

RECENT DEVELOPMENTS IN OIL AND GAS IN ILLINOIS¹

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In the week ending March 16, Illinois passed Oklahoma in daily production of crude oil for third place among the oil producing states of the nation. The daily average production for Illinois that week was approximately 456,000 barrels which represents peak of daily production for the State up to that time (fig. 1). In 1939 Illinois produced 94,302,000 barrels of oil. This is approximately three times the amount of oil produced at the peak in 1908 when development in the southeastern Illinois field was at its height (fig. 2). For the first three months in 1940 the State's production was 36,531,000 barrels, and production for 1940 is estimated to be 145,000,000 barrels.

On the basis of posted prices the total value of the oil produced in 1939 was \$94,835,500. Of this amount it is estimated that \$11,843,000 was paid to the land and royalty owners as the customary one eighth royalty income from the oil produced. In addition, \$3,650,000 is paid annually in rentals to the landowners for land leased for oil exploration and development. This additional income to the residents of the State is reflected in retail sales tax collection from the counties having oil production where it has increased more than 100 per cent in three years. In these counties the sales of new automobiles are up 85 per cent, bank deposits have increased 50 per cent, and bank loans only 15 per cent.

The accompanying chart (fig. 3) shows the cumulative production and proved reserves by states as of December 31, 1939. Table 1 includes figures accompanying the chart. It is of particular interest to note that Illinois was eighth in cumulative production to the end of 1939. However, at the present time it ranks seventh. Texas has produced more than six billion barrels of oil which is approximately one-sixth of the world's production and has a proved reserve of almost 10 billion barrels. California is second in cumulative production and has produced almost five and one half billion barrels of oil and has a future reserve of

more than three and one half billion barrels. Oklahoma, ranking third in cumulative production has produced more than four and one half billion barrels of oil and has a reserve of slightly more than one billion barrels. The total cumulative production for Illinois, which has produced oil since 1904, is

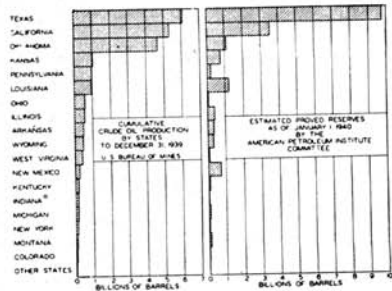
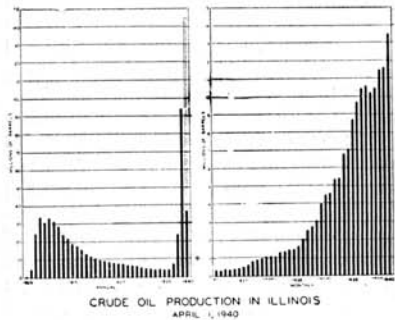
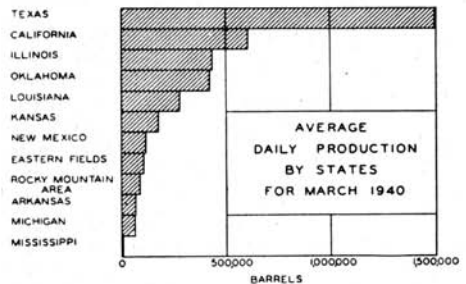


Fig. 1 (top), fig. 2 (middle), fig. 3 (bottom)

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more than a half billion barrels of oil and there is in the State a reserve of more than 381 million barrels for future production. The estimated proved reserves of approximately eighteen and one half billion barrels in the United States are 82.5 per cent of the total amount of oil so far produced in this country. During 1939 the nation's total oil production was slightly more than one and one quarter billion barrels. At this rate of production our known reserves should last approximately fifteen years. Further discoveries of new fields and exploration of other producing strata in the known fields will however increase our known reserves and extend the period of oil production in the nation.

From January 1, 1937 to April 2, 1940, 60 new fields were discovered in Illinois; three of these have been abandoned. All of the new fields are in the southern part of the State, where the Chester series is present (fig. 4). Approximately the same area was designated by Dr. A. H. Bell of the Survey in 1930 as having the best possibilities for oil production in the State. There were 5,686 oil wells and 43 gas wells in the new fields as of April 2, 1940. During 1939, 3,675 wells were completed in Illinois, 2,946 produced oil, 24 produced gas, and 705 were dry holes. In 1939 a total of 7,521,986 feet of hole was drilled in the State. Of this amount 6,079,423 feet was drilled in producing wells. Assuming an average cost of \$3.00 per foot the total investment in drilling was \$22,565,958. This includes both producing wells and dry holes. The average depth of all wells drilled in the State in 1939 was 2,026 feet.

