ROLE OF MICRO-ORGANISMS IN FORMATION OF LIMESTONE

The modern oölite, coral reefs, calcarenite, calcilutite, and beach rock are cemented with a $CaCO_3$ cement which consists of crystals of aragonite. Experimental evidence supports the view that the crystals of aragonite are formed by organisms which are thought to be actinomycetes.

The Floridan and Puerto Rican beach rocks are formed in tropical and subtropical climates in littoral and supralittoral environments and are confined to high-energy areas where there is daily agitation of water and a supply of fresh nutrients.

The Floridan beach rock occurs as an intermittent shallow shelf on the Atlantic coast from Key West to Key Largo and along the east coast from West Palm Beach to Jupiter. However, the Puerto Rican beach rock is primarily confined to the north side of the island where the formation of beach rock may be related to the path of the currents which bring nutrients to the surface.

The aragonite in these sediments is most likely of a biogenetic origin. However, the partial to complete alteration of the cementing agent to calcite is by penecontemporaneous solution and redeposition. In the alteration of aragonite to calcite, some of the $CaCO_3$ is removed in solution. Consequently, voids are formed within the matrix of the rock and the resulting rock can be very porous because of the development of microporosity.

E. H. RAINWATER, Tenneco Oil Co., Houston, Tex.

RÉSUMÉ OF JURASSIC TO RECENT SEDIMENTATION HISTORY OF GULF OF MEXICO BASIN

The oldest marine sediments that are known to occur on all sides of the Gulf of Mexico basin are of Late Jurassic age. These sediments, mainly carbonates, overlie generally unfossiliferous sandstone, and shale, anhydrite, and salt of unknown age—possibly Jurassic, Triassic, or Permian. The Late Jurassic was deposited only after a probable shield area (which is postulated to have occupied the Gulf of Mexico basin) sank.

The Late Jurassic Smackover Limestone and equivalents were deposited above a very thick salt section. As the bordering lands rose, gravel, sand, silt, and mud of the Cotton Valley (up to 4,000 ft thick) were deposited. Deposition continued unbroken into Early Cretaceous time, beginning with up to 4,000 ft of Hosston and equivalents. In the southeastern part of the Gulf of Mexico, Early Cretaceous equivalents include carbonate, evaporite, and some black shale. After Hosston deposition, carbonates were deposited around the entire Gulf basin, though terrigenous clastics also were deposited in the northern region.

There is no significant regional depositional break between the Lower and Upper Cretaceous. In medial Late Cretaceous time, the sea transgressed farthest, coinciding with a worldwide eustatic sea-level rise. The Mississippi embayment formed and the sea reached southern Illinois.

Mountain-building activity and uplift at the end of Cretaceous time forced the sea from much of the continent. Carbonate deposition continued in the southeast from Paleocene through Miocene, but fine terrigenous clastics were deposited in the north and west (Midway-Velasco). As the mountains of the interior rose, clastic debris supplied to the basin was more abundant and coarser. In general the northwestern gulf shoreline was pushed seaward, though important transgressions occurred in early, middle, and late Eocene times and during the Oligocene. Deltas formed, and the local shifts in Miocene deltaic depocenters caused numerous local transgressions and regressions during that time. Sedimentation rates increased steadily. The Pleistocene deposits reach a thickness of 15,000 ft in the northern Gulf of Mexico.

Although a marine basin has occupied the Gulf of Mexico since Late Jurassic time, the existing gulf may be a very young feature. In fact, parts of the gulf may have been land during much of Jurassic-Pleistocene time.

The depositional and tectonic history, insofar as it is known, of the large gulf basin is described briefly. The need for more information on the geological history of all parts of the basin is apparent to anyone charged with exploring for minerals in this area.

JOHN S. RIVES, Ranger Drilling Co., San Antonio, Tex.

STRUCTURAL AND STRATIGRAPHIC TRAPS RELATED TO EXTRUSIVE ROCKS IN SOUTH-CENTRAL TEXAS

Paralleling the Balcones fault zone, yet most numerous in the Uvalde salient and the Zavala syncline, are several dozens of ill-defined, olivine-basalt extrusives, most of which have been altered to serpentinite. Oil and gas production from rocks of Late Cretaceous to Tertiary ages exists on the crests and off the flanks of many of these domal features. There are many more domal extrusive complexes known from reconnaissance exploration, but, as yet, untested by the drill bit.

Age and rock type of the objective reservoir rocks are determined by the time when the underlying igneous body was extruded. Structural deformation or stratigraphic development above these effusive masses is primarily influenced by the presence of the extruded rock on an older rock surface. There are more clastic-rock reservoirs than domes. Oil or gas affinity for accumulation in either sandstone or limestone seems random. The serpentinite itself may serve as reservoir rock. Outpourings of igneous magma are concentrated in the Upper Cretaceous. Structure and stratigraphy of the overlying rocks into the Tertiary sediments are affected.

Hydrocarbon production from the domes ranges in depth from a few hundred feet to approximately 4,000 ft. The shallowest production is found above the shallowest extrusives, markedly demonstrating their structural and stratigraphic influence.

Exploration methods include surface geology, magnetic surveys, subsurface geology, and core drill near-surface geology. All methods are extremely effective where that particular geological method may be applied. From the standpoint of geology, land, and drilling, profitable objectives may be explored at minimum costs.

ROBERT W. ROCHON, Monarch Logging Co., San Antonio, Tex.

RELATIONSHIP OF MINERAL COMPOSITION OF SHALES TO DENSITY

(No abstract submitted.)

JAMES K. ROGERS, Cities Service Oil Co., Houston, Tex.

COMPARISON OF SOME GULF COAST MESOZOIC CARBONATE SHELVES

(Read by title)