The Under-Water "Landscape"

Modern sea-floor research has given us a fairly complete picture of the topography and larger features of the ocean floors. Excellent color maps, such as those produced by the National Geographic Society, show the many abyssal plains and abyssal hills, the great ridge systems, the gentle rises, and the volcanic seamounts, as well as deep troughs, and intricately carved continental shelves.

Of interest is the fact that the basin floors of both the Atlantic and Pacific are dotted with a multitude of relatively low, broad abyssal hills. In the Pacific these are from 50 to 1,000 meters in height, with the average being approximately 300 meters (980 feet) high and 6 kilometers in diameter.[14] In most cases this is a much lower height than seamounts. Some of the abyssal hills were produced by slow intrusions of molten rock that pushed up from the underlying floor, while others seem to have had a more rapid volcanic origin similar to that of the seamounts. Most of them are now covered with fine-grained sediments which have a high proportion of pelagic, biogenic components.[15] It is now known that some parts of the ocean floor are changing with relative rapidity, whereas other parts have been exceedingly stable for long periods of time.

Some of the areas of rapid change are the great ridge systems, where fluid magma is welling up from underneath, causing a slow process of sea-floor spreading; chains of under-water volcanos, such as those which lie to the west of the Hawaiian Islands; and unstable areas around the continents. In the latter areas strong turbidity currents sweep land-derived sediments off into the deeper water to settle as thick deposits.

But many parts of the sea floor know no such change. They show by their intricately layered deposits of sediment that tranquility has been their lot during hundreds of thousands of years and more. Occasionally their sedimentary "calendar" shows the record of a period of disturbing volcanic eruptions in the distance, sending their fine particles of ash to cover the normal marine ooze; and afterward another long period of tranquility with the slow "rain" of biologically produced particles being the major sedimentary component.

Thicknesses of Sediments on the Ocean Floor

We have already referred to the Lamont Geological Observatory's discovery that the floors of most parts of the open oceans are covered with less sediment than had been expected. Now that we have the records of many more seismic surveys of sediment thicknesses, plus the measurements made by deep drillings in all the major ocean areas of the world, we are able to give a meaningful statement of several aspects of the deep-sea deposits.

The thicknesses of sediments found off-shore on the continental shelves and at the bases of the continental slopes are in many places astounding. Along the United States coast of the Gulf of Mexico, under the outer shelf, the sediments are approximately 20,000 feet