In Illinois the total wildcat footage drilled was 1,036,111 feet which is approximately one eighth of the wildcat footage drilled in the United States in 1939.²

After the discovery of Devonian production in the old Sandoval pool in western Marion County, which had produced from the Bethel sandstone of the Chester series for a number of years, the Devonian limestone was tested in the Salem, Centralia, and Bartelso pools where it was found to be productive. Devonian development in these pools was rapid, and on April 23 there were 374 wells producing from this formation in Clinton

and Marion counties. This development has caused considerable interest in the Devonian possibilities in new and old fields where the formation has not yet been tested.

Production in the Devonian limestone is obtained from a porous dolomite zone which occurs at a short distance below the top of the limestone. In the Salem field the producing zone averages 30 feet in thickness and is encountered from 50 to 55 feet below the top of the limestone which is reached at an average depth of approximately 3,330 feet. As the producing zone is very porous with some cavities as large in diameter as a lead pencil, the wells have large initial production but decline rapidly. One of the early Devonian wells in the Centralia field which had an initial production of approximately 800 barrels daily had declined to 40 barrels daily in two months. During that time it had produced 35,000 barrels of oil. The average cost of drilling and equipping a well to the Devonian in the Centralia field is estimated to be \$18,000 and in the Salem field from \$25,000 to \$30,000.

There is also much interest in the possibilities of production from the "Trenton" limestone in various fields. A well is being drilled to this formation in the Centralia field. The "Trenton" limestone is productive in the Dupo field in St. Clair County, in the Westfield pool in Clark County, and is expected to be productive on large structures in the Illinois basin provided that the limestone is porous.

The Carter Oil Company recently drilled a well to the St. Peter sandstone, encountered at a depth of 4,710 feet, on a seismograph structure south of Mattoon, Illinois, and obtained a show of oil in the Glenwood sandstone that overlies St. Peter sandstone. The Glenwood formation at this locality is interbedded shale, sandstone, and sandy dolomite. The St. Peter sandstone penetrated in the well is typically friable and medium grained. It is of interest to note a petroleum residue was found in drill cuttings from the Glenwood formation in wells drilled in Bond, Ford, Bureau and Perry counties.

This show of oil in the Glenwood formation will no doubt add to the interest in drilling to the Glenwood and St.

²Lahee, F. H., Wildcat Drilling Activity, page 11.

1939, Oil and Gas Journal April 11, 1940,

Peter sandstones on known structures in Illinois. The St. Peter sandstone was tested by the Pure Oil Company in the Cisne field in Wayne County but no commercial production was reported below the McClosky sand.

In view of the interest in the deeper

possibilities in the Illinois basin, it is expected that a number of deep tests will be started in the near future. The following table lists the depths from the top of the Lower Mississippian to the top of the St. Peter formation in various areas in southern Illinois:

Field and Co.	Bartelo field Clinton County	Centralia field Clinton, Marion Counties	Salem field Marion County	Mattoon field Coles County	Cisne field Wayne County	T. 4 N., R. 12 W. Lawrence County
Top Lower Mississippian limestone.....	1280	1510	1870	1980	3100	1690
Top Devonian limestone.....	2420	2860	3330	3170	4900	2965
Top "Trenton" limestone.....	3440*	4000*	4280*	4060	6300	4370
Top St. Peter sandstone.....	4130*	4730*	5080*	4710	7100	5185**

* Estimated.

