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The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

Drilling in the Ocean Floor

The lengthy controversy concerning Mohole drilling (*Science*, 10 Jan., 17 Jan., 24 Jan.) had some constructive aspects. Strong-minded, knowledgeable scientists cared enough and believed enough in deep-sea drilling to fight over how it should be conducted. Disagreement over the proper scope of the project led to recognition of the desirability of a broad program of exploration of the rocks under the oceans. Even the spectacle of scientists in conflict had a positive side, for the resultant open discussion provided the Congress and the public with a basis for trust in the eventual decisions. But a good thing can be overdone. There has been more than enough controversy about Mohole. We should all be pleased with the way Leland Haworth, director of the National Science Foundation, has assumed authority in the matter, and with the prospects for an effective future organization.

The time has come to forget the trauma of the past and to look toward the opportunities of the future. We know so little about the rocks under the sea that the potentialities are difficult to evaluate. But that is precisely the reason we should explore them. In the scientific area, many major possibilities have been pointed out which are of interest to everyone, for drilling at sea may provide information on the history of the earth, the origin of life, the evolution of life, continental drift, and the emergence and submergence of continents. One of the possible results of such investigation would be of both scientific and practical importance. This is the elucidation of the geochemical processes which have occurred and of the resultant concentrations of chemicals to be found in the rocks. On continental shelves, exploration and exploitation are already proceeding.

Some of this activity can be carried out by techniques already developed by the petroleum industry. Most of the sea bottom, however, is not accessible to such techniques. In attempting to assess what might be found under the deep seas, there are two possible approaches. One is to look at the material obtained from the ocean floor. These samples are usually of only moderate interest, though there are exceptions, such as the manganese nodules. A second approach is a more general one. Most of the rocks at the surfaces of the present continents were formed from sediments deposited in marine environments. We can use them as a kind of rough yardstick to gauge what might be found under the present seas. In the past, the oceans have played the role of a gigantic laboratory in which chemical processes have led to concentration of relatively rare substances, both organic and inorganic, into commercially valuable occurrences. An example is the role of the marine environment in the formation of petroleum. Concentrations of trace elements in the black shales ultimately will have great economic significance. On the continents, exploitation of the crust is destined to provide returns of the order of trillions (10^{12}) of dollars.

Since the seas cover about 71 percent of the earth's surface, the wealth under them could be greater than that now known on land. To obtain even a glimpse of the scientific and economic potential will involve great effort and the application of our best scientific and engineering talents. We should not make small plans or squabble further about objectives. Both deep and shallow exploratory drilling are worth while. Both should be carried forward with no more delay.—P.H.A.