which there is no known stratigraphic or structural break.

At least 300 holes have penetrated basement beneath the Mesozoic and Cenozoic sediments of the Atlantic Coastal Plain between New York and Georgia. Approximately 90 per cent of them penetrated basement at elevations above −1,000 feet M.S.L. The 10,054-foot Esso #1 Hatteras Light well, which encountered the top of basement at −9,954 feet M.S.L., is deepest.

Drill hole plus meager geophysical data support the following tentative conclusions.

Precambrian and Paleozoic metamorphic and igneous (including volcanic) rocks, similar to those exposed on the Piedmont to the west, constitute basement. Many of these rocks have been highly fractured and sheared.

Part of the rocks accumulated in a pre-Mesozoic eugeosyncline.

From at least late Mesozoic time the basement surface has played the role of a differentially warping platform.

At least four periods of diastrophism are known to have occurred in this area.

The regional structural (and topographical) trend is northeast-southwest.

The surface of the basement may be characterized as an old age erosion surface—commonly referred to as the Fall Zone peneplain—with sporadic fault troughs, ridges, valleys, and "arches."

Locally some of the rocks have been weathered to depths exceeding 150 feet.

The basement surface dips generally seawardly from 15–40 feet per mile (with about 35 feet per mile typical) to approximately the −2,250-foot M.S.L. contour; seaward from this contour it steepens to about 100–125 feet per mile.

Oil may occur in commercial quantities in weathered zones on or fractured zones in the basement or in sedimentary rocks that lens out against topographic highs on the basement surface.

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Isotopic Evidence on Mechanism of Dolomitization

Dolomite found in nature is generally thought to be either "primary" in origin, or to be the result of diagenesis of pre-existing calcium carbonate sediments, or else to have been formed under different conditions by both mechanisms. In an effort to elucidate the mechanism of formation of dolomite, attention has been given to the evidence which might be given by the isotopic compositions of dolomite, partially dolomitized limestones, and limestones.

Theoretical studies indicate that there should be little, if any, difference in the carbon isotopic composition of dolomite regardless of whether it is of primary or secondary origin. Measurements of carbon isotope abundance in limestone and continuous dolomitized limestone show no significant differences. Consideration of the circumstances and processes which might affect oxygen isotopic composition indicates that these isotopes are of little help in revealing the mechanism of formation of dolomite.

In theory, study of the magnesium isotopic composition of dolomite and partially dolomitized limestone should indicate whether dolomitization has resulted, in particular cases, from diffusion of magnesium salts in solution into pre-existing calcium carbonates. Measurements have been made of magnesium isotope abundances in carbonate rocks from several different geologic situations, and attempts have been made to interpret the data in terms of the probable mechanism of dolomitization.

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Possibilities of Wire-Line Well-Logging Methods in Mohole

Wire-line well-logging refers to the measurement of some physical characteristics of the underground formations traversed by a borehole. The corresponding equipment involves a bottom-hole sensing device which generates signals that are directly a function of the measured parameters, an insulated electric cable whereby these signals are transmitted to the surface, and an apparatus for the continuous recording of the measurements.

The parameters commonly recorded in oil wells are the following:

(1) Electrical resistivities, which can be obtained with the greatest accuracy and detail by means of induction log, laterolog, microlog and microlaterolog, depending on the cases. From the knowledge of electrical resistivity an estimation of porosity can be made.

(2) Spontaneous potentials, for the definition of permeable formations, and the estimation of interstitial water salinity.

(3) Natural radioactivity.

(4) Density (by gamma ray scattering).

(5) Porosity by means of neutron logging.

(6) Compressed sound wave velocity, either by steps over large intervals (several hundred feet), or continuously over short intervals (1–3 feet).

(7) Temperatures.

(8) Formation dips.

Other operations can be performed by means of equipment attached to the electrical cable: for example, sampling of formation and of the impregnating fluids from the wall of the hole. It seems offhand that all these operations could usefully be performed in the Mohole, at the level of the sedimentary rocks. In the igneous rocks and in the mantle, some of them could be omitted, because of unfavorable conditions. However, the recording of natural radioactivity, density, porosity, and sonic velocity would be highly desirable. It is also possible that the electric cable will be used to transmit the signal of other non-standard bottom-hole devices, which may be especially developed for the Mohole, such as a gravity meter, or an NMR magnetometer.

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Offshore Exploration in Great Lakes Region

All of the Great Lakes with the exception of Lake Superior are underlain by Paleozoic sediments and can be considered drillable with the various types of equipment illustrated. However, Lake Ontario being underlain by a veneer of essentially Ordovician and Cambrian rocks only, is less attractive explorationwise.

An arbitrary 108-foot maximum (18 fathoms) is set as the practicable depth of water which could be handled by the types of equipment presently in use, beyond which companies would have to resort to floating drilling vessels or to more elaborate and expensive drilling towers.

Lake Erie and Lake St. Clair have so far been the center of off-shore drilling activity in the Great Lakes