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BULLETIN 75

OIL AND GAS DEVELOPMENTS IN KANSAS DURING 1947

By

W. A. VER WIEBE, G. E. ABERNATHY, J. M. JEWETT,
and E. K. NIXON

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OIL AND GAS DEVELOPMENTS IN KANSAS DURING 1947

By

W. A. Ver Wiebe, G. E. Abernathy, J. M. Jewett, and E. K. Nixon

ABSTRACT

Kansas oil production in 1947 totaled 103,916,169 barrels, which was 7.5 percent more than the 1946 production, and within 3 million barrels of the record set in the war year, 1943.

In value, the 1947 output increased to $200,000,000 from $139,000,000 in the preceding year.

Natural gas production in Kansas reached an all-time high of 183 billion cubic feet; the Hugoton field produced 140 billion cubic feet or 75 percent of this amount.

In 1947, 2,619 tests drilled for oil or gas were recorded in the State. These were located in 51 counties, excluding 19 eastern Kansas counties for which records were inadequate. Of the recorded completions, 1,296 were oil wells, 417 were gas wells, and 907 were dry holes; 216 of the dry holes were wildcats. Counting eastern Kansas counties, probably 3,000 tests were drilled for oil or gas in the State during 1947. The number of recorded well completions was 60 percent larger in 1947 than in 1946. In the Hugoton field 382 gas wells were completed to make a total of 1,256 gas wells in the field at the end of 1947. The number of gas wells drilled in 1947 was 33 percent greater than in 1946.

Barton, with a production of 17.5 million barrels, was the largest oil producer among the counties. Russell County ranked second, with a production of 15.1 million barrels. The Trapp pool of Barton and Russell Counties was the top-ranking pool in the State with a production of 11.3 million barrels of oil in 1947. The Kraft-Prusa, Bemis-Shutts, and Silica pools were second, third, and fourth, respectively.

Secondary oil recovery is increasing rapidly in importance in Kansas. A table shows 144 such operations including more than 2,000 producing wells at the end of 1947.

INTRODUCTION

In issuing this report, the Kansas Geological Survey has departed somewhat from previous custom. For several years, a report on exploration for oil and gas in western Kansas has been issued annually. The last is Bulletin 68 by W. A. Ver Wiebe (1947). Developments in eastern Kansas have been covered by

a summary report, Bulletin 57, "Oil and Gas in Eastern Kansas" issued in 1945.

This is the first report of recent years that has shown annual oil production from individual pools or producing areas in eastern Kansas. Heretofore, counties have been treated as the smallest production unit in the eastern part of the State (Jewett and Abernathy, 1945) but it is believed that designation of pool production adds to the usefulness of the report. Production figures by pools in eastern Kansas were possible because of a program initiated by G. E. Abernathy and carried out by J. M. Jewett and Christine Notari.

Oil and gas activities have increased well beyond expectation both in western and in eastern Kansas since the end of the war in 1945. This has been due largely to increased prices resulting from increased demand for oil and gas. The shallower oil and gas fields of eastern Kansas, some of which have been idle or nearly so for many years, have recently been reconsidered by oil operators. Several of these fields are being redrilled for deeper oil sands and some have become active again under programs of secondary recovery by water flooding.

Drilling in the more active oil-producing counties of western Kansas, such as Russell, Ellis, and Rooks Counties, and in the more likely prospective areas, such as Graham County, was increased markedly during 1947. Similarly, in the Hugoton gas field of southwestern Kansas, drilling in 1947 increased about one-third over 1946, and definite plans for building a by-product plant of far-reaching significance to utilize natural gas from the Hugoton field were announced by a major company.

In view of the new developments and of the increased importance of petroleum in the economy of Kansas, the State Geological Survey this year is publishing a petroleum industries map of Kansas in colors, and also enlarging this bulletin, the Survey's annual report on oil and gas, to cover developments not only in western Kansas but also over the entire State.

Figure 1 is an index map of the State showing in a very general way the areas within which there is production of oil or gas or both. Obviously, the boundaries are not precise. Only a small fraction of the oil and gas area is actually in production, because there are broad areas of barren country between the pools. However, the map is useful to show county relations, and also to convey

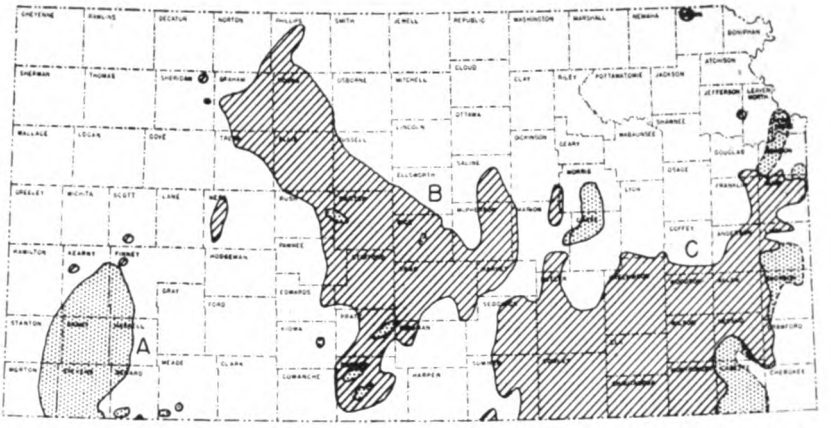

FIG. 1.—Index map of Kansas showing oil and gas producing areas. A, Hugoton gas field; B, essentially oil; C, oil and local shallow gas.

to the reader both the location of the oil country and an idea of what a large percentage of the State may be called "oil and gas territory."

Production.—Production of both oil and gas in the State during 1947 increased substantially as compared with 1946, according to figures supplied both by the State Corporation Commission in Wichita and by the U.S. Bureau of Mines. These sources do not agree precisely, but the differences are not large. Table 1 gives a comparison between amount and value of oil and gas produced during 1946 and 1947.

The increase of 35 percent in value of oil and natural gas in 1947 from the preceding year is due mainly to the increased price,

TABLE 1.—*Petroleum production and value in 1946 and 1947*

	Oil			Natural Gas			Year Total	
	Bbls. produced	Value	Percent increase	M cu. ft. produced	Value	Percent increase	Value	Percent increase
1946	97,218,000[1]	138,800,000[3]		164,000,000[3]	55,760,000[3]		194,560,000	
1947	103,916,169[2]	200,080,434[4]	44	183,527,266[2]	62,400,000[4]	12	262,480,434	35

[1] As given by both the Kansas Corporation Commission and the U.S. Bureau of Mines.
[2] As given by the Kansas Corporation Commission.
[3] As given by U.S. Bureau of Mines (Preprint of 1946 Minerals Yearbook).
[4] Calculated at same unit value as used by U.S. Bureau of Mines in 1946 and subject to later revision.

TABLE 2.—*Summary of oil produced, imported, used, and exported in 1947**

	Barrels of oil
Produced	103,916,167
Imported	13,162,705
Total	117,078,874
Exported	52,111,269
Refined and used in Kansas	64,967,605

* Figures supplied by Kansas Corporation Commission.

especially for oil. The price of Kansas crude was raised three times during 1947. The upward trend of both production and price during the early part of 1948 indicates that the total value of oil and gas produced in Kansas for 1948 will well exceed $300,000,000.

Salient figures covering the State's oil production in 1947 are shown in Table 2.

During 1947, Barton County was first in oil production in the State with a total of 17.5 million barrels. Russell County was second with a production of 15.1 million barrels, and Ellis and Rice Counties were nearly tied for third place with 11.7 and 11.5 million barrels, respectively. Butler County, the stand by of eastern Kansas, followed with a production of 5.6 million barrels of oil in 1947.

The so-called eastern Kansas Counties (Dickinson, Marion, Butler, Cowley, and all counties to the east) produced 16 percent of the State's oil in 1947. Table 3 gives the oil and gas production of the State by counties.

Figures on Kansas gas production were furnished by the State Corporation Commission. They show substantial increases from

TABLE 3.—*Oil and gas production in Kansas during 1947, by counties*

COUNTY	Oil, bbls.	Gas, M cu. ft.
Allen	284,240	*
Anderson	325,288	
Barber	1,185,650	18,720,177
Barton	17,540,101	5,464,413
Bourbon	31,660	
Brown	9,631	
Butler	5,613,704	
Chase	included with Greenwood County	
Chautauqua	830,535	
Coffey	12,970	

Cowley	2,647,860	
Crawford	60,792	
Dickinson	32,190	
Douglas	5,110**	
Edwards		921,521
Elk	239,975	
Ellis	11,696,661	
Ellsworth	4,702,823	
Finney	192,424	
Hugoton gas field		140,839,734
Franklin	188,185	
Graham	1,655,876	
Grant		included with Hugoton
Greenwood	4,129,418	
Hamilton		included with Hugoton
Harvey	232,056	266,695
Haskell		included with Hugoton
Jefferson	120,902	
Kearny	40,374	included with Hugoton
Kingman	166,258	430,799
Labette	6,958	
Leavenworth	2,795	
Linn	73,163	
Lyon	135,480	
Marion	506,442	
McPherson	4,821,421	619,857
Miami	290,806	
Montgomery	890,426	
Morris	390	
Morton		included with Hugoton
Neosho	35,158	
Ness	239,854	
Norton	15,163	
Pawnee	404,626	2,839,573
Phillips	1,894,238	
Pratt	2,911,933	2,299,902
Reno	2,622,755	3,400,629
Rice	11,528,761	474,665
Rooks	2,506,085	
Rush	496,428	2,237,925
Russell	15,153,795	
Saline	336,161	
Scott	79,892	
Sedgwick	629,619	
Seward	5,905	1,049,363***
Sheridan	371,187	
Stafford	5,340,888	1,154,593
Stanton		included with Hugoton
Stevens		included with Hugoton
Sumner	1,171,718	
Trego	87,699	
Wilson	77,281	
Woodson	404,026	

* Figures on gas productions in this and other eastern Kansas counties are not available.

** Approximate.

*** This figure covers gas not produced in Hugoton field. The total production of Hugoton field is not segregated as to counties.

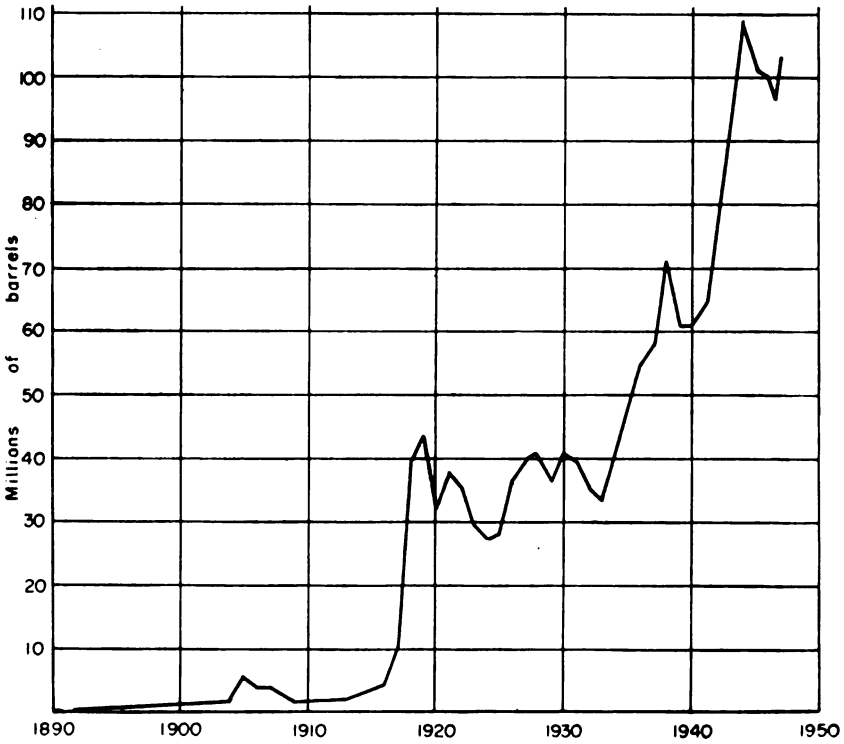

FIG. 2.—Annual oil production in Kansas from 1890 to 1947.

most areas. The Hugoton field, producing 140 billion cubic feet of gas in 1947, supplied 75 percent of the State's gas. Gas production by pools is shown in Table 4.

The Trapp pool in Barton and Russell Counties having a production of 11.3 million barrels of oil in 1947, produced almost twice as much as any other pool. The Kraft-Prusa, Bemis-Shutts, and Silica pools were second, third, and fourth, respectively, total production ranging from 6.4 to 5.1 million barrels. Table 5 shows the 10 Kansas oil pools having the greatest total production since discovery, and Table 6 shows the 10 pools having the highest production during 1947.

For the first time, production figures for the oil industry in Kansas have been broken down in Table 3 to show the individual output of the counties in western as well as eastern Kansas. This has been difficult because pools cross county boundaries and be-

TABLE 4.— *Kansas natural gas production in 1946 and 1947*
(From records of the Conservation Division, Kansas Corporation Commission)

FIELD	1946 M cu. ft.	1947 M cu. ft.
Aetna	115,472	141,026
Alden	374,308	39,352
Belpre	672,283	921,521
Burrton	1,199,217	2,809,205
Cairo	58,101	92,607
Carmi	28,258	38,185
Chitwood	981,838	529,717
Clara		276,094
Cunningham (Arbuckle)	206,397	178,670
Cunningham (Viola)	2,314,480	1,891,522
Deerhead	890,850	750,149
Eastern Kansas, miscellaneous*	1,750,000	2,148,566
Eberhard		254,459
Haferman		100,695
Hugoton	106,872,109	140,839,734
Krier (Kraft-Prusa)	4,411	37,587
Lake City—See Skinner North.		
Liberal		392,762
Liberal Southeast		656,601
Lyons	142,748	107,770
Macksville		59,981
McPherson County	717,476	619,857
Medicine Lodge	7,485,652	8,478,694
Merten	24,136	109,344
Orth	245,700	83,862
Otis	6,280,383	4,475,849
Otis (Neva)	138,661	
Pawnee Rock-Behrens-Ryan area	56,818	1,618,268
Quivira		142,986
Schraeder	453,691	413,740
Shady		277,237
Silica (Rick)	192,467	17,373
Skinner North (formerly Lake City)	5,815,242	7,271,305
Sperling	36,854	67,479
Stucky South		199,216
Unruh	905,839	2,807,726
Whelan	420,510	1,802,909
Winfield	454,431	245,114
Yoder	482,918	591,424
Zenith-Peace Creek	1,554,225	1,094,612
Zook	2,129,689	944,068
TOTALS	143,005,164	183,527,266

* Another estimate from a reliable source gives a figure of 4,600,000 M cu. ft. for eastern Kansas counties.

cause neither the oil and gas companies nor the Corporation Commission—the sources of the Survey's information—has occasion to segregate production according to counties. Although the county figures in many cases are necessarily approximate, they

TABLE 5.—*Largest oil producing pools in Kansas since date of discovery*

Rank	Pool	Age years	County	Total production, barrels
1	Eldorado	33	Butler	195,591,000
2	Trapp	12	Russell-Barton	95,260,320
3	Silica	17	Barton-Rice	77,301,454
4	Bemis-Shutts	13	Ellis	49,056,378
5	Chase	17	Rice	46,053,902
6	Burrton	17	Reno-Harvey	42,059,928
7	Ritz-Canton	19	McPherson	40,009,288
8	Hall-Gurney	17	Russell	33,919,716
9	Gorham	22	Russell	32,816,546
10	Kraft-Prusa	11	Barton	31,251,115

are believed to be close enough to justify publication. Where important pools cross county boundaries, productions have been prorated on the basis of pool area in the counties affected.

It has been impossible as yet to obtain satisfactory figures for natural gas production in eastern Kansas counties, although the amount has been estimated by the Corporation Commission. Hence, in Table 3, gas production has been omitted in a number of cases, although it is well known that there is some gas produced.

Kansas has 30 pools that have produced more than 10 million barrels of oil each since discovery, and a dozen that now are producing at a rate of 1 million barrels a year. Tables 5 and 6 show the first 10 pools in rank in total production since discovery and in present annual production. The ElDorado field, Kansas' greatest, is still a heavy producer. It helped greatly in making Butler County the fifth largest producer in the State among the counties in 1947.

New pools.—During 1947, 52 new oil pools and 10 new gas pools were discovered in Kansas. Six old pools were revived. Nine

TABLE 6.—*Largest oil producing pools in Kansas during 1947*

Rank	Pool	Age years	County	Total production, barrels
1	Trapp	12	Russell-Barton	11,326,520
2	Kraft-Prusa	11	Barton	6,397,105
3	Bemis-Shutts	13	Ellis	6,013,003
4	Silica	17	Barton-Rice	5,145,884
5	Hall-Gurney	17	Russell	3,386,651
6	Bloomer	12	Ellsworth-Barton-Rice	3,062,066
7	Chase	17	Rice	2,924,937
8	Eldorado	33	Butler	2,764,000
9	Gorham	22	Russell	1,862,481
10	Burrton	17	Reno-Harvey	1,066,728

new oil pools were discovered in Rooks County and five each in Barton and Stafford Counties. One of the more interesting new discoveries was the Kismet oil pool in Seward County near the edge of the Hugoton gas pool. The Stanolind Oil and Gas Company opened a new gas pool in Kiowa County, in which no oil or gas had been produced previously.

Perhaps the most important new discovery among the better-known producing counties was the Paradise Creek pool in Rooks County. This new pool, together with the Paradise Creek South pool which was discovered and then combined within the year, now covers more than 1 square mile. Table 7 shows all new pools discovered in Kansas in 1947.

