

A SHORT HISTORY OF SIO

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The investigations that led to the founding of Scripps Institution of Oceanography began as a series of summer marine biological studies conducted at several stations along the California coast by University of California Professor William E. Ritter beginning in 1892. Avalon was the location in summer of 1893; a bath house on the government breakwater in San Pedro was its location in 1901 and 1902.

In 1903, Ritter and a group of San Diegans established Scripps Institution of Oceanography as a seaside research laboratory for the University of California's Department of Zoology. The San Diego Marine Biological Station, as it was first known, was sponsored by the Marine Biological Association of San Diego

"... to carry on a biological and hydrographic survey of the waters of the Pacific Ocean adjacent to the coast of Southern California; to build and maintain a public aquarium and museum; and to prosecute such other kindred undertakings as the Board of Trustees may from time to time deem it wise to enter upon."

By 1904 Ritter had begun working in San Diego on what he hoped would be an exhaustive study of marine life focused on a limited area, using the vessel Albatross for deep water investigation. He was hence for many years to divide his time between Berkeley and La Jolla where he spent his summers.

In 1905, the Association moved from Coronado to La Jolla and acquired the present campus location in 1907. Endowed and supported by Ellen Browning Scripps and her brother E.W. Scripps, the Marine Biological Association of San Diego staff in 1910 consisted of Ritter as scientific director, two scientific assistants, a part-time librarian, the master of Alexander Agassiz, a superintendent of grounds, and six nonresident researchers. In 1912, the Marine Biological Association of San Diego was transferred to the Regents of the University of California and renamed the Scripps Institution for Biological Research. The Institution soon attracted many young men to work with Ritter, namely Harry B. Torrey, Loye Holmes Miller, Samuel Jackson Holmes, Joseph Grinnell, Charles Atwood Kofoid, and others who would later attain prominence in the world of science.

Ritter retired in June 1923 and Thomas Wayland Vaughan was appointed the second director on February 1, 1924. The Scripps Institution for Biological Research was renamed the Scripps Institution of Oceanography on October 13, 1925. Vaughan set high goals for Scripps Institution and every year the scope of these goals broadened. He proposed to the Berkeley administration over the years that Scripps upgrade the scientific staff, secure a new oceanographic vessel, build a new aquarium, repair the sea wall, pier and roads, expand the laboratory building and the library. Vaughan was successful in laying the groundwork for many of these items but was frustrated by the lack of University funding for them. During Vaughan's directorship, Scripps Institution of Oceanography scientists worked in four fields of oceanography: physiology, chemistry, biology and geology. Vaughan encouraged his scientific staff to select special areas of oceanographic study and concentrate on these research efforts exclusively. Vaughan himself spent many active years stimulating oceanographic investigations in the Pacific and was appointed by Professor Joji Sakurai to be chairman of the Pacific Science Association's International Committee on the Oceanography of the Pacific. Vaughan retired in 1936 and was succeeded by Harald Ulrik Sverdrup who became director on September 1, 1936.

The Norwegian oceanographer and arctic scientist Harald Sverdrup was one of the greatest oceanographers of his generation. He accepted the position of Director of the Scripps Institution of Oceanography for three years only, with the understanding that he would convert the institution from a marine station to a world class oceanographic institution. During his years as director, he increased the budget of the Scripps Institution, persuaded Robert Paine Scripps to purchase a research vessel capable of deep water oceanography, R/V E.W. Scripps, united a divided staff around a reinvigorated oceanographic research program, invented the first oceanographic curriculum, and

took the institution to sea to conduct the first hydrographic survey of the Gulf of California. Before 1938, the University of California in Berkeley granted graduate degrees for work done at the Scripps Institution. After 1938, Scripps became part of the University of California, Los Angeles, and Sverdrup worked with UCLA administrators to improve the quality of instruction. Sverdrup set an agenda for physical oceanography of the Pacific, and he and coauthors Martin W. Johnson and Richard H. Fleming wrote the first modern textbook in oceanography, *The Oceans: Their Physics, Chemistry and General Biology*.

