the coring tube. This made it possible for the scientists to study layer-by-layer, the upper 65 feet of sediments in the natural order in which they were laid down. Ewing's improved corer used boiler tubing of two-and-one-half inches diameter as the main tube to be driven into the sediments and then withdrawn with its load.[10] This was a more effective and more economical coring device than the original Swedish model had been.

A great many research voyages have been made by the Lamont Geological Observatory (now the Lamont-Doherty Geological Observatory) since its beginning in 1949. During the first decade these voyages concentrated on the Atlantic Ocean. Some important achievements of the investigations, under the direction of Ewing, were: (a) a detailed mapping of large areas of the mid-Atlantic Ridge, which is now known to be far larger and more extensive than the greatest mountain ranges on the continents, (b) the discovery that the bottom of the Atlantic Ocean has great expanses of abyssal plain which are almost perfectly flat--much flatter than any plain or desert on the continents, (c) the mapping and analysis of the work of turbidity currents in helping to form the great submarine canyons which have been cut into the continental shelf off the eastern coast of the United States, (d) the discovery that most of the ocean floor which is not near to the continents has a covering of less than 3,500 feet of sediments--considerably thinner than was expected, and (e) the observation that the earth's crust beneath the sedimentary covering of the ocean floor is much thinner than the crust beneath the continents. The latter two of these discoveries led to the realization that the floors of most of the oceans are relatively young as compared with the age of the continents, and prepared the way for the present knowledge of sea-floor spreading, continental drift, and plate tectonics.[11]

Within the past decade the Deep Sea Drilling Project, a united research project of several marine and geological institutions, has carried out by far the most extensive investigation of the sea floor ever to be attempted. This project has been largely financed by the National Science Foundation, and has concentrated on the taking of intact cores of sediments from deep in the drill holes which they have been able to sink into the floor. The deep cores are obtained by a rotary drilling process, rather than by the long-used piston core process which can sample only the upper sediments of the floor. The depth to which rotary drilling can penetrate depends to some extent on the depth of the water at the particular drilling site, but at one place in the Atlantic the crew was able to recover cores from 1,412 meters (4,600 feet) in the sea floor.[12] Such an achievement was practically undreamed of 20 years ago, but the sophisticated equipment of the research vessel, the Glomar Challenger, has made this great advantage possible. (See Chapter 4 concerning some other details of these drilling explorations and the reports of them which have been published.) In the succeeding parts of the present chapter we will be referring numerous times to data published by the scientists of the Deep Sea Drilling Project.[13]