

## Deep Flowing Currents Deposited Ocean Shelves

► FOR MILLIONS of years, sediments have been deposited around the continents by deep undercurrents flowing parallel to the coastline, a U.S. oceanographer reported at the Second International Oceanographic Congress.

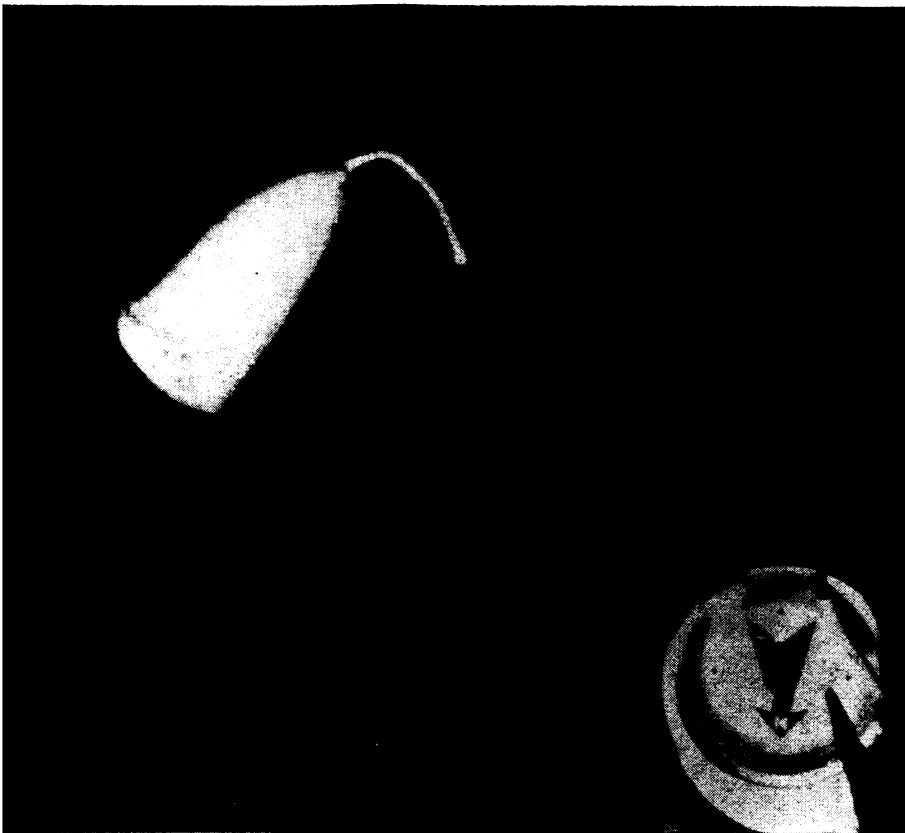
These thick accumulations of marine sediments could prove valuable as deposits of petroleum, said Dr. Bruce Heezen of Columbia University's Lamont Geological Observatory.

Deep sea bottom currents off the coast of the United States do not flow in a northerly direction, as the Gulf Stream does, but in a southerly direction, the scientist reported. This undercurrent has been building up the continental rise, which is the broad area between the continental shelf and the abyssal plain of the ocean floor.

Fine mud with rose and rose-gray colors found in the outer ridge about 600 miles from the coast of Georgia and Florida may have been transported as much as 1,800 miles by the undercurrent from Nova Scotia, New Brunswick and the Gulf of St. Lawrence.

The Congress was jointly sponsored by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Soviet Government.

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UNESCO

**HELPFUL SPONGE**—A sponge deflected by currents 15,000 feet beneath the sea 200 miles west of Bermuda helped Dr. Bruce Heezen of the Lamont Geological Observatory trace deep sea currents. His studies led to a new theory on the formation of the continental rise. The compass in the lower right shows the current here flowing northwest.

### GEOPHYSICS

## Shifts Change Life

► THE DISAPPEARANCE of species of living organisms may be caused by changes in the earth's magnetic field. Prof. Bruce Heezen of Columbia University's Lamont Geological Observatory presented evidence of his discovery to the Second International Oceanographic Congress meeting in Moscow.

Announcement of this discovery is expected to have wide-ranging scientific repercussions and, according to experts, may well hold the key to the secret of evolution. Messrs. Drogslav Ninkovich, Billy Glass, Neil Updike, John Foster and James Hayes were members of the team of investigators whose research led to the discovery.

Dr. Heezen said that experiments carried out in the north and south Pacific, south Atlantic and the Indian Ocean showed that for several feet below the top of the deep sea core, sedimentary particles were magnetized in the same direction as the earth's present magnetic field, but that below that were reversed.

Several such changes were observed deeper in the cores. These changes were pinpointed through the use of a

spinner magnetometer, a sensitive device for measuring the magnetic "moment" of the sample by spinning it inside a coil. The abrupt magnetic polarity reversals coincided with the disappearance of several species of plankton—*foraminifera*, diatoms, and radiolaria—and the appearance of new species.

At the present time, Dr. Heezen said, Columbia scientists had measured through core samples a series of reversals in the magnetic field, the most recent of which occurred about 700,000 years ago.

Dr. Heezen explained that when the earth's magnetic field reverses, there is an interim period as it switches poles, when the electromagnetic field which envelops the earth in a protective shield disappears, allowing a bombardment of the earth's surface by cosmic rays. Such bombardment can cause genetic mutations, some of which lead to the establishment of new species, as well as large scale deaths leading to the extinction of other species.

Dr. Heezen said that we are faced with a decline in the magnetic field.

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### TECHNOLOGY

## Tiny Water Drops Measured Precisely

► THE SIZE of a drop of water can now be measured to the nearest twelve-thousandths of an inch.

Size determines the final composition of a mixture of two liquids such as water and oil; therefore, by knowing the size of a drop of liquid, scientists can control mixtures or products made from them.

Scientists at Esso Research and Engineering Company, Linden, N.J., have designed and assembled equipment that can make such precise measurements. In a miniature simulated cell reactor the axial dimensions of a drop of one liquid are measured while it hangs suspended in a second liquid. The droplet is photographed in about one-millionth of a second.

The four-foot distance between the drop of liquid and the camera allows a droplet no more than a quarter of an inch wide to be magnified to three inches, 12 times its original size.

A measuring microscope then determines the dimensions of the photographed droplet to one-thousandth of an inch, actually giving measurements to one twelve-thousandths of an inch because the photograph is already magnified 12 times.

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