ATHELSTAN SPILHAUS

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A THELSTAN SPILHAUS was born on 25 November 1911 in Capetown, Union of South Africa, son of Karl and Nellie (Muir) Spilhaus. This opening sentence is probably the only conventional one that can be made of this remarkable individual's life. Typical of his first action on arriving in the United States was his presentation before the admissions officer of MIT without prior notice. (Equally remarkable was the action of the officer in provisionally admitting this young man, something that could not happen today!)

He obtained his first degree, B. Sc. in engineering, at the University of Capetown, and his M.S. at MIT in 1938. He utilized his vacation periods during his college years to go to sea, a deliberate experience in an environment that was to absorb most of his future career. He started his most important work at MIT, the creation of the bathythermograph, almost immediately, using a basement men's room.

He returned to South Africa for one year as assistant director of technical services for the Union of South Africa Defense Forces. There his principal research was in upper atmosphere meteorology. In 1936–37 he returned to the United States as research assistant in oceanography at the Woods Hole Oceanographic Institution. In 1937 he assumed the position of assistant professor of meteorology at New York University, while maintaining his relationship with the Woods Hole Oceanographic Institution—a relation that lasted until 1960.

It was during this period that he perfected the bathythermograph. This instrument was of vital importance in World War II in the battle against the German U-boat. Using sound, both actively and passively, is known as sonar. It is the principal method of both combating and protecting the submarine. The velocity of sound, however, is largely dependent upon temperature, and much less upon pressure, in the ocean. There is normally a considerable variation of temperature with depth near the surface, typically ten to fifteen degrees Kelvin in the first one hundred to two hundred meters of depth. The resultant change in sound velocity can cause a downward deflection of sound from a source near the surface, thus limiting the range of utility of detection or, conversely, providing a safe zone for a submarine outside of this circle.

Spilhaus’s device provided a simple method for the skipper of the destroyer or submarine to estimate the range of effectiveness of his sonar. His device was much used during the war. One million of the traces were stored and digitized at the Scripps Institution of Oceanography after the war. They are now stored at the navy facility at Monterey, where they are a valuable data source for oceanographic applications. The device has been altered in many ways to adapt to different tactical situations in warfare and in oceanography.

At NYU, Spilhaus created and chaired a new department of meteo-
rology and oceanography. This contribution was probably as important as the invention of the bathythermograph. It was a very crucial time for the military, which had a desperate need for meteorologists. The new department was a primary source for the war effort. It was also the source for the next two generations of some of the country’s outstanding scientists in the geophysical sciences.

All this was achieved before Spilhaus received either his U.S. citizenship or a Ph.D. He received the first in 1946, and the second from the University of Capetown in 1948. From this point on in this history no attempt is made to present a chronological recital of his accomplishments and honors. They have been too numerous and too varied.

He had an intense interest in the environment and its optimal use for mankind. One outstanding success was his proposal for a Sea Grant College system akin to the Morrill Land Grant College Act system. He made the proposal in 1966, and, in true Spilhaus style, accompanied the suggestion with a proposal to grant each college a cubic kilometer of ocean (or was it a cubic nautical mile?). Other than the latter equivalent of the land grant colleges, the system is in full effect today. Hundreds of millions of dollars and matching institutional funds have gone into a system—involving several hundred institutions—that focuses on the better use of our ocean environment.

He chose a unique way to advertise the importance of visualizing the relative magnitude of the world’s oceans. He constructed a variety of projections of the earth’s sphere, some of which were intended to emphasize the seamless nature of the world’s oceans. They were published by our Society in May 1991. One of the more extreme presentations is reproduced here.1

Spilhaus’s broad interests and mature insights were used effectively by successive presidential administrations. President Eisenhower nominated him as the first U.S. representative on the UNESCO Executive Board. President Kennedy appointed him U.S. commissioner to the Seattle World’s Fair, where he was responsible for the science exhibition that is a permanent feature of Seattle. President Johnson appointed him to the National Science Board for the term 1966–72.

His career continued as director of research at NYU, 1946–48, and dean of the Institute of Technology at the University of Minnesota, 1949–66.

He served the scientific community as president of the Franklin

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1 The map chosen as an example is the “World Ocean Map” by Spilhaus, first published in *Smithsonian*, Nov. 1979, p. 120. It is reproduced in his *Atlas of the World with Geophysical Boundaries showing Oceans, Continents and Tectonic Plates in their Entirety* (American Philosophical Society 1991).
Institute and president of the American Association for the Advancement of Science.

Among his many honors, which included twelve honorary degrees, is the Legion of Merit awarded in 1946. The latter was in recognition of his wartime research, in addition to the bathythermograph, which contributed to and introduced into the battle zone radar and radio upper wind finding, spherics, and meteorological instruments for measurements from aircraft in flight. He was later (1951) director of weapons effects for Nevada atomic tests. For this and other contributions he was awarded the Exceptional Civil Service Medal, by the United States Air Force in 1952.

He left the University of Minnesota and administrative responsibilities in general in 1967, to be free to pursue an extensive set of ideas. He was able to fill successively a variety of posts that enabled him to achieve that objective. Among them were distinguished professor of marine sciences, university visiting professor, Texas A&M, 1974–75; University of Texas, 1977–88; fellow, Woodrow Wilson International
Center for Scholars, 1971–74; distinguished scholar, Annenberg Center for the Study of the American Experience, University of Southern California, 1980–81; visiting fellow, Institute for Marine and Coastal Studies, University of Southern California, 1981–82; and distinguished research fellow, Woods Hole Oceanographic Institution.

During this period he actively presented a great variety of speculative ideas, mostly but not all dealing with the oceans. They were not always new, for example the proposal to use icebergs for fresh water supply, nor were they all thoroughly worked out before presentation, for example some of his ideas on fisheries, but they were clearly calculated to stimulate thinking and action on important problems. These problems were usually associated with pressures generated by population growth. Some, such as the proposal to use dolphins as herding animals for fisheries, would surely cause considerable controversy at this time. So would his proposal to harvest whales for human consumption instead of pursuing their favorite food, the Antarctic krill, on the grounds that the whale was more efficient in harvesting krill than fishermen.

His concept of creating cities deliberately and successively to deal with the population expansion was taken more seriously by experts. He proposed “Urban Disposal” in place of “Urban Renewal.”

He would describe himself as a “futurist,” but in a time-limited sense. At his death he had thirteen grandchildren and five great-grandchildren. This helped him to define a unit of time—the “granny.” This is about one hundred years, an interval of time that he considered most useful for planning.

No biography of Spilhaus would be complete without reference to his toy collection. At the last count they numbered three thousand! His home in Virginia had been enlarged by the addition of several rooms to be able to display his collection properly. Just as with all his other activities, special conditions apply. None are battery-operated—all are spring-wound or obtain their energy from some mechanical source like gravity-operation or a flywheel. It is not clear whether this policy was motivated by the unreliability of battery-operated toys, or by his ancient Dutch economical background. In any event, this allowed him to exercise his very special skills in the shop.

This special interest extended to the design of jigsaw puzzles, one of which is a toy for explaining the subtleties of plate tectonics. Athelstan Spilhaus will long be remembered in our community as a person of very special genius whose interests seemed to have no limits.