almost continuous producing area from Keensburg, Wabash County, at the north, to a point 3½ miles southeast of Phillipstown, White County. This single area is approximately 18 miles long and varies in width from ½ mile to more than 2 miles at its widest point in White County. As of January 1, 1942, there were almost 1,000 producing wells in the two fields and the productive area proved by drilling was 7,238 acres.

All of the eight Chester sandstone formations and additional sandstone beds in other Chester formations were found productive in one place or another throughout the area. Considerable lateral variation in thickness and character of the "sands" was indicated by drilling. In many cases it was so great that it made the development of a particular sandstone uncertain from well to well. The lenticular character of producing "sands" resulted in irregular producing areas. The producing areas of the different "sands" may or may not be directly over or under each other. Many wells in the area are producing from more than one "sand."

Distribution of productive areas depends more on sand characteristics than structure in the lower Wabash River area.

62. JED B. MAEBIUS, Gulf Refining Company, Saginaw, Michigan
The Results of the Drilling of a Deep Test near Bay City, Michigan

The Gulf's Bateson No. 1 is located approximately 3 miles northwest of Bay City, Michigan, in CS/2-SE.-SE. Sec. 2, T. 14 N., R. 4 E. It was completed at a total depth of 10,447 feet in the St. Peter sandstone. This is the first well that has penetrated rocks of Silurian and Ordovician age near the center of the Michigan structural basin. The stratigraphy of the formations drilled are described, and correlations are made with other deep wells in the state. Gas was encountered in a dolomitic member near the base of the Salina formation. At this point the well blew out and caught fire, destroying the drilling equipment. An exceptional occurrence of gas, as inclusions in the Salina salt above the producing zone, caused blow-outs and presented many drilling-mud problems. No showings of oil or gas were encountered below the Salina gas zone.

63. L. E. WORKMAN, Illinois State Geological Survey, Urbana, Illinois
TRACY GILLETTE, Illinois State Geological Survey, Urbana, Illinois
Subsurface Stratigraphy of the Kinderhook-New Albany Strata in Illinois

This paper summarizes the subsurface occurrence of the Kinderhook-New Albany succession in Illinois and shows the relationships of the formations and facies from place to place.

A zone of relatively thinner strata extending northeasterly from the Ozark uplift divides the region into two sedimentary provinces. Southeast of this zone the succession is predominantly hard, black New Albany shale capped by the Rockford limestone. Its thickness increases southeasterly to a maximum in Gallatin and Hardin counties. Along the zone of relatively thinner strata the black shale is overlain by gray and greenish shales and siltstones in turn overlain by the Rockford limestone. In a limited area northwest of the zone, as far as Calhoun, Green, Macoupin, and Montgomery counties, the upward succession is the black Grassy Creek shale, the Louisiana limestone, the blue Maple Mill shale and siltstone, and the Chouteau limestone. The Chouteau limestone is shown to be the westerly equivalent of the Rockford limestone.

Farther northwest, as far as the Kinderhook occurs in Illinois, the black shale grades upward through grayish brown into gray and blue shales, succeeded by the English River siltstone, the McCraney limestone, and the Prospect Hill siltstone. The total thickness of these strata reaches a maximum in Hancock County.

There is an erosional unconformity between the Kinderhook and overlying Osage group.

A number of cross sections and isopach maps illustrate correlations and changes in thicknesses and facies of the strata throughout their subsurface occurrence in Illinois.

64. EUGENE L. EARL, Fohs Oil Company, Houston, Texas
FREDERICK W. MUELLER, Skelly Oil Company, Houston, Texas
The Sam Fordyce Field, Hidalgo and Starr Counties, Texas

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, 1932, by King-Woods Oil Company, was completed from 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-southeast along 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 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 is responsible for thicker sediments which are found on the downthrown side of the major fault.

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

65. J. G. CRAWFORD, U. S. Geological Survey, Casper, Wyoming
Oil-Field Waters of the Rocky Mountain Area
Relationship of Water to the Accumulation of Oil and Gas in the Rocky Mountain Region

66. N. W. BASS, U. S. Geological Survey, Washington, D. C.
HAROLD M. SMITH, U. S. Bureau of Mines, Bartlesville, Oklahoma
Geologic Relationship of Crude Oil in the Tow Creek, Wilson Creek, Iles, and Moffat Fields, Colorado

A comparison of the composition of crude oils from six zones ranging in age from Jurassic to Cretaceous in the Tow Creek, Wilson Creek, Iles, and Moffat fields, and oil from a seep at Tow Creek, Colorado, shows that, except at Wilson Creek, the oil in each pool is unlike the oil in all other pools of these fields, whether at the same or a different stratigraphic position. In the Wilson Creek field the oil from the Sundance formation is similar to the oil from the overlying Morrison formation. These facts may indicate that, except at Wilson Creek, the source of the oil of each pool was local to that pool; or the data may indicate that the oil of the several pools was at one time similar and was affected differently during the folding and faulting that formed the domes and anticlines. The oil in the Morrison formation at Wilson Creek may have migrated upward from the Sundance formation. The oil in the north Tow Creek pool and the oil in the seep at Tow Creek may have been altered by an intrusive body that occupies a large area in the north part of the Tow Creek anticline. On the other hand, the differences between the oils near the intrusive body are no greater than between oils in a region in Oklahoma containing no intrusive bodies, which has been investigated recently by the research committee of the Tulsa Geological Society.

67. KENNETH G. BRILL, JR., University of Chattanooga, Chattanooga, Tennessee
Late Paleozoic Stratigraphy of the Gore Area, Colorado

The area is located in Eagle and Summit counties in west-central Colorado. Two new late-Paleozoic formational names are proposed. In the area the name Battle Mountain formation is given for the clastics which were originally assigned to the Weber shale, Weber grit, and Maroon formation. The Belden shale member of this same formation is proposed to include the lower dark shale originally called the Weber shale. Much of the Battle Mountain formation is found to be of Des Moines age. The name State Bridge formation (of Donner) is applied to the red siltstones and shales which lie between the Battle Mountain formation and the Triassic sediments. These beds may be either Pennsylvanian or Permian in age. At least a part of the gypsum of the Eagle Basin is shown to belong in the Des Moines series.

68. HORACE D. THOMAS, University of Wyoming, Laramie, Wyoming
MAX L. KRUEGER, Union Oil Company, Los Angeles, California
Late Paleozoic and Early Mesozoic Stratigraphy of the Uinta Mountains, Utah

At the western end of the Uinta Mountains Triassic rocks rest unconformably on the Permian Park City formation. From the base upward the Triassic formations are (1) red Woodside shale, (2) marine Thaynes limestone, and (3) Ankareh redbeds. The Ankareh is overlain by the Jurassic Nugget (Navajo) sandstone. The Thaynes tongues out eastward, and east of its edge the Woodside and the Ankareh can not be differentiated.

At the eastern end of the mountains Woodside redbeds rest on the Pennsylvanian