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ASSOCIATION ROUND TABLE

24th ANNUAL MEETING GULF COAST ASSOCIATION OF GEOLOGICAL SOCIETIES (GULF COAST SECTION OF AAPG) and SOCIETY OF ECONOMIC PALEONTOLOGISTS AND MINERALOGISTS (GULF COAST SECTION)

Lafayette, Louisiana October 16-18, 1974

KEYNOTE ADDRESS

Morgan J. Davis: The energy crunch is not over

FIELD TRIPS

Field Trip 1. Avery Island Salt Mine, Louisiana: 1-day trip, Saturday, October 19, to observe the interior of the salt dome and structures. Limited to 40 persons. Approximate cost $10.00.

Field Trip 2. A plane flight over the recent sediments of south-central Louisiana, in specific, to view the Atchafalaya basin, Chenier trend, and Five Island salt domes. Three flights per day, limited to 14 persons per trip. Approximate cost $20.00.

Field Trip 3. SEPM-GCAGS Convention Trip—Guatemala Field Trip, October 19-23, 1974.

This trip will be limited to 32 participants. However, some persons may wish to travel as part of our group in order to take advantage of group-rate air fares, yet not be able to attend the field trip itself. We are reserving extra aircraft seats with this in mind.

Archeological part of trip will be to Tikal, largest of the ancient Mayan cities.

Geologic part of trip will be to examine Cretaceous and younger sedimentary rocks of Guatemala City and vicinity, extending into the Motagua fault zone. H. H. Wilson will lead this excursion.

Participants will fly from New Orleans International Airport (Moisont) on Saturday around noon and return about the same time the following Wednesday. All accommodations will be for double occupancy.

It is assumed that some participants will wish to spend vacation time in Guatemala, and air space is reserved for a part of the group to return at the end of two weeks (November 2, 1974). In order to do this and still obtain group rate fares, at least 10 persons must select this option.

Guatemala is a strikingly beautiful country. Prices of rooms and meals are about half of comparable U.S. prices. The capital is a thoroughly modern international city, comparable to Paris, London, or Mexico City. The more remote parts of the country are virtually unchanged from Pre-Columbian times and primitive in the extreme. Climate in the highlands is spring-like all year. The coastal areas (Pacific and Caribbean) are warm and tropical.

Approximate cost to participants is $275.00; for wife (covers only transportation), $125.00.

ABSTRACTS OF PAPERS

ACHAUER, C. W., Atlantic Richfield Co., Dallas, Tex.

Deposition and Diagenesis of James Limestone (Early Cretaceous) in East Texas Basin

Northeast-trending facies of the James Limestone of the East Texas basin reflect three depositional settings. From northwest to southeast they include (1) an area of quartz-sandstone deposition, most of which can be inferred to be of continental origin, (2) a reef and skeletal-oolitic grainstone belt that formed under high-energy conditions in nearshore shallow water, and (3) a broad area of open-marine shelf on which argillaceous lime mudstone and calcareous shales formed under relatively quiet-water conditions.

Three depositional trends and their associated carbonate bodies can be differentiated in the reef and carbonate grainstone belt. One is an east-northeast-trending oolitic grainstone ridge of "dune" which can be mapped for at least 30 mi. A second is marked by northwest trending rudistid-reef complexes, one of which forms a conspicuous salient projecting southeastward from the main grainstone belt (Fairway reef) and another within the main grainstone belt (Quitman reef). The third depositional trend is also in the northwest and is seen as very large skeletal-oolitic grainstone bars separated from one another by channels. The northwest-trending channels, reefs, and oolitic grainstone bars strongly suggest that tidal currents from the ancestral Gulf in the southeast played an important role in the deposition of the James reef and grainstone belt.

Porosity and permeability distribution within the reef and grainstone belt were controlled profoundly by a sequence of three diagenetic events. In the first event, subaerial exposure of the reef and grainstone belt shortly after deposition resulted in the development of solution or moldic porosity and the precipitation of an iron-free calcite cement. Maximum development of solution or moldic porosity is in the thickest reef and oolitic buildups indicating that (a) areas of higher relief played an important role in the gathering and movement of meteoric water, and (b) areas of higher relief contained enough unstable carbonate (probably aragonite) so that the solution by meteoric water was maximized. Although a calcite cement was precipitated during this first diagenetic event, it did not seriously occlude void space and, therefore, did not significantly lower porosity and permeability.

