If one uses the *Globorotalia fohsi* forms to mark time datums, then the stratigraphic ranges of *Sphaeroidinella* forms in Louisiana are not contemporaneous with their ranges in the Caribbean region. The evolution of *Sphaeroidinella* is apparently similar in both areas.

There is some evidence that *Sphaeroidinella dehiscens* is a deep-water variant of *Globigerinoides sacculifer*. Benthonic associates of fossil specimens suggest that *Sphaeroidinella* did not require great water depths in the past.

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SOURCE OF DETRITUS IN GUEYDAN (CATAHOULA) FORMATION, SOUTHERN TEXAS GULF COAST

The Gueydan Formation in outcrop is pastel-colored tuffaceous clay, sandstone, conglomerate, bentonite, and minor ash. The clay, bentonite, and ash are composed predominantly of silicic pyroclastic debris or the alteration products of such debris. Sandstone and conglomerate are composed largely of debris from volcanic and hypabyssal rocks plus minor detritus from sedimentary rocks and reworked Gueydan deposits.

Bailey (1926) reviewed the problem of the source of the igneous material and, although the evidence was inconclusive, favored a source near Duval and McMullen Counties. The writers' study suggests that sand and gravel debris of igneous rocks was derived from the Big Bend region of Texas and adjacent parts of northern Mexico; the fine pyroclastic material may have come from the same area or farther west.

Cross-bed data show that streams flowed east-southeast to the Gulf during the time of Gueydan deposition; hence, detritus was derived from terrane in an updip direction. Pebbles of soda-rich trachyte and trachyandesite (latite), rhyolite porphyry, and welded tuff in the Gueydan are similar in texture and composition to rocks exposed in the Big Bend region and adjacent Mexico. Although the Gueydan lacks detritus from some rocks exposed there, the rocks which are not represented as pebbles are mafic types that weather rapidly. Boulder-size clasts in the Gueydan were transported as stream bed-load and possibly for short distances by mudflows; they are not proof of a local source. Cretaceous foraminifers and rock fragments in the Gueydan show that pre-Tertiary bedrock was exposed locally across the drainage area.

Upper level winds today and presumably throughout the Tertiary moved eastward across Texas; hence, the source volcanoes were toward the west. Although ash may have travelled to the site of deposition by wind, much was reworked by streams after initial deposition and subsequently modified by soil-forming processes.

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ENERGY—PAST, PRESENT, AND FUTURE

(No abstract submitted)

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FUTURE HYDROCARBON PROVINCES OF GULF OF MEXICO-CARIBBEAN REGION

Future possible hydrocarbon provinces of the Gulf of Mexico-Caribbean region include: (1) offshore Late Jurassic-middle Cretaceous reef extension of the Golden Lane, eastern Mexico; (2) additional Pánuco-Ébano-type fields in Late Jurassic-middle Cretaceous basinal carbonate facies of eastern Mexico; (3) additional Poza Rica-type fields in intertonguing zones between Late Jurassic-middle Cretaceous reef carbonates and basinal carbonate facies of eastern Mexico; (4) Parras and similar types of basins, associated with structure and stratigraphic traps, in the Late Jurassic-Tertiary sequence of eastern Mexico; (5) new pay zones in the Rio Grande embayment; (6) Cretaceous reef buildups and other types of stratigraphic traps around the San Marcos arch, Sabine uplift, and Wiggins arch; (7) reef and stratigraphic traps along the Cretaceous trends of Texas and Louisiana in the areas between the arches and uplifts named, and extending offshore in the West Florida shelf area; (8) pre-Monroe "gas rock" plays in the Cretaceous, Jurassic, and Paleozoic of northeastern Louisiana, southeastern Arkansas, and northwestern Mississippi; (9) Jurassic-Cretaceous-early Tertiary reefs and sandstone trends in the Florida parishes of Louisiana; (10) exploration of the pre-Werner or pre-Louann Salt sequence along the interior part of the Gulf Coastal plain; (11) additional Poth Sand-type plays in the downdip marine Wilcox of southeastern Texas and southern Louisiana; (12) downdip sandstone trends in the post-Wilcox of the Gulf Coast geosyncline, both offshore and onshore; (13) deep-water drilling to both shallow and deep objectives beneath the outer continental shelf and the upper continental slope; (14) Cretaceous and Jurassic of Mississippi-Alabama-northern Florida; (15) offshore drilling for Jurassic, Cretaceous, and Tertiary reefing on the West Florida shelf; (16) Bahamas platform; (17) Mesozoic-Tertiary carbonates along the north coast of Cuba; (18) Late Cretaceous-Tertiary marine basins in Cuba, Jamaica, Hispaniola, Puerto Rico, Barbados, and Trinidad; (19) offshore drilling east and south of Trinidad; (20) Orinoco delta, both onshore and offshore; (21) Gulf of Paria; (22) further exploration in Barinas basin of southwestern Venezuela; (23) additional exploration of Cretaceous and Tertiary trends in Eastern Venezuela and Maracaibo basins, as well as drilling of the Gulf of Venezuela; (24) Tertiary basins of South Central America orogen; (25) Nicaragua Rise from Nicaragua-Honduras to Jamaica; (26) Tabasco (Mexico)-Petén (Guatemala) fold belt; (27) offshore and onshore British Honduras, including Sarstún embayment; (28) Yucatán Peninsula and Campeche Bank; and, ultimately, (29) exploration of the Sigsbee diapirs, central Gulf of Mexico.

Not all of these areas listed can be considered to have equal potential. Considering only those areas where 20 or less exploratory tests have been drilled, more than 250,000 sq mi, an area the size of Texas, is relatively unexplored. Including areas where exploratory drilling ranges from 21 wells to extensive drilling, more than 500,000 additional sq mi have not been explored completely. This is a total of 750,000 sq mi which remains to be explored carefully before pessimistic attitudes are justified.

