In the petroliferous areas indicated on the maps of areas not yet fully explored, it is suggested that electrotelluric surveys are a means of pinpointing and of delineating the actual subsurface oil and gas accumulations within the broad probable oil-bearing regions.

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GEOPETAL FABRICS: IMPORTANT AIDS FOR INTERPRETING ANCIENT REEF COMPLEXES

The term "geopetal fabric" was introduced by Sander for fabrics in sedimentary rocks "which record the direction of the earth's surface at the time they were being formed." Geopetal fabrics thus can be used to determine the orientation of these rocks (*i.e.*, top, bottom, horizontal, and vertical) when the fabrics developed.

The importance of geopetal fabrics in the interpretation of reef complexes is illustrated by examples from the Devonian of the Canning basin in Western Australia. The most useful geopetal fabrics in these limestones are formed by the carbonate mud and spar fillings of fossils, especially closed brachiopod shells. These shells commonly were partly filled by horizontal layers of carbonate mud, the remaining upper part of each cavity being filled subsequently by sparry calcite. The spar and carbonate-mud layers thus demonstrate top and bottom, and the contact between them usually marks the horizontal at the time of deposition. Similar geopetal fillings occur in gastropods, nautiloids, ammonoids, and (on a microscopic scale) in the cellular structure of stromatoporoids, corals, and bryozoans. Other geopetal features of these limestones include birdseyes and other voids that were partly filled by carbonate mud, stromatactis structures, umbrella structures (below laminar stromatoporoids or algae), heliotropic algae and stromatolites, certain coral and stromatoporoid growth forms, and bedded fillings of neptunian dikes.

Steep depositional dips commonly are developed in facies associated with reefs, especially in forereef facies, and geopetal fabrics can be used to demonstrate the amount of depositional dip and to distinguish it from subsequent tectonic dip. Reefs themselves are commonly unbedded, and geopetal fabrics may be the only means of determining attitude in these rocks. In addition, allochthonous blocks of reef that have been incorporated in forereef and basin deposits can be distinguished from in-place bioherms through the use of geopetal fabrics. These can show that bioherms are in their original growth positions, whereas allochthonous blocks have haphazard orientations.

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DEVONIAN ALGAL STROMATOLITES FROM CANNING BASIN, WESTERN AUSTRALIA

Algal stromatolites are present in the reef, backreef, and forereef facies of Devonian reef complexes in the Canning basin of Western Australia. The most varied of these forms are in the forereef facies, where they grew on slopes as steep as 55° and in places that were at least 45 m below sea level. These occurrences negate the common belief that algal stromatolites are diagnostic of intertidal and near-intertidal environments.

Sediment-binding stromatolitic algae played an important role in maintaining the steep upper parts of the forereef slopes. Forms represented in the forereef facies are described as columnar, longitudinal, undulatory, contorted-bulbous, mound-shaped, planar, reticulate, and nodular stromatolites. Nonskeletal algae are believed to have been dominant in forming these stromatolites, but recognizable skeletal species (especially of the genera *Sphaerocodium, Girvanella, Frutexites,* and *Pleurocapsites*) also are present, and bacteria may have contributed to certain forms. Holdfasts of crinoids and corals are encrusted on some stromatolites, and other conspicuous elements of the associated open-marine fauna include ammonoids, nautiloids, and conodonts.

Stromatolites in the reef and backreef facies are generally irregular columnar types, commonly showing birdseye textures. Oncolites are also common in parts of the backreef facies. The reef and backreef stromatolites are believed to be analogous to modern intertidal and near-intertidal forms.

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SUBSIDENCE AND ITS CONTROL

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BIOGENIC PELLETIZATION AND ALTERATION OF SUSPENDED ARGILLACEOUS SEDIMENTS

The feeding activities and excretory products of the marine decapods *Callianasa* and *Upogebia* and the marine annelid *Onuphis* have been studied in the natural environments of the southern Atlantic and eastern Gulf of Mexico coasts and in controlled aquarium experiments. These organisms produce depositionally significant quantities of argillaceous fecal pellets which are transported with hydraulically equivalent sand grains and deposited as viable, granular clays in relatively high-energy environments. The organisms also significantly alter clay minerals taken into their digestive systems and the organic-rich, argillaceous fecal pellets serve as sites for postdepositional alteration of the clay minerals.

The fecal pellets are more than 90% mineral matter, largely clay minerals. The decapods produce rod-shaped fecal pellets about 2 mm long and 0.75 mm in diameter. The specific gravity and water content of these pellets yield a fall velocity in seawater equivalent to that of 0.25 mm quartz grains. The annelids produce ovoid fecal pellets, about 0.5 mm in diameter, with fall velocities in seawater equivalent to coarse silt and fine quartz sand.

The argillaceous fecal pellets exhibit a clay mineralogy significantly different from that of the related suspended sediments. In fecal pellets the crystallinity of muscovite is disordered, the crystallinity of interlayered minerals is reduced, chlorite is largely destroyed, and the illite/montmorillonite ratio is reduced. There is a clay mineral difference between fecal pellets produced by decapods and annelids in the same environments. The argillaceous fecal pellets also are recycled in the coprophagic chain and the clay minerals are further altered.