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Rocks under the Oceans

The United States has responded inadequately to the exciting opportunities created by the Mohole test drilling of 1961. Prior to that time there had been some drilling in the ocean, but this was confined to water not much deeper than 30 meters. The holes were drilled to conventional depths—3000 meters and more. In the deep sea the longest core that had been obtained from a sediment was about 22 meters long. In the preliminary Mohole effort of 1961, holes 1000 meters long were drilled in rocks lying beneath 1000 meters of water. Even more significant was a 240-meter hole drilled beneath 4000 meters of water. The cores that were obtained were of interest, but the real significance of the 1961 experience is the finding that it is practical to explore the rocks underlying almost all the oceans. These rocks contain answers to great scientific questions and may eventually yield economic returns.

We have little information concerning the geologic history of oceanic areas. Most geophysicists believe that the solar system was formed about 4500 million years ago. The oldest rocks which have been found on the continents are about 3300 million years old. In the rocks underlying the ocean it may be possible to find specimens as old as the earth itself, and of a composition representative of the materials which accreted to form our planet.

In studies of the origin and evolution of life, materials which are now available come from sedimentary rocks of the continents. Specimens are few, and these for the most part have been subjected to severe environmental conditions, including high temperatures. It is possible that somewhere beneath the ocean may be discovered a sequence of sediments, from times near the beginning of earth history, which contain evidences of life from its prebiologic origins to the present, and which also include organic chemicals associated with Precambrian life.

Other interesting problems are those related to polar wandering and continental drift. Many reputable scientists believe that great movements of the poles and continents have occurred. These ideas are controversial, but ocean-sediment cores could provide decisive evidence.

Economic interest in undersea rocks has been stimulated by the discovery of a large natural-gas field near Remagen in the northeast portion of the Netherlands. Already, more than enough gas has been found there to supply all the needs of the country for 100 years. The gas was found in a Permian formation which also underlies a large area of the North Sea. Thus, there is a lively possibility that this sea covers enormous petroleum reserves, and countries bordering this water are alert and hoping for a new source of wealth.

Concurrently, there is discussion of potential resources lying under other regions of the oceans. On the continental shelves these resources may take the form of petroleum. In deeper water they may be in other forms, exemplified by manganese nodules on the ocean floor off Panama. In shallow water the potential wealth can be tapped by conventional drilling techniques, but in deeper water novel positioning methods such as those used in the U.S. Mohole project are required.

We have made an initial breakthrough in the exploration of the ocean floor. It is time we began more vigorous exploitation of this major scientific and economic frontier.—P.H.A.