When the war prevented Sverdrup's return to Europe, he and the Scripps Institution turned to war work. Between 1941 and 1945, Sverdrup taught a course in military meteorology at the UCLA Department of Meteorology and trained over 1200 military weather officers. Sverdrup and his graduate student Walter Munk developed a method of predicted surf conditions which they taught to classes of military meteorologists at the Scripps Institution. The Sverdrup-Munk method was used to predict surf conditions for Allied landings in North Africa, Italy and Normandy. During the war years, the University of California Division of War Research (UCDWR) was established in San Diego to conduct research on sonar and sound in the sea under naval contract. Many Scripps scientists worked at UCDWR. Navy oversight of the work of the laboratory was the responsibility of Roger Revelle, a Scripps oceanographer on active duty in the navy. When UCDWR closed after the war, navy contracts for research in basic science were transferred to the newly formed Marine Physical Laboratory (MPL), which became part of the Scripps Institution in 1948.

MPL director Carl Henry Eckart became SIO's fourth director in 1948. Roger Revelle was appointed SIO's associate director in the same year. Eckart resigned as director of SIO in 1950 to devote more time to his research. Revelle was appointed acting director in 1950, and then director in July 1951. Research expanded at SIO following World War II with an increase in federal funding, and SIO participated in the state funded California Cooperative Oceanic Fisheries Investigation (CalCOFI) which studied the causes of the depletion of the sardine from California waters. Revelle used his navy contacts in Washington to build a research fleet, and Scripps conducted a series of oceanographic expeditions in the Pacific which profoundly expanded knowledge of the oceans and contributed to a new understanding of earth history. Revelle also built new facilities to support the fleet and campus facilities to support research and the work of a growing number of graduate students.

In 1956, graduate education began at the new University of California, La Jolla, later renamed the University of California, San Diego. Revelle helped found the campus, and its first undergraduate college was named for him. Administrative and academic functions at SIO, which had formerly been managed by UC Berkeley and then UCLA, were transferred to UCSD. During the International Geophysical Year, Roger Revelle arranged for the first measurements of atmospheric carbon dioxide by Charles David Keeling, a chemist who joined the SIO staff in 1958. Keeling's measurements proved conclusively that atmospheric carbon dioxide was increasing and made the Scripps Institution of Oceanography a center for research in climate change.

In September 1961, Revelle left SIO to become the first science advisor to the U.S. Secretary of the Interior. Fred Noel Spiess was named acting director and then appointed director three years later when Revelle resigned the position.

William Aaron Nierenberg was appointed SIO's seventh director on July 1, 1965. He came to Scripps Institution of Oceanography at a time of increasing public interest in the oceans. While director, he supervised a five-fold increase in SIO's budget, obtaining funding from federal, state, and private sources. He expanded the graduate education program and started an applied ocean sciences program, which stressed both engineering and oceanography. Among the first to recognize the value of satellites and computers in oceanography, Nierenberg started the first use of large-scale computers aboard research vessels at SIO, obtained remote access to the CRAY Supercomputer at UCSD, and established the first remote sensing satellite facility at an oceanographic research center. Other accomplishments were the JOIDES Deep Sea Drilling Project, which was operated by SIO, and NORPAX, or North Pacific Experiment, which studied the impact of the air-ocean interface on short-term climatic changes. Many new research vessels and buildings were added during Nierenberg's administration.

Notable among these was R/V Melville, the first in a series of research vessels designed specifically for oceanographic work. Nierenberg increased cooperative programs with other institutions and strengthened ties with outside organizations and agencies at local, state, national, and international levels. His awareness of the scientific political climate helped keep SIO at the forefront of scientific advances.

Nierenberg retired in 1986, and Edward Allan Frieman became director of SIO, a position he held until his retirement in 1996. Dr. Frieman expanded research in climate and climate change, and he positioned Scripps to offer scientific advice to government on the issue of global warming. He directed the institution through the transition in research goals at the end of the cold war. He introduced a program of instruction to undergraduates in 1992. During his administration, SIO acquired a new oceanographic vessel, R/V Roger Revelle.

On February 1, 1998, Charles F. Kennel became Director of the Scripps Institution of Oceanography. Tony Haymet succeeded Charles Kennel on September 12, 2006.

The scientific scope of the Institution's research has grown to embrace physical, chemical, geological, and geophysical studies of the oceans, earth and atmosphere as well as biological research. Continuing investigations are conducted on the oceans, the earth beneath the sea, and the atmosphere. Observation, measurement, and collection of specimens and data are accomplished by shipboard, ground and aerial operations including remote sensing by satellite.