zones of Gulf of Mexico: DeSoto and Campeche Canyons
24. W. R. BRYANT, CHARLES S. WALLIN: Stability and geotechnical characteristics of marine sediments, Gulf of Mexico

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25. M. MALEK-ASLANI: Habitat of oil in carbonate rocks
26. ED GOODIN: Reintegration: synthesis EDP techniques in geology
27. DUDLEY J. HUGHES: Salt tectonics as related to several Smackover fields along northeast rim of Gulf of Mexico basin
28. HAROLD E. KARGES: Pelahatchie field—Mississippi giant?
29. J. A. HARTMAN: Norphlet sandstone, Pelahatchie field, Rankin County, Mississippi
30. MARVIN L. OXLEY, EDWARD D. MINIHAN: Jurassic geology of Alabama and Florida panhandle
31. RICHARD L. BOWEN: Paleoclimatologic and paleobiologic implications of Louann Salt deposition
32. DEWEY J. BUSHAW: Gulf basin-East Texas shelf-Lower Cretaceous—an environment history
33. OSCAR L. PAULSON, JR.: Relation between interior salt domes and basin morphology

ABSTRACTS OF PAPERS

(In order of presentation)

WILLIAM F. TANNER, Florida State Univ., Tallahassee, Fla.

ORIGIN OF GULF OF MEXICO, II: ADDITIONAL DATA

Paleomagnetic data indicate that North America is now moving northward, and has had a measurable northward component of motion since late in Paleozoic time. The Gulf of Mexico is thought to have formed as a tensional feature in the wake of the continent. Twenty-two lines of supporting evidence include: earthquake-epicenter alignments, first-motion data (still very scanty), new offset information on a major fault, migration rates from paleomagnetic data, a new east-west graben, the apparently tensional nature of features such as the Mexico and Cayman Trenches, Appalachian?-type strata recently described from Mexico, tensional effects in the central Mississippi Valley, tensional indications along the St. Lawrence Valley, long-term subsidence of the Blake Plateau, the tapered shape of the Atlantic coastal plain, diapirism in the coastal plain, and several well-known items such as the general east-west orientation of grabens in, for example, Louisiana and southeastern Mexico.

The rate of north-south widening during Mesozoic and Cenozoic time has been approximately 2 cm/yr. This should have produced a Gulf 1,000–2,000 km wide in the north-south direction.

A time summary of 12 specific deformational events shows that the southeastern part of North America underwent an important change in tectonic style, during the Pennsylvanian-Permian-Triassic interval. The "Paleozoic style" can be described in terms of compression and left-lateral displacement along the southern Appalachian trend; the "Mesozoic-Cenozoic style" can be characterized in terms of north-south tension (and its corollary, right-lateral displacement along the same trend). Part of the difficulty inherent in understanding the tectonic history of the southern and southeastern part of North America arises from this major reversal. The northward migration of the continent in Mesozoic and Cenozoic time appears to have had the second-order result of thinning from east to west. This thinning may have caused a gentle widening (over a period of about 10^8 years) of the North Atlantic basin. The proposed widening was not, however, nearly as great as that envisaged in the Wegener-du Toit hypothesis of continental drift.

H. J. McCUNN, Mobil Oil Corp., Shreveport, La.

A THEORY OF CRUSTAL DEVELOPMENT BASED ON EXPERIMENTAL ANALYSIS OF VERTICAL UPLIFT

By constructing simple model experiments it can be shown that vertical uplift can produce first-order tectonic features similar to those seen in nature. Models of known tectonic features such as the orogen and tensional furrow can be simulated by inflating and deflating a large elongate balloon below layers of clay and lime slurry. Symmetrical and asymmetrical orogens can be simulated as well as simultaneous and migrational orogens. The simultaneous orogen forms as the result of the balloon inflating as a unit along its length. The migrational orogen is formed by the balloon expanding progressively along its length. The migrational expansion causes compressional folds to develop ahead of the expanding front. Drag folds and wrench faults are formed along the flanks.

The first-order tectonic features of known areas can be modeled by using simulated orogens placed in the same relative positions as the naturally occurring features. Some of the areas modeled are the Rocky Mountains, the California system, and the central Western Hemisphere.

Transverse and extension faults can be produced experimentally by vertical uplift. Offsetting uplifts of model orogens produce transverse faults as does differential uplift along the same model orogenic belt. The model transverse and extension faults compare favorably with those observed in nature.

JAMES E. CASE AND W. R. MOORE, Texas A&M Univ., College Station, Tex

GRAVITY ANOMALIES, BASEMENT ROCKS, AND CRUSTAL STRUCTURE, CENTRAL AND SOUTHEAST TEXAS

Regional gravity surveys have been conducted (1) between Bryan-College Station and Austin, Texas, across the margin of the Gulf Coast geosyncline and the buried Ouachita fold belt, and (2) across the northwestern Llano uplift, in the Llano-Mason-San Saba-Brady area. These new gravity data have been incorporated with those previously published in order to construct a regional gravity-anomaly map, contoured at a 5-mgal interval, of a large part of central and southeast Texas.

Gravity anomalies in the Llano region can be interpreted readily in terms of exposed major Precambrian rock units. Characteristic anomaly patterns then can be used to interpret basement lithology where concealed around the periphery of the uplift.

Gravitational effects of the thick wedge of Cenozoic and Mesozoic sedimentary rocks in the Gulf Coast geosyncline were calculated for several different density contrasts; thicknesses were based on extrapolations of regional well data. Similarly, gravitational effects of Paleozoic clastic rocks in the "foreland basin" between the metamorphosed Ouachita facies and the crystalline rocks of the Llano uplift were calculated