

CHAPTER 9

EVIDENCES FROM THE SEA FLOOR

The present decade is an exciting time of oceanographic exploration and discovery. The ocean floors are now yielding fabulous amounts of information concerning some of the earth's past history. Speculations concerning the depths of the ocean are undoubtedly as old as the human race, but it is only within the past century that man has developed the proper equipment for making a systematic study of the sea floor.

In the 19th century British scientists made some studies of the upper surface of the ocean floor in many parts of the world. They did this during the three-year-long world cruise of the Challenger, an exploration ship equipped for dredging the ocean bottom and taking other kinds of samples and measurements. Much was learned about life on the ocean bottom, and about some of the recent deep-sea sediments, but the deeper layers of the sea floor remained a mystery.

In the present century, as was mentioned in Chapter 4, man has designed drilling equipment which can penetrate more than 3,000 feet into the sediment layers of the ocean floor. This equipment is so arranged that sections of the sedimentary column can be brought to the surface intact, as cores. Each sediment core is brought out of the drill hole already encased in a metal or plastic tube which is carefully labeled and later opened for detailed chemical and biological study.

The progressive accumulation of sediments on the ocean floors has left us an important record of the past. Near to the continents large amounts of sediment accumulate fairly rapidly, being washed off the continent by rivers and turbidity currents. But farther out in the ocean the situation is entirely different. In many parts of the open ocean we find a cumulative, sedimentary record of what goes on century after century, apart from continental disturbances. The main sources of sediments for these layers are the shells of tiny, floating marine animals and plants, minute clay particles which are derived from the land but often float in the water for many years before settling to the bottom, and volcanic debris from underwater volcanoes.

The first of these three types of open-ocean sediments is so important in some waters that it is the primary sediment source. The slow fallout of the shells and skeletal fragments of these minute organisms has in some places produced as much as 2,000 feet of thickness of almost pure skeletal matter on the ocean floor.¹ Thus the study of time records in the ocean floor is not a mere measuring of the amounts of sediments which have washed off the continents, but is largely an analysis of what the sea itself has produced and laid down on the floor.