

greater primary and secondary recovery of oil. The information cementation yields concerning the periods of folding and oil accumulation is brought out.

In conclusion, the physical properties of the Bethel sandstone are compared with other sands of the Chester series, and insofar as possible the detailed data from the Bethel is applied to the other sand zones. The paleogeography and source of sediments are likewise discussed.

59. R. P. GRANT, Department of Conservation, State of Michigan, Lansing, Michigan
Oil and Gas Developments in Michigan During 1941

During 1941 the "Basin" was the most active district in Michigan due chiefly to development in the Reed City, Detroit River (Devonian) field in western Osceola County, the Headquarters Traverse (Devonian) field in southern Roscommon County, and extensive development of Michigan "Stray" ("Mississippian") gas fields in Osceola, Missaukee, and Clare counties.

Ten new oil fields and extensions and six new gas fields were discovered during the year, with the "Basin" taking the limelight insofar as new developments were concerned. The most important oil strike in southwestern Michigan was the West Hopkins Traverse (Devonian) field in Allegan County. Actual oil production dropped approximately 17 per cent below 1940.

More gas wells were drilled in 1941 than in any year since 1936. Actual gas production reached an all time high with 6 per cent increase over 1940. The Gulf Oil Company's Bateson No. 1 in the Kawkawlin field in Bay County was drilled to a depth of 10,445 feet into the St. Peter (Ordovician) sandstone, but was plugged back to 7,800 feet and kept as a condensate well. Late in December a gas well was discovered in Calhoun County in the Traverse (Devonian) limestone, opening an entirely new area to development.

The Panhandle and Eastern Pipeline Company began construction of a gas transmission line approximately 250 miles long. The line will run from the Michigan Gas transmission line in the southeastern corner of Lenawee County northward to Pleasant Lake in Washtenaw County. One branch will be laid west to Kalamazoo, the other will extend north to Flint and Saginaw. Construction started at Saginaw and the line is expected to be completed during 1942.

Geophysical prospecting and core testing were carried on at a brisk rate particularly in the northern and south-central parts of the Southern Peninsula.

60. ALFRED H. BELL, Illinois State Geological Survey, Urbana, Illinois
Development in the Eastern Interior Basin in 1941

More wells were drilled in 1941 in Illinois and southwestern Indiana than in any previous year except 1907 when drilling reached a peak in that area. Drilling declined in western Kentucky, making the total number of completions in the Eastern Interior basin in 1941 slightly less than in 1940. Much of the 1941 drilling (both pool and wild-cat) was concentrated in the deep basin area in the region of the lower Wabash River in Illinois and Indiana where 44 new pools and 43 extensions were discovered. None of the new pools was of major size and the total output of new wells in the whole area failed to offset the decline of the older wells. Total production from the Eastern Interior basin in 1941 is estimated at 145,603,000 barrels as compared with 154,796,000 barrels in 1940, a decline of 6 per cent. Percentage of the national total was 10.3 in 1941 as compared with 11.5 in 1940.

Rocks of the Mississippian system continue to yield most of the oil in the area—91.5 per cent of the Illinois total of 133,750,000 barrels in 1941. No new Devonian production was discovered in Illinois in 1941 and the Devonian wells, which yielded an estimated 26 per cent of the Illinois total in 1940, produced only 6 per cent of the total in 1941. Pennsylvanian and Ordovician strata yielded estimated amounts of 1.7 and 0.9 per cent, respectively. Geologic studies indicate that lenticular sand conditions are important in controlling the occurrence of the oil.

61. GEORGE V. COHEE, Illinois State Geological Survey, Urbana, Illinois
Lateral Variation in the Chester Sandstones Producing Oil and Gas in the Lower Wabash River Area

Oil and gas production in the Wabash River Valley in southeastern Illinois and southwestern Indiana is from lower Pennsylvanian and Chester sandstones and the McClosky limestone of the Ste. Genevieve formation. The principal fields in the area are New Harmony Consolidated and Keensburg Consolidated. These fields include an

almost continuous producing area from Keensburg, Wabash County, at the north, to a point $3\frac{1}{2}$ miles southeast of Phillipstown, White County. This single area is approximately 18 miles long and varies in width from $\frac{1}{2}$ 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