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-

ganic carbon, 0.32 percent total nitrogen, and 1.68 percent total sulfur. Elemental sulfur generally amounts to less than 2 percent of the total sulfur content. However, one river-sediment sample contained an anomalously high value of 54 percent free sulfur relative to total sulfur content. Elemental sulfur seemed to be the clearest indicator of early diagenesis as it invariably diminished in concentration with shallow depth of burial.

The bitumen content in the bay muds ranged from 160 to 380 ppm of the dried sediment, and the bitumen content generally accounted for less than 0.5 percent of the total organic matter content. In some of the sandy sediments of the bay and barrier island environments; however, the bitumen content ranged from 1 to nearly 4 percent of the total organic matter. The environment least favorable for the accumulation of bitumens seemed to be the fresh-water lake environment which, on the basis of a single sample, yielded 85 ppm bitumen or only 0.13 percent of the total organic matter content.

The alkaline-soluble humic matter, subdivided into humic-acid and fulvic-acid fractions, constituted the largest organic fraction extracted from any of the sediments studied. Quantities of soluble humic substances, ranging from 5,500 to 17,050 ppm of the dried sediment, were found in the finer grained sediments of the bay, whereas a value of 165 ppm was found in one of the sandy sediments. Higher concentrations of soluble humic matter—30,750, 31,600, and 76,300 ppm—were found in the bayou, lake, and marsh environments, respectively. In general, the soluble humic substances in these Recent sediments comprise about 20–50 percent of the total organic matter and a large part of the remaining organic content is believed to be chiefly insoluble humic compounds.

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SOME PROBLEMS IN MARINE GEOLOGY, GULF OF MEXICO

The geologic history, or paleoceanography, of a marine basin such as the Gulf of Mexico is interpreted primarily from the sedimentary record. Many basic research problems in sedimentology can be profitably studied in the gulf because much descriptive work already has been done, and it is a relatively small marine basin which is easily accessible.

Some problems in transport of detrital sediment are (1) possible bypassing of coastal lagoons and (2) the lack of modern cycle detrital sediment on much of the outer continental shelf. Is the modern sediment which reaches the open ocean being trapped in many places on the inner continental shelf? If so, how can the post-glacial deposits in the Sigsbee deep be explained? Is this deep basin sediment bypassing the outer shelf, and if so, what is the mechanism of transport?

The rate of supply of organic debris to the gulf sediments depends on the rate of organic production. High organic production near river affluents and in hypersaline lagoons deserves further investigation. The rate of supply of organogenic calcium carbonate from planktonic organisms and the rate of solution of calcium carbonate are of special interest. An understanding of shelf-edge calcareous reefs may have far-reaching implications.

An understanding of marine processes which affect the characteristics and distribution of sediments will require observations and analyses by new techniques.

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DEVELOPMENT OF BASIN-IN-BASIN HONEYCOMB OF FLORIDA BAY AND NORTHEASTERN CUBAN LAGOON

This triangular, 1,000-sq mi, bimodally windy, subtropical lagoon is a honeycomb of closely spaced, interconnecting, suboval, pan-shaped basins individually upward of 10 mi long and 12 ft deep. It lies north-south between multiple mangrove-swamp belts along the Everglades shoreline and the emergent barrier reef of the Florida Keys and east-west between Biscayne Bay and a zone of broad, marly, sandy and shelly shoals facing the Gulf of Mexico, north of Vaca Key.

Basin walls of Holocene marl (mostly shelly calcareous silt grading above to mangrove peat) stabilized by alternations of mangrove-swamp bands and marine grasses form a honeycomb pattern throughout the lagoon. Walls rise to 2.5 ft and basin floors are as deep as 11–12 ft msl. Bottoms are muddy or floored by shell concentrate. Near the keys are bottom exposures of the underlying hard Pleistocene Miami Limestone.

Basin areas and depths increase irregularly southward from tiny, oval, fresh-water, marsh ponds of the Everglades border, by multiple mergings and irregular loss of separating walls, to form large, nearly smooth-sided bays along the barrier reef with its "keys" cut by tidal inlets. The honeycomb pattern of the geographic map appears below water as a more intricate though fragmentary basin-in-basin structure.

Alignments of basins, trending roughly north-south between nearly continuous mangrove belts which mark former rill-valleys of the Everglades marsh, cross northeast-southwest alignments separated by walls which have been reinforced by shoreline storm-debris ramparts.

Aqueous erosion of a contemporaneously gradually thickening marl-and-peat formation is indicated by suboval basin form maintaining a rough width/depth relation in a windy region (Price, 1947), while sediment accumulating, in step with rising sea level, produced Scholl's (1964) dated regional stratigraphy of the last 5,000 to 4,000 years.

The basin-in-basin honeycomb is the result of conflict between (a) aqueous erosion in saline basins, and (b) the strong sediment potential of tropical paralic vegetation, while (c) the erosion continued during the slow transgression of an 8-mi-wide fresh/salt contact zone like that of today which passed across a rock basin at first lightly carpeted with Everglades marsh. Thus, salt-denuded rill-valley lows developed oriented lakes, which were drowned to form tidal bays. Shoaling of ponds, with mangrove occupation, alternates today with flushing-out of wave-eroded marl. Total volumes of walls and water are now roughly equal.

Patches of a similar basin honeycomb occur along 270 mi of the northeastern Cuban lagoon behind its emergent barrier reef. Pleistocene examples occur in Florida and Cuba. Drowned oriented Carolina "bay" lakes give a somewhat similar pattern along a Chesapeake Bay shore.

No process of accumulation adequate by itself to form such honeycombs is known. The genetic process was the drowning and embayment of oriented lakes formed by similar action from drowned marsh rills.

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