TABLE 7.—*Oil and gas pools discovered in Kansas during 1947*

County, pool, and location of discovery well	Discovery well	Producing zone	Depth, feet	Month of discovery	Initial production per day, bbls.
Barton County					
Adolph 16-20-15W	Kansas-Nebraska No. 1 Adolph Unruh	Arbuckle	3,734	May	10,200 M cu. ft. gas
Ames Northwest 9-18-11W	R. L. Williams No. 1 Ehly	Arbuckle	3,312	October	173
Ash Creek 31-20-15W	Bay Pet. et al. No. 1 Houdyshell	Arbuckle	3,787	February	477
Carroll Southwest 32-17-14W	Bridgeport Oil Co. No. 1 Hunt "A"	Lansing	3,193	July	180
Esfeld 15-16-11W	B. & R. Drlg. Co. No. 1 Esfeld	Arbuckle	3,313-3,358	October	138
Kowalsky Northwest 30-20-11W	R. L. Williams No. 1 Soeken	Arbuckle	3,381	December	994
Butler County					
Allen North 36-25-3E	Rex & Morris No. 1 Robinson	Mississippian "Chat"	2,708-2,721	October	25
Joseph 18-24-5E	Cox & Burns No. 1 Joseph	Mississippian	2,491		15
Kramer-Stern South 15-28-6E	J. M. Huber Corp. No. 1 Gardiner	Viola	3,036-3,038	May	35
Semisch 4-29-6E	Dunne & Strait No. 1 Semisch	"Bartlesville"	2,775- 2,826	August	50
Womack 19-28-6E	J. M. Huber Corp. No. 1 Womack	"Bartlesville"	2,715	February	2,000 M cu. ft. gas
Chautauqua County					
McGlasson 11-33-9E	Coop. Ref. Assn. No. 1 McGlasson	Mississippian		September	20
Cowley County					
Combs 5-30-5E	Kewanee Oil Co. No. 1 Combs	"Bartlesville"	2,835- 2,853	January	25
Doane 36-33-6E	McNeish & Gralapp No. 1 Doane	Mississippian	2,732	November	25
School Creek 15-32-7E	Mid Plains & Veeder No. 1 Reidy	"Bartlesville"	2,817- 2,836	May	25
Dickinson County					
Lost Springs Northeast 26-16-4E	International Oil Co. No. 1 Schlesener	Mississippian	2,301		100

TABLE 7.—*Oil and gas pools discovered in Kansas during 1947 (continued)*

County, pool, and location of discovery well	Discovery well	Producing zone	Depth, feet	Month of discovery	Initial production per day, bbls.
Ellis County					
Antonino (Revived) 27-14-19W	Trojan Oil & Gas No. 1 Feitz	Arbuckle	3,712	January	132
Burnett South 25-11-18W	Keyes Drlg. Co. No. 1 Marshall This pool is now part of the Burnett pool.	Arbuckle	3,618-3,624	June	3,458
Younger North 32-13-17W	Ben F. Brack No. 1 Hoffman	Arbuckle	3,580		100
Graham County					
Houston 9-6-22W	B. & R. Drlg. Co. No. 1 Rush	K.C.-Lans.	3,506-3,516	June	297
Kiowa County					
Brenham 29-28-17W	Stanolind O. & G. No. 1 Repp	Mississippian Chert	4,843-4,854	August	7,300 M cu. ft. gas
Lyon County					
Rock Creek 32-21-11E	Murphy et al. No. 1 Fee	"Bartlesville"	1,930-1,942		35
Marion County					
Antelope 33-18-4E	J. Leiker et al. No. 1 Henke	Mississippian "Chat"	2,380-2,390		25
Elbing North 27-22-4E	E. H. Adair Oil Co. No. 1 Jensen	Mississippian "Chat"	2,439	November	100
Lost Springs South 16-18-4E	Saco Oil Co. No. 1 Navrat	Mississippian "Chat"	2,409		35
Wenger 11-21-3E	Goering & Branine No. 1 Wenger	"Hunton"	2,771		50
McPherson County					
Doles Park 12-19-1W	W. C. McBride, Inc. No. 1 Waln	Mississippian "Chat"	2,843	January	238 M cu. ft. gas
Georob 31-17-1W	Westgate-Greenland & Mallard Drlg. No. 1 Robinson	Mississippian "Chat"	2,665	May	160
Hoffsommer 6-18-1W	Mallard Drlg. Co. Westgate-Greenland No. 1 Hoffsommer	Mississippian "Chat"	2,745	August	215
Meade County					
Adams Ranch East 36-34-30W	Helmerich & Payne No. 2 Adams	Morrow Sand Upper "Miss. lime"	5,874 5,904	June	2,860 M cu. ft. gas
Pawnee County					
Ash Creek South 12-21-16W	Bay Pet. Corp. et al. No. 1 Sara Smith	Arbuckle	3,766-3,788	August	272
Ash Creek Southwest 11-21-16W	Mid-Continent Pet. No. 1 Bowman	Arbuckle	3,779-3,789	October	2,197
Garfield 17-23-17W	Gabbert & Lindas No. 1 Hutchinson	Kinderhookian	4,276	November	44
Torrance 19-21-15W	J. M. Huber Corp. No. 1 Torrance	Arbuckle	3,816-3,857	April	35,000-53,000 M cu. ft. gas
Rice County					
Click Southeast 11-18-7W	Phillips Pet. Co. No. 1 Newkirk	K.C.-Lans.	3,065	September	25
Quivira 36-19-9W	Drillers Gas Co. No. 1 Dinsmore	Tarkio	2,117	February	2,500 M cu. ft. gas
Rick Southeast 18-19-10W	Adair & ElDorado No. 1 Chamberlin	Arbuckle	3,334-3,337	October	376
Wherry North 35-20-7W	Tom Allan et al. No. 1 Chronister	Sooy	3,423	April	67
Rooks County					
Barry East 6-9-18W	Continental Oil Co. No. 1 Gilbert	Arbuckle	3,489-3,498	July	609

Finnesy 14-10-18W	Continental Oil Co. No. 1 Finnesy	K.C.-Lans.	3,419-3,437	August	26
Gick 30-9-19W	Continental Oil Co. No. 1 Eva Gick	Arbuckle	3,578	October	611
Jelinek 23-9-19W	Derby Oil Co. No. 1 Jelinek	Arbuckle	3,537	December	2,292
Paradise Creek 21-9-18W	W. L. Hartman No. 1 Rempe	Arbuckle	3,576-3,581	January	1,470
Paradaise Creek South 28-9-18W	Lowell Drlg. Co. No. 1 Hayes	K.C.-Lans.	3,325	June	351
	This pool is now part of the Paradise Creek pool.				
Silvers 21-8-19W	Aylward Prod. Co. No. 1 Silvers	Arbuckle	3,466	April	249
Vohs Northwest 9-10-19W	Harbar Drlg. Co. No. 1 Baldwin	K.C.-Lans.	3,446-3,450	May	771
Vohs South 23-10-19W	Armer & Anshutz No. 1 Catudal	K.C.-Lans.	3,303-3,310	September	82
Rush County					
Rush Center 16-18-18W	Great Lakes Carbon No. 1 Dirks	Arbuckle	3,836-3,851	May	122
Tammen 24-19-16W	Solar Oil Co. No. 1 Tammen	Arbuckle	3,661-3,666	January	3
Weitzel 1-16-20W	Darby & Bothwell No. 1 Weitzel	Gorham	3,674	April	673
Russell County					
Dillner Northwest 27-13-15W	Kissinger & Stearns No. 1 Billings "C"	Arbuckle	3,318	November	39
Forest Hill North 20-15-12W	Polamus & Harbar No. 1 Meier	Arbuckle	3,270	July	5
Kaufman 33-15-12W	W. L. Hartman No. 1 Kaufman	Arbuckle	3,311-3,318	November	75
Sedwick County					
Curry (Revived) 11-27-1W	Drillers Gas Co. No. 1 Rombach	K.C.	2,715-2,720	December	72
Schulte (Revived) 7-28-1W	Aladdin Oil Corp. No. 1 Dugan	Simpson	3,658	June	2,955
Seward County					
Liberal (Revived) 34 & 35-34-34W					
Liberal Southeast 15-35-33W	Stanolind O. & G. No. 1 Feathers	Pennsylvanian Sand	5,880	January	5,000 M cu. ft. gas
Stafford County					
Heyen West 23-22-12W	Musgrove Pet. Corp. No. 1 Lanterman	Arbuckle	3,675	August	1,842
Kenilworth 15-22-13W	E. H. Adair Oil Co. No. 1 Howard	K.C.-Lans.	3,505-3,511	June	307
Macksville (Revived) 3-24-15W	J. J. Lynn No. 1 Cornwell	Arbuckle	4,107	May'44	3,500 M cu. ft. gas
O'Connor 16-24-15W	J. M. Huber Corp. No. 1 O'Connor	Arbuckle	4,061-4,064	April	26,000 M cu. ft. gas
Pundsack 19-21-13W	Stanolind O. & G. No. 1 Pundsack	Arbuckle	3,735	September	89
Sandago 12-21-12W	Sohio Pet. Co. No. 1 Schrepel	Arbuckle	3,480	June	363
Syms East 21-21-12W	Armer & Lindas No. 1 Hammeke	Arbuckle	3,565	December	50
Trego County					
Cotton East 14-12-21W	Continental Oil Co. No. 1 Cotton	Arbuckle	3,942	March	125
Riga (Revived) 20-13-21W	Doley Oil Co. No. 1 Moon	Marmaton Cherty Limestone	3,902-3,938	February	138
Woodson County					
Teichnor 24-23-15E	King et al. No. 1 Teichnor	Mississippian	1,457-1,488		1,000 M cu. ft. gas

Wells and dry holes drilled during 1947.—There is record of the completion of 2,619 new tests during 1947 in 51 Kansas counties. As records are unavailable or incomplete from some parts of eastern Kansas, the following counties have been omitted in compiling the above figures: Elk, Chautauqua, Wilson, Woodson, Coffey, Franklin, Douglas, Montgomery, Jefferson, Leavenworth, Johnson, Miami, Anderson, Linn, Allen, Bourbon, Neosho, Crawford, and Labette. Of the 2,619 holes, 1,295 were oil wells, 417 were gas wells, and 907 were dry holes; 66 of the oil and gas wells were new discoveries, accounting for new or revived pools; 215 of the dry holes were wildcats, the remainder being drilled within or near pools.

Barton County, having 222 new producing oil wells in 1947, ranked first in number of new tests. More gas wells, 94, were drilled in Stevens than in any other county. Rooks County, which ranked first in number of new pools, also had the largest number, 21, of dry wildcat completions, although Graham County was a close second with 17 unsuccessful wildcats.

The number of new wells drilled in the eastern Kansas counties listed above is not available. The drilling is relatively shallow, and many wells have been put down in connection with current secondary recovery operations. It is estimated that 400 to 500 wells were drilled in the southeastern Kansas counties in 1947. It is probable that 3,000 wells were drilled in the State in 1947.

Test wells drilled within 2 miles of the outside boundaries of producing pools are called "extension wildcats" and are not shown on county maps in this bulletin. Test wells drilled outside this 2-mile zone are classed as "wildcat wells" and are shown by the usual symbol on the county maps. As pool boundaries are rarely exact, the classification of wildcat wells becomes somewhat arbitrary. Hence, the total number of wildcat wells the reader may obtain from various published sources is likely to vary somewhat.

For the purposes of the tables, wells counted as 1947 completions are those which have been finished within the year and which have been drilled to completion in one operation. Old wells worked over, although they came in as producers, were not counted as 1947 completions. The 1947 wells abandoned as dry and then converted to salt water disposal use have sometimes been classed as dry holes, unless it was plain that they were drilled expressly for salt water disposal.

Secondary recovery operations.—Pointed recognition has been given to secondary oil recovery, by waterflooding or otherwise, in this report. This is because a significant amount of oil—about 4 million barrels in 1947—is being produced in Kansas by this very desirable method, and because there are definite indications that the practice is increasing rapidly.

There had been waterflooding, especially in Chautauqua and Montgomery Counties, for a good many years before a Kansas law was passed in 1935 giving official sanction and status to the practice. Grandone (1944) reports that after passage of the law, the first project was organized by the York State Oil Company in the Seeley pool of northern Greenwood County. This was started in May 1935; water was injected into the "Bartlesville" sandstone at a depth of 1,940 feet. The second flooding operation was organized by the Wiser Oil Company in Chautauqua County in September 1935. In December of the same year, the Texas Company started the third project in the Centerville shoestring field of Linn County.

Between 1935, when secondary oil recovery started on a proper basis in Kansas, and November 1942 when the U. S. Bureau of Mines completed an inventory (Grandone, 1944), 4,209,634 barrels of oil had been recovered as a result of the injection of 40,654,726 barrels of water. About 2,612 acres had been developed, and the cumulative production amounted to 1,612 barrels of oil per acre. In November 1942 there were 49 operations in 13 eastern Kansas counties.

At the end of 1947, 144 secondary oil recovery operations were reported in the State, including more than 2,000 producing wells, in a total area of 17,000 or 18,000 acres under development in 26 counties—including 11 of the so-called western counties. The figures were compiled from a canvass by letter inquiry made by the State Geological Survey, using in part, data obtained by Mr. Albert Sweeney of the Interstate Oil Compact Commission, and in part, data previously obtained by G. E. Abernathy.

Chautauqua County, with 2,065 acres, ranks first in acreage developed for secondary oil recovery. Greenwood County, having 1,784 acres under flood, is second; Montgomery County had 1,456 acres developed, and Butler 1,390. Greenwood County, having 451 producing wells under secondary recovery programs, probably led in oil production.

TABLE 8.—*Secondary oil recovery operations in Kansas at the end of 1947*

County	Operator	Pool	Producing zone	Developed acreage	No. wells	Date started	Injection medium
Allen	Fees & Hoyt, Iola	Elsmore	"Bartlesville"?	60	35	1941	Fresh water
"	Fetty & Wagner, ElDorado	"	" "	....	13	....	" "
"	Sloan & Zook, Bradford, Pa.	Humboldt	.....	97	53	....	Fresh & salt water
"	Carl Weiner, Chanute	Humboldt-Chanute	"Bartlesville"	20	10	1945	Salt water
"	" " "	" "	" "	10	4	1945	" "
"	" " "	" "	" "	40	20	1942	" "
"	" " "	Humboldt	" "	30	10	1941	" "
Anderson	Brundred Oil Corp.	Garnett Shoestring	.....	296	169	1936	Garnett City water
"	Mack C. Colt, Iola	Selma	"Bartlesville"	60	.....	1941	Salt water
"	Kewanee Oil Co., Tulsa	Bush City Shoestring	.....	315	145	1944	" "
"	Sloan & Zook, Bradford, Pa.	" " "	.....	237	104	1939	" "
"	" " " "	" " "	.....	170.5	73	1941	" "
Barton	Stanolind O & G, Ellinwood	Silica	Arbuckle	580	27	1946	Nitrogen gas
Butler	Cooperative Ref. Assn., Wichita	South Fox Bush	.....	120?	11	1944	Fresh water
"	Magnolia Petroleum Co., Wichita	ElDorado	Ordovician	680	45	1947	Salt water
"	" " " "	Kramer-Stern	"Leon lime"	50	4	1937	" "
"	" " " "	Young	Kansas City	80	7	1946	" "
"	" " " "	Seward	" "	40	3	1945	" "
"	" " " "	ElDorado	Viola	40	3	1947	" "
"	Phillips (Trousdale lease)	Keighley	.....	80	22	....	Salt water
"	Stelbar Oil Corp.	Fox-Bush	.....	120	6	1945	Fresh water
"	Morrison Producing Co., ElDorado	" "	"Bartlesville"	360	15	1942	Salt water
"	United Oil & Gas	" "	" "	20	10	1947	.....
Chautauqua	Denman Bros., Sedan	Chautauqua (Albright)	"Peru"	600	38	1935	Salt water
"	" " "	" (Scatt)	"	160	6	1940	" "
"	" " "	Chautauqua	"	300	53	1940	" "
"	" " "	(Bird-Redd)	"Redd"	140		1940	" "
"	" " "	Chautauqua (Alford, Bradley, et al.)	"Peru"	420	42	1939	" "
"	" " "	Chautauqua (Beck, Lemmon, Dunham)	"	420	58	1938	" "
"	Forest Oil Co., Nowata, Okla.	Peru-Sedan	"	25	5	....	" "
"	Sinclair Prairie Oil Co. (Albert Casement)	Sedan	.....	....	....	1944	" "

