

Some initial results of these studies are as follows: (1) a pre-Devonian polymetamorphic basement complex, including Precambrian granulite facies gneisses, has been located south of the Denali fault; (2) a stratigraphic interval containing approximately 12,000 feet of greywackes, thin limestones, and associated andesitic volcanics has been mapped and dated paleontologically as upper Mississippian and lower Pennsylvanian in age; and (3) a preliminary study of rugose and tabulate corals representative of the *Lonsdaleiidae*, *Cyathopsidae*, *Hapsiphyllidae*, *Favositidae*, and *Auloporidae* has been made and indicates that many forms are as closely related to Asiatic species as to described North American species.

Heretofore, rocks of Pennsylvanian age were believed to be rare or absent in the Alaska Range. Their presence in geosynclinal accumulations will require modification of existing concepts of the depositional history of this region. Additional paleontological study of these northern faunas may further modify and expand our present poor understanding of the paleogeography and faunal realms of the Carboniferous.

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NEARSHORE SANDS OFF SOUTHEASTERN VIRGINIA

In 1961 and 1962, SCUBA divers examined nearshore sands off southeastern Virginia and collected surface samples and 52 short cores, 2 inches in diameter and up to 4 feet long. The samples were analyzed by standard laboratory procedures.

Two relict populations were recognized: (1) a coarse-grained (median about 1.5 phi) brown sand; and (2) a fine-grained (median about 3.3 phi) gray sand. The brown sand exists principally in linear ridges, whereas the gray sand occupies lower areas between ridges. The two sands are found interbedded in layers up to 10 cm. thick in cores taken from the landward side of a nearshore submarine ridge off False Cape. Though both sand populations have been derived from reworking of older Pleistocene deposits, both contain abundant Recent shell debris.

Ripples covered the bottom continuously from just outside the surf zone outward to the outer limit of effective wave action, which varied from a line about 3 miles offshore in water 28 feet deep after a period of calm weather, to a line more than 9 miles offshore in water 71 feet deep after a moderate storm. Long axes of all active ripples measured were parallel to shore in spite of a 90-degree divergence (NE to SE) in direction of wave approach. Farther offshore ripples occur only on submarine ridges.

Differential impregnation of longitudinally cut core surfaces with epoxy cement revealed numerous primary sedimentary structures, chiefly cross-laminae of both normal and oversteepened dip and burrow structures.

Four stations were occupied in the summers before and after the intense storm of March, 1962. Cores collected here illustrate the principle of shelf sedimentation generally attributed to Barrell (1917) but first propounded by H. C. Sorby (1857) that a slow average rate of vertical accretion is combined with evidence of rapid deposition of individual layers.

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ANALYSIS OF THE SEDIMENTS FROM THE SUBSURFACE OF THE BOGRA AREA, BENGAL BASIN, EAST PAKISTAN

The Bengal Basin, located in East Pakistan and neighboring India, contains a stratigraphic section which can best be described as a basin-delta complex. Formations ranging in age from Gondwana (Upper Paleozoic) to Recent have been studied in cuttings and core samples from two dry tests. The samples were described and some were analyzed either mechanically or chemically.

Conclusions are that both the tectonic and the resulting sedimentary environments varied considerably during the deposition of this section. The older sediments deposited prior to the principal Himalayan orogenies were nonmarine. They differ greatly in lithologic character and in thickness. They were influenced by volcanic activity and continental glaciation. The Sylhet limestone (Eocene) can be interpreted as having originated in a fairly uniform marine environment. The growth of the Himalayas initiated a new and significant source of sediments and fluvial and deltaic agencies of deposition predominated as they do at present.

The Sylhet limestone has yielded gas from several pools and appears to be the most likely, if not the only, possibility for future discoveries of hydrocarbons. However, there may be other marine deposits to the south, closer to or underlying the Bay of Bengal.

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SALT STOCK FAMILIES IN NORTHWESTERN GERMANY

In northern Germany there are more than 200 known salt stocks which are composed of Zechstein salt. Because of favorable geologic conditions, it was possible to reconstruct the historical development of the salt stocks with the aid of reflection seismic surveys. The development of a single salt stock appears to have started with an accumulation of salt, the so-called salt-pillow. At a later stage, the overlying strata broke, allowing the diapir to form. In northern Germany, genetic connections between salt stocks are recognizable. Some of the larger groups of salt stocks are classified as "salt stock families." Such salt stock families consist of a number of salt stocks grouped around the genetically oldest which is said to be the "mother salt stock." The rim synclines of the adjacent salt stocks become younger as their distances from the center increase.

The geological impulse causing the formation of mother salt stocks is supposed to be partly due to tectonics whereas the subsequent wave-front-like growth of the salt stock families took place in a purely halokinetic way, i.e., by the movements of salt under the influence of gravity. The absolute rate of the horizontal wave-front-like flow of the salt over large distances averages about 0.3 mm./year.

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IZA, AN UNUSUAL DIAPIR IN NORTH SPAIN

Interspersed among the gentle fold structures of the Cantabrian Mesozoic basin of northern Spain are at least 12 diapirs with cores of plastic Triassic shales, evaporites, and ophitic igneous rocks exposed at the surface. These occur in an S-shaped belt in a generally east-west direction over a distance of some 130 kilometers (80 miles). The Iza diapir is located in the extreme east portion of the basin at the eastern termination of the diapiric trend.

Surface evidence and seismic work plus the data from four wells drilled on the Iza structure have outlined this unusual diapir. Most diapirs in northern Spain are expressed on the surface as nearly circular depressions