relate remarkably well with present platform topography. The straits and basins invariably are areas of negative anomaly whereas the platforms generally are areas of positive anomaly. Seismic measurements show that refractors with similar transmission velocities are displaced downward in Florida Straits and Northwest Providence Channel. Limited subsurface control, utilizing paleontologic data and velocity surveys, indicates the deepest and highest velocity refractor traceable in and adjacent to the Bahamas to be at the top of Lower Cretaceous rocks.

The best explanation for the observations available is that some combination of post-Late Cretaceous downfolding or downfaulting occurred in the areas of the present intraplatform straits and basins. Erosion of adjacent highs and accompanying infilling of lows with relatively light material subdued the topography directly reflecting structure and at the same time created the conditions necessary to explain the residual gravity anomalies. Perpetuation of the structural high areas by continuation of shallow-water carbonate sedimentation, during the Cenozoic, gave rise to the relief of the Bahama Banks. It follows that, although the plan distribution of Bahamian platforms *versus* strait and basin areas is structurally controlled, the great relief of the platforms is a function of local upbuilding by carbonate sedimentation in step with regional subsidence.

Tectonic control of the limits of shallow-water carbonate sedimentation is also indicated for various other modern and ancient platforms. The Blake, Campeche, and Great Barrier Reef platform edges all coincide with regional structure features, *i.e.*, zones of transition of continental to oceanic crust. The Devonian Leduc-Rimbey trend of Alberta, Canada, follows the structural grain of Precambrian basement rocks. The relationship of the Permian Central Basin platform to a structurally high block in its foundation is well known from both geophysical and drilling information.

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FLORIDA EMBANKMENT COMPARED WITH MISSISSIPPI EMBAYMENT

On the continent of North America, the Florida embankment and the Mississippi embayment are large areas of thick sedimentation within the Atlantic and Gulf coastal province of post-Paleozonic age.

The Florida embankment occupies an exterior position on a broad continental rise between the deep waters of the Gulf of Mexico and those of the Atlantic Ocean. It has a central axis of thin sediments, a thick column of beds rich in carbonate grains derived from marine sources, and very few beds that were deposited above sea level.

In contrast, the Mississippi embayment occupies a position within the continent between the Ouachita and Appalachian Mountains. It has a central axis of thick sediments, a thick column of beds rich in quartz grains and clay minerals derived from the mountains, any many beds deposited above sea level.

The consequences of these important differences are discussed; also, stratigraphic divisions of the Florida column are presented.

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DIFFUSION AND SETTLING OF SUSPENDED SEDIMENT AT RIVER MOUTHS: A COMPUTER SIMULATION MODEL

A *Fortran IV* computer program has been written for simulating the diffusion and settling of suspended sediment at river mouths. The rate of sediment accumulation at any point in front of the channel mouth is governed by water and sediment discharge, sediment grain-size distribution, sediment density, the porosity of the resulting sediment, width and depth of the river channel, and the geometry of the basin. A plane jet model is used for determining the velocity field and the rates of sediment diffusion. By adjusting the input parameters, a variety of "delta" deposits may be created. The shape and foreset slope of the delta fan are found to be closely controlled by grain size and discharge. By allowing the model to respond dynamically to the buildup of sediment at the channel mouth, a distributary mouth bar and submerged levees can be formed. Delta-simulation experiments are monitored by printing (1) maps showing the rates of sedimentation for each grain size at every point in a digital accounting grid and (2) facies maps using alphabetic symbols. Maps and stratigraphic cross sections are drawn with a digital plotter.

Computer simulation is an important method for sedimentology, and should be used in combination with hydraulic models and direct observations of natural phenomena.

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WHY AND WHITHER GULF COAST ASSOCIATION OF GEOLOGICAL SOCIETIES?

The limitations of four AAPG-sponsored regional meetings held in the Gulf Coast area between 1946–49 resulted in the design of an Association of Geological Societies for two purposes, to hold an annual meeting and to implement a means of rapid publication. GCAGS was founded May 15, 1951 and the first Annual Meeting was held in New Orleans on November 15, 16, and 17, 1951.

A strong wedge of disunity was driven into the Association in its embryonic stage. It was driven ever deeper until about 1957. Since that time the wound has been slowly healing.

The issue has been the question of GCAGS becoming a section of AAPG. The last blow was struck in 1967 with Mike Halbouty wielding the hammer. Mike, representing AAPG, submitted a resolution on March 2, 1967 inviting GCAGS to become a section of AAPG. It was amended by GCAGS, approved by AAPG, and as of this date the invitation has been accepted and approved by a majority of the member societies.

GCAGS officially notified AAPG of its acceptance on July 10, 1967 and the Executive Committee of AAPG has approved. The formality of approval by the Business Committee of AAPG is awaited.

Henceforth it is anticipated the history of GCAGS will be an accumulation of dates and statistics.

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MARINE AND TERRESTRIAL PLIOCENE AND PLEISTOCENE DEPOSITS OF FLORIDA

For the first time fossiliferous marine, estuarine, and terrestrial deposits of peninsular Florida are correlated and are related to topographic terraces. Synthesis of all data reliably proves a middle to late Plio-

cene stand of sea level at 120–140 ft altitude, an Aftonian stand at 90–100 ft, a Yarmouthian stand at 40–70 ft, and a Sangamonian stand at about 25 ft.