Chautauqua	Sinclair Prairie Oil Co. (J. Gregg "Special")	Peru-Sedan	.....	....	1937	Fresh water
"	Sinclair Prairie Oil Co. (Jackson Fee)	Sedan	.....	....	1943	Salt water
Cowley	Frost & Bennett, Wichita	Weathered	.....	40	3 1946	" "
"	Hill & Hill, Fort Worth, Texas	Murphy	"Bartlesville"	80	5 1946	Fresh water
"	Texas Co., Tulsa, Okla.	Hittle	"Layton"	100	3 1945	Salt water
Crawford	Max B. Miller, McCune No. 2 (Run by M.F.A. Oil Co.)	McCune	.....	....	 1941	" "
Elk	Cities Service Oil Co.	New Albany	.....	229	57 1937	Fresh & salt water
"	Sagamore Oil & Gas Co., Independence	Gardner	"Longton"	40	9 1947	Fresh water
Franklin	Brundred Oil Corp. Unit No. 2 (Rantoul)	Rantoul	.....	212	83 1944	Marais des Cygne River
"	Brundred Oil Corp. (Springer lease)	.....	.....	22	17 1944	.....
"	J. B. Wickard	Rantoul	.....	40?	8	Salt water
Greenwood	Arkansas Fuel Oil Co., Shreveport, La.	Aagard	"Bartlesville"	84	10 1944	" "
"	Barbara Oil Co., Wichita	Pixlee	" "	220	20 1947	" "
"	Cities Service (Cragan lease)	Seeley-Wick	.....	23	2 1942	" "
"	" "	Seeley	.....	80	22 1946	" "
"	Magnolia Petroleum, Wichita	"	"Bartlesville"	540	60 1943	" "
"	Mid-Cont. Pet. Corp., Tulsa	Demalorie-Souder	.....	20	8 1946	" "
"	" " " " "	Virgil	.....	330	33 1946	" "
"	Ohio Oil Co.	Teeter	.....	160	13 1944	" "
"	" " "	Thrall-Aagard	.....	100	13 1944	" "
"	" " "	Sallyards	.....	10+	31 1946	" "
"	Phillips (F. W. Cannon lease)	Thrall-Aagard	.....	44.5	5 1946	" "
"	" (Lewis Unit)	" "	.....	43.5	5 1945	" "
"	" (Wiggins, Osmundson, etc. lease)	" "	.....	110	17 1942	" "
"	" Seeley-Wick Unit	.....	.....	89.5	25 1943	" "
"	" Bratton Unit	Thrall-Aagard	.....	8	2 1945	" "
"	" Burkett Unit (4 Units-sec. 24, Unit "B," "D," and "F")	Burkett	.....	665	88 1939	" "
"	Phillips (Aagard lease) (3 Units)	Thrall-Aagard	.....	47.5	5 1937	" "

TABLE 8.—*Secondary oil recovery operations in Kansas at the end of 1947 (continued)*

County	Operator	Pool	Producing zone	Developed acreage	No. wells	Date started	Injection medium
Greenwood	Phillips-Scott Unit	Scott	.....	95	43	1945	" "
"	Skelly Oil Co., ElDorado	Seeley-Wick (H. B. Wick)	"Bartlesville"	280	20	1947	" "
"	" " " "	" " (Don Harlan)	" "	50	5	1947	" "
"	" " " "	" " (Hess)	" "	30	3	1947	" "
"	Sunray Oil Corp., Tulsa	Lamont	" "	90	8	1943	" "
"	" " " "	"	" "	100	8	1943	" "
Harvey	Magnolia Pet., Wichita	Hollow-Nikkel	"Hunton"	60	2	1940	" "
"	Shell Oil Co., Wichita	" " (Voth No. 2)	"	140	2	1941	" "
"	" " " "	" " (Schmidt)	"	60	1	1941	" "
"	" " " "	" " (Nikkel No. 1)	Mississippian	20	1	1941	" "
Kingman & Pratt	Skelly Oil Co., Hutchinson	Cunningham	.....	1,800	49	1936	Gas injection
Linn	Bradford Producing Co., Bradford, Pa.	Goodrich-Parker	.....	119.6	67	1944?	Salt water
"	Sloan & Zook, Bradford, Pa.	La Cygne	.....	22.5	13	1942	" "
"	Texas Co., Tulsa	Centerville	"Squirrel"	94	50	1936	Fresh water
Lyon	Phillips (Lauck & McIlvain & Pedroja leases)	Fankhouser	.....	30	9	1943	Salt water
Marion	Harwood Oil Co.	Lost Springs	"Chat"	80	4	1943	" "
McPherson	Continental Oil Co., Valley Center	Graber	"Hunton"	240	15	1947	Fresh water
"	M & L Oil Co., Wichita	Lindsborg	.....	160?	33	1947	Salt water
"	W. C. McBride, Inc., McPherson	Ritz-Canton	.....	160	10	1947	" "
"	" " " "	" "	.....	120	9	1947	" "
"	Shell Oil Co., Wichita	Voshell (Koen No. 2)	Simpson	70	4	1947	" "
"	" " " "	Ritz-Canton (F. A. Lovett)	Mississippian	140	1	1941	" "
"	" " " "	" " (E. M. Hull)	" "	100	6	1946	" "
"	" " " "	" " (Griffin)	" "	200	7	1942	" "
"	" " " "	" " (J. W. Meyer "B")	" "	100	6	1941	" "
"	" " " "	" " (T. L. Fleming)	" "	140	0	1946	.....
"	" " " "	" " (Finkle)	" "	40	2	1947	Salt water
"	" " " "	" " (P. A. Decker)	" "	120	3	1947	" "
Miami	Andrus, Pate & Lavens, Chanute	Paola	"Peru"	37.5	21	1947	" "
"	Bradford Prod. Co., Bradford, Pa.	Paola-Rantoul	.....	70	30	1945	Fresh water
"	" " " " "	Stanton (Unit "C")	.....	102	24	1944	Salt water
"	Brundred (McKoon & Gilbert lease)	Rantoul	.....	113	27	1944	Fresh & salt water

Miami	N.Y.K. Oil Co., Osawatomie	Paola	"Peru"	60	42	1941	Fresh water
"	Ohio Oil Co., Paola	Big Lake	"Big Lake"sand	55	200	1945	Salt water
"	Sloan & Zook, Bradford, Pa.	Paola-Rantoul	.....	113	26	1945	" "
"	Vossler & Ellison, Osawatomie	Paola	"Peru"	120	18	1938	Fresh water
Montgomery	Amherst Oil Co., Mitchell lease	Wayside	.....	....	25	1946	" "
"	Boop & Boop, Nowata, Okla.	" "	.....	40?	?	1935	Salt water
"	Consolidated Gas & Oil Mfg. Co., Independence	" " (Flanagan No. 1)	"Wayside"	75	27	1942	Fresh & salt water
"	Consolidated Gas & Oil Mfg. Co.	" " (Flanagan No. 2)	" "	20	10	1945	" " "
"	" " " " "	" " (Flanagan No. 3)	"Wayside" & "Weiser"	40	15	1945	" " "
"	" " " " "	" " (Bell)	"Wayside"	25	14	1944	" " "
"	" " " " "	" "	" "	40	19	1945	" " "
"	Feltmont Corp.	Bolton	.....		2	1945	.....
"	Forest Oil Co., Nowata, Okla.	Wayside-Havana	"Wayside"	56.25	29	1938-39	Fresh & salt water
"	Greysolon Oil Co. (Adams & Hester)	Jefferson-Sycamore	.....	....	81	1940	Fresh water
"	E. W. Hayes, Independence	Riggs	"Wayside"	60	30	1944	" "
"	" " "	Raney	.....	40	17	1946	" "
"	" " "	Savage	.....	30+	2	1942	.....
"	Bert L. Horton	Wayside-Havana	.....	....	25	1940	.....
"	Layton Oil Co., Independence	Bolton	"Bartlesville"	400	66	1945	H_2S water
"	" " " "	Jackson	" "	60	8	1945	Fresh water
"	" " " (Bolt, Erhart & Woody)	Tyro	.....	....	18	1945	.....
"	Marshall & Fife	Sorghum Hollow	.....	....	2	1944	.....
"	Henry Stekoll (Bredehoft & Sicks)	Bolton	.....	....	26	1944	Fresh water
"	Stekol Pet. Co., Independence	Bolton	.....	800	180	1943	Fresh & salt water
"	W. W. White, Independence	Wayside	.....	20	3	1945	Salt water
"	W. N. White (Defenbaugh lease)	Jefferson-Sycamore	.....	....	14	.....	.....
"	L. D. White (J. A. Kincaid lease)	Wayside	.....	....	15	1941	Salt water
Neosho	Fred Stipp, Chanute	.....	"Bartlesville"	10	6	1941	Fresh water
"	Lynde, Walter, & Darby, Tulsa	Chanute	.....	679	250	1937	" "
"	Production Engineering Lab. Okla. City	Erie	.....	30	11	1947	" "
Pratt	Skelly Oil Co., Hutchinson	Cunningham	.....	160	3	1947	Salt water
Reno	" " " "	Abbyville	.....	160	3	1947	" "

TABLE 8.—*Secondary oil recovery operations in Kansas at the end of 1947 (continued)*

County	Operator	Pool	Producing zone	Developed acreage	No. wells	Date started	Injection medium
Reno	Stanolind Oil and Gas Co., Okla. City	Hilger	Viola	30	4	1946	" "
Rice	Barnsdall Oil Co., Tulsa	Silica	Arbuckle	40	3	1946	" "
"	Continental Oil Co., Valley Center	Smyres	"Chat"	140	6	1945	" "
"	Gulf Oil Corp., Tulsa	Silica	Arbuckle	80	5	1946	(Temp. abandoned)
"	Shell Oil Co., Wichita	" (Hathaway)	"	80	1	1946	Salt water
Russell	Skelly Oil Co., Hutchinson	Hall-Gurney (L. B. Carter)	.....	160	1	1944	" "
"	" " " "	" " (G. C. Erlich)	Lansing	160	5	1947	" "
"	" " " "	" " (C. M. Phinney)	.....	80	3	1944	" "
"	Stanolind O & G, Gorham	" "	Lansing	160	3	1947	" "
Sedgwick	Magnolia Petroleum, Wichita	Robbins	Mississippian	80	6	1945	Fresh water
"	Solar Oil Co., Wichita	Valley Center	.....	....	....	1941	.....
Stafford	Campbell & Kuhn, Wichita	Zenith	.....	80	2	.....	Salt water
"	Deep Rock Oil Co., Tulsa	"	Viola	40?	1	1946	" "
"	" " " " " "	"	"	80?	3	1946	" "
"	" " " " " "	"	"	120?	1	1946	" "
"	Skelly Oil Co., Hutchinson	Kipp	.....	80	2	1946	" "
"	Texas Co., Tulsa	Zenith	Viola "Misener"	313	9	1945	" "
"	" " "	"	Viola	80	3	1945	" "
Sumner	Lario-Barnsdall, Wichita	Oxford	.....	160?	9	1946	" "
"	Shell Oil Co., Wichita	Churchill	"Tonkawa"	40	....	1941	(Discontinued)
"	" " " "	" "	"	60	2	1941	.....
Wilson	Nolan Oil & Gas Co., Chanute	Vilas	"Bartlesville"	240	11	1943	Salt water
Woodson	L. M. McCormick, Yates Center	Yates Center	Mississippian	160?	3	.....	" "

Methods used in secondary oil recovery in Kansas follow those developed mainly in Pennsylvania. Where the supply is adequate, fresh water is commonly used for injection. Because of the vagaries of the oil sands, especially in southeastern Kansas where normal structure is complicated by the so-called "shoestring" sands, a standard pattern of in-put and producing wells is hardly to be expected.

In one experimental secondary recovery operation in Barton County, nitrogen gas is being injected for a combination of reasons. The operation is described in some detail in the county chapter.

A large number of permits to start secondary oil recovery operations have been issued by the Corporation Commission, but many of these permits have not been exercised. Some of the grantees have carried out their plans, some have deferred action, and some have gone out of business. Table 8 lists all reported operations in 1947.

Well elevations.—Elevations of many wildcat wells and new discovery wells in 23 of the western counties of the State are given in tables or in the text. Actual depths below sea level of stratigraphic horizons have been given in many cases. Well logs usually are obtainable at nominal cost from the Kansas Well Log Bureau in Wichita. In the cases of the eastern counties containing the older fields and in areas of large production, such as Russell, Barton, and Ellis Counties, elevations of wildcat wells have been omitted because in such areas of concentrated activity they should not be difficult to obtain. Publication of elevations of approximately 60 wildcat wells was made possible through the kind cooperation of Laughlin-Simmons and Company of Tulsa, Oklahoma.

The eastern Kansas counties.—Maps of the eastern counties have been drawn in a manner designed to show present conditions as fairly and accurately as possible. The so-called "stripper" oil fields of southeastern Kansas have been shown mainly in outline and by name as they were known in the past during their days of primary production. As these former fields are now much reduced in size, only the spots, pools, or "leases" that were actually producing oil in 1947 have been given the conventional symbol for "producing area."

Secondary recovery operations reported active in 1947 have been indicated on the county maps where their locations are known.

Some difficulty was encountered in the eastern counties in giving names to pools or producing areas which were parts of older known fields. Names appearing on the county maps usually are those by which the pools or producing areas are known at the present time. Sometimes, they actually are lease names, but, being in common use, the names used are likely to be of greatest aid to a stranger searching for a given operation in the area.

In several eastern Kansas counties, deposits of natural gas, usually in modest quantities and at shallow depths, are known to be present. The boundaries of such areas are very indefinite. An effort has been made to show these areas on the map by a symbol not bold enough to hinder interpretation of other map data.

Previous publications.—Much has been written and published by the State Geological Survey of Kansas on oil and gas developments in the State and on phases of Kansas geology that bear, directly or indirectly, on petroleum production. For the most part, reports have been written either on western or on eastern Kansas areas or subjects because the general subject has been divided rather naturally between consideration of the older, eastern counties and the more recent developments of western Kansas.

There have been 13 reviews of oil and gas developments in the western part of the State. The first of these was published in 1928 as Mineral Resources Circular 1. A second report, published in 1933 as Mineral Resources Circular 2, described developments in 1928, 1929, and 1930; Mineral Resources Circular 3, published in 1934, described developments in 1931 and 1932; and Mineral Resources Circular 10, a cumulative report issued in 1938, gave information on the areal geology, stratigraphy, and structure of each county producing oil or gas at that time. The history of development during succeeding years may be found in Mineral Resources Circular 13 and in Bulletins 28, 36, 42, 48, 54, 56, 62, and 68.

Information on oil and gas developments in eastern Kansas and on the oil geology of that part of the State has been published in numerous reports, some written before the turn of the century. The first of these which gives any considerable quantity of information is the report called Mineral Resources of Kansas, 1897. This series was continued as an annual publication until 1903

TABLE 9.—*Wells completed in 1946 but reported in 1947*

County	Oil	Gas	Dry
Barber	1	1	1
Barton	4	....	1
Butler	....	....	1
Ellis	2	....	....
Ellsworth	2	....	....
Finney	....	3	....
Graham	....	....	1
Kearny	....	2	....
McPherson	1	....	....
Morton	....	2	....
Phillips	1	....	....
Rice	1	....	....
Rooks	1	....	....
Rush	1	....	....
Russell	2	....	....
Stevens	....	3	....
Total	16	11	4

after which it was abandoned. Volume 9, published by the University Geological Survey in 1908, was a special bulletin on oil and gas, and brought the information up to date. Bulletin 3, Oil and Gas Resources of Kansas, a report devoted rather largely to oil geology, was published in 1917 by the State Geological Survey. Thereafter, several "spot" surveys or studies of county areas or fields were made. Among these were Bulletin 5, on the Elk City gas field in 1920; Bulletin 6, part 1, General Geology of Oil and Gas, 1920; Bulletin 7, Geology of the Eldorado Oil and Gas Field; and Bulletin 23, Origin of the Shoestring Sands of Greenwood and Butler Counties, 1936. The first summary report devoted to the more recent oil and gas developments in eastern Kansas is Bulletin 57, Oil and Gas in Eastern Kansas, by Jewett and Abernathy.

A complete bibliography of the reports on oil and gas production published by the State Geological Survey is given at the end of the report.

Straggler wells.—After the statistical records have been finished for each year, late reports of completed wells continue to come in. These are referred to as stragglers, and are reported in the bulletin for the following year, but are credited to the year in which the wells were completed.

Straggler wells for 1946 totaled 31; 16 were oil wells, 11 were gas wells, and 4 were dry holes. The figures on 1946 completions

given by Ver Wiebe (1947) should be changed to total wells, 1,668, of which 811 were oil wells, 333 were gas wells, and 524 were dry holes. Table 9 lists 1946 straggler wells by counties.

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ALLEN COUNTY

Historical background.—Oil was first found in Allen County about 1883, although gas had been discovered 10 years earlier. Soon after the discovery of gas near Iola in 1873 in the "Acers well," enough producing wells had been drilled to supply abundantly all the needs of the town.

Prior to the turn of the century, a number of industries that were attracted by the cheap natural gas were located in the vicinity of Iola, Gas City, and La Harpe. There were brick plants, one or more glass plants, six smelters (Haworth, 1899, p. 39), and other industries requiring cheap fuel. Later, the diminished supply of gas—which was used prodigally—caused some of the important industries to move elsewhere.

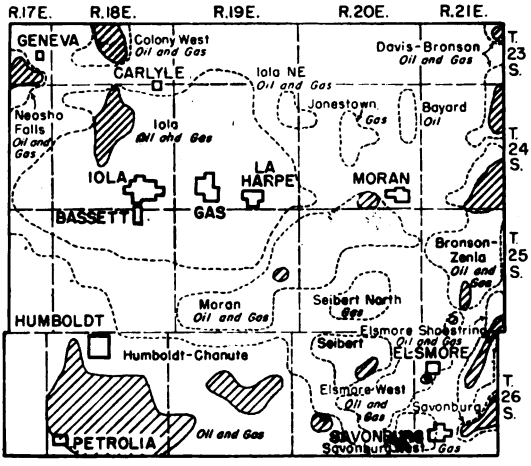

FIG. 3.—Map of Allen County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

Prospecting for oil and gas in southwestern Allen County north and south of Humboldt began in 1894 (Moore and Elledge, 1920, p. 7). A considerable amount of oil and some gas were found, but the Humboldt field, which greatly surpassed the Iola field in oil production, never attained the latter's importance as a gas producer. At that time there was a greater demand for gas than for oil.

By about 1920, the Humboldt, Iola, Moran, and Bronson areas were well developed. There were oil refineries at Humboldt and Moran. The average initial daily production of oil wells drilled in the county in those years was about 25 barrels, but some wells had initial ratings of 250 barrels or more. After a few months, the daily production of wells in the area commonly dropped off to about 5 to 20 barrels. The wells were long-lived, however (Moore and Elledge, 1920).

