red and green clays with thinly bedded sands, assigned to the Frio formation. Two prominent sandstone beds occur in the upper 200 feet of the formation.

The Catahoula is subdivided into three members: Fant, 75 feet; Soledad, 200 feet, and La Chusa, 1,000 feet thick (Thomas L. Bailey, *Univ. Texas Bull. 2645*).

Approximately 200 feet of pinkish chocolate-colored clays with globules of soft limestone overlies the La Chusa tuffs. These clays are distinctly different from Catahoula deposits, and are referred to the Oakville formation, due to their lithologic character and position in section.

The Catahoula and Oakville are overlapped by Lissie or post-Pleistocene conglomerate throughout north and northeastern Starr County.

5. LEE C. SMITH, geologist, Sun Oil Company, Dallas: Oil and Gas Fields of the Rio Grande Valley.

6. EUGENE L. EARL, geologist, Fohs Oil Company, Houston, and F. W. MUELLER, geologist, Skelly Oil Company: The Sam Fordyce Field, Hidalgo and Starr Counties (abstract).

The Sam Fordyce oil and gas field is located in southwest Hidalgo and southeast Starr counties, Texas.

Magnetometer work in 1929 first indicated structure in the area; however, the first well drilled on the anomaly in 1932 was completed as a dry hole.

The discovery well of the field, which was drilled in September, 1923, by the King-Woods Oil Company, was completed in a sand in the basal Frio formation of middle Oligocene age. Subsequent development has proved the accumulation of oil and gas in other sands of the same formation.

The reservoir is a faulted anticline whose major axis trends northwest and southeast along the regional strike. Closure against a major fault on the updip side of the structure accounts for the oil and gas accumulation. The fault has a maximum throw of 880 feet on top of the Sam Fordyce sand, and this sand has 260 feet of producing closure.

Geologically the Sam Fordyce structure is an outstanding example of differential sedimentation during the time of fault movement. A gradual downwarping movement northeast into the Rio Grande embayment caused the thicker sediments which are found on the downthrown side of the major fault.

The productive area of the field embraces 2,000 acres, 900 acres of which are within the oil zone of the Sam Fordyce sand zone. There are 260 acres of oil production in the Wheeler sand zone, and 215 acres in the Barlow.

7. L. B. HERRING, consulting geologist, Corpus Christi: Economics and Evaluation of the Oil and Gas Fields of South Texas.

8. HAROLD M. SMITH, chemist, United States Bureau of Mines, Bartlesville, Oklahoma: Commercial Production of Synthetic Products from Natural Gas.

Presentation of 9 charts showing composition of natural gas and the products obtainable from natural gas production.

9. EUGENE MCDERMOTT, president, Geophysical Service Incorporated, Dallas: Soil Surveys (abstract).

Attention was called to the important rôle that visual oil and gas seeps and mineralization phenomena have played in the location of oil and gas fields throughout the world. A. Beeby Thompson was quoted in part from his

paper entitled "The Economic Value of Surface Petroleum Manifestations," which appeared in the *Proceedings* of the World Petroleum Congress in 1933, as follows.

> An attempt is made in this short paper to show that surface indications of oil are a natural and essential phenomenon connected with oilfields rather than an unusual circumstance, and further that failure to discern such manifestations is either damaging to prospects or a reflection upon our present-day knowledge of detecting signs of the past escape of hydrocarbons.
>
> With the exception of some of the oilfields of the Eastern Mid-continental and Rocky Mountain States of U.S.A., practically all the great oilfields of the world were marked by oil and gas issues near the crests of anticlines or the apices of domes.

George Sawtelle, in a paper entitled "Salt-Dome Statistics" in the A.A.P.G. *Bulletin* of 1936, pointed out that of the 141 salt domes discovered in the Gulf Coast prior to 1936, 75 owed their discovery, in part at least, to the presence of oil or gas seeps or mineralization phenomena. This is a surprisingly large percentage in view of the crude methods of detecting such evidences. Only large gas seeps generally occurring under water could be detected and mineralization measurements depended on the chance location of water wells.

The soil survey method is merely an extension of these older methods in that it makes possible the quantitative measurement of invisible seeps and mineralization phenomena. Furthermore, such measurements may be made at predetermined locations.

Data showing soil surveys in South Texas, West Texas, New Mexico, and Oklahoma were shown. Some interesting theoretical deductions arrived at from the data of soil analysis were dwelt on briefly.

10. W. ARMSTRONG PRICE, consulting geologist, Corpus Christi: Physiographic Mapping of Quaternary Formations in Rio Grande Delta (abstract).

There has been an increasing use of geomorphologic ("physiographic") criteria in the mapping of the Quaternary formations of the northwestern coastal plain of the Gulf of Mexico. Begun by Deussen, the employment of these criteria has been increased and improved by Barton, Doering, Fisk, Howe, R. J. Russell, and the writer. Meanwhile the method has been employed along the North Atlantic coast by Cooke, MacClintock, and others. The last few years has seen a rapid advance in the method through recent studies of deltas using precise topographic data, available for the first time, and by extensive use of soil groupings in the tracing of formation outcrops. Lithologic criteria now fall in second place.

The Rio Grande delta is relatively small and contour maps with one-foot contours and modern soil maps are now available for a strip 30 miles wide across the Texas side of the delta along the Rio Grande. No other Gulf Coast delta is now so thoroughly known. Correlations have been carried from the Rio Grande to the Mississippi delta and to the terraces of the Red and Mississippi. Formations recognized are: Recent, Lake Charles (not present on Rio Grande), Ingleside (two latter replace Beaumont), Lissie, Willis, and the Pliocene Goliad. The Willis is the probable equivalent of the Uvalde and the Reynosa term was brought into use because of calcareous soil-hard-pan deposits (caliche) in the older formations, erroneously grouped into a single formation containing "limestones." The Trowbridge and present U.S.G.S. mappings are entirely replaced.

The coastal plain delta is analyzed and its component parts described.