Subsurface sediments in the Cape Kennedy area are widely diversified in sorting, texture, composition, and macrofauna. Major lithologic types are commonly correlative between cores; however, individual cores commonly contain several distinct changes in sediment type. Lithologic characteristics and thickness of strata suggest rapid changes of depositional environment; marsh, lagoon, littoral, and open-shelf facies are represented. Most of the sediments studied were produced by bottom erosion of Pleistocene surfaces and by shoreward migration and mixing of an outer-shelf oolitic sand with an inner-shelf quartzose-molluscan sand during the Holocene transgression.

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PROBLEMS OF CHERT IN OCEAN

Mesozoic-Cenozoic pelagic sedimentary cherts exposed in mobile belts or recovered from the deep sea are diagenetic alteration products of a variety of primary sediments rich in opaline skeletons.

The abundance of skeletal opal in fresh sediments depends on its rate of production, losses to solution during transport and before burial, and dilution by other sediment. The chief effect of volcanism on silica deposition is probably one of inhibiting solution. Maximal quantities of silica are buried in the shallower pelagic sediments, but the percentage of organic silica is normally highest near the carbonate compensation depth, where dilution by carbonate is slight. These normally deep sediments are most susceptible to wholesale silicification (radiolarites). Widespread cherts in otherwise noncherty sequences (Reflectors A and B in the North Atlantic) record chemical changes from a regime of silica solution to one of silica retention and back.

Predilection of chert for permeable beds indicates localization along zones of water movement. Paragenesis may be complicated. In normal abyssal sediments, complete conversion of skeletal opal requires 30–60 m. y., but in areas of rapid burial, high heat flow, and faster connate water flow, the rate must be more rapid.

Two organic events have greatly affected patterns of chert sedimentation. First was the rise, in the early Paleozoic, of organisms with siliceous skeletons; prior to that time silica had been precipitated inorganically. Second was the rise of planktonic carbonate producers during the Jurassic, resulting in restriction of highly opaline sediments to great depths (radiolarian oozes) or to areas of unusual circulation (diatom oozes).

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VARIATIONS IN HEAVY MINERAL COMPOSITION DURING TRANSPORT OF SHORT-HEADED STREAM SANDS

Past studies on variation in heavy minerals along large streams have shown that progressive change, or lack of it, during transport is due to abrasion, dilution, hydraulic conditions, and sorting on the basis of size, density, and shape. In the light of these studies assessment of the variation in heavy minerals was made along the short-headed Canadaway and Cattaraugus Creeks in western New York. In that area the glacial drift and moraine deposits are ready sources of heavy minerals. Major annual erosion and transportation of these materials occur during peak streamflow in March-April and deposition during decreased flow in the succeeding months. Thus, during the summer of 1968, efforts were made to collect part of the bedload deposited during the interim period of optimum and minimum streamflow.

Analyses of samples of similar size distributions show that variation in heavy minerals during transit occurs along these creeks and the relation is best developed in the coarse fractions. Results show a decrease in garnet and complementary increase in hypersthene, hornblende, and tourmaline downstream. Comparison of variation in heavy minerals reveals that although overall difference in weight percent exists, the relation of these minerals and the transport direction do not differ significantly between the two creeks.

Consideration of the possible causes of heavy mineral variation indicates that it is not due to dilution and abrasion. This modification may result from progressive sorting on the basis of size, density, and shape as produced by the annual current-flow fluctuations.

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MINERAL DEPOSITS FOUND IN EXPLORING FOR PETROLEUM

The greater part of the world's supply of mineral commodities, both in monetary value and tonnage, is obtained from strata lying within or near petroliferous regions. Commercial deposits of many metals as well as nonmetallic minerals are present in such sediments.

Serendipity has been responsible for the discovery of numerous valuable deposits of various nonhydrocarbon minerals as a by-product of exploration for petroleum. Such discoveries include enormous reserves of aluminum ore in northern Australia; a major copper deposit in New Guinea; saline deposits comprising various magnesium, potassium, and/or sodium minerals in many parts of the world; most of the sulphur deposits produced by the Frasch process in the USA and Mexico; and uranium in Texas. Hundreds of other valuable deposits probably have been found but were not recognized.

Making full use of all the geologic information that can be derived from petroleum operations inevitably will lead to discovery of additional mineral deposits with little extra cost, and thus increase the return on investment. Conversely, thorough study of stratigraphic zones containing commercially valuable minerals commonly will improve the interpretation of geophysical data and thereby assist in petroleum exploration.

In order to attain maximum profit from exploration, companies should: (1) itemize all mineral possibilities in the area of operations; (2) train personnel to recognize and report all minerals of economic interest; (3) collect and examine cuttings from all shot-holes and wells, from surface to total depth; and (4) take full advantage of the wealth of geologic and geophysical data already in the files.

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MAGNESIUM-RICH WATER FROM EVAPORITE-BEARING SHALES, AND DIAGENESIS OF SUBJACENT CARBONATES—KEUPER-MUSCHELKALK, IBERIAN RANGE, SPAIN

Triassic rocks of the Iberian Range consist of a succession of continental sandstones (Buntsandstein), peritidal carbonates and shales (Muschelkalk), and continental claystones and evaporites (Keuper).

Dolostone, which comprises 75% of Muschelkalk