Most of the oil and gas produced in Allen County have come from the "Bartlesville sand" in the Cherokee shale at depths ranging from about 650 to 800 feet. In the northwestern part of the county where the Neosho Falls pool crosses the line from Woodson County, production is from the "first break" in the Mississipian limestone at about 1,200 feet.

For more than 10 years, secondary oil recovery by water flooding has been increasing the yield of oil wells in the areas of "Bartlesville" production in Allen County (Jewett and Abernathy, 1945, pp. 46-48). There were nine reported water-flooding operations active in the county at the end of 1947 (Table 8). Two of these were located in the Elsmore pool, the remainder in the Humboldt, or Humboldt-Chanute. In all reported cases operations were in the "Bartlesville sand."

Oil production in 1947 totaled 284,240 barrels. There were 10 active oil pools. No new pools were discovered. Seven secondary recovery operations were reported. A small amount of gas was produced in several areas.

Developments during 1947.—The **Neosho Falls** pool was extended northward into sec. 26, T. 23 S., R. 17 E. during the year. Production is from the "first break" in the Mississippian limestone (Cowley formation) at a depth of about 1,200 feet. Drilling in other areas in the county during the year was done mainly in connection with water-flooding activities.

The **Humboldt-Chanute** area, having a production of 135,449 barrels of oil in 1947, was the outstanding producer of the county, although the **Elsmore Shoestring** and the **Davis-Bronson** areas, each having a production of about 32,000 barrels of oil, had considerably higher productions per well.

TABLE 10.—*Oil production in Allen County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Bronson-Zenia[1]	55+	11,183
Colony West[2]	30	7,035
Davis-Bronson[2]	21+	32,019
Elsmore Shoestring[1]	8+	32,921
Elsmore West		5,118
Humboldt-Chanute[3]	5+	135,449
Iola	182+	56,471
Moran	14	2,114
Neosho Falls[4]	2	1,432
Savonburg	See Bourbon County	
Seibert		385
Miscellaneous		113
Total	317+	284,240

[1] Field extends into Bourbon County.
[2] Field extends into Anderson County.
[3] Field extends into Neosho, Wilson, and Woodson Counties.
[4] Field extends into Woodson County.

The active producing areas and the reported production of each are listed in Table 10. The number of active wells is as reported, and is open to doubt in some cases. Figure 3 shows the oil and gas producing areas in Allen County.

ANDERSON COUNTY

Historical background.—Prospecting for gas and oil started in the county about 1885 when a well drilled in the SW¼ sec. 6, T. 20 S., R. 20 E., reported a good showing of oil.

The first important discoveries of both oil and gas in the county were made near Garnett, gas being found in 1904 and oil a few years later. Soon after gas was discovered just southeast of Garnett, an important field was developed and the city was supplied with gas for lights and fuel. As drilling of the gas field continued, oil also was discovered. The field developed into a narrow continuous belt 6 or 8 miles long between Garnett and Greeley.

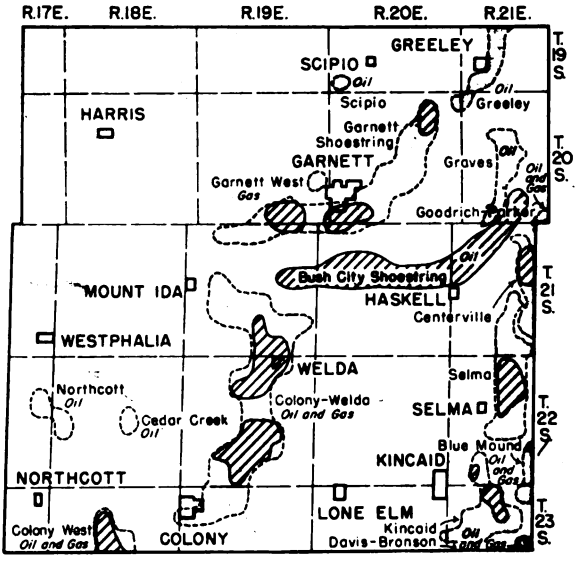

FIG. 4.—Map of Anderson County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

The Garnett Shoestring was discovered in 1921, and about the same time gas was found near Colony. Within 2 years an unbroken strip of country, some 12 miles long, between Colony and Mount Ida (Charles, 1927, p. 14) was producing both oil and gas. In the following few years oil and gas were discovered in several other parts of Anderson County, and the fields as they are now known were developed (Jewett and Abernathy, 1945, pp. 54-58).

Oil and gas production in Anderson County has been from Pennsylvanian rocks at depths of less than 1,000 feet. The principal producing sandstones are in the Bandera shale (Marmaton group) and in the Cherokee shale. The "Squirrel sand" near the top and the "Bartlesville sand" in the lower-middle part of the Cherokee shale have been the principal producing formations in the county.

Secondary oil recovery by water flooding has come to be a very important method of oil production in this county. Sloan and Zook are credited with starting the first water-flood operation in the county in 1939 in the Bush City Shoestring; the operation is understood still to be active. Two other water floods were started in 1941, one by Sloan and Zook in the Bush City Shoestring, and one by Mack C. Colt in the Selma pool. Another flood was started in 1944 in the Bush City Shoestring by the Kewanee Oil Company.

Oil produced in 1947 totaled 325,288 barrels. There were seven active oil pools. Five secondary oil recovery operations were reported. Some gas was produced, mainly for local consumption.

Developments during 1947.—Most of the drilling and other related activities during 1947 were in conjunction with water-flood-

TABLE 11.—*Oil production in Anderson County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Bush City Shoestring	78+	202,475
Centerville[1]		4,370
Colony-Welda	158+	12,314
Colony West[2]	30	22,708
Garnett Shoestring	18+	56,511
Kincaid	12+	19,158
Selma		7,661
Miscellaneous		91
Total	296+	325,288

[1] Field extends into Linn County.
[2] Field extends into Allen County.

ing operations. Such activity is on the increase on account of the rather attractive price of oil.

The **Bush City Shoestring** and the **Selma** pools are reported to have had water-flood projects under way in 1947. Production comes from the "Squirrel sand" in the Bush City Shoestring pool, and from the "Bartlesville" in the **Garnett Shoestring**, the Selma, and the **Kincaid** pools.

The secondary recovery operations are listed in Table 8; the active pools and the production of each during 1947 are given in Table 11. The oil and gas producing areas in Anderson County are shown in Figure 4.

BARBER COUNTY

Historical background.—Active prospecting for oil in Barber County began during 1926. However, neither oil nor gas was found until January 1927, when the Shaffer Oil Company completed its first producer, a gas well, on the Alexander ranch in sec. 13, T. 33 S., R. 13 W. This was the discovery of the Medicine Lodge gas pool. Gas is produced from the top of the Mississippian System. More than 100 billion cubic feet of natural gas has been produced from the Medicine Lodge pool in the 20 years since its discovery. Oil also occurs in the same field. It comes from the deeper "Misener."

The second productive pool in the county, the Whelan, was discovered in 1934 in sec. 32, T. 31 S., R. 11 W. Here oil was found in the "chat" zone which marks the top of the Mississippian rocks. The second gas pool to be discovered in Barber County was called the Aetna. The Viola is the producing zone. The Sun City pool was found in 1941, the Skinner and Deerhead pools in 1943, and the Boggs and Boggs South in 1946. In these pools the Simpson and K. C.-Lansing are the most important producing zones although some oil comes from the deeper Arbuckle dolomite.

Statistical summary for Barber County, 1947

Oil produced	1,185,650	barrels
Gas produced	18,720,177	thousand cubic feet
Wells drilled: Oil	38	
Gas	3	
Dry	23	
Total	64	
Wildcat wells	9	(included in above total)
New, revived, or abandoned pools	none	
Secondary recovery operations	none	

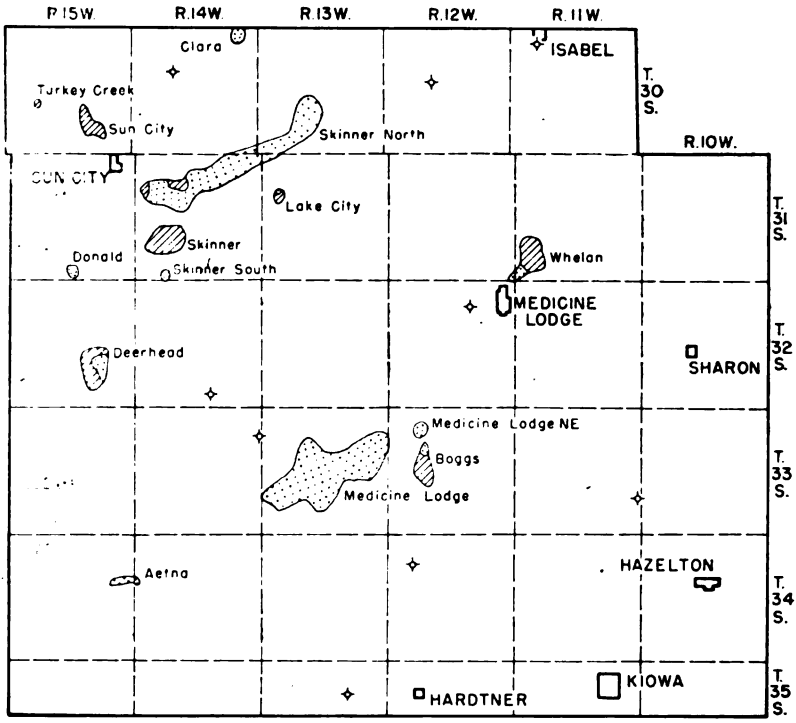

FIG. 5.—Map of Barber County showing oil and gas pools and dry wildcat tests drilled during 1947. (Gas, dots; oil, diagonal lines.)

Developments during 1947.—Although no new pools were discovered, several oil and gas pools in this county received active development during 1947. Ten operators drilled test holes in the vicinity of the **Skinner,** the **Skinner North,** and the **Skinner South** pools. Sixteen new oil wells and two gas wells resulted. The three Skinner pools seem to be parts of a single deposit of oil. The producing zone is called the Maquoketa which many geologists regard as a part of the Viola. The Maquoketa is found between 4,300 and 4,600 feet depending mainly on the surface elevation at which the wells are drilled. Commonly, gas is found where the Viola occurs between 2,622 and 2,694 feet below sea level, whereas wells encountering the producing zone between 2,680 and 2,789 feet below sea level are more likely to encounter oil. Two holes, one reaching the producing zone at 2,697 feet and the other at 2,743 feet below sea level, were dry. Strangely, some wells found

the Viola to be dry but encountered oil at a lower depth. The Sinclair Prairie Oil Company No. 4 well on the Oldfather lease in sec. 7, T. 31 S., R. 14 W., is an example of this. The hole produces from the Simpson sandstone although the Viola was found relatively high (2,680 feet below sea level). In another locality where the Viola was unproductive, the Arbuckle dolomite below produced oil. This was on the Gant lease in sec. 7, T. 31 S., R. 13 W.

TABLE 12.—*Oil and gas pools of Barber County*

Pool and location of discovery well	Discovery year	Area acres	1947 production	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
			barrels				
Boggs 17-33-12W	1946	400	159,264	159,264	18	Simpson	4,806
Boggs South 21-33-12W	1946	combined with Boggs					
Deerhead 22-32-15W	1943	320	151,613	211,638	14	Viola	4,950
Lake City 7-31-13W	1937	80	12,831	220,521	2 1 1	Viola Simpson Arbuckle	4,435 4,530 4,607
Medicine Lodge 13-33-13W	1937	40	none	45,703	1	"Misener"	4,845
Skinner 29-31-14W	1943	800	371,521	514,461	39	Viola Simpson	4,626 4,422
Skinner North 29-31-14W		included with Skinner				Viola Arbuckle	
Sun City 35-30-15W	1941	450	299,977	1,100,182	11	K.C.-Lans.	4,344
Turkey Creek 20-30-15W	1943	40	2,374	19,034	1	Simpson	4,438
Whelan 32-31-11W	1934	1,000	188,070	1,702,435	22	"Chat"	4,355
			thousand cubic feet				
Aetna 13-34-15W	1935	160	141,026	641,026 estimated	2	Viola	5,215
Boggs (gas) 8-33-12W	1947		none	none	1	Simpson	4,824
Clara 2-30-14W	1944	160	276,094		1 1 1	Simpson Viola Arbuckle	4,435 4,509 4,540
Deerhead (gas) 26-32-15W	1942	1,000	750,149	1,640,999	3	Viola	4,931
Donald 33-31-15W	1946	640	none	none	1	"Mississippi lime"	4,697
Lake City 7-31-13W	1945	included with Skinner North					
Medicine Lodge (gas) 13-33-13W	1927	6,400	8,478,694	118,796,871	39	"Chat"	4,455
Medicine Lodge Northeast 8-33-12W	1945	included with Medicine Lodge			1	"Chat"	4,472
Skinner North (gas) 17-31-14W		8,000	7,271,305	13,543,736	10	Viola	4,630
Skinner South 32-31-14W	1944	included with Skinner North				"Douglas sand"	4,023
Whelan (gas) 32-31-11W	1934	640	1,802,909	2,512,786	3	"Chat"	4,355

In the **Whelan** pool two test holes were completed. One produced oil; the other was dry. Production is from the "chat" zone at the top of the Mississippian.

Two tests, one dry and one an oil well, were completed in the **Sun City** pool in 1947. The producing well, located in sec. 27, T. 30 S., R. 15 W., found oil in the Massey zone of the Pennsylvanian rocks.

In the **Deerhead** pool, four oil wells and one dry hole were completed during 1947. The producing zone, the Viola, which is about 135 feet thick, was encountered about 3,042 feet below sea level. The initial capacity of one of the new oil wells was 2,900 barrels per day.

Fifteen new oil wells and one gas well were completed in the **Boggs** pool, discovered in 1946. The Simpson sandstone, sometimes called the "Wilcox," is the producing zone. Its depth is roughly 3,300 feet below sea level. Some of the dry holes reached the Simpson sandstone at relatively high elevations.

Figure 5 shows the oil and gas pools of Barber County. These pools and pertinent figures concerning area, production, and producing zones are listed in Table 12. Table 13 gives information about dry wildcat tests drilled in the county during 1947.

TABLE 13.—*Dry wildcat tests drilled in Barber County during 1947*

Company and farm	Location	Depth to top of Lansing, feet	Depth to top of Arbuckle, feet	Total depth feet
Earl F. Wakefield No. 1 Rolf	NW cor. SW¼ 5-30-11W	3,873	4,791	4,839
Gabbert & Lindas et al. No. 1 Lawrenz	NW cor. SW¼ 16-30-12W	3,878	4,682	4,727
J. M. Huber Corp. No. 1 Baker	NE cor. NE¼ 17-30-14W	3,987	4,654	4,705
Globe & Huber No. 1 Smith	Cen. E½ NE¼ NE¼ 10-32-12W	3,679	4,707	4,741
J. M. Huber Corp. No. 1 Peckenpaugh	SW cor. NE¼ 34-32-14W	4,231	5,306	5,336
Bishop Oil Co. No. 1 Burns	NE cor. NE¼ 25-33-11W	3,921	5,214	5,242
Champlin Refg. Co. No. 1 Storm	NE¼ SE¼ NE¼ 12-33-14W	4,214	5,288	5,334
J. M. Huber Corp., et al. No. 1 Cook	Cen. W½ SW¼ NW¼ 8-34-12W	3,974	5,417	5,459
J. M. Huber Corp., et al. No. 1 Achenbach	Cen. NW¼ SW¼ 11-35-13W	4,234	5,611	5,636

BARTON COUNTY

Historical background.—Although there was drilling in the 1920's the first successful attempt to find oil in Barton County was in March 1930 when the Prairie Oil Company completed its first well on the Davidson farm in sec. 4, T. 16 S., R. 11 W. to open the Davidson pool. Oil was found in the Arbuckle dolomite which has since provided most of the oil found elsewhere in the area. In October of 1931, Hilligoss and Torry completed the first well in the Isern pool. This discovery, also an Arbuckle producer, supplied the nucleus for what later became the important Silica pool through combination of the Isern, the Schartz, the Steckel, and the Kowalsky pools. (The original Kowalski is not to be confused with the present Kowalsky pool in the SW cor. T. 20 S., R. 11 W.) The Silica pool, one of the richest oil-producing areas in the State, now covers 25,000 acres and has produced more than 77 million barrels of oil.

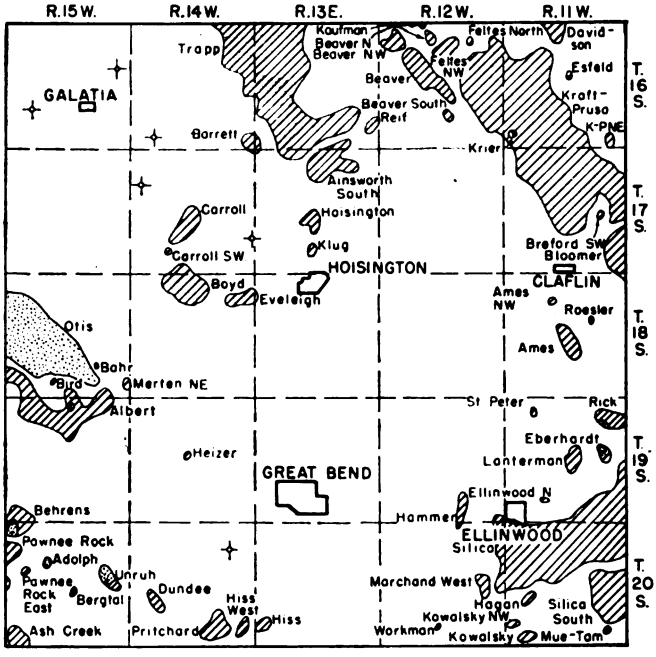

FIG. 6.—Map of Barton County showing oil and gas pools and dry wildcat tests drilled during 1947. (Gas, dots; oil, diagonal lines.)