** The Glenwood sandstone overlying the St. Peter sandstone in this well is 70 feet thick.

TABLE 1.—PRODUCTION OF OIL AND ESTIMATED PROVED RESERVES IN PRINCIPAL PRODUCING STATES 1939

	Cumulative production in thousands of bbls. as of Dec. 31, 1939 ¹	Estimated proved reserves as of Jan. 1, 1940 in thousands of bbls. ²
Texas.....	6,087,361	9,768,371
California.....	5,346,197	3,532,342
Oklahoma.....	4,650,006	1,063,152
Kansas.....	1,054,337	725,467
Pennsylvania.....	979,670	183,123
Louisiana.....	956,232	1,173,225
Ohio.....	585,218	31,692
Illinois.....	551,269	381,636
Arkansas.....	480,444	320,148
Wyoming.....	475,212	305,616
West Virginia.....	407,326	45,888
New Mexico.....	235,316	687,168
Kentucky.....	161,933	44,086
Indiana.....	125,838	14,164
Michigan.....	125,156	51,078
New York.....	113,778	35,392
Montana.....	76,726	93,460
Colorado.....	38,257	20,162
Other states*.....	1,121	6,842
Total.....	22,451,397	18,483,012

* Mississippi, Missouri, Tennessee, Utah, Nebraska.

¹ U. S. Bureau of Mines.

² American Petroleum Institute Committee on Petroleum Reserves estimates.

Natural gas was marketed from two fields in Illinois during 1939: the Russellville gas field in Lawrence County which produced approximately 964 million cubic feet of gas, and the Ayers gas field in Bond County which produced slightly more than 13.5 million cubic feet. A considerable quantity of natural gas is produced with the oil in the new fields, but it is not marketed.

It was estimated recently that 250 million cubic feet of gas was being produced daily in the Salem field, Marion County;

100 million in the Storms field, White County; and 30 million in the Loudon field, Fayette County. Possibly another 70 million cubic feet of gas is being produced in the other new fields making a total daily production of gas in Illinois of approximately 450 million cu. ft. A small portion of the gas is being used for repressuring purposes, drilling, operation of powers, and local heating and lighting. The remainder of the gas is burned in flares.

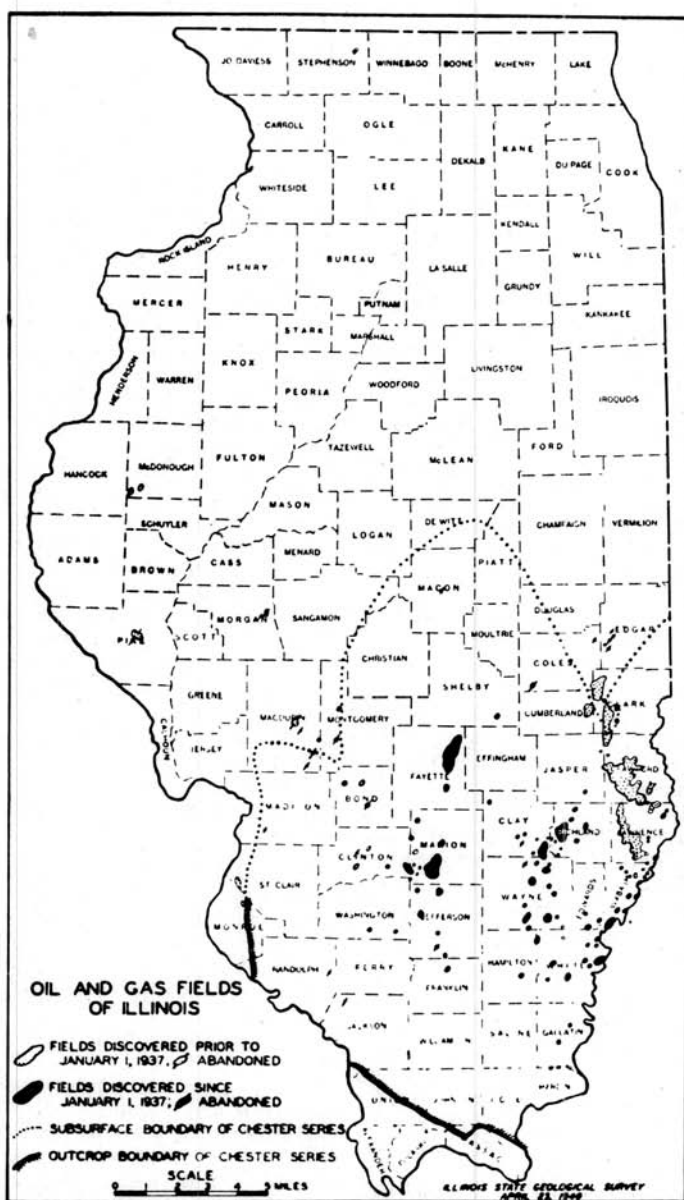


Fig. 4.

ACKNOWLEDGMENTS

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