In contrast to the first diagenetic event, a second event of ferroan calcite cementation and a third event of ferroan dolomite cementation resulted in widespread elimination of porosity and permeability, especially in areas between the thickest carbonate buildups and in limited zones within the carbonate buildups. The textural relations of these second and third cements clearly indicate that they were precipitated some time following subaerial exposure and prior to migration of hydrocarbons into the producing reservoirs. However, fundamental problems remain, the foremost of which is the determination of the source, or perhaps sources, of the fluids from which the cements were precipitated.

ALANIZ, R. T., Amoco Production Co., Houston, Tex., and R. H. GOODWIN, Texas Christian Univ., Dept. of Geology, Fort Worth, Tex.

Recent Sediments of Hypersaline Estuarine Bay

Cayo del Grullo is a hypersaline estuarine bay on the south Texas Gulf Coast. Most surficial sediment is mud, with sand predominating around the periphery of the bay. Influx of sediment is small and distribution of the several lithofacies and biofacies within the bay is related directly to the prevailing energy conditions. The mud comes from several sources, from Laguna Madre, from erosion of surrounding Pleistocene bluffs, and from intermittent streams during heavy rains. Organic content of bottom sediments is inversely proportional to grain size. Oolitic aragonitic sands are present in the bay and are more extensive than previously reported. Oolitic grains are precipitated and deposited in the high-energy swash zone. Other carbonate material

in the sediments is primarily pelecypod shell fragments. Concentration of carbonate material is a function of currents and wave activity. A few species of Foraminifera and Ostracoda which can tolerate severe fluctuations of salinity comprise the microfauna.

APPELBAUM, B. S., and A. H. BOUMA, Texas A&M Univ., Dept. of Oceanography, College Station, Tex.

Quartz Microtextures as Indicators of Subaqueous Density Flow

Quartz samples from density flow deposits from the Colombia basin (Caribbean Sea) were analyzed for surficial microtextural associations using the scanning electron microscope. Microtextural abrasion patterns were found to vary in the "A" division of turbidites, grain-flow deposits, debris-flow deposits, and in material resulting from washover on the Magdalena deep-sea fan. The observed microtextural patterns are useful criteria for the identification of the transport mechanisms of other deposits assumed to have resulted from density flows.

Relative distances of travel of contemporaneous turbidites could be ascertained from impact densities on "A" division sand grains. The limiting conditions on such analyses are a minimum of postdepositional alteration of the mechanical textures of the grains and a lack of intense abrasion features received during episodes of predensity-flow transport.

ARDEN, D. J., JR., Geophysical Service Inc., Houston, Tex.

Geology of Suwannee Basin Interpreted from Geophysical Profiles

The Suwannee basin developed in Mesozoic time as a broad syncline on a smoothly eroded Paleozoic terrane. It is in the eastern Gulf Coast area and includes parts of Florida, Alabama, and Georgia. Its axis extends northeasterly from Apalachicola, Florida, into southwestern Georgia.

Deep drilling in the eastern Gulf Coast region has penetrated the Tertiary and Mesozoic section, but wells seldom have extended very deeply into pre-Mesozoic rocks. Geophysical Service Inc. conducted a survey in the Suwannee basin consisting of reflection-seismic profiles plus gravity and magnetic readings. The seismic sections provided the basic framework for a geologic interpretation. Drilling information helped to establish control for the upper part of the sections, and also aided in verifying interval-velocity determinations. Velocity analyses were spaced one mi apart, with about 14 interval determinations at each point. These computations permitted display of the sections in depth as well as time. Models of gravity and magnetic fields were generated by computer programs which permitted comparison of interpreted and observed fields. Thus the geologic interpretation could be altered to test various hypotheses, and refinements continued until data were reconciled.

