SEPM TECHNICAL PROGRAM SUMMARY

THURSDAY AFTERNOON, OCTOBER 24 (Green Room, 2:00 P.M.–5:30 P.M.)

Presiding: BEN PETRUSEK, President, GCS-SEPM; HERBERT ELLIOT, Treasurer, GCS-SEPM; and HUBERT C. SKINNER, Past-President, GCS-SEPM

1. LOUIS DE A. GIMBREDE: *Aturia alabamensis* (Morton) in Jackson beds at Creola Bluff, Montgomery, Louisiana
2. CLYDE H. MOORE, JR.: Factors controlling carbonate sand distribution in shallow shelf environment: illustrated by Texas Cretaceous
3. ROGER JAHNKE: Sinkhole prediction
4. JAMES A. WOLLEBEN: Statistical biostratigraphic correlation and Senonian stratigraphy in West Texas and northeastern Chihuahua, Mexico
5. L. GIFFORD KESSLER II: Palynomorph distribution and depositional environments in Glen Rose Formation (Lower Cretaceous), Somervell County, Texas
6. MURIEL E. HUNTER: Molluscan guide fossils in late Miocene sediments of southern Florida
7. WALTER H. TRENCHARD: Sedimentation and distribution of marine biofacies

FRIDAY MORNING, OCTOBER 25 (Green Room, 9:00 A.M.–12:00 NOON)

Presiding: DAN R. MCGREGOR, Vice-President, GCS-SEPM, and GARRETT BRIGGS, Secretary, GCS-SEPM

8. *C. JOHN MANN, WILLIAM A. THOMAS: Ancient Mississippi River
9. C. JOHN MANN: Illinois basin, Mississippi embayment, and Ouachita orogenic belt
10. JOHN H. BEARD, *JAMES L. LAMB: Lower limit of Pliocene and Pleistocene in Caribbean and Gulf of Mexico

* Speaker.

ABSTRACTS OF PAPERS

(In order of presentation)

LOUIS DE A. GIMBREDE, Univ. of Southwestern Louisiana, Lafayette, La.

Aturia alabamensis (MORTON) IN JACKSON BEDS AT CREOLA BLUFF, MONTGOMERY, LOUISIANA

A single specimen of *Aturia alabamensis* was found in the lower Yazoo Clay or upper Moodys Branch Marl at Creola Bluff on the Red River at Montgomery, Louisiana. Other reports of the presence of this species at various localities in the Gulf Coast region emphasize the anomalous absence of this species from equivalent age beds in the Louisiana-Texas area. The scarcity of this pelagic animal in the above lithologic units suggests possible ecologic implications.

CLYDE H. MOORE, JR., Louisiana State Univ., Baton Rouge, La.

FACTORS CONTROLLING CARBONATE SAND DISTRIBUTION IN SHALLOW SHELF ENVIRONMENT: ILLUSTRATED BY TEXAS CRETACEOUS

Carbonate sandstone bodies, attractive petroleum reservoirs, are present in significant concentrations adjacent to the shelf edge, at the shoreline, and associated with reef development. On the basis of the writer's studies of the Lower Cretaceous carbonate sequences in Texas, this paper outlines conditions whereby significant deposits of carbonate sand can be concentrated in the shallow-shelf environment, an area usually characterized by the deposition of fine-grained carbonate mud and silt.

Three conditions must be met before carbonate sands can be deposited: (1) grains must be available; (2) high energy must be present to winnow the "fines" and concentrate the coarser grains; and (3) high-energy conditions must persist long enough to concentrate the sands. The first condition is easily met because of abundant fossil or biogenic material.

The shallow shelf generally is a low-energy environment, therefore, the problem is to find a situation where high-energy conditions persist long enough to concentrate significant deposits of coarse-grained material.

The most obvious high-energy situation occurs during a marine transgression across the shelf, but Texas Lower Cretaceous sequences indicate that transgressive deposits generally are deeper water, muddy sediments.

