islands." Ladd and Hoffmeister's studies formed the basis for all later geologic fieldwork in the Fiji Islands.

Their collaboration resulted also in three short papers on foundations of atolls that would greatly influence later reef studies. In these papers they critically reviewed the two most widely accepted hypotheses for the origin of reefs and atolls—the subsidence theory of Darwin and Dana, as strongly advocated by William Morris Davis, and the glacial-control theory of Reginald Daly—and put forward their version of the antecedent-platform theory. This theory held that reefs could originate and grow to the surface on any shelf or bank of suitable depth, given favorable ecologic conditions for coral growth, without the necessity for a change in sea level by subsidence or by glaciation. Such changes, they maintained, might stimulate coral growth but were not essential to the formation of a flourishing reef.

The significance of the papers lay not in the essential correctness or predictive capacity of their version of the antecedent-platform hypothesis, but rather in their recognition that different emergent reefs and islands had very different histories: thus, no single hypothesis was all-encompassing. They emphasized the need for interdisciplinary field studies in which both geologic and biologic aspects were considered, including detailed sedimentological studies of the limestones to determine whether they were, in fact, atoll or even reef rock.

After his first trip to Fiji, Harry taught for 3 years at the University of Virginia. He disliked teaching, and as he often put it, he got awfully tired of hearing about Mr. Jefferson. Despite this, though, he seems to have enjoyed the social life of a faculty member. Then he spent 2 years as paleontologist for the Venezuela Gulf Oil Company in the Falcon district of Venezuela. This broadened his knowledge of Tertiary Mollusca and resulted in a lifelong friendship with Hollis D. Hedberg.

Having put some money aside, Harry began his association with the U.S. National Museum in 1931. Self-supported, he worked there for a year on his fossils from Fiji and supported himself for a second year working as a photographer for E. O. Ulrich while continuing his research at night, a pattern that he was to follow in later years when he was assistant chief geologist of the U.S. Geological Survey.

As mentioned above, Harry's second trip to Fiji followed this period of study. 1934 was an important year for him—and not just because of geology. Jane Mahler of St. Louis, to the consternation of her family, traveled alone to Fiji, and she and Harry were married there in September 1934. Following Fijian custom for the marriage of important people, Harry was presented with a marriage gift of a tambua (a sperm-whale tooth)—
a powerful talisman. The Ladds spent the following winter in Rochester, New York, where Ladd and Hoffmeister collaborated in writing the report on the geology of Lau.

In 1936 Harry began his career with the U.S. Department of the Interior, joining the National Park Service as district geologist in Atlanta, Georgia. In 1938 he transferred to Richmond, Virginia, as regional geologist. During this period, he worked on dam sites, construction materials, and water supply in the southeastern states. The work involved a lot of drilling; as it turned out, the experience was valuable in his later work in the Pacific. A close associate in the Park Service was Virgil C. Mickle, a driller from Oklahoma, who later worked with Harry in drilling deep holes on Pacific atolls.

In 1940 Harry transferred to the U.S. Geological Survey. His first assignment was to study Holocene and Cenozoic mollusk faunas of the Texas Gulf coast. This choice of assignment probably resulted from Harry’s long and close association with T. Wayland Vaughan, the dean of coral students of his day and an active proponent of research in paleoecology. In 1940 Vaughan organized a Subcommittee on the Ecology of Marine Organisms under the Committee on Geologic Research of the National Research Council. Harry was appointed chairman of the subcommittee. It was dormant during World War II, but after the war, Harry saw to its reconstitution as the Committee on Marine Ecology and Paleoecology and led its members in the preparation of the monumental Treatise on Marine Ecology and Paleoecology (two volumes, 2,372 pages), which was published by the Geological Society of America in 1957 and forms the basis for modern work in this field.

World War II ended Harry’s work in Texas. In 1941 and 1942 he worked on manganese in the Appalachians under Hugh D. Miser. This work, besides contributing to the war effort, supplied Harry with a wealth of stories about Mr. Miser, one of the all-time U.S. Geological Survey characters. In 1942 Harry was appointed regional geologist in Rolla, Missouri, where he spent the rest of the war coordinating strategic minerals work in the midcontinent region.

