

THE OFFICIAL MAGAZINE OF THE OCEANOGRAPHY SOCIETY

Oceanography

CITATION

Given, H., and R. Monroe. 2019. In memoriam: Walter Munk (1917–2019) and Gustaf Arrhenius (1922–2019). *Oceanography* 32(1):22–23, <https://doi.org/10.5670/oceanog.2019.111>.

DOI

<https://doi.org/10.5670/oceanog.2019.111>

PERMISSIONS

Oceanography (ISSN 1042-8275) is published by The Oceanography Society, 1 Research Court, Suite 450, Rockville, MD 20850 USA. ©2019 The Oceanography Society, Inc. Permission is granted for individuals to read, download, copy, distribute, print, search, and link to the full texts of *Oceanography* articles. Figures, tables, and short quotes from the magazine may be republished in scientific books and journals, on websites, and in PhD dissertations at no charge, but the materials must be cited appropriately (e.g., authors, *Oceanography*, volume number, issue number, page number[s], figure number[s], and DOI for the article).

Republication, systemic reproduction, or collective redistribution of any material in *Oceanography* is permitted only with the approval of The Oceanography Society. Please contact Jennifer Ramarui at info@tos.org.

Permission is granted to authors to post their final pdfs, provided by *Oceanography*, on their personal or institutional websites, to deposit those files in their institutional archives, and to share the pdfs on open-access research sharing sites such as ResearchGate and Academia.edu.

In Memoriam

Walter Munk (1917–2019) and Gustaf Arrhenius (1922–2019)

By Holly Given and Robert Monroe

Two pioneers of scientific ocean drilling, Walter Heinrich Munk and Gustaf Olaf Svante Arrhenius, passed away in February 2019. As colleagues at Scripps Institution of Oceanography, UC San Diego, Munk and Arrhenius both took part in the 1961 feasibility test for Project Mohole aboard the drilling platform *CUSS I* (Figure 1), which marked retrieval of the first cores of oceanic crust aided by the new invention of dynamic positioning.

There are many parallels in the lives of these two men, who were friends and neighbors, as well as colleagues, and

who both lived to advanced ages before succumbing to pneumonia within one week of each other. Both were Europeans from privileged backgrounds who were brought to Scripps by famous mentors. Both stayed to build their legacies in the United States amid the heady explosion of science under federally funded research programs that grew from World War II.

Walter Munk was born October 19, 1917, into a wealthy Viennese banking family in the waning days of the Austro-Hungarian Empire. Out of concern over her bon vivant son, Munk's mother sent him to New York in 1932 to learn the banking business from a relative. Bored, Munk drove across the country to study geophysics at Caltech with Beno Gutenberg, and eventually received an invitation to La Jolla from oceanographer Harald Sverdrup, director of Scripps at the time, who became his mentor. Although Munk's scientific bibliography, beginning in the 1940s, firmly characterizes him as a physical oceanographer who

occasionally dabbled in whole Earth geophysics, Munk is famous in the scientific ocean drilling community for his proposition at a 1957 meeting of the US National Science Foundation Advisory Panel for Earth Sciences to drill through the oceanic crust to reach Earth's mantle. A committee of the American Miscellaneous Society (AMSOC) began work on the proposal for Project Mohole at a champagne breakfast held on Walter's patio the following month. For a number of reasons, including cost overruns, the project was scuttled before the attempt could be made. Munk later called the evolution of this complex mission "Project No Hole," and said it was one of the main disappointments of his scientific career.

The AMSOC committee set up an Ocean Sediments Drilling Panel in 1962. This effort took hold, growing into the organized scientific ocean drilling programs we recognize today. Walter's involvement with scientific ocean drilling came full circle in 2012 when the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) and the Sloan Foundation hosted his visit to D/V *Chikyū*, and JAMSTEC Director Asahiko Taira honored him by re-naming the ship's library the Walter Munk Library (Figure 2).

Gustaf Arrhenius was born September 5, 1922, in Stockholm into an aristocratic heritage of explorers and scientists. His maternal grandfather, Gustaf Nordenskiöld, son of the great Swedish explorer Baron Adolf Erik Nordenskiöld, surveyed and cataloged artifacts of the Mesa Verde civilization of Colorado. His paternal grandfather, Nobel laureate



FIGURE 1. (a) From left facing camera: Roger Revelle, Walter Munk, and Gustaf Arrhenius aboard the oil drillship, *CUSS I*, during Project Mohole, 1961. Among participants was John Steinbeck, who covered the test cruise for *Life* magazine. (b) From left: Roger Revelle, Willard Bascom, Gustaf Arrhenius, and Walter Munk aboard *CUSS I* during Project Mohole, 1961. Photo courtesy of UC San Diego Library