In a regressive situation the high-energy zone shifts in front of the zone of concentration toward the shelf edge, allowing previously deposited sands to be preserved. The potential for widespread carbonate sand in the regressive phase is borne out by the presence of widespread, blanket, carbonate sandstones in Lower Cretaceous regressive sequences.

Structural elements within the shelf tend to influence bottom topography for a long time, and positive features become the site of relatively high energy and of the deposition of carbonate sand bodies surrounded by fine-grained carbonate sediments. Structural control of carbonate-sand deposition is illustrated by Lower Cretaceous Fredericksburg linear carbonate sandstone bodies coincident with the San Marcos and Concho arches in Central and West Texas.

ROGER JAHNKE, Mobil Chemical Co., Mulberry, Florida

SINKHOLE PREDICTION

Important sinkhole activity accompanied the spring drought of 1967 in central Florida. Several sinkholes developed in a large subdivision near Bartow, Florida. Mobil Chemical Company, and other phosphate companies in the area cooperated with local officials to make test corings near unaffected houses in an attempt to predict any further sinkhole activity. The writer conducted Mobil's drilling program and found a relation between surface subsidence and large basin-shaped structures on the bedrock surface. Evidence was used to advise homeowners of possible future sinkhole development under their homes.

JAMES A. WOLLEBEN, Louisiana State Univ., New Orleans, La.

STATISTICAL BIOSTRATIGRAPHIC CORRELATION AND SENONIAN STRATIGRAPHY IN WEST TEXAS AND NORTHEASTERN CHIHUAHUA, MEXICO

Upper Cretaceous rocks in West Texas and northeastern Chihuahua, Mexico, are divided into the Ojinaga, San Carlos, and El Picaco Formations.

A quantitative zonation based on morphologic changes in stratigraphically successive *Placenticeras* samples is proposed to supplement the established Upper Cretaceous collignonicerid zonation. The correlation coefficients of eight stratigraphically unrelated samples are compared statistically with the established

Placenticeras evolutionary sequence and time correlations are made.

The results of the biostratigraphic analysis suggest that the Senonian strandline in Presidio and Jeff Davis Counties, Texas, and northeastern Chihuahua shifted southeastward during an extensive marine regression.

L. GIFFORD KESSLER II, Univ. of Texas at Austin, Texas

PALYNOMORPH DISTRIBUTION AND DEPOSITIONAL ENVIRONMENTS IN GLEN ROSE FORMATION (LOWER CRETACEOUS), SOMERVELL COUNTY, TEXAS

The Glen Rose Formation (Lower Cretaceous) contains a microfossil flora which is useful as a paleoecologic tool. Examination of measured sections and three mapped terrigenous-clastic units shows that gymnosperm pollen and dinoflagellate hystrichospheres are useful in diagnosis of subtidal and supratidal conditions if coupled with lithologic evidence. Fern spores and angiosperm pollen were of limited use in paleoenvironmental interpretations.

Percentage-distribution maps of gymnosperm pollen and hystrichospheres for three units in a terrigenous clastic sequence in the Glen Rose of Somervell County show an increase of hystrichospheres and a decrease in gymnosperms toward probable open-water sediments. This suggests that palynomorph number is influenced by distance from source area.

Hystrichosphere morphologic types were found to change with depositional environment. Barb-spined forms commonly were associated with shallow-water open-marine sediments. Straight-spined forms commonly were associated with sediments deposited in shallow brackish-water.

Angiosperms, fern spores, and certain hystrichospheres were not related clearly to depositional environments inferred from lithologic evidence and other palynomorphs. Distribution of these microfossils may be explained by wind- and water-current fluctuations during deposition. Particle characteristics, such as settling velocity and size sorting, also may have influenced their distribution.

MURIEL E. HUNTER, Coastal Petroleum Co., Pinellas Park, Fla.

