trend. It is possible that this reef extends southeastward into Franklin and Catahoula Parishes, but subsurface data is lacking to substantiate this. The lithology of the northern reef is similar to the main reef in that it contains about the same fossil assemblage in sparry, granular, or micrite matrix. Some zones within and on the north edge of the reef contain an abundance of oolites and algal pisolites. In part the limestone is slightly dolomitic, but there are no dolomite zones as in the main reef. In some localities within the northern reef, porosity and permeability are very high.

Commercial oil and gas production has not been found in the main biohermal trend in central Louisiana, but the possibilities have by no means been exhausted. In contrast, the Black Lake field in Natchitoches Parish was discovered in the northern bioherm in 1964. This is a major gas-distillate-oil field within a stratigraphic-structural trap, containing ultimate reserves of approximately 150 million bbl of oil equivalent. This discovery set off an active wildcat play in search of additional traps of the Black Lake type, so far without success.

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SURFACE FEATURES OF QUARTZ SAND GRAINS FROM NORTHEAST COAST, GULF OF MEXICO

The surface textures of quartz sand grains from locations along the Florida Gulf Coast have been compared with those from other environments. High-magnification studies consistently show the predominance of chemical over physical textural features, which is to be expected in low- to moderate-energy coastal environments. Because of multiple reworking of these sediments, detailed environmental interpretations are difficult but not impossible. Distinctions are commonly quite subtle.

The great influence of the crystal structure of quartz on the physical and chemical surface features precludes the normal method of rapid scanning of several grains per sample by the electron microscope. Therefore, a statistical approach is suggested using a combination of Nomarski differential interference-contrast microscopy and scanning electron microscopy. A relatively high percentage of the total surface areas of large numbers of grains can be studied in detail by this method.

Stereopairs of scanning electron micrographs illustrate numerous surface textural features produced by a variety of sedimentary processes and environments.

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GEOLOGY OF JURASSIC, FLOMATON-JAY AREA, ALABAMA AND FLORIDA

Flomaton field, in Escambia County, is the first major gas condensate discovery from the Jurassic Norphlet Formation in Alabama. Structurally the field is a NW-SE trending low-relief salt anticline bounded on the north and east flanks by a major down-to-the-basin fault which is part of the Pickens-Gilbertown-Pollard regional fault system. The Norphlet sandstone reservoir is about 60 ft thick within the field and produces CO_2 and sour gas with a high condensate yield.

The paleostructural history of the area indicates that early Louann Salt movement and faulting occurred, probably as a result of gravity slide and basinward salt creep, forming structures necessary for trapping hydrocarbons. Jurassic deposition was affected by these early structural features and pre-salt topography.

Norphlet clastics were derived from the northeast and deposited by braided stream systems. As the Smackover seas transgressed the area, the upper part of the Norphlet was partly reworked. In the Flomaton area, the Smackover Formation is a dark-brown, dense, micritic limestone. The overlying Haynesville Formation can be subdivided into an upper member consisting of predominantly red, coarse clastic material and a lower member consisting of fine, red clastics and evaporites. At Flomaton, over 300 ft of bedded salt has been drilled in the lower Haynesville causing many drilling and completion problems. The Cotton Valley Group marks the top of the Jurassic and consists primarily of coarse gravelly clastics.

Exploration activity in southwest Alabama during 1969, 1970, and 1971 led to additional discoveries from the Jurassic. Among these is Jay field in Santa Rosa County, Florida, 7 mi southeast of Flomaton field. Jay produces oil from Smackover dolomite and is the first Jurassic discovery in Florida. The discovery well produced 1,710 BOPD and has resulted in one of the most active exploration plays in the United States.

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LOWER MIOCENE STRATIGRAPHY AND PETROLEUM POTENTIAL, OFFSHORE GALVESTON AND JEFFERSON COUNTIES, TEXAS

Lower Miocene sediments in the southeast Texas coastal area can be divided into 2 distinct trends. The basal Miocene interval from the top of the Oligocene *Discorbis* upward to the *Robulus chambersi* is a predominantly regressive-marine sequence that reflects the gradual progradation of Miocene sands into this area. The overlying sequence from *Robulus chambersi* to *Amphistegina (B)* consists of deltaic and delta-related sediments that reflect continued marine regression and seaward progradation of a large early Miocene delta system.

In the nearshore Galveston and High Island areas, the basal Miocene interval contains a series of potential reservoir sandstones, most of which are above the abnormally pressured zones and occur at depths of less than 9,500 ft. Farther offshore, the younger *Amphistegina (B)* sandstones become favorable exploration objectives.

Several lower Miocene biostratigraphic zones are identifiable throughout the area and an attempt has been made to relate each zone to particular lithologic conditions or depositional environments. Because of the general southward movement of the shoreline during the Miocene and a relatively limited supply of sand, prospective Miocene sandstone trends in the southeast Texas offshore occur in narrow "belts" approximately parallel with the present coastline. Identification of these favorable trends is essential to a successful exploration program in this area.

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PLANKTONIC FORAMINIFERAL BIOSTRATIGRAPHY AND PALEOMAGNETICS OF LATE PLIOCENE AND EARLY PLEISTOCENE STRATA AT LE CASTELLA, ITALY

Late Pliocene to early Pleistocene stratal segments were measured and sampled along the coast at Le Castella, Italy, to determine their planktonic foraminiferal