

## **Dr. Walter Munk & Frank Snodgrass are first recipients of the Marine Technology Society's Award for Ocean Science & Engineering**

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Two San Diego collaborators in extensive and continuing scientific studies of deep-ocean tides that have "profound implications not only in the development and use of the sea floor but in areas as far afield as astronomy and space travel," were honored by the Marine Technology Society (MTS) at its annual conference in Miami Beach this week.

They were Dr. Walter H. Munk and Frank E. Snodgrass, the first recipients of MTS's Award for Ocean Science and Engineering.

Dr. Munk is professor of geophysics at UCSD's Scripps Institution of Oceanography and director of the La Jolla Laboratories of the University of California's Institute of Geophysics and Planetary Physics (IGPP). Snodgrass is research engineer with Scripps and IGPP.

The award, sponsored by the Lockheed Aircraft Corporation, was presented by the firm's board chairman, D. J. Haughton.

The award marks the second received by Munk within a month. In May he was named 1969 California Scientist of the Year by the California Museum of Science and Industry. He also holds the Gold Medal of the Royal Astronomical Society, the Sverdrup Gold Medal of the American Meteorological Society, and the Arthur L. Day Medal of the Geological Society of America.

Dr. Munk and Snodgrass were cited by MTS "for their outstanding contributions to the theories and study of deep-ocean circulation and deep-ocean tides and for their work on sophisticated instrumentation designed for sea-bed recording and monitoring of minute fluctuations in sea environmental parameters.

"Using a deep-sea instrumentation capsule primarily developed by Snodgrass, Dr. Munk and his associates have a program of deep-sea tide measurements well under way.

"Pressure and current records at stations several hundred kilometers apart off the California continental shelf are presently being analyzed to determine the modal structure of the ocean boundary tide.

"Aside from being an exciting excursion past the frontiers of man's ocean knowledge, this work has profound implications not only in our development and use of the sea floor, but in areas as far afield as astronomy and space travel.

"Data obtained from such scientific enterprises as Dr. Munk and Snodgrass have undertaken will aid design of deep-sea systems and structures and abet development of undersea mining and farming and such vital vehicles as submarine rescue craft.

"Study of deep-sea currents and low-frequency waves will lead to a better appreciation of the moon's effect on ocean tides and interaction in the earth-moon system, particularly the role the oceans play in dynamic friction that is slowly changing the moon's orbit and may open the door to a fuller understanding of the moon's origin."

When he accepted the California Scientist of the Year Award in May for his experimental and theoretical studies of ocean waves, Dr. Munk said that Snodgrass deserved half the credit.

He said Snodgrass designed instruments used to track wave trains across the ocean from Antarctica to Alaska. These were pressure meters sensitive enough to register the increase in pressure caused by a passing wave and to measure the size of the wave.

Newer instruments designed by Snodgrass are being used to measure deep-ocean tides by dropping free-falling, untethered capsules into the ocean and recovering them by a coded acoustic command from the surface.

Such capsules are held on the ocean floor by weight of storage batteries. When a capsule is ordered to rise, it opens a link attached to the batteries and the capsule's buoyancy causes it to surface.

Dr. Munk served as assistant professor of geophysics at Scripps Institution from 1947-49 and as associate professor until 1954, when he was named professor of geophysics at IGPP and at Scripps Institution. In 1959, he was appointed associate director of IGPP and director of the La Jolla Laboratories of IGPP.

Snodgrass joined Scripps in 1952 as an assistant research engineer. He became an associate research engineer with IGPP's La Jolla Laboratories in 1961 and since that time has been a full research engineer with both Scripps and IGPP.

Both Dr. Munk and Snodgrass have authored numerous scientific articles, and in 1963, they collaborated with others in a global expedition to measure the attenuation of ocean swell in the Antarctica-to-Alaska studies mentioned above.

At a technical session, two papers prepared by Scripps representatives were presented during discussions of marine temperature measurements. A joint paper by Martha Evans, John D. Isaacs, and Richard A. Schwartzlose was entitled "Atmospheric Effects on the Ocean as Measured From Deep-Moored Instruments." Meredith Sessions presented the paper on behalf of the authors. Another, entitled "Fine Scale Temperature Gradient," was prepared by Dr. Charles S. Cox, B. P. Johnson, and Thomas R. Osborn and presented by Johnson.