MOLLUSCAN GUIDE FOSSILS IN LATE MIOCENE SEDIMENTS OF SOUTHERN FLORIDA

Upper and lower members of the Tamiami Formation of late Miocene age are exposed at the surface in southern Florida. Fossiliferous members contain distinctive *Pecten* species, two varieties of *Ecphora*, and other mollusks. A study of the molluscan fauna of these members indicates the presence of at least three concurrent range zones. According to age, with the youngest at the top, these zones are: (1) *Pecten tamiamiensis* zone; (2) *Pecten jeffersonius* zone; and (3) *Pecten santamaria middlesexensis* zone.

This study suggests certain time correlations between formations of southern Florida, northern Florida, and the Atlantic coast.

WALTER H. TRENCHARD, Phillips Petroleum Co., Lafayette, La.

SEDIMENTATION AND DISTRIBUTION OF MARINE BIOFACIES

The rate of sedimentation is considered as a major factor in the distribution of faunal facies. The continental slope is believed to be the site of the greatest accumulation of sediment, but the rate of sedimentation on the slope commonly is low. Although it is nearly impossible to determine the rate of sedimentation in the geologic section, the relative rate of sedimentation generally is easy to establish. Five concepts are needed to interpret the relative rate of sedimentation in the geologic section: (1) Moore's concept (modified): the greater the relative abundance of Foraminifera in sediments, the slower the rate of sedimentation; (2) each facies has its own "normal" rate of sedimentation; (3) given uniform conditions, each facies should be present in belts approximately parallel with the coast; (4) each fossil species is present in a belt along the coast which overlaps or coincides with those of several other species; and (5) population peaks of many species tend to recur in the geologic section whenever and wherever conditions are favorable. The masking of fossil facies resulting from high rates of sedimentation is emphasized.

C. JOHN MANN, Univ. of Illinois, Urbana, Ill., AND WILLIAM A. THOMAS, Birmingham-Southern College, Birmingham, Ala

ANCIENT MISSISSIPPI RIVER

Stratigraphic evidence in the central Mississippi embayment indicates that apparently a stream of major size has occupied continuously the approximate same location as the existing Mississippi River—at least since Late Jurassic time. Significant quantities of deltaic sediments are present in the Smackover Limestone (Late Jurassic) and in most younger units. The stream which has persisted since Jurassic time is referred to here as the "Ancient Mississippi River."

C. JOHN MANN, Univ. of Illinois, Urbana, Ill.

ILLINOIS BASIN, MISSISSIPPI EMBAYMENT, AND OUACHITA OROGENIC BELT

Evidence that the Illinois basin was open toward the south during the Mississippian, the geographical coincidence of a unique Ouachita lithologic province with the Mississippi embayment, the distribution of late Paleozoic sediments, interpreted paleoslopes, and interpreted structural relations suggest that the embayment existed during late Paleozoic time. Further insight into the Ouachita orogenic belt and its relation to the Appalachian belt may be gained if the age of subsidence of the Mississippi embayment and its modification from or to the Ouachita belt can be determined.

JOHN H. BEARD AND JAMES L. LAMB, Esso Production Research Co., Houston, Tex.

LOWER LIMIT OF PLIOCENE AND PLEISTOCENE IN CARIBBEAN AND GULF OF MEXICO

A comparison is made between the late Neogene planktonic foraminiferal biostratigraphy of Italy and the Caribbean and Gulf of Mexico. In both regions the order of stratigraphic appearance of the species *Globorotalia margaritae* (= *G. hirsuta* auct.), *G. aemiliana*, *G. crassacrotonensis*, *G. crassaformis*, *G. tosaensis*, and *G. truncatulinoides* is closely comparable and provides a basis for interregional correlation of the Pliocene and early Pleistocene. The occurrence of *G. margaritae* defines the early Pliocene; the globorotaliid lineage of *G. aemiliana* → *G. crassacrotonensis* → *G. crassaformis* defines the middle Pliocene; and the appearance of *G. tosaensis*, *G. truncatulinoides*,