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Marie Tharp, Oceanographic Cartographer, Dies at 86

By [MARGALIT FOX](#)

Marie Tharp, an oceanographic cartographer whose work in the 1950's, 60's and 70's helped throw into relief — literally — the largely uncharted landscape of the world's ocean floor, died on Wednesday in Nyack, N.Y. She was 86 and a resident of South Nyack.

The cause was cancer, according to the Lamont-Doherty Earth Observatory of [Columbia University](#), which announced the death. Ms. Tharp was a researcher at the observatory from 1948 until her retirement in 1982.

With her colleague Bruce C. Heezen (pronounced HAY-zen), Ms. Tharp compiled the first comprehensive map of the entire ocean bottom, illuminating a hidden world of rifts and valleys, volcanic ranges stretching for thousands of miles and mountain peaks taller than Everest. The map was published by the Office of Naval Research in 1977.

In the revised edition of his book "The Mapmakers" (Knopf, 2000), John Noble Wilford, a science reporter for The New York Times, described their achievement this way: "Like other pioneering maps, the one by Heezen and Tharp is not complete and not always completely accurate. It is, nonetheless, one of the most remarkable achievements in modern cartography. It is the graphic summary of more than a century of oceanographic effort."

Ms. Tharp's work in plotting the ocean's bottom would also help gain acceptance for the theory of continental drift, still a fairly subversive proposition when she and Mr. Heezen began their collaboration in the late 1940's.

Marie Tharp was born in Ypsilanti, Mich., on July 30, 1920, into a mapping family. Her father, William Edgar Tharp, was a soil surveyor for the [United States Department of Agriculture](#), and the Tharps moved wherever his work took him. Ms. Tharp once estimated that by the time she graduated from high school, she had attended two dozen public schools across the country.

She received a bachelor's degree in English and music from Ohio University in 1943, followed the next year by a master's degree in geology from the [University of Michigan](#). While working as a geologist for an oil company in Oklahoma, Ms. Tharp earned a degree in mathematics from the [University of Tulsa](#) in 1948.

That year, she joined Columbia's geology department as a research assistant to the eminent scientist Maurice Ewing. Mr. Heezen, who went on to become a leading geologist and oceanographer, was a graduate student there, and he and Ms. Tharp would share their professional and personal lives for the next three decades.

Before the mid-20th century, little was known about the ocean bottom. Many scientists regarded it as a mostly flat, dull expanse whose principal function was to act as a plinth for the masses of water on top of it. There were some mountains down there — that much was known — but no one was certain if they were isolated anomalies or part of a larger geologic system.

In 1949, Mr. Ewing and his team moved their base of operations to the newly opened Lamont Geological Observatory (now the Lamont-Doherty Earth Observatory), in Palisades, N.Y. There, they embarked on a quest to map the sea floor using sonar soundings. Because a research vessel was considered no fit place for a woman, Ms. Tharp, working with pen, ruler and what turned out to be a dangerous bottle of India ink, plotted the data back in Palisades.

She noticed something striking. Charting the soundings in 1953, she observed what seemed to be a depression in the mid-Atlantic Ridge, a volcanic chain that traverses the ocean from north to south. She wondered whether the depression was evidence of a continuous rift — a crack in the world — down the middle of the ridge. And she wondered in turn whether that rift might be evidence of what scientists now call seafloor spreading, popularly known as continental drift.

She and Mr. Heezen argued about it. She threw erasers and bottles of ink at him. It took him some time to come around.

“I discounted it as girl talk and didn’t believe it for a year,” Mr. Heezen later said in an interview.

Over time, Ms. Tharp’s hunch was proved correct. Her work with Mr. Heezen, along with the work of other scientists, helped establish the existence of a continuous belt of undersea mountains girdling the earth, with a rift down the center of it.

“It was only in the early 60’s that the marine scientists around the world started putting the pieces of the puzzle together and understanding that these huge volcanic mountain chains were actually where seafloor spreading was taking place,” Michael Purdy, the director of the Lamont-Doherty observatory, said in a telephone interview yesterday.

Like many women of her era in science, Ms. Tharp was recognized mainly late in life. In 1997, she was honored by the [Library of Congress](#) as part of the 100th anniversary of its geography and map division. A fellowship at Lamont-Doherty to promote women in science now bears her name.

The boys finally let her onto the boat, and in her later years, Ms. Tharp sailed the seas, plotting them.

Ms. Tharp leaves no immediate survivors. Mr. Heezen died aboard a submarine, apparently of a heart attack, in 1977.

Of all the waters Ms. Tharp plotted, she found the Atlantic the most congenial. “It’s such a nice symmetrical ocean,” she told The New York Times in 1991. “I felt sorry for the people who had to do the Pacific — it was so much more complicated.”