Five years later, in February 1936, the first well was completed in the Bloomer pool. The well was drilled by Yarnell and Spencer in sec. 36, T. 17 S., R. 11 W. almost on the east line of the county. Oil comes from both the Kansas City-Lansing and Arbuckle groups.

From 1934 until the present, two or more pools have been discovered in Barton County each year. In 1947, eight new oil pools, all still producing, and two new gas areas were opened. Of the four outstanding fields in the county—the Silica, Bloomer, and Kraft-Prusa oil pools and the Otis gas pool—only the Kraft-Prusa lies almost wholly within Barton County. The Bloomer had produced 27.4 million barrels of oil to the end of 1947. Meantime, the Kraft-Prusa, discovered in May 1937, had produced 31.2 million barrels to that date and is now producing at about double the rate of the Bloomer. The Silica pool, dating from 1931, ranks third among pools of the State in total production, and is still producing more than 5 million barrels of oil per year.

Secondary recovery operations.—Barton County is the scene of an interesting experiment in secondary oil recovery. Late in 1946 the Stanolind Oil and Gas Company started work on an operation using nitrogen instead of natural gas for injection into the Arbuckle sand of part of the Silica pool. It was understood (McCaslen, 1947) that the Stanolind engineers regarded the experiment as "field research" in reservoir mechanics. In the area of 580 acres selected, the production from the 24 wells was down to an aggregate daily output of 345 barrels of oil and 5,334 barrels of water, a 15:1 water-to-oil ratio. Natural gas for injection was not readily available at low cost, so nitrogen, which was not expected to introduce corrosion problems, was selected for introduction into the two input wells. In the absence of a free gas phase in the porous Arbuckle dolomite here, it was presumed that oil trapped in the upper closures within pore channels and within local structural highs between wells might be released or "chased out" by introduction of a free-phase gas, such as nitrogen. The nitrogen is produced in a 45,000 cubic-foot-per-hour generator and injected at a pressure of about 1,000 pounds per square inch.

Results of this experiment will be watched with interest, as they may suggest a feasible method of recovering oil from other

depleted producing areas where conditions are analogous to those in the Silica pool.

Statistical summary for Barton County, 1947

Oil produced	17,540,101	barrels
Gas produced	5,464,413	thousand cubic feet
Wells drilled: Oil	222	
Gas	6	
Dry	112	
Salt water disposal	2	
Total	342	
Wildcat wells	12	(included in above total)
New pools: Oil	5	
Gas	1	
Revived pools	none	
Abandoned pools: Oil	3	
Secondary recovery operations	1	

Development during 1947.—Barton County was actively prospected for petroleum during 1947. As a result, five new oil pools and one gas pool were discovered. One of these is the **Ash Creek** pool in the extreme southwestern corner of the county. The Bay Petroleum Corporation drilled the first successful test there on the Houdyshell farm in the NE¼ SE¼ SW¼ sec. 31, T. 20 S., R. 15 W. In this well the top of the Arbuckle dolomite, the producing zone, was found at 3,787 feet. A potential capacity of 477 barrels of oil per day was assigned to this well. Before the close of the year, 13 additional oil wells and 1 dry hole were completed in this pool. An interesting stratigraphic situation was discovered during the development of the pool. The Arbuckle dolomite generally occurs immediately below the Pennsylvanian basal conglomerate (Sooy formation) in this part of the State, but some wells in this pool found other Ordovician beds between the conglomerate and the Arbuckle. In the No. 1 Houdyshell well, drilled by the Bay Petroleum Corporation as the discovery well, 30 feet of the Simpson formation was found. Simpson rocks were also found in six other wells. The greatest thickness of Simpson encountered was 35 feet. In a few wells a thin wedge of the Viola was also encountered. These wells are located in the SW¼ sec. 31 where the Phillips Petroleum Company drilled seven wells before the close of the year. The Viola ranges from a few inches to a maximum of 33 feet in thickness. Despite these variations in the stratigraphic sequence at the bottom of the hole the producing zone in each case is the Arbuckle dolomite. The Ash Creek pool is showing a rather consistent relationship between structure and

production. The highest wells are those in the NW¼ sec. 31 while the low wells are located in the SW¼ sec. 32. One test, a dry hole in sec. 32, found the Arbuckle dolomite 2,039 feet below sea level, 250 feet lower than other tests in the pool.

Another new Barton County pool was found by Robert L. Williams when he completed the first test on the Ehly farm in the SE cor. NW¼ sec. 9, T. 18 S., R. 11 W. This well produces from the Arbuckle dolomite which was found at 3,312 feet. The well's potential capacity was 173 barrels of oil with about 45 percent water. Inasmuch as the new discovery lies only 1½ miles northwest of the Ames pool, it has been named the **Ames Northwest.** The first well was completed in October 1947, and no further tests have since been made in the vicinity.

The third new pool in Barton County, the **Carroll Southwest,** was discovered by the Bridgeport Oil Company in the NE cor. sec. 32, T. 17 S., R. 14 W. on the Hunt lease. The test was drilled into the Arbuckle dolomite to a total depth of 3,473 feet without finding production. The well was then plugged back to test a good showing higher up. The pipe was perforated between 3,193 and 3,201 feet, 16 feet below the top of the Kansas City-Lansing, and the well was completed. The initial capacity was determined as 180 barrels of oil per day. One offset test drilled later by the Bridgeport Oil Company was dry.

The discovery well of the **Esfeld** pool was drilled by Bennett and Roberts on the Esfeld farm in the SE cor. NW¼ sec. 15, T. 16 S., R. 11 W. Production, at the rate of 138 barrels per day, comes from the Arbuckle dolomite between 3,343 and 3,358 feet. This new pool is located about 1½ miles east of the Kraft-Prusa. No other tests were drilled in the vicinity during 1947.

The first well of the **Kowalsky Northwest** pool, located in sec. 30, T. 20 S., R. 11 W., was completed in December 1947. It was drilled by Robert L. Williams, and had an initial potential of 994 barrels of oil per day. Oil was found in the Arbuckle at 3,381 feet.

A new gas pool, the **Adolph,** was discovered by the Kansas-Nebraska Natural Gas Company in sec. 16, T. 20 S., R. 15 W. The well was rated as capable of producing 10.2 million cubic feet of gas per day. The gas comes from the Arbuckle at 3,734 feet. Two near-by wells, not close enough to be offset locations, were dry. One of these, drilled by the Table Mesa Oil Company in sec. 17, T. 20 S., R. 15 W., found the top of the Arbuckle at 3,904 feet, and

the other well, drilled by the Alkay Oil Company in the SW¼ sec. 9, T. 20 S., R. 15 W., encountered the cherty conglomerate, probably not far above the Arbuckle, at 3,733 feet. It is significant that the producing horizon occurred more than 100 feet higher in the gas well than in either of the dry holes.

One old pool, the **Kowalsky**, idle for several years, again began producing. The original well in the Kowalsky pool was completed during 1941. By 1944 the pool, after having produced 2,540 barrels of oil, became idle. In 1947 a well drilled in sec. 32, T. 20 S., R. 11 W. on the Kowalsky farm by the Bay Petroleum Corporation had an initial production of 458 barrels of oil from the Arbuckle dolomite between 3,365 and 3,374 feet. By the close of the year, the total number of tests drilled in the Kowalsky pool in 1947 was seven, six of them producers.

Routine operations in the other established pools of Barton County resulted in many new oil wells, some gas wells, and a considerable number of dry holes. A brief summary of operations in the county is presented below.

In the large **Kraft-Prusa** pool 47 new oil wells and 20 dry holes were completed. On the Skelly lease in the NE¼ sec. 31, T. 16 S., R. 11 W. granite was found beneath the Pennsylvanian conglomerate. Another well in the NW¼ sec. 31 found quartzite below the conglomerate. In this test the hole was plugged back to produce in the Kansas City-Lansing. One well in sec. 11, T. 17 S., R. 12 W. (ElDorado Refining Company No. 3 Ehler) had an initial potential of 200 barrels per day from the Pennsylvanian basal conglomerate.

The largest pool in T. 16 S., R. 12 W. is the **Beaver.** Eight new oil wells and six dry holes were completed during the year. The Sooy conglomerate produces oil in the Franco-Central Oil Company No. 4 Meyers well in sec. 16 and the Gorham sand produces oil in two of the new wells. In the Black-Marshall Oil Co. No. 1 Kultgen test in sec. 17 no Arbuckle was found, but the Reagan sandstone was present and quartzite was found below it. The Reagan here was 41 feet thick. Granite was found in the Hartman No. 1 Rieman well in sec. 23, T. 16 S., R. 12 W. at the depth where normally the Arbuckle would be expected. Quartzite was found at the level of the Arbuckle in the Phil-Han Oil Company No. 1 Depiesse well in sec. 5.

Three new oil wells were added to the **Beaver Northwest** pool. In the **Reif** pool only one new producer was found. The **Trapp** pool, largest producer in the State during 1947, was the scene of extensive drilling operations. Thirty new oil wells were added to the approximately 1,220 previous wells in the pool. (Other data regarding the pool are given under Russell County.) The Arbuckle dolomite was absent in the Weaver No. 4 Prusa test in sec. 20, T. 16 S., R. 13 W. Quartzite occurs at the level usually occupied by the producing dolomite. This test was plugged back and completed as a producing well in the Kansas City-Lansing. The same situation was found in the Continental No. 7 Shriber test in sec. 32, T. 16 S., R. 13 W. Here, also, quartzite was found where the Arbuckle was expected. In sec. 24, T. 16 S., R. 14 W., the Derby Oil Company No. 5 Siemsen test found the Arbuckle dry at 3,403 feet and drilled into quartzite at 3,576. The test was completed at 3,606 feet in the quartzite.

Five new oil wells and seven dry holes were completed in the **Ainsworth South** pool. Six new oil wells and one dry hole were completed in the **Hoisington** pool. Two oil wells and three dry holes were drilled in the **Carroll** pool in 1947.

Much activity in the area of the **Ames** pool resulted in the completion of 11 new oil wells and 5 dry holes. Eight of the new wells produce oil from the Kansas City-Lansing and three produce from the Arbuckle dolomite. The top of the Arbuckle in the three producing wells ranges from 1,525 to 1,541 feet below sea level. Some of the Kansas City-Lansing producers which found the Arbuckle dry encountered the Arbuckle less than 1,541 feet below sea level. Furthermore, several dry holes found the top of the Arbuckle at about 1,529 feet below sea level.

Four oil wells and one dry hole were drilled in the **Eveleigh** pool. Two oil wells and four dry holes were added to the **Boyd** pool.

The **Merten** and **Albert** pools have been combined and are now known as the Albert pool. During 1947, 36 new oil wells and 4 dry holes were completed. At the beginning of 1947, all the 36 wells in the Merten pool produced from the Reagan sandstone. Although 31 of the new wells also derive their oil from the Reagan, there are five wells which produce from the Arbuckle. In one well, located in the SW¼ sec. 32, T. 18 S., R. 15 W., 10 feet of Arbuckle dolomite was found between the Pennsylvanian rocks and

the Reagan sandstone, but production in this well is not from the Arbuckle. Farther south the Arbuckle dolomite was found in eight different wells in secs. 3, 5, 6, and 7, T. 19 S., R. 15 W. The thickness of the Arbuckle ranges from 2 to more than 27 feet. Three wells in sec. 5 and two wells in sec. 6 produce oil from the Arbuckle dolomite. Other wells in sec. 6 produce oil from the Reagan sandstone below the Arbuckle. In one well in sec. 5, drilled by the Skelly Oil Company on the Schultz farm, the Reagan sandstone was found to be unproductive, and oil was found in the Pre-Cambrian quartzite below.

The Barton County part of the important **Silica** pool lies mainly in T. 20 S., R. 11 W. This pool, although discovered in 1931, still is quite active. In 1947, 25 new oil wells and 8 dry holes were drilled in the Barton County part of the pool. (For other data see Rice County.) In the **Silica South** pool four new oil wells and five dry holes were completed. In the **St. Peter** pool one oil well and one dry hole were completed during the year. One oil well was added to the **Rick** pool. One new oil well was reported in the **Hammer** pool.

The **Unruh** gas area was enlarged by three new gas wells. One oil well and three dry holes also were drilled. Exploration in the

TABLE 14.—*Oil and gas pools of Barton County*

Pool and location of discovery well	Discovery year	Area acres	1947 production	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
			barrels				
Ainsworth South 10-17-13W	1937		6,982	33,486	2	Arbuckle	3,390
Albert 30-18-15W	1935	6,500	617,140	2,322,515	90	Reagan	3,601
Ames 22-18-11W	1943	600	295,923	480,683	22	K.C.-Lans. Arbuckle	3,042 3,348
Ames Northwest 9-18-11W	1947	40	735	735	1	Arbuckle	3,312
Ash Creek 31-20-15W	1947	400	77,683	77,683	19	Arbuckle	3,787
Bahr 26-18-15W	1943	80		29,925	2	Reagan	3,495
Barrett 36-16-14W	1943	120	15,701	75,505	3	Arbuckle	3,463
Beaver 16-16-12W	1934	1,300	685,395	2,836,550	34	Oread Arbuckle Reagan	2,885 3,348 3,335
Beaver North 4-16-12W	1937	300	69,027	371,262	7	Arbuckle	3,316
Beaver Northwest 6-16-12W	1942	120	9,660	62,945	3	K.C.-Lans.	3,066
Beaver South 27-16-12W	1945	120	11,088	33,698	3	Arbuckle	3,359

TABLE 14.—*Oil and gas pools of Barton County (continued)*

Pool and location of discovery well	Discovery year	Area acres	1947 production	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
			barrels				
Behrens 6-20-15W	1944	700	115,505	201,695	16	Arbuckle	3,719
Bergtal 22-20-15W	1941		692	692	1		
Bird 33-18-15W	1940	200	16,166	46,571	5	Reagan	3,508
Bloomer 36-17-11W	1936	5,000	3,062,066	27,371,786	273	K.C.-Lans. Arbuckle	3,044 3,257
Boyd 4-18-14W	1942	900	371,327	1,112,252	31	K.C.-Lans. Arbuckle	 3,438
Breford Southwest 23-17-11W	1942	40	3,352	20,685	1	Arbuckle	3,299
Carroll 21-17-14W	1944	900	163,033	338,293	1 20	K.C.-Lans. Arbuckle	3,109 3,356
Carroll Southwest 32-17-14W	1947	80	3,892	3,892	2	Lansing	3,193
Davidson 4-16-11W	1930	400	26,136	340,261	11	K.C.-Lans. Sooy Arbuckle	3,016 3,317 3,314
Dundee 29-20-14W	1945	40	2,590	3,865	1	Arbuckle	3,507
Eberhardt 14-19-11W	1935	320	29,458	328,703	7	K.C.-Lans. Arbuckle	3,194 3,311
Ellinwood North 33-19-11W	1937	40	2,614	70,654	1	Arbuckle	3,328
Esfeld 15-16-11W	1947	40	571	571	1	Arbuckle	3,343
Eveleigh 11-18-14W	1943	360	112,827	283,997	13	K.C.-Lans. Arbuckle Pre-Cambrian	 3,339 3,311
Feltes North 2-16-12W	1944	included with Feltes Northwest			1	Arbuckle	3,338
Feltes Northwest 3-16-12W	1945	300	65,038	124,713	7	Arbuckle	3,342
Hagan 20-20-11W	1938	160	41,923	258,878	4	Arbuckle	3,323
Hammer 35-19-12W	1940	200	81,971	179,011	9	Arbuckle	3,348
Heizer 16-19-14W	1935	40	3,183	35,023	1	K.C.-Lans.	3,228
Hiss 31-20-13W	1936	800	133,415	797,310	14	K.C.-Lans.	3,270
Hiss West 36-20-14W	1945	included with Hiss				K.C.-Lans.	3,250
Holsington 21-17-13W	1938	500	44,399	263,669	13	K.C.-Lans. Arbuckle	3,222 3,440
Kauffman 33-15-12W	1947	see Russell County					
Klug 28-17-13W	1946	80	10,582	15,406	2	Arbuckle	3,414
Kowalsky 32-20-11W	1941	200	10,134	12,674	6	Arbuckle	3,378
Kowalsky Northwest 30-20-11W	1947	40	none	none	1	Arbuckle	3,381
Kraft-Prusa 10-17-11W	1937	18,000	6,397,105	31,251,115	542	Shawnee K.C.-Lans. Gorham Arbuckle Reagan	2,885 3,160 3,335 3,281 3,310