The classic exposures of the Fort Thompson and Caloosahatchee Formations on the Caloosahatchee River are the best sections for correlation. Cooke's four marine units in the Plio-Pleistocene sequence are confirmed by detailed tracing of fossiliferous beds, fresh-water marl, and caliche crust related to unconformities. Faunas in the four marine beds show distinct biostratigraphic and paleoecological trends. The ratio of extinct to extant molluscan species indicates a Pliocene age for unit 1 (the lowest marine bed). The presence of Pleistocene land vertebrate remains and the ratio of extinct to extant molluscan species indicate a Pleistocene age for units 2, 3, and 4. For mapping purposes, the lower two units, 1 and 2, are included in the Caloosahatchee Formation. Units 3 and 4 are included in the Fort Thompson Formation. The following bathymetric interpretations were made on the basis of molluscan and foraminiferal faunal assemblages: unit 1—maximum depth 15–20 fm; unit 2—maximum depth 10–15 fm; unit 3—maximum depth 5–10 fm; and unit 4—less than 5 fm.

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SHALE DIAPIRS OF LOWER TEXAS GULF COAST AS TYPIFIED BY NORTH LAWARD DIAPIR

Most geologists who have worked the Oligocene-Frio trend of the Gulf Coast have encountered shale or salt diapirs in their subsurface mapping. Much has been written about salt diapirs or salt domes but little emphasis has been placed on pure shale diapirs.

The purposes of this paper are to acquaint the reader with a typical example of a shale diapir and to point out the possible economic and geologic significance of these features in future exploration for buried lower Frio structures. The North LaWard diapir was chosen because of the large number of wells drilled into the shale stock. This shale diapir has intruded into the lower Frio to a depth approximately 1,100 ft above the base of the Frio Formation. The intrusion appears to have taken place as late as late Frio time and most of the lower Frio reservoirs have been truncated and displaced by the shale. Shale diapirs that have not intruded the lower Frio are believed to have formed many of the lower Frio buried structures such as Una West, Potilla, and Copano fields.

The timing and extent of intrusion by the diapiric shale seem to be critical factors in determining the economic success or failure on these structures.

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WORLD-WIDE EXPLORATION EFFORT AND ITS EFFECT ON GULF COAST GEOLOGIST

(No abstract submitted)

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PALEOCLIMATIC SIGNIFICANCE OF BRYOZOAN METRARABDOTOS

The cheilostome bryozoan genus *Metrarabdotos* occurs abundantly in late Eocene to Recent sediments in the Gulf and Atlantic coastal provinces, the Caribbean region, Europe, and northern and western Africa. The tropical distribution of Recent populations is apparently a consequence of a temperature tolerance of 61° to 82°F. This stenothermy and the distinctive generic morphology of fossil and Recent species provide a basis for identifying tropical faunal provinces on the sublittoral margins of both sides of the Atlantic during late Paleogene and Neogene times.

The northern limit of the genus, congruent in Recent seas with the 70°F. isocryme for surface water, has fluctuated during late Paleogene and Neogene times. The amplitude of latitudinal fluctuation has been 8° in the New World and 34° in Eurafrica. The synchronous latitudinal shifts of this line on both sides of the Atlantic probably reflect variations in Atlantic marine climate. The northern boundary of the genus lay at 31° N. Lat. in the Gulf and Atlantic Coastal Plain and at 40°–48° N. Lat. in Europe from late Paleogene to middle Miocene, at about 26° in America and 28° in Europe in late Miocene, and at its northern maximum of 34° in America and 51° in Europe in the Pliocene; it now lies at 29° in the Gulf of Mexico and at 17° in Africa. The greater amplitude in Eurafrica is probably the result of a surface-current gyre similar to the modern one. The pattern of increasing amplitude of fluctuation does not agree with a paleo-climatic model of cooling from early to late Tertiary time.

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DIAPIRS IN SOUTHWESTERN GULF OF MEXICO

Recent surveys have traced the belt of diapiric structures, first observed in the Sigsbee deep, through the Bay of Campeche to within about 60 mi of the saline basin of southeastern Mexico. This prompts a further examination of the structure of the Gulf of Mexico with particular attention to the possibilities that the diapirs are salt.

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DEPOSITIONAL SYSTEMS IN WILCOX GROUP OF TEXAS AND THEIR RELATIONSHIP TO OIL AND GAS OCCURRENCE

Regional investigation of the lower part of the Wilcox Group in Texas in outcrop and subsurface indicates seven principal depositional systems. These include: (1) Mt. Pleasant fluvial system developed updip and in outcrop north of the Colorado River; (2) Rockdale delta system, present primarily subsurface between the Guadalupe and Sabine River; (3) Pendleton lagoon-bay system in outcrop and subsurface largely on the southern flank of the Sabine uplift; (4) San Marcos strandplain-bay system, found in outcrop and subsurface mainly on the San Marcos arch; (5) Cotulla barrier bar system in subsurface of South Texas; (6) Indio bay-lagoon system developed updip and in outcrop of South Texas; and (7) South Texas shelf system, an extensive system entirely subsurface in South Texas. The Rockdale delta system, consisting of large lobate wedges of mud, sand, and carbonaceous deposits, is the thickest and most extensive of the lower Wilcox depositional systems. It grades updip to the thinner terrigenous facies of the Mt. Pleasant fluvial system Deposits of the Rockdale delta system were the source of sediments redistributed by marine processes and deposited in laterally adjacent marine systems. Delineation of depositional systems and, more specifically, delineation of component facies of the various systems, permit establishment of regional oil and gas trends which show relationship to