The end of the war brought Harry the chance to put into effect his ideas for work in the Pacific. During the war the Military Geology Unit of the Survey had prepared terrain intelligence studies of all the major islands of the western Pacific Ocean, using aerial photographs, scattered geologic studies, and mostly outdated maps. This work emphasized how meager was our knowledge of the geology of the region and led Harry to propose a geologic mapping program, to be done by the Survey and financed by the Corps of Engineers, U.S. Army. The program began in 1946 with the initiation of geologic and soils mapping of Okinawa and continued for 15 years, during which time the major islands of the Ryukyus, Marianas (including Guam), Palau, and Carolines were mapped. Interpretative maps were also prepared, including engineering geology, water supply, and what would now be called environmental geology.

After a stint as assistant chief geologist (1946-1949), Harry joined the Paleontology and Stratigraphy Branch of the U.S. Geological Survey and spent the rest of his career there, in the National Museum of Natural History. He retired from the Survey in 1969 but continued to work at the Museum as a research associate of the Smithsonian Institution until 1979.

Even while doing administrative work he was involved in the Pacific. In 1946 he was a member of the Oceanographic Section of Operation Crossroads, surveying Bikini Atoll in preparation for the atomic-bomb tests there. A resurvey was made in 1947, after the tests, and in connection with this, Harry carried out a drilling program to provide geologic and geophysical data for interpretation of the bomb tests. Coring the atoll gave Harry the opportunity of accomplishing what the British had attempted half a century
earlier in their classic study and drilling of the atoll of Funafuti—to penetrate the foundation of an atoll and find out whether it had subsided and how much. Harry did not reach the foundation either, for drilling stopped at 2,556 feet when the crew ran out of drill pipe, still in shallow-water, reef-associated, lagoonal-type sediments of Oligocene age. The drilling demonstrated that Bikini Atoll had subsided at least that much, interrupted several times by periods when it stood well above sea level.

In subsequent years, Harry organized and supervised deep drilling on Eniwetok and Midway Atolls. The drill on Eniwetok reached basaltic bedrock overlain by shallow-water reef limestone of Eocene age at a depth of more than 4,000 feet, corroborating Darwin’s theory of atoll subsidence in the central Pacific but showing recurrent periods of atoll emergence and rejuvenation during the Tertiary and especially during Quaternary glaciations. Davis’s and Daly’s opposing hypotheses were each partly right, and as Hoffmeister and Ladd had proposed, new reefs grew on the antecedent platform of the former emergent reef with each cyclic swing of sea level.

Harry was an active participant as well as an organizer in the atoll drilling projects. He always did more than his share of the dirty work, bagging and labeling samples and taking his turn at logging the hole.

With his background in drilling on Pacific islands, it was natural that Harry became involved in Project Mohole, the plan to drill to the Mohorovičić discontinuity. He put much time into his work on the scientific advisory committee and helped plan the test drilling off Guadalupe Island in the eastern Pacific. This test drilling was carried out successfully in 11,700 feet of water, encountering basalt at about 600 feet below the sediment-water interface. Although Project Mohole was discontinued without achieving its goal, its technological developments were important to the success of the Deep Sea Drilling Project.

No matter what else he was doing, throughout his career Harry devoted himself to the systematics of Pacific fossil Mollusca. He published many papers on this subject; the culmination of his molluscan research was a series of four U.S. Geological Survey Professional Papers, the last of which was published in 1982, shortly before his death. In addition to his own work, he arranged for others to publish their studies of the deep cores and the surficial geology of the islands. Much of this work appeared in U.S. Geological Survey Professional Paper 260, “Bikini and Nearby Atolls.” This publication, which appeared over the years as 35 separately bound chapters by as many authors and co-authors, was originally intended to record the results of studies on Bikini. As work progressed, the term “nearby” was stretched to include islands far beyond the Marshall group, to such an extent that Harry’s friends maintained that the series should be retitled “Bikini and the Rest of the World.” This publication is the longest U.S. Geological Survey Professional Paper ever published—1,185 pages, 311 plates, and 342 figures.