Kraft-Prusa-Northeast 36-16-11W	1941	160	14,985	154,150	3	Arbuckle	3,351
Kruckenberg 14-19-15W	1939	abandoned during 1947				Arbuckle	3,580
Lanterman 15-19-11W	1934	500	9,331	762,071	11	K.C.-Lans. Arbuckle	3,109 3,235
Marchand West 24-20-12W	1939	included with Silica					
Merten 10-19-15W	1942	combined with Albert					
Merten Northeast 36-18-15W	1946	40	2,981	8,369	1	Arbuckle	3,494
Mue-Tam 35-20-11W	1942	40	none	17,731	1	Arbuckle	3,312
Odin 10-17-12W	1941	abandoned during 1947			1	Arbuckle	3,340
Otis	no oil produced in Barton County part						
Pawnee Rock	see Pawnee County						
Pawnee Rock East 17-20-15W	1941	40	1,012	14,548	1	Arbuckle	3,814
Pospishel 20-17-15W	1939	abandoned during 1947				Arbuckle	3,548
Pritchard 34-20-14W	1944	750	151,607	420,007	15	Arbuckle	3,455
Reif 30-16-12W	1944	160	10,359	37,064	3	K.C.-Lans. Arbuckle	3,253 3,399
Rick 1-19-11W	1936	500	46,723	727,033	12	K.C.-Lans. Arbuckle	3,106 3,355
Roesler 14-18-11W	1943	40	3,596	26,056	1	Arbuckle	3,291
St. Peter 5-19-11W	1944	80	14,501	44,296	2	Arbuckle	3,387
Silica 12-20-11W	1931	25,000	5,145,884	77,301,454	710	K.C.-Lans. Arbuckle	2,955 3,328
Silica South 24-20-11W	1935	included with Silica				K.C.-Lans. Arbuckle	3,035 3,268
Trapp	see Russell County						
Unruh 24-20-15W	1945	120	3,332	30,197	3	Arbuckle	3,641
Workman 33-20-12W	1944	40	2,981	12,661	1	Arbuckle	3,407
Adolph 16-20-15W	1947	160	none	none	1	Arbuckle	3,734
Albert (gas) 30-18-15W	1935		109,344	213,843		Reagan	3,601
Behrens (gas) 6-20-15W	1944	included with Pawnee Rock see Pawnee County					
Bergtal (gas) 22-20-15W	1941	500			3	Arbuckle	3,689
Eberhardt (gas) 14-19-11W	1935		254,459	254,459			
Krier 30-16-11W	1944	within Kraft-Prusa pool	37,587	210,149	2		
Merten (gas) 10-19-15W	1945	combined with Albert					
Otis (gas)	see Rush County						
Rick (Silica) (gas) 11-19-11W	1941	400	17,373	344,222	2	Arbuckle	3,355
Unruh (gas) 24-20-15W	1945	500	2,807,726	3,713,565	3	Arbuckle	3,641

TABLE 15.—*Dry wildcat tests drilled in Barton County during 1947*

Company and farm	Location	Depth to top of Lansing, feet	Depth to top of Arbuckle, feet	Total depth, feet
Helmerich & Payne No. 1 Davis	NW cor. SW¼ 32-16-14W			3,718
Texon Oil & Land Co. No. 1 DeWald	SE¼ NE¼ NE¼ 13-16-15W	3,152	3,486	3,504
Stickle Drlg. Co. No. 1 Morrison	NW cor. NW¼ 29-16-15W	3,292	3,613	3,655
Derby Oil Co. No. 1 Curtis	SW cor. SE¼ 7-17-14W	3,142	3,395	3,420
Anderson-Prichard & Bay No. 1 Putnam	SE cor. NE¼ 25-17-14W	3,184	3,434	3,491
Lion Oil Co. No. 1 Merton	SW cor. NW¼ 12-20-14W	3,234	3,491	3,588

Behrens pool resulted in four new oil wells, one new gas well, and two dry tests. In the **Bergtal** pool one new gas well was completed and one old well was worked over into a small oil producer. Three new oil wells and one dry hole were completed in the **Pritchard** pool in T. 20 S., R. 14 W. An interesting stratigraphic variation was found in one well in sec. 35 where 8 feet of Simpson formation intervened between the Arbuckle and the Pennsylvanian strata (Trickett No. 3 Weathers). In the **Hiss West** pool one new oil well, the Phillips Petroleum Company No. 4 Spani in sec. 36, T. 20 S., R. 14 W., was drilled to test the Arbuckle, but the Arbuckle was absent. Instead, granite was found at the usual level of production. The test was then plugged back to the Kansas City-Lansing where pipe was perforated between 3,287 and 3,413 feet. Enough oil came into the hole to justify a potential capacity of 3,000 barrels per day. This is an area where Pre-Cambrian granite peaks project high into the Pennsylvanian strata.

The oil and gas pools of Barton County are shown on Figure 6. Their production, area, and depth to producing zone are given in Table 14. The dry wildcat tests drilled in the county during 1947 are listed in Table 15.

BOURBON COUNTY

Historical background.—Oil and gas production in this county began just after the turn of the century. In 1906 there were six gas and eight oil wells in the county. The Walnut-Hepler pool was discovered in 1917 and the Bronson in 1919.

It is reported that gas was discovered in the vicinity of Fort Scott at a very early date, but little definite information as to the location and depths of wells is available. More important gas fields were opened later. The Mapleton pool was discovered in 1918, the Fulton gas area much more recently, in 1943.

Oil and gas production in the county has come almost entirely from sandstones in the Cherokee shale. The "Bartlesville sand," lying at a depth of about 665 feet in the Bronson-Zenia area along the west line of the county, and at about 450 feet in the Fulton field in the northeastern corner of the county, has been the most important oil and gas producing zone.

Oil produced in 1947 totaled 31,660 barrels. Gas production figures are not available. There were five active oil pools. No secondary recovery operations were reported.

Developments during 1947.—No record of holes drilled is available although it is thought that a few were put down along the west line of the county in connection with water-flooding operations.

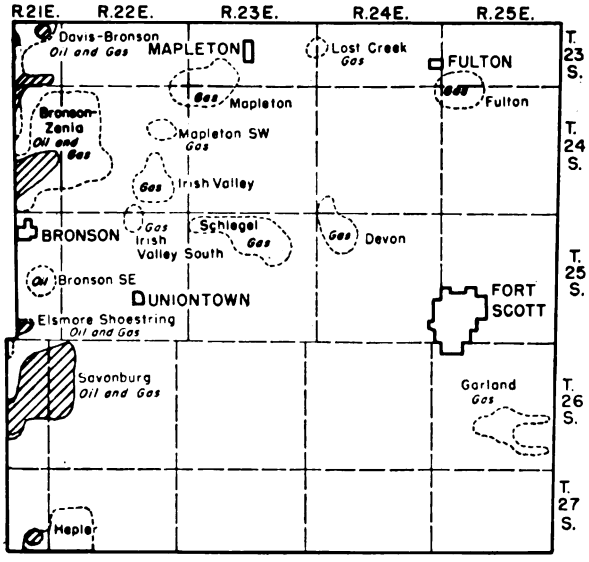

FIG. 7.—Map of Bourbon County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

TABLE 16.—*Oil production in Bourbon County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Bronson-Zenia[1]	4	397
Davis-Bronson[1]	62+	23,059
Elsmore Shoestring[1]	12	1,092
Hepler		715
Savonburg[2]	11	6,397
Total	89+	31,660

[1] Field extends into Allen County
[2] Includes Allen County production.

Oil activity in the county centered mainly in a strip of land about 2 miles wide bordering and extending along the west line of the county. There is a row of oil pools that follows rather closely for 25 or 30 miles the common boundary of Allen and Bourbon Counties. In order, counting from the south, they are the **Hepler, Savonburg, Elsmore Shoestring, Bronson-Zenia,** and **Davis-Bronson** pools. Judging by the number of active wells in the pools, production in none of them was greater than 1 or 2 barrels per day. The five active pools are therefore classed as "strippers."

Some gas was produced in the county during the year, but there is no record of the amount produced within the county borders.

One well drilled for gas about a mile southwest of Redfield by a company supplying natural gas to local communities was reported to have been unproductive and abandoned at a depth of about 650 feet.

A list of active pools and their production in 1947 is given in Table 16. The oil and gas producing areas are shown on Figure 7.

BROWN COUNTY

Historical background.—In June or July 1944 oil was discovered by Clifton Gall in a well in Brown County within a mile of the Nebraska boundary. The well was the No. 1 Livengood in sec. 3, T. 1 S., R. 15 E., and the pool was named the Livengood. Oil was found in the "Hunton" limestone at a depth of 2,579 feet. The well was rated initially at 85 barrels of oil and 25 barrels of water.

The records are not complete, but it seems that five wells now have been drilled in this section. One of them produced 40 bar-

rels per day from the "Hunton" just after the first of 1948. In May 1945 the R. S. Tomer Production Company drilled a well one-quarter mile north of the opener. Later in 1945, the same company drilled another well about one-quarter mile south of the discovery well. Each of the three wells, including the pool opener, received an initial rating of 85 to 90 barrels of oil per day, but casing difficulties and distance from pipe line are said to have been responsible for much less than maximum production in the new pool. The fifth well in the section was a dry hole reported to have been drilled in the NW¼ NE¼ by Mid-Kansas Oil Company.

Oil produced in 1947 totaled 9,630 barrels. There was no gas produced, and only one active oil pool.

Developments during 1947.—One well was located by Stout and Hahn in the **Livengood** pool, about one-quarter mile southeast from the discovery well, but was not finished until 1948. Stout and Hahn are reported to have taken over the principal acreage in the Livengood pool, and to be preparing to develop the field.

It is commonly believed that geological conditions about the Livengood pool are analogous to those in the Falls City, Nebraska, pool where the "Hunton" limestone is the reservoir rock.

During 1947, Brown County was the scene of much surface geologic work by two or three oil company groups. One of the major companies is understood to have leased a substantial-sized block of acreage after conducting geophysical investigations over a broad area.

BUTLER COUNTY

Historical background.—It is said that gas was being produced in the vicinity of Augusta as early as 1906 (Fath, 1921, p. 17). The first Butler County oil discovery, however, was not until June 1914 when Augusta again was the site of an important find.

That discovery was overshadowed, however, in early October 1915 when the ElDorado oil pool was opened by the No. 1 Stapleton well drilled by the Wichita Natural Gas Company in sec. 29, T. 25 S., R. 5 E. Production was estimated at 50 to 200 barrels per day from the Admire group (Permian) at 660 to 678 feet. This well was deepened to the "Stapleton" zone at 2,465 feet where a production of 175 barrels per day was developed.

Production of oil and gas in Kansas was 2,823,487 barrels in 1915, 8,783,077 barrels in 1916, 36,536,125 barrels in 1917, and the then record of 45,551,017 barrels was made in 1918. The El-Dorado field alone produced about 20 million barrels or 57 percent of the State's total in 1917, and nearly 30 million barrels or two-thirds in 1918. In that year the ElDorado oil field was the leading field in the entire United States, and now, 30 years later, it ranks far above any other in Kansas in total production since discovery and total production in any single year.

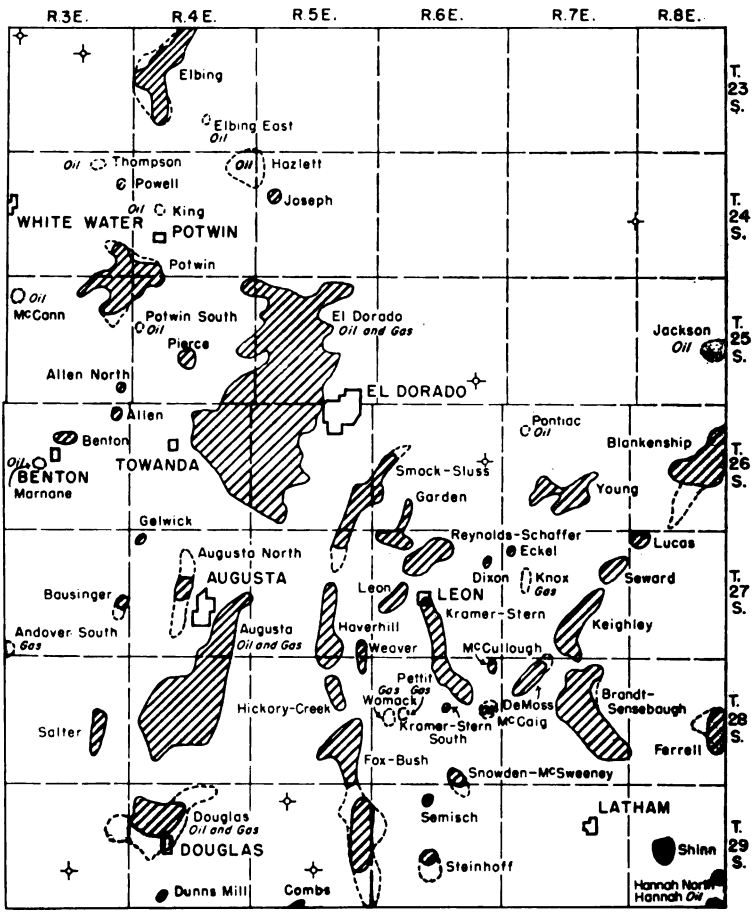

FIG. 8.—Map of Butler County showing oil and gas producing areas and dry wildcat tests drilled during 1947. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

The first gusher in the field was drilled in sec. 11, T. 26 S., R. 4 E. by the Trapshooter Oil Company in June 1917. It produced about 15,000 barrels of oil per day. Another famous gusher was the Gypsy Oil Company No. 5 Shumway well, located about 1,500 feet northeast of the Trapshooter. The Shumway No. 5 produced about 2½ million barrels of oil during its flowing life (Fath, 1921, p. 23) of 222 days, probably a greater production than that of any other midcontinent well up to that time.

The advent of the ElDorado field marked the beginning of really important oil and gas production in Kansas. Annual oil production was measured in tens of millions of barrels and gas production in tens of billions of cubic feet from shortly after the ElDorado field was discovered.

Producing zones in the ElDorado field have been the Admire rocks at about 600 feet, the Kansas City-Lansing group at about 1,700 feet, the Bronson rocks at about 2,000 feet, and the Viola limestone at about 2,500 feet.

The development of the petroleum industry in Butler County subsequent to the Augusta and ElDorado pool discoveries is illustrated in part by the following. The Towanda pool was opened in 1916; the Fox-Bush, producing from the "Bartlesville," was opened in 1917; and the Elbing, producing from the Viola, was found in 1919. The Potwin pool, which produces from the Bronson rocks at about 2,550 feet and from the "Mississippi lime" at about 2,660 feet, was opened in 1921. In 1926, the Leon field, producing from "chat" at about 2,660 feet and from the Viola at about 3,050 feet, was opened. The Haverhill, discovered during 1927, produces from the "Bartlesville," and the Kramer-Stern, discovered the following year, produces from the Ordovician at about 3,050 feet.

Several other smaller pools have been found in Butler County, and there is still a substantial amount of primary oil production. However, secondary oil recovery in recent years has accounted for an important amount of the production in the county.

The Magnolia Petroleum Company has been a leading secondary recovery operator in this county, having started their first project in the Kramer-Stern pool in 1937. The Magnolia had five water-flooding operations, the United Oil & Gas Company one, the Morrison Producing Company one, and the Cooperative Refinery Corporation one at the end of 1947. The operations were

active in the Fox-Bush, ElDorado, Kramer-Stern, Young, and Seward pools. Water-flood data are given in Table 8.

Statistical summary for Butler County, 1947

Oil produced		5,611,484 barrels
Gas produced		Figures not available
Wells drilled:	Oil	181
	Gas	1
	Dry	87
	Salt water disposal	3
	Total	272
	Wildcat wells	15
New pools:	Oil	4
	Gas	1
Revived or abandoned pools		none
Number of active pools		45
Secondary recovery operations		11

Developments during 1947.—One new gas pool and four new oil pools were discovered in Butler County during the year. The **Kramer-Stern South** pool was discovered in sec. 15, T. 28 S., R. 6 E. by J. M. Huber et al. The pool opener was the No. 1 Gardiner which produced 35 barrels of oil per day from the Viola at 3,036 feet.

Dunne and Strait opened the **Semisch** pool with their No. 1 well in the SW¼ sec. 4, T. 29 S., R. 6 E. The well was rated at 50 barrels of oil and 10 barrels of water from the "Bartlesville" at about 2,800 feet.

A new pool, called the **Joseph,** was discovered by Cox and Burns in the NE¼ sec. 18, T. 24 S., R. 5 E. Production was estimated at about 15 or 20 barrels of oil per day from the "chat" at 2,491 feet.

Another oil pool was opened in the NW¼ sec. 36, T. 25 S., R. 3 E. by Rex and Morris with their No. 1 Robinson well. The pool was named **Allen North.** Production estimated at 25 barrels per day is from the Mississippian between 2,708 and 2,721 feet.

One new gas pool was discovered in the county by the J. M. Huber Corporation in working over a well previously drilled and abandoned in 1946. The discovery well was drilled in the NE¼ sec. 19, T. 28 S., R. 6 E. Production of the new well is estimated to be 2 million cubic feet of gas per day from the "Bartlesville."

