for several density contrasts and basin configurations.

Combined gravitational effects of the models have been applied as corrections to the Bouguer anomaly map to obtain a gravity-anomaly profile that generally represents effects of changes in crustal thickness or density. The granitic crust is considerably thicker under the Llano uplift than under the Gulf Coast geosyncline.

At present, the region is at or near isostatic equilibrium, but near the end of the Paleozoic it was out of equilibrium, with an excess mass at the present site of the Gulf Coast geosyncline. The writers speculate that gulfward migration of depocenters during Mesozoic and Cenozoic has taken place in response to a mechanism for gradual restoration of regional isostatic equilibrium.

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GEOLOGICAL HISTORY AND OIL AND GAS POTENTIAL OF CENTRAL GULF COAST

The area described includes the coastal plain and continental shelf between Texas and peninsular Florida, and includes the Mississippi embayment. The stratigraphic section includes sediments of all ages from Triassic through Holocene. The maximum composite thickness probably exceeds 80,000 ft, but only about 50,000 ft of Mesozoic-Cenozoic sediments is present at any locality in the deepest part of the Gulf Coast geosyncline. Oil and gas currently are produced in numerous fields in this area from both silicate clastics and carbonate rocks of Jurassic, Cretaceous, Tertiary, and Quaternary ages. The sedimentation history clearly indicates that the potential for future discoveries is great.

The structure and stratigraphy of this richly petroliferous basin are described and the possibility of discovering more oil and gas than has been found is pointed out. Thickness, lithology, and depositional environments of each major division of the Mesozoic and Cenozoic are shown on maps and sections.

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BASIC DELTA SYSTEMS IN EOCENE OF GULF COAST BASIN

Studies of certain of the thick terrigenous clastic wedges that comprise most of the Eocene fill of the western Gulf Coast basin indicate that principal deposition of sediments occurred as parts of major delta and associated systems.

Two basic types of delta systems are recognized in the Gulf Coast Eocene. One type developed at the mouths of a few, very large, distant-source streams which resulted in extensive shoreline progradation of numerous, elongate to lobate, terrigenous, delta lobes. Streams supporting this type of delta system entered the basin at only a few places and deposited local fluvial facies along the updip basin margin. The second type developed at the mouths of several, relatively small, local streams, and consists of a series of nearly uniformly prograding arcuate to cuspate delta lobes. Streams supporting this type of delta system entered the basin at many places and deposited a more or less continuous fluvial facies along the basin margin.

In the first type of delta system sediment input was great and exceeded the energy of coastal processes so that, within the component facies of the system, the ratio of constructional or progradational facies to destructional facies is high. In the second type, sediment input was moderate and only slightly exceeded the energy of coastal processes so that ratio of constructional to destructional facies is relatively low.

Extensive delta systems of the lower Wilcox in the Gulf Coast basin (Rockdale system in Texas, Holly Springs system in Louisiana and western Mississippi) are of the first type; large delta and associated systems of the Jackson (Fayette) in Texas and the Cotton Valley in the northern Gulf Coast basin also are primarily of this type. The recent counterpart is the Mississippi delta system. Main component facies of this delta system include: (1) extensive delta-plain deposits with abundant lignite or peat (distributary-channel and interdistributary deposits); (2) well-developed delta-front sand deposits made up chiefly of distributary mouth bars; (3) very thick, dark prodelta mud; and (4) interdelta mud. Lobes are elongate perpendicular to the coast where associated with sequences containing large amounts of mud, or are rounded where associated with sequences which are relatively low in mud content. Destructional components include thin, locally persistent, marine units across distal parts of abandoned delta lobes and widespread lignite or peat on the landward or updip parts of abandoned lobes. Constructional and destructional units are vertically distinct. Associated depositional systems include well-developed delta-flank mud facies along margins of the delta-fluvial systems, and prominent strandplain and barrier-bar (with complementary lagoon) systems along strike and down longshore drift.

The large delta systems of the upper Wilcox in Texas and Louisiana, of parts of the Vicksburg, and probably of the Frio in Texas are chiefly of the second type. Recent analogues include the Appalachicola, Rhône, and certain of the U. S. Atlantic coast delta systems. Because of approximate balance of moderate sediment input and energy of coastal processes, much of this type of delta consists of locally redistributed marine sediments; construction and destruction were more or less contemporaneous and units of these phases are not vertically distinct. Principal facies consist of numerous coastal barrier-sand bodies. Constructional delta-plain facies (including distributary-channel and interdistributary deposits) are only partly preserved. Lignite or peat is not important. Frontal shoal-sand facies commonly mark the original progradation of individual deltas. Lagoon, marsh, and lacustrine deposits are minor components. Prodelta mud is not thick and generally is similar to open-shelf deposits. No extensive marginal delta-flank deposits nor prominent strandplain and barrier-bar systems developed along strike.

Significant, and commonly multipay, oil and gas reservoirs are present within both types of delta systems in the Gulf Coast basin. In the first type, main trends are chiefly coincident with marine delta-front sand; in the second type, marine coastal barrier- and frontal shoal-sand bodies are the principal reservoirs. Distribution of deltaic oil and gas trends depends on the type of delta system in which they are present. Reconstruction of the system from facies composition and three-dimensional facies geometry and facies relations provides a useful guide for exploration.

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DEPOSITIONAL SYSTEMS OF LOWER WILCOX GROUP, NORTH-CENTRAL GULF COAST BASIN

The lower Wilcox Group (Eocene) of Louisiana,