During his years at the National Museum, Harry’s studies were often punctuated by trips to the Pacific— for drilling on the atolls, a return to Saipan for further collecting (during which he was badly stung by wasps, causing a flare-up of arthritis and an extended hospitalization in Hawaii), attendance at the Southwest Pacific Geological Survey Conference in Fiji, and a visit to Australia as a consultant to the Great Barrier Reef Committee, one of the high points of his career. As he became less active in fieldwork, he continued in close touch with Peter Rodda and Peter Ibbotsen of the Fiji Geological Survey, and also with workers in Tonga, the Solomon Islands, the New Hebrides, and other western Pacific island areas. Fossils were sent to him that resulted in more papers, as well as in advice to the field geologists. The pace of Harry’s work did not slacken until, in 1979, the onset of Parkinson’s disease forced his confinement at home.
Harry received the Distinguished Service Award of the U.S. Department of the Interior in 1965 and the Paleontological Society Medal in 1981. He was president of the Paleontological Society (1954) and of the Geological Society of Washington (1960), vice-president of the Geological Society of America (1955), and vice-president and chairman of Section E (Geology and Geography), American Association for the Advancement of Science (1965).

Harry was known as an organizer; he was a clean-desk man who never seemed to be behind on anything. This summons up a picture of a solemn, dedicated scientist. Dedicated Harry was, but never solemn. For almost 30 years he presided over a lunch mess, as he called it, in his office at the Museum. Promptly at eleven o'clock, he would take a brown paper bag from his briefcase and a plate, cutlery, and salt and pepper shakers from his bottom desk drawer. The plate bore the likenesses of Jack and Jackie Kennedy, almost obliterated from years of scrubbing, and on it would go a cold steak or a chop—no salad.

Just as promptly, the other members of the lunch mess would appear. They would array themselves around the desk with their sandwiches, and the talk would begin.

Here, you would say, is an example of the cross-fertilization that takes place in a great museum—scholars engaged in the exchange of ideas. Ideas were exchanged all right—on politics; reminiscences of fieldwork; stories of questionable taste; the Washington Redskins, as opposed to the “bastards of Baltimore” (Harry’s term); and innumerable small bets, usually on sports or politics, which were duly recorded on Harry’s desk calendar. Lunch-mess members were sometimes pleasantly surprised several years later to find that they had won a bet based on some long-forgotten political prediction.

Occasionally during lunch the needle would come out, usually in the form of Harry’s urging someone on to publication. In the midst of the badinage, he would inquire about the progress of a paper, or even when one would be started. He knew what his colleagues were doing and often had his own ideas (just as often hotly contested by us) where our priorities should lie. This concern with the work of others extended far beyond the lunch mess; Harry had a superb ability to get a group of scientists working together and to push the project through to completion. From the earliest days of his professional career, he knew what he wanted to do and proceeded with his work in an orderly way, and if you participated in one of his projects you soon found that you were well organized too.

Jane, Harry, and their sons, Nicholas and David, had a close and jolly family life. In a speech on the occasion of Harry’s receiving the Paleontological Society Medal, his son David said.

To my brother and me, when we were growing up, he was a father rather than a great scientist. In fact, I did not begin to appreciate his accomplishments until I took freshman geology and was assigned one of his articles to read. Dad loves his profession with a passion. However, he was also concerned with the people he worked with. I can remember, as a child, accompanying him when he went to visit Dr. T. Wayland Vaughan, after Vaughan had retired and was pretty much a shut-in. Dad would read his mail to him and bring him up to date on what was happening at the Survey. Years later he regularly visited Julia Gardner after her retirement.

The Ladd family worked together about the house and played together in the summers at Bethany Beach, Delaware, and on one notable occasion on a long trip to the West. With his sons, as with his friends, Harry delighted in small but complicated bets, and as the boys grew older, they continued a relationship with their father that was full of humor and mutual respect. Although Jane and Harry were often separated during Harry’s long absences in the Pacific, they traveled much together in later years, to
Europe, Central America, Japan, and Southeast Asia. They planned a trip to China, but Harry’s illness made this impossible.

Four grandchildren have joined the clan, and to them, as to the other family members and all who knew him, Harry was the best of companions.

SELECTED BIBLIOGRAPHY OF H. S. LADD

1927 (and Hoffmeister, J. E.) Recent negative shift in strandline in Fiji and Tonga: Journal of Geology, v. 35, p. 542-556.
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