

7. J. V. HOWELL, consulting geologist, Tulsa, Oklahoma, "Benton Pool, Franklin County, Illinois."

The Benton pool was opened in January, 1941, and developed so rapidly that practically the entire area was drilled by the end of the year. Oil is produced from the Tar Springs sandstone at 2,000-2,100 feet. Accumulation is controlled by a northward-trending anticline with limited closure, but with abrupt graduation of sand to shale at the south, or critical side. Effective sand thickness is as great as 62 feet and the average for the field is 42 feet. Deeper sands have not been tested.

To June 1, 1947, the field had produced 18,656,892 barrels, and for the month produced 2,123 barrels per day. Two hundred forty-two producing wells were completed, of which three have been plugged. The recovery to date has been slightly more than 77,000 barrels per well for each productive well drilled.

Most of the wells have been drilled through abandoned, active, and projected coal mines, and the special methods used are discussed, as well as the history of discovery, reservoir conditions, and sand conditions.

8. J. PETER SMITH, Carter Oil Company, Carmi, Illinois, "Pressure-Maintenance Problems in Dix Pool, Illinois."

The Dix pool, in northwest Jefferson County, Illinois, produces chiefly from the Bethel sand. From its discovery in early 1938 until the middle of 1945, bottom-hole pressures were kept above reservoir-saturation pressure. Because of the influence of Bethel production in the Boyd pool discovered in the summer of 1944 and located 2 miles southwest of Dix, the bottom-hole pressures at Dix began to approach the reservoir-saturation pressure.

Since it was not advisable to restrict production to a point that would maintain satisfactory pressure, a program for the drilling of water-injection wells for the purpose of pressure maintenance is now underway at Dix.

9. C. DON, Schlumberger Well Surveying Corporation, Mattoon, Illinois, "Geology of Mattoon Field, Illinois."

The interesting features of the Mattoon field are: (1) the history of its discovery; (2) the dual-completion methods used; and (3) the very lenticular condition of its sands.

1. The Mattoon anticline in Coles County—180 miles south of Chicago—was generally known in 1937. The first well, drilled in 1939, made a total of 132 barrels. In 1940, four more wells, with only one producer (the discovery well), had practically condemned exploitation in spite of the verification of the structure. Three years later a small well extended the potential field and was followed by a series of mediocre wells.

In 1945, or five years after the discovery well was completed, an independent operator completed a 100-barrel well, $\frac{3}{4}$ mile from the discovery, renewing the general interest. A boom soon developed when a well was completed, producing 1,200 barrels. Rapid extensions defined a potential area of 7,000 acres, a major field.

2. Wells in the two main shallow producing sands, less than 2,000 feet deep, soon were dually completed with successful results. The Cypress sandstone, with as much as 40 feet of saturation, produced with the more commonly developed Rosiclare sand and sandy limestone. A 7-inch oil string was set on the top of the lower sand with aluminum pipe opposite the Cypress sand. Both sands were shot with nitroglycerine, tested individually by setting a temporary, drillable plug, and produced together.

Wells are drilled to 2,000 feet in 7 days, with two rock bits and four retips. However, the dual completion takes 20 days of spudder time. Average total cost of single completion is \$15,000. The dual method increases the cost to \$18,000.

Electric logs were made on all wells and gave good quantitative results. One problem could not be solved by electric logs: differentiation between gas and oil in the Cypress. However, a gas-oil level was determined by drill-stem tests on the crest of the structure.

Within 14 months 114 wells had been drilled, of which 22 were dry holes and 92 were producers, with an average initial production of 148 barrels. Peak production was reached in June, 1946, with 15,500 barrels daily. Steady decline was experienced during the next 12 months, and in June, 1947, the daily production was down to 5,500 barrels daily. Total recovery from 5,500 producing acres is estimated at 17 million barrels.

3. Detailed electrical-log cross sections are presented to show the extremely lenticular condition of the sands. A considerable area on the top of the structure remains undrilled. A gas cap in the upper Cypress sand has not been exploited. The west part of the City of Mattoon also remains undrilled due to communization problems, in spite of its potential productivity.

The Aux Vases sand was found extremely shaly, excepting the southwest part of the field. Its development, estimated at only 50 acres, will produce approximately 6,000 barrels.

Six Devonian wells on the structure have produced only 1,100 barrels of oil. However, potential production from the Devonian can not be ignored at this time.

The total accumulated production of the Mattoon field on September 1, 1947, is 6,280,000 barrels.