The number of wells drilled in Butler County seems surprisingly large until one takes into account the fact that there are 45 active pools. Many of these, in fact most of them, must be classed

as strippers if productivity of not more than 5 barrels of oil per day per well is used as basis of classification. On that seemingly fair basis, even the **ElDorado** pool, as well as the Augusta and Augusta North, must be classed as strippers. Certainly this implies

TABLE 17.—*Oil production in Butler County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Allen	1+	98,555
Allen North		710
Augusta	128+	248,252
Augusta North	65	84,317
Bausinger	4	4,950
Benton	1	2,070
Blankenship[1]	82	68,460
Brandt-Sensebaugh		101,790
Combs	see Cowley County	
DeMoss	4	32,079
Douglas	29+	20,592
Dunns Mill	1	2,089
Eckel		3,271
Eckel West (Dixon)		2,300
Elbing[2]	61	224,026
ElDorado	1,755+	2,736,863
Ferrell	30	99,652
Fox-Bush	80	313,134
Garden	28+	38,916
Gelwick	1	1,800
Hannah North	1	318
Haverhill	60+	86,626
Hickory Creek	14	154,740
Joseph	1	270
Keighley	36	37,440
Kramer-Stern	34	236,944
Kramer-Stern South	2	990
Leon	18	27,360
Lucas	1	3,690
McCullough		7,624
Pierce	21	133,200
Powell	1	150
Potwin	93	164,596
Reynolds-Schaffer	11	79,540
Salter	21	100,183
Semisch	1	4,260
Seward	14	7,620
Shinn	3	79,842
Smock-Sluss	61	161,245
Snowden-McSweeney		3,054
Steinhoff	2	3,300
Weaver		1,927
Young	74	232,739
Total	2,739+	5,611,484

[1] Includes Greenwood County production
[2] Includes Marion County production

TABLE 18.—*Dry wildcat tests drilled in Butler County during 1947*

Company and farm	Location	Depth to top of Lansing, feet	Depth to top of Mississippian feet	Total depth, feet
Hipple et al. No. 1 Janzen	SW cor. NE¼ 6-23-3E	2,120	2,796	3,280
D. S. Hager No. 1 Frey	SW¼ NW¼ NE¼ 10-23-3E	2,030	2,606	3,102
B. V. Cox et al. No. 1 Darst	NE cor. SE¼ 12-24-5E		2,685	3,092
Donald T. Ingling, Inc. No. 1 Foltz	NE cor. NE¼ 24-24-7E		2,750	2,775
Barnsdall Oil Co. No. 1 Hess	SW cor. SE¼ 26-25-6E	1,770		2,680
D. S. Hager No. 1 Webb	NE¼ SW¼ SW¼ 13-26-6E		2,740	2,745
Shawver-Graham No. 1 Nelson	SW SW¼ 33-28-3E	2,080	2,664	3,265
Baker & Yeager No. 1 Jones	NE¼ NW¼ NW¼ 27-29-3E	2,105	2,905	3,256
E. H. Adair Oil Co. No. 1 Guyot	SW¼ SE¼ SE¼ 5-29-5E		2,865	2,882
Mid Plains & Veeder Sply. No. 1 Whitbeck	SW¼ NW¼ NW¼ 27-29-5E	1,817	2,859	2,883

no disparagement of the State's outstanding oil field which 33 years after its discovery is still producing 2¾ million barrels of oil a year from 2,000 wells, or 3.75 barrels per well per day. By comparison, the Trapp field, which is the largest producing field in the State at this time, has 1,232 wells producing an average of 25 barrels per well per day. That field is only 12 years old.

How many of the 272 wells drilled in Butler County during 1947 were in connection with water flooding is not known. The number probably was large. A list of the active oil pools and their production during 1947 is given in Table 17.

Probably 75 million cubic feet of gas was produced in the county during 1947, but the figure is a rough estimate.

The oil and gas producing areas in the county are shown on Figure 8. A list of the dry wildcat tests is given in Table 18.

CHASE COUNTY

Historical background.—Wells were drilled in search of oil or gas in Chase County for a number of years after the turn of the century, but the first production was not reported until sometime in the 1920's. The Elmdale gas pool is said to have been the first

discovered. It was found in the early 1920's, but the year is uncertain. In September 1925, the Lipps pool was discovered—according to available record—by the Preston and Pasewalke No. 1 well on the Lipps farm in sec. 32, T. 18 S., R. 7 E.

In the same year, 1925, the Teeter oil pool was extended across the county line into Chase from Greenwood County. Not long afterward, the Atyeo oil pool was extended into Chase County from Lyon County along the line between Rs. 9 and 10 E.

The Teeter and Atyeo oil pools produce from the "Bartlesville sand." Gas is produced from several zones in the various fields—from the Lawrence shale in the Lipps field; from Lower Permian rocks between depths of 340 and 350 feet in the Davis field; and also from Lower Permian rocks in the Elk, Neva, and Elmdale pools.

Production from the Chase County parts of the Teeter and the Atyeo fields is not segregated.

Developments during 1947.—Total production from the Teeter field, which chiefly is in Greenwood County, was 212,557 barrels; production from the Atyeo field, chiefly in Lyon County but extending into Greenwood County, was 68,780 barrels.

CHAUTAUQUA COUNTY

Historical background.—Oil production in Chautauqua County was known at least as early as 1899, although there was gas production previous to that time. Haworth (1900, p. 38) states, "The wells around Peru, however, have produced some oil and seem to be able to supply comparatively large quantities should they be called upon to do so." The Peru-Sedan field was discovered about 1900, and a surge of oil development in the vicinity of Peru followed. In March 1903 drilling began in Caney Valley between Niotaze and Peru resulting in the development of oil there. In July 1903 drilling was being done also within the town of Peru. About this time a famous well, known as the Spurlock, discovered oil in sec. 31, T. 34 S., R. 12 E. This furnished incentive for substantial development that made Chautauqua County an important oil producing area at that time. The Huffman field was opened in 1903 and during the fall of that year another pool was discovered about 2 miles north of Peru. About 50 wells were

drilled in the year 1903 within the town limits of Peru and by the end of the year there are reported to have been a total of 151 producing wells in Chautauqua County.

The record of producing oil wells drilled in Chautauqua County by years shows the trend and the relation of oil production to the country-wide financial depression of 1907. The number of new oil wells was 566 in 1904, 191 in 1905, 125 in 1906, 20 in 1907, 16 in 1908, 23 in 1909, 42 in 1910, 64 in 1911, 182 in 1912, 311 in 1913, 308 in 1914, 112 in 1915, and 440 in 1916.

In the last 30 years, many pools have been found in the county, and the large fields producing both oil and gas have been widely extended. At the present time only the west tier of townships in the county and T. 33 S., R. 9 E. are without oil or gas production.

The "Wayside sand" in the Nowata shale, the "Peru sand" in the lower part of the Marmaton, the Little Osage shale, a member of the Ft. Scott limestone, the "Bartlesville" in the middle part of the Cherokee shale, the "Burgess sand" near the base of the Cherokee, the upper part of the Mississippian limestone, and the Arbuckle of Cambro-Ordovician age, all are or have been producing zones in Chautauqua County. Arbuckle production was found in the Oliver pool about 1935 and later in the McAllister pool.

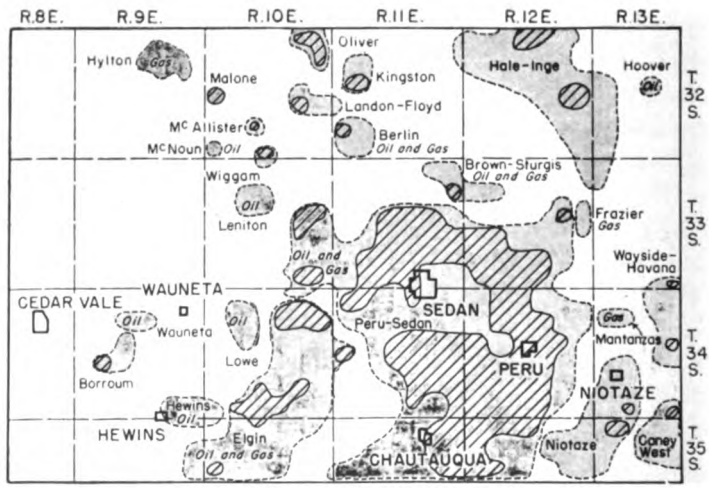

FIG. 9.—Map of Chautauqua County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

TABLE 19.—*Oil production in Chautauqua County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Berlin	1	3,166
Borroum	5	4,275
Brown-Sturgis	4	885
Caney West	17	1,433
Elgin		40,611
Hale-Inge[1]	65	17,094
Kingston		4,149
Landon-Floyd	27	38,511
McAllister	6	11,070
Malone	1	615
Niotaze	10+	420
Oliver	18	12,990
Peru-Sedan	1,158+	690,291
Wayside-Havana[2]	16	1,978
Wiggam	6	1,713
Miscellaneous	13+	1,334
Total	1,347+	830,535

[1] Field extends into Elk County.
[2] Field extends into Montgomery County.

Oil and gas production in the Arbuckle dolomite and from the upper part of the "Mississippi lime" is mainly from anticlinal structures whereas production in the Pennsylvanian sandstones is due mainly to favorable porosity and minor structural causes.

The first secondary oil recovery operation in Chautauqua County, which began in 1935, is reported to have been that of the Denman Brothers in the Peru-Sedan pool. Another project was started by the Sinclair Prairie Oil Company in the Peru-Sedan area in March 1937, but it was discontinued in December 1938. The Denman Brothers started one water-flood operation in the Peru-Sedan pool in 1938, another in 1939, and three in 1940. All these are reported to be in operation at the present time. All produce from the "Peru sand."

Oil produced in the county totaled 830,535 barrels in 1947. There are no available records on gas production. Fifteen oil pools were active, one new pool was discovered, and 10 secondary oil recovery projects were under way.

Developments during 1947.—The principal development in Chautauqua County during 1947 was the discovery of a new pool, the **McGlasson,** in sec. 11, T. 33 S., R. 9 E. The discovery well had an initial production of 20 barrels of oil per day from Mississippian rocks.

Other oil and gas developments in the county were related for the most part to water-flooding projects. Table 19 shows the production and approximate number of active wells in oil pools in the county during 1947. Figure 9 shows the oil and gas producing areas.

CLARK COUNTY

Historical background.—Gas was found in Clark County in 1926 when the Morrison pool was discovered in T. 32 S., R. 21 W. From its discovery until its abandonment in 1946 it produced about 150,000 barrels of oil and some gas. A gas well that produced 20 million cubic feet per day was added to the pool in 1928, but the record of gas produced is not clear.

There is no present production in the county.

Developments during 1947.—No oil was produced in the county during 1947. One test well was drilled in an area of favorable structural conditions by the J. M. Huber corporation. It was located on the Berryman farm in sec. 12, T. 31 S., R. 21 W. Elevation of the well was 2,185 feet above sea level. A complete set of samples from this well is available. They show a gypsiferous zone which may be the Blaine formation from 380 to 480 feet. The Stone Corral dolomite, 50 feet thick, was found at 1,160 feet, the top of the Herington at 2,535 feet, and the Ft. Riley limestone at 2,710 feet. The Shawnee group with the Topeka limestone at the top was present between 3,580 and 4,196 feet. The Kansas City-Lansing limestones were encountered between 4,475 and 4,845 feet. Below, the Marmaton shales and thin lime members extended from 4,845 to 5,210 feet. The Mississippian cherty limestone was reached at a depth of 5,210 feet. The test was abandoned at a total depth of 5,310 feet still in the Mississipian without shows of gas or oil.

CLOUD COUNTY

Historical background.—Wildcat wells have been drilled in Cloud County at intervals through the years, but a producing pool has yet to be opened.

Developments during 1947.—In Cloud County the Cities Service Oil Company drilled a wildcat test on the Blake farm in sec. 8, T. 8 S., R. 4 W. The samples from the well were studied by the

Kansas Well Log Service, which reported the following stratigraphic data. Elevation of the well was 1,428 feet. The Hollenberg limestone was found at 577 feet and the Herington limestone 53 feet lower at 630 feet. The Topeka limestone was reached at 1,835 feet, the base of the Oread limestone at 2,120 feet, the top of the Kansas City-Lansing at 2,235 feet, and the base of the Kansas City-Lansing at 2,703 feet. The Mississippian Warsaw dolomite was found at 2,823 feet, the Osagian cherty limestones at 2,850 feet, the St. Joe oölitic limestones at 2,970 feet, and the base of the limestone series (top of the Kinderhookian shale) at 3,028 feet. In this location the Kinderhoqkian consists of greenish-gray shale with oölitic hematite at the top.

The Silurian "Hunton" limestone was encountered between 3,117 and 3,262 feet. It is extremely cherty and for a distance of 100 feet or more has approximately 90 percent chert and only 10 percent limestone. Toward the base there is much dolomite with very little chert. The Maquoketa shale which was found between 3,262 and 3,317 feet consists of pale-green slightly dolomitic shale. The Viola limestones and cherty dolomites were encountered between 3,317 and 3,512 feet. The Simpson, 86 feet thick, consists of green shale, some sandstone layers, and considerable calcareous rock. It rests on the Arbuckle dolomite, the top of which was reached at 3,598 feet. The total depth was 3,611 feet. A drill stem test in the Arbuckle dolomite showed only water.

COFFEY COUNTY

Historical background.—Oil was first discovered in Coffey County in the LeRoy pool in 1903. Important oil production began about 1916. For the past several years the annual yield has been decreasing.

In 1930, the county produced 93,008 barrels of oil (Hall, 1933, p. 110); 28,821 barrels in 1936 (Landes, 1937, p. 20); 20,956 in 1941; 19,968 in 1942; 17,912 in 1943; 15,301 in 1944 (Jewett and Abernathy, 1945, p. 93).

The Carter gas pool was discovered in 1928. The discovery well was the Union Gas Corporation No. 1 Carter in sec. 8, T. 22 S., R. 14 W. Production was found in a sand in the upper part of the Cherokee shale at 1,335 feet. Initial production was 1,178,650 cubic feet daily. The Hatch oil pool was discovered in 1930 with pro-

duction in the "Burgess sand" at 1,825 feet. The discovery well, the Prairie Oil and Gas Company No. 1 Hatch in the NW¼ SW¼ sec. 35, T. 21 S., R. 14 E., had an initial daily production of 80 barrels. The Van Noy field was developed mainly in 1935 and 1936, although oil had been found there earlier. Production has been largely from the upper part of the Mississippian limestone with some reported production from the "Peru sand."

The Dunaway and Virgil North fields extend from Greenwood County into Coffey County and the Winterscheid extends into the county from Woodson County. Oil in these fields is produced from the "Bartlesville sand."

One pool, the Van Noy, which has 19 producing wells, furnished the total output of oil for the county, 12,970 barrels.

Developments during 1947.—At least one new pool well was drilled during the year, and there probably were others which were not reported. The oil and gas producing areas are shown on Figure 10.

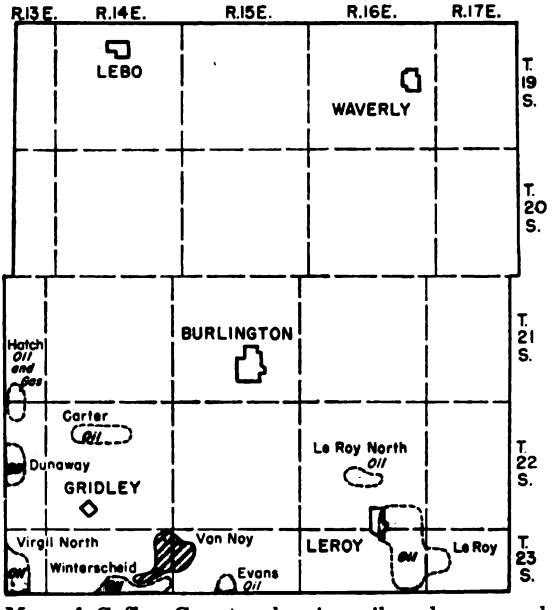

FIG. 10.—Map of Coffey County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

COMANCHE COUNTY

Historical background.—Wildcat wells have been drilled in Comanche County at intervals through the years, but a producing pool has yet to be opened.

Developments during 1947.—Two test wells were drilled in Comanche County during 1947. The first of these was the No. 1 Ferrin test drilled by the J. M. Huber Corporation in sec. 10, T. 31 S., R. 17 W. At an elevation of 2,077 feet, this test found the Stone Corral, 40 feet thick, at 970 feet. The Wellington gray shale began at 1,517 feet and the salt, 502 feet thick, at 1,710 feet. The Herington limestone was found at 2,350 feet, the Ft. Riley limestone at 2,508 feet, the base of the Oread limestone at 4,220 feet, the top of the Kansas City-Lansing limestones at 4,301 feet, and the base of the Kansas City-Lansing at 4,942 feet. Much residual chert from the Mississippian was found at a depth of 4,986 feet but normal cherty limestones occur lower down. The "Misener" standstone at the base occurs between 5,230 and 5,267 feet. The cherty dolomites of the Viola group were found at 5,267 feet and extended down to 5,435 feet where nearly 30 feet of the basal coarsely crystalline limestone began. The Viola rests on the Simpson formation at 5,462 feet. In this test the Simpson is quite sandy, but also contains the usual green shale. The Arbuckle dolomite was encountered at 5,566 feet, and the hole continued to a total depth of 5,595 feet. The data were taken from the log of the Kansas Well Log Service.

The second test to be completed was drilled by the Stanolind Oil and Gas Company on the Winkler farm in sec. 6, T. 31 S., R. 19 W. At an elevation of 2,145 feet, this test found the Kansas City-Lansing limestone at 4,382 feet and the base of the Kansas City-Lansing at 4,970 feet. The residual Mississippian chert was found at 5,018 feet, and below it there is a long sequence of limestones and cherty limestones down to 5,675 feet. There are traces of the Chattanooga and also of the "Misener" sandstone. They rested upon the Viola at 5,694 feet. The Simpson was encountered at 5,930 feet and the Arbuckle dolomite at 5,980 feet. The total depth is 6,036 feet with the well still in the Arbuckle dolomite. Five different zones of porosity were tested. In the Mississippian between 5,029 and 5,053 feet a small amount of gas was found but at other levels only water was found.

COWLEY COUNTY

Historical background.—The discovery of gas in a well drilled near Winfield in 1902 was then rated as an important development as it extended the gas-producing area almost 50 miles to the westward. The Arkansas City gas area dates from 1906. Many wells were drilled in succeeding years mainly to tap the shallow gas-producing zones.