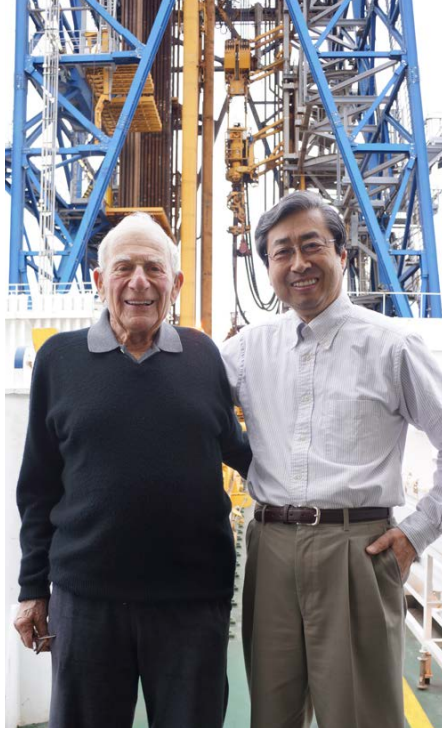


FIGURE 2. Walter Munk with JAMSTEC President Asahiko Taira on the deck of *DIV Chikyu*. Credit: JAMSTEC

Svante Arrhenius, founded the field of physical chemistry and was the first person to publish—in 1896—on the prospect of anthropogenic global warming caused by industrial CO₂ emissions. Steeped in the family tradition of scientific exploration, Arrhenius signed up for *Albatross*, the legendary 1947–1948 Swedish expedition organized by oceanographer Hans Pettersson that used a new piston coring tool developed by Börge Kullenberg to retrieve the first long cores of ocean sediments from the equatorial Pacific. Because no one place in Sweden had enough laboratory space to process the more than 200 *Albatross* cores, Arrhenius offered his father's laboratory, and the samples became the basis for his PhD thesis. Based on his *Albatross* experience, Arrhenius was invited by Scripps Director Roger Revelle to join the famous 1951–1952 Capricorn Expedition that mapped the Pacific seafloor on the way back from the thermonuclear test in the Marshall Islands (an expedition that also included Munk; see *Oceanography* 17(2), <https://doi.org/10.5670/oceanog.2004.53>; Figure 3). Arrhenius developed analysis techniques and published extensively on the chemistry of pelagic sediments and interpretations for paleoceanography for



FIGURE 3. Scientists, including Gustaf Arrhenius (back row, fourth from right) and Walter Munk (seated, second from right) on the fantail of *R/V Spencer F. Baird*, homeward bound from the Capricorn Expedition (1952–1953). Back row (left to right): Richard von Herzen, Roger Revelle, Willard N. Bascom, Theodore Robert Folsom, Alan Churchill Jones, Gustaf Arrhenius, Henri Rotschi, Robert Livingston, Russell Raitt. Seated (left to right): Philip E. Jackson, Richard E. Blumberg, Ronald Mason, Robert Floyd Dill, Arthur E. Maxwell, Winter Davis Horton, Walter Munk, and Helen Raitt. February 1953. Photo courtesy of UC San Diego Library

almost 20 years before turning his attention to the evolution of the solar system and the origins of life as seen in the geologic record.

Aside from their contributions to scientific ocean drilling, Arrhenius and Munk inspired generations of scientists as visionaries and through their wider dimensions as human beings.

With his connections among the intellectual elite of Europe, Arrhenius was heavily involved in the establishment of UC San Diego in the 1960s. He was asked to lead the search for someone to head the new Literature Department, but was unsuccessful at recruiting novelist Wallace Stegner, because at that time UC San Diego lacked a library.

Building on the school he established with Sverdrup to teach wave height prediction to Navy personnel during World War II, Munk was largely responsible for the enduring ties between Scripps and the Office of Naval Research, and later cultivated a close relationship with geophysicist

and philanthropist Cecil Green.

With Jenny de Hevesy Arrhenius, Judith Horton Munk, and Mary Coakley Munk, Gustaf and Walter organized informal intellectual “salons” for visiting scientists and graduate students in their ocean view La Jolla homes. These great men indeed personified the modern golden age of scientific inquiry and expressed what is best about the academic life—yes, the dedication to rigorous scientific inquiry and discovery, but also the intellectual camaraderie, the adventure, the global connections, and the downright fun of it all. They will be missed, but their legacies live on. 📷

AUTHORS

Holly Given (hgiven@ucsd.edu) is Executive Director, IODP Science Support Office, and **Robert Monroe** (rmonroe@ucsd.edu) is Media Specialist, both at Scripps Institution of Oceanography, UC San Diego, La Jolla, CA, USA.

ARTICLE CITATION

Given, H., and R. Monroe. 2019. In memoriam: Walter Munk (1917–2019) and Gustaf Arrhenius (1922–2019). *Oceanography* 32(1):22–23, <https://doi.org/10.5670/oceanog.2019.111>.