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STRATIGRAPHY OF EDWARDS AND ASSOCIATED FORMATIONS, WEST-CENTRAL TEXAS

West-central Texas is strategically located along the Texas Comanche outcrop belt. On the east and north, the Comanche section is influenced by terrigenous clastics allowing the classic formational breakdown of this region. On the south and west, the section is almost entirely limestone. The area of study is a convenient avenue for correlation between these two areas.

The Cretaceous of west-central Texas consists of a basal quartz sand, the Antlers Sand, and an overlying carbonate sequence. The Antlers is laterally equivalent to both Fredericksburg and Trinity sequences at the northeast. The southern limit of the usefulness of the term is at the latitude of the Brady Mountains, Menard County. The carbonate sequence above the Antlers can be divided into two geologically distinct areas; a northern area, generally coincident with the Callahan Divide, and a southern area underlain by the northern Edwards Plateau.

The carbonate sequence on the Callahan Divide may be broken into two units: (1) a basal, nodular, marly unit, and (2) an overlying massive, rudistid-bearing limestone. The basal unit has characteristics of, and is laterally equivalent to, the Walnut and Comanche Peak Formations of central Texas. These units cannot be recognized and the sequence is termed the Walnut-Comanche Peak undifferentiated. The overlying massive rudistid-bearing limestone is continuous with the Edwards of north-central Texas and the term Edwards is used across the Callahan Divide.

South of the northern Edwards Plateau, the Edwards Limestone replaces the Walnut-Comanche Peak by facies change to occupy the entire Fredericksburg interval. The term "Edwards" should include the beds which extend southward into the Edwards Plateau proper until they are lost at the position of the Devils River Limestone in Edwards and Val Verde Counties. The top of the Edwards is an unconformity from Edwards and Val Verde Counties northward to an east-west line running through central Irion, Tom Green, and Concho Counties. North of this line the contact appears to be conformable. The base of the unit lying above the Edwards (unnamed upper formation of Lozo and Smith) is termed the "Dr. Burt ammonite beds." This stratigraphic datum can be extended northward from the Edwards Plateau to the Callahan Divide south of Abilene in Nolan County.

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IMBALANCE OF SULFUR SUPPLY AND DEMAND, AND FUTURE RESOURCES

(No abstract submitted)

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ROLE OF FEDERAL GOVERNMENT IN CHANGING ENERGY PICTURE

(No abstract submitted)

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GRAVITY PROFILE OF SOUTH FLORIDA SHELF

A gravity profile from La Belle, Hendry County, to Miles City, Collier County, reveals positive anomalies at Felda and Sunniland fields—the only two fields where oil now is produced in Florida.

Sunniland field is probably a compactional anticline, with approximately 80 ft of closure and 180 ft of structural relief. The gravity anomaly overlying it is about 20 gravity units. Felda field is probably a hydrodynamic trap over a nose. Structural relief of the nose is approximately 50 ft.

Poor results which have reportedly been obtained by seismic surveys in the South Florida basin indicate gravity may be the more reliable indirect method currently available for use in the area.

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JURASSIC SEDIMENTS OF MISSISSIPPI AND ALABAMA

The writers present a regional isopachous, lithofacies, and stratigraphic study of the Jurassic sediments in the potential producing trend of Mississippi and Alabama. Jurassic deposition in the study area was affected by three major tectonic factors: a southwestward subsurface extension of the folded Appalachians, regional ancestral faulting, and salt uplift. These factors are manifested in the distribution of the sediments and in facies variations.

The middle and lower Smackover is characterized by dense argillaceous carbonate deposits. Locally, a littoral facies with good sandstone porosity is present. Upper Smackover carbonate sediments are zoned into a porous sandy facies, a dense dolomitic facies, and a porous oölitic facies. Tectonic influences are first evidenced in upper Smackover sediments and appear to culminate during younger Cotton Valley deposition.

Haynesville deposits (above the Smackover) include a basal Buckner Anhydrite Member and an overlying anhydritic carbonate section which grades shoreward into a porous sandy facies. Excellent reservoir rocks have been found in the transitional zone between the restricted shelf and littoral environments.

The youngest Jurassic unit, the Cotton Valley, has been subdivided into the Schuler and Dorcheat facies. The Schuler facies is predominantly a coarse-grained redbed section representing a paralic environment. The Dorcheat facies is a fine-grained, open-neritic shelf deposit with grain size increasing toward the shoreline. Excellent reservoir properties are present in all Cotton Valley sandstones.

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ORGANIC MATTER IN BOTTOM SEDIMENTS, CHOCTAWHATCHEE BAY, FLORIDA

Choctawhatchee Bay, in the panhandle of northwest Florida, is one of many estuaries that border the northern Gulf of Mexico. A geochemical study of the organic matter of this modern environment was begun as part of a broader research program to obtain a better understanding of the nature of organic materials in ancient environments. In addition to the brackish-water by itself, other contiguous depositional environments were sampled for comparative purposes, namely, bayou, barrier island, marsh, river, and fresh-water lake. The following analyses were made: organic and mineral carbon, total nitrogen, total sulfur, elemental (free) sulfur, bitumens, and alkaline-soluble humic matter.

Preliminary studies have shown that the sediments of the bay are predominantly detrital in origin, ranging from fine- to medium-grained, relatively pure quartz sand, in the shallower marginal parts of the bay to finer grained, commonly pelletoid, silty-clayey sediment in the deeper parts.

Organic content is highest in the finer grained sediments of the bay and lowest in the nearshore sandy sediments. The finer grained sediment or muds are characterized by average contents of 3.5 percent or-