Our interpretation shows Tertiary and Cretaceous sedimentary rocks lying upon a remarkably smooth unconformity developed across Paleozoic and Triassic rocks. The unconformity dips southward from a depth of 2,560 m near the Alabama-Florida boundary to about 3,600 m near Panama City, Florida. Below the unconformity is a folded and faulted sequence of lower Paleozoic rocks and Triassic continental strata accompanied by volcanic flows or intrusives. Paleozoic rock types appear to include volcanics, quartzite, and a sandstone-shale sequence. Individual structures are large and varied, and include broad anticlines developed above thrust faults. The Paleozoic rocks are correlated with African counterparts, and it is suggested that their hydrocarbon potential warrants further investigation.

BADON, C. L., Department of Earth Sciences, Tulane Univ., New Orleans, La.

Stratigraphic Relations and Petroleum Potential of Smackover-Buckner Sequence (Jurassic), Clarke County, Mississippi

In eastern Mississippi, the upper member of the Smackover Formation and the lower member of the Buckner Formation represent a major regression of the Jurassic shoreline. The upper Smackover carbonate strata were deposited under shallow open-marine conditions, and the vertical sequence indicates progressive shoaling and basinward progradation of environments. The overlying lower member of the Buckner Formation consists of thick units of nodular anhydrite with interbedded dolomite, and is inferred to be the supratidal equivalent of the upper Smackover marine carbonate rocks.

The principal reservoir rocks in the Smackover Formation are oolitic grainstones with primary depositional interparticle porosity. The high-energy oolitic deposits formed by tidal action on shoals which were aligned roughly parallel with the coastline. An understanding of the structural and sedimentologic factors which controlled the location of the oolite shoals is critical to exploration in adjacent areas. The oolitic deposits appear to have built up as a consequence of the intersection of wave base and a gently sloping sea floor, as there is no indication of a controlling shelf break.

Although there is strong evidence of penecontemporaneous growth of salt-cored anticlines during deposition of the upper Smackover sediments, these structures are not thought to be the principal factor in controlling the location of the high-energy shoals.

BEBOUT, D. G., Univ. Texas Bur. Econ. Geology, Austin, Tex.

Early Cretaceous Stuart City Shelf Margin of South Texas: Its Depositional and Diagenetic Environments and Their Relation to Porosity

The Stuart City trend, South Texas, represents a climax biogenic development along the Early Cretaceous (late Aptian, Albian, and early Cenomanian) shelf margin. Landward of this trend, a wide variety of shallow-water shelf carbonate sediments accumulated on a broad, relatively flat platform. Seaward, the entire section consists of dark planktonic foraminifer-bearing argillaceous carbonate sediments. The sediments of the Stuart City trend make up the Stuart City limestone, which attains a total thickness of 2,000 to 2,500 ft. Time-equivalent rocks which crop out in central Texas are the Glen Rose and Edwards Formations. Between 1954 and 1961 many wells ranging in depth from 11,000 to 20,000 ft were drilled with the Stuart City Formation as their final objective. Of the 19 wells from which cores were obtained for this study, 12 were considered gas wells with initial production ranging from 1.5 to 36.5 MMCFGD. Six of these wells still produce gas. Depositional facies and environments and their relation to the diagenesis and porosity development provide a model for further hydrocarbon exploration along the Stuart City and the deeper Sligo trends.

The Stuart City carbonate rocks have been assigned to five major environments of deposition: shelf lagoon, shelf margin, upper shelf slope, lower shelf slope, and open marine. The shelf-lagoon facies include miliolid wackestone, mollusk wackestone, toucasid wackestone, and mollusk-miliolid grainstone. These facies accumulated in generally low-energy condition in water depths from 0 to 20 ft. In contrast, the narrow band of shelf-margin carbonate rocks is made up of coral-caprinid boundstone, requienid boundstone, and rudist grainstone, all of which accumulated in moderate to high-energy conditions and in less than 15 ft of water as a complex of reefs, banks, bars, and islands. Seaward of the shelf margin, the upper shelf-slope environment comprises the caprinid-coral wackestone and coral-stromatoporoid boundstone facies, the lower shelf slope, the intraclast-grainstone, echinoid-packstone, and echinoid-mollusk-wackestone facies. Farther seaward in water depths greater than 60 ft, the open-marine environment is represented by the planktonic-foraminifer wackestone basins.

Porosities in the carbonate rocks of the Stuart City trend are divisible into two main types, those which are fabric related and