In 1914, the Winfield oil pool which was to be one of the most important pools in the county was discovered. The Clark pool was opened in 1916. Two pools were discovered in 1923, the Rock in January and the Rainbow Bend in December. Three pools were opened in the county in 1924: the Eastman, the Graham, and the Slick-Carson. The Hittle pool, currently the largest ro-

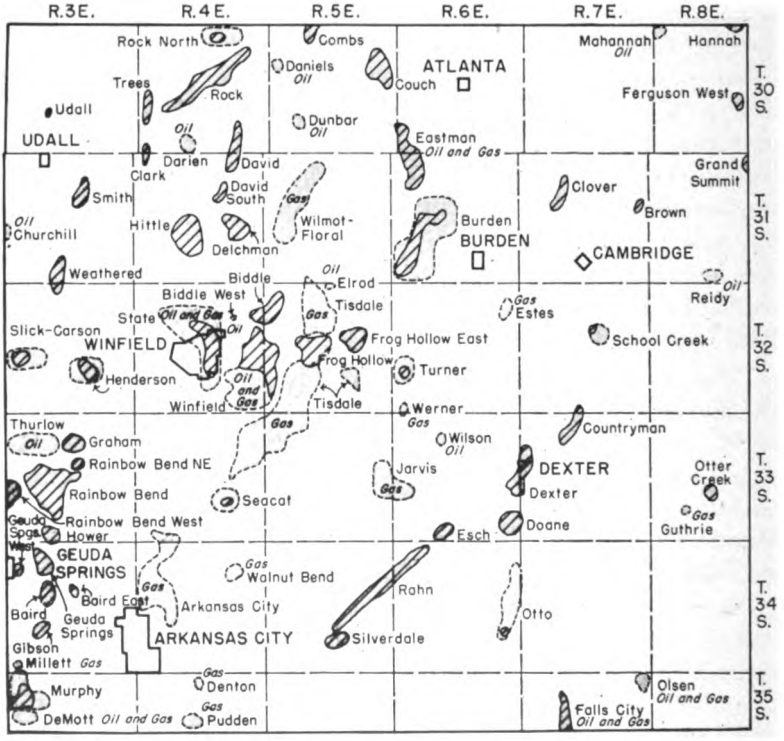

FIG. 11.—Map of Cowley County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

ducer in the county, was discovered in the summer of 1925. Cowley County was really becoming an important oil-producing county owing to this surge of production.

The State pool was discovered in 1926, when, largely under the influence of developments in the Rainbow Bend and Winfield pools, the production of the county reached a record of nearly 4 million barrels of oil. In 1927, the Winfield pool produced nearly half of the oil output of the county, and 245 million cubic feet of gas.

Production of gas continued in the county along with the oil. In the Burden area, sec. 20, T. 31 S., R. 6 E., a well drilled in 1928 was rated at 40 million cubic feet of gas when drilled into a sand at 1,640 feet. Deepened to 2,215 feet, the well was estimated to be capable of producing 68 million feet. The gas was mudded off and the well drilled deeper for oil.

Production in the county was down to 3 million barrels in 1927, to 2 million barrels in 1930, and to 1.9 million barrels in 1931, after which it began climbing again for a few years.

Four of the oil pools discovered before the first World War are still producing: the Winfield, the Smith, the Clark, and the Falls City. Nine of the pools opened in the 1920's are still producing. Of these, the Hittle pool, dating from 1925, is now the largest producer in the county. The Rainbow Bend pool, opened in 1923, is now fifth largest producing pool. Seven of the pools discovered in the 1930's are still producing, including the second and third largest current producers, the Frog Hollow and the Rahn. The Couch and Deichman pools are the largest present producers among the pools discovered since 1940.

The county has through the years produced a substantial amount of gas, although total production figures are not available. The zones of gas production have been from the lower part of the Permian, from sands of the Kansas City-Lansing groups, from shoestring sand lenses in the Cherokee shale, locally called "Bartlesville," from the upper Mississippian, and from the upper Ordovician.

Oil has come mainly from the "Bartlesville," the "Stalnaker," the "Burgess," the Kansas City-Lansing rocks, and the Arbuckle group. The "chat," the "Peacock sand," and the "Layton sand" also have been found productive in some pools.

There were four secondary recovery operations reported to be active in 1947. These are listed in Table 8.

Statistical summary for Cowley County, 1947

Oil produced	2,647,860 barrels	
Gas produced	Figures not available	
Wells drilled: Oil	46	
Gas	1	
Dry	58	
Total	105	
Wildcat wells	14	(included in above total)
New pools: Oil	3	
Number of active oil pools	50	
Secondary recovery operations	4	

Developments during 1947.—As indicated by the number of wildcat wells drilled and new pools found, there was considerable oil and gas activity in the county during the year. The first new pool to be discovered was the **Combs**, located in sec. 5, T. 30 S., R. 5 E. The pool opener, completed at the first of the year, was drilled by the Kewanee Oil Company as No. 1 Combs. Production was found in the "Bartlesville" at 2,833 feet. The well was rated at 25 to 50 barrels of oil per day.

The second new pool, the **School Creek**, was opened by Mid Plains and Veeder with their No. 1 Reidy well in sec. 15, T. 32 S., R. 7 E. The well, completed in May, produced 25 barrels of oil and considerable water from the "Bartlesville" at 2,817 feet.

In November a third pool, the **Doane**, was found in sec. 36, T. 33 S., R. 6 E. McNeish and Grallap drilled the well, which was estimated at 50 to 70 barrels per day from the Mississippian at about 3,070 feet.

Table 20 shows that 50 oil pools were in production in the county during 1947. The records of number of wells are incomplete for only a few of the lesser pools. It is interesting to note that the per-well average production in the county for the year was 10 barrels of oil. That, indeed, is high for a county that has been producing oil for more than 30 years.

The **Hittle** pool, discovered in 1925, is outstanding in that it ranked first in production in the county with an output of about 600,000 barrels of oil, its wells averaging almost 23 barrels of oil per day each during the year. The **Frog Hollow** pool, next in total production, had the same average well production. The **Rahn** and **Couch** pools produced at the rate of 30 barrels per well

TABLE 20.—*Oil production in Cowley County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Baird	2	1,590
Baird East	1	2,490
Biddle	19	25,470
Brown		5,695
Burden	30	30,420
Clark	5	9,330
Clover		442
Combs[1]	9	32,490
Couch	21	235,824
Countryman		33,154
David	26	45,780
David South	5	5,910
Deichman	19	148,560
Dexter		1,500
Doane	1	1,650
Eastman	24	43,681
Esch	2	1,590
Falls City		6,890
Ferguson West	17	4,705
Frog Hollow	44	367,233
Frog Hollow East	7	24,570
Geuda Springs	11	21,990
Geuda Springs West	1	720
Gibson	9	29,910
Graham	7	16,167
Grand Summit[2]	2	642
Hannah	2	4,033
Henderson	7	15,090
Hittle	74	617,856
Hower	4	6,000
Murphy[3]	27	5,692
Otter Creek	2	No runs
Otto	1	540
Rahn	28	304,121
Rainbow Bend	82	230,218
Rainbow Bend Northeast	1	4,020
Rainbow Bend West[4]	3	5,418
Rock	54	100,709
Rock North	5	7,292
Seacat		1,774
School Creek	1	2,040
Silverdale	1	750
Slick-Carson	16	33,870
Smith	7	3,510
State	19	30,464
Trees	10	15,660
Turner	4	8,790
Udall	1	2,250
Weathered	20	58,200
Winfield	57	91,160
Total	695+	2,647,860

[1] Includes Butler County production.
[2] Field extends into Elk County.
[3] Includes Sumner County production.
[4] Field extends into Sumner County.

TABLE 21.—*Dry wildcat tests drilled in Cowley County during 1947*

Company and farm	Location	Depth to top of Kansas City, feet	Depth to top of Mississippian, feet	Total depth, feet
E. H. Adair Oil Co. No. 1 Ratley	SE cor. NE¼ 16-30-3E	2,582		2,607
Continental Oil Co. No. 1 Kropp	NW cor. SW¼ 26-30-3E	2,450	3,015	3,425
Overstake & Worth et al. No. 1 Chance	SW cor SW¼ 14-31-5E		3,004	3,040
Western Drlg. Co. No. 1 Bolack	NE¼ NW¼ NE¼ 21-32-6E	2,229	2,965	3,101
Earl F. Wakefield et al. No. 1 Hanna	NE¼ SW¼ NW¼ 27-32-6E		3,091	3,570
B. C. W. Hyde No. 1 Mueller	NW cor. SW¼ 36-33-4E			3,071
Continental Oil Co. No. 1 Taylor	NW cor. SE¼ 2-33-6E		3,114	3,131
Mid Plains Oil Corp. et al. No. 1 Shaver	NE cor. Lot 25 7-33-8E	2,237	2,874	2,919
Frank McMillin No. 1 Childress	SE¼ SW¼ NE¼ 36-34-4E	2,484	3,306	3,316
Dilworth & Hager No. 1 Long	NE cor. SW¼ 9-34-5E		3,159	3,174
Wakefield & Kanotex No. 1 Goatley	Cen. W½ SW¼ NE¼ 5-35-5E		3,036	3,040

per day during the year, but the rate per well was down to 7.7 barrels per day in the **Rainbow Bend** pool.

The oil and gas producing areas are shown on Figure 11. The dry wildcat wells drilled during 1947 are listed in Table 21.

CRAWFORD COUNTY

Historical background.—Although several oil and gas pools have been found in the western part of Crawford County (Fig. 12), oil production is now confined to five areas (Table 22). All production is from the "Bartlesville sand." The most important field, the McCune, was opened in 1932. The "Bartlesville sand" at about 300 feet is the producing formation. Initial daily production of some wells was as much as 100 barrels. The field is the shoestring type. The average thickness of the sand body is about 25 feet.

There was one secondary recovery operation active during 1947. It was started in 1941.

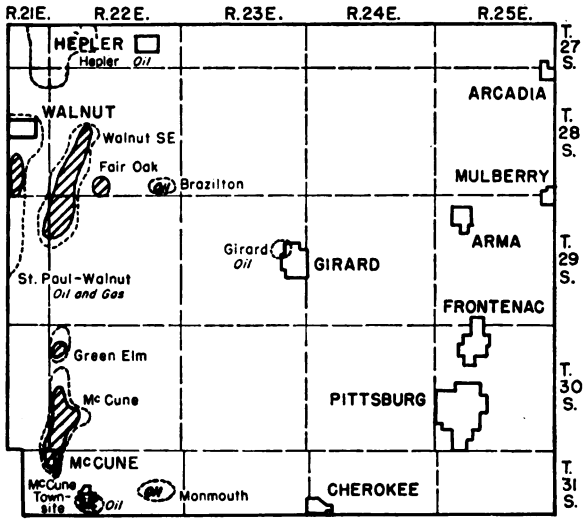

FIG. 12.—Map of Crawford County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

Oil produced in 1947 was 60,792 barrels. There were five active oil fields. Figures are not available for gas produced.

Developments during 1947.—No new pools have been found in Crawford County for several years. The county lies in the east edge of the oil and gas territory of southeastern Kansas. No new developments of note were reported from the county in 1947. The single water-flood project is in the **McCune** field.

TABLE 22.—*Oil production in Crawford County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Fair Oak		1,641
Green Elm		2,444
McCune		49,418
St. Paul-Walnut[1]		516
Walnut Southeast	27	6,594
Miscellaneous		179
Total	27	60,792

[1] Field extends into Neosho County.

DECATUR COUNTY

Historical background.—Wildcat wells have been drilled in Decatur County from time to time, but so far no pools have been discovered.

Developments during 1947.—In Decatur County only one test well was completed during 1947. It was drilled by the B. & R. Drilling Company on the Ellis farm in sec. 22, T. 5 S., R. 26 W. to a total depth of 4,080 feet; the surface elevation is 2,503 feet. No shows of oil or gas were reported. The operator's report indicates that the Topeka limestone in this wildcat was found at 3,330 feet, the Heebner black shale at 3,541 feet, the Kansas City-Lansing at 3,579 feet, the basal Pennsylvanian conglomerate at 3,901 feet, and below that the Arbuckle dolomite at 4,018 feet. The test was abandoned as a dry hole on December 16, 1947.

DICKINSON COUNTY

Historical background.—Soon after the discovery of the Lost Springs oil pool in Marion County in 1926 the field was extended into southern Dickinson County. Production was found in the upper part of the Mississippian limestone at about 2,365 feet. The Bonaccord pool was discovered in 1943. Production came from a lower Pennsylvanian sandstone ("Burgess") at about 2,485 feet.

The Lost Springs North pool is reported to have produced 32,190 barrels of oil during 1947.

Developments during 1947.—There were 34 reported tests drilled for oil or gas in the county during 1947; 20 were oil wells and 14 were dry holes. Two of the wells drilled were wildcats and one new pool was found. There were two active oil pools in the county.

A new oil pool, named the **Lost Springs Northeast,** was found in sec. 26, T. 16 S., R 4 E. in December 1947. Discovery was credited by the Nomenclature Committee to the Hutchinson Oil and Gas Company No. 1 Schlesener, a minimum well estimated at 6 barrels of oil per day, from the Mississippian "chat." Two dry holes had been drilled earlier in the year by the ElDorado Refining Company and the Midwest Petroleum Company in near-by locations. Later a good producer, estimated at 100 barrels per day from the Mississippian, was brought in about one-fourth mile

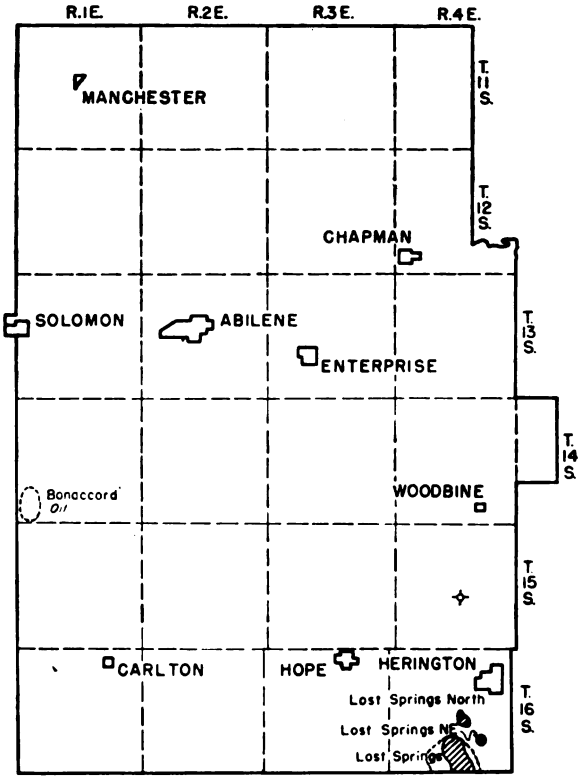

FIG. 13.—Map of Dickinson County showing oil producing areas and the dry wildcat test drilled during 1947. Shaded areas represent oil fields; diagonal lines show areas of 1947 oil production.

north of Hutchinson Oil and Gas Company well. It is possible that the 100-barrel well is the true pool opener.

The oil pools in the county are shown on Figure 13.

DOUGLAS COUNTY

Historical background.—Several deep test wells have been drilled but no oil or gas has been found in Douglas County in rocks older than the Pennsylvanian. The Baldwin oil field in southeastern Douglas County was opened in 1919. The discovery well was drilled in sec. 12, T. 15 S., R. 20 E. Oil was found in the "Squirrel sand" at about 800 feet. Wells in the area had average initial productions of about 20 barrels per day although in some

wells the rate was as high as 220 barrels. The decline in production of the wells was rather pronounced. The field was developed rather slowly and peak production probably did not take place until 1927 when the field yielded 23,900 barrels of oil. During recent years the Baldwin field has produced small amounts of petroleum most of which has been used locally as fuel oil. In 1941 the production was approximately 7,000 barrels; and in 1943, 3,000 barrels (Jewett and Abernathy, 1945, p. 118).

Gas was first found in Douglas County several years ago in the Eudora field, secs. 17, 18, 19, 20, 29, and 30, T. 13 S., R. 21 E.; and in the Eudora East field, secs. 2, 34, and 9, T. 13 S., R. 21 E. (partly in Johnson County). Production has been from the "Peru" and "Squirrel sands." The second area in which gas production was developed in the county is north and east of Baldwin. The field was developed about 20 years ago. Initial production of some wells was as high as 1 million cubic feet per day. Production was from the "Squirrel sand." The field is now inactive. The Lawrence gas-producing area lies north and east of Lawrence and extends into Leavenworth County. The field was opened in 1944, but the production has been small. The "Squirrel sand" is the reservoir rock.

Oil production in 1947 from the Baldwin field was estimated at 5,110 barrels from about 15 wells.

Developments during 1947.—Production is reported in sec. 36, T. 14 S., R. 20 E., secs. 1, 9, 11, 12 and 14, T. 15 S., R. 20 E., sec. 6, T. 15 S., R. 21 E. (A little oil came from sec. 23, T. 15 S., R. 20 E. in Franklin County.)

A small amount of gas was produced in the **Lawrence** and **Eudora** fields during the year.

EDWARDS COUNTY

Historical background.—The first oil or gas reported from Edwards County was in February 1927 when gas was struck in the Nubergall well in sec. 7, T. 23 S., R. 19 W. Seemingly production was not developed.

Two years later, in May 1929, the British American Oil Company drilled a deep test on the McCarty ranch in sec. 31, T. 25 S., R. 17 W. This was the discovery well of the McCarty pool which

was a light producer of both oil and gas until it was abandoned in 1945. Production came from depths of slightly more than 4,500 feet, from the Sooy conglomerate and other porous zones within a vertical range of a few hundred feet from that horizon.

Wildcat drilling in the county during 1942 resulted in the discovery of the Belpre pool. The pool opener, drilled by Cities Service Oil Company in sec. 8, T. 25 S., R. 16 W., was a 25 million cubic foot gas well. The following year, Cities Service drilled two additional wells in the Belpre pool which were modest oil producers. Production was found in porous zones of the Kansas City-Lansing at about 3,800 feet.

Statistical summary for Edwards County, 1947

Oil produced	none	
Gas produced	921,521	thousand cubic feet
Wells drilled: Oil	none	
Gas	none	
Dry (a wildcat well)	1	
Total	1	
New, revived, or abandoned pools	none	
Secondary recovery operations	none	

Developments during 1947.—Only one test was drilled in Edwards County during 1947. It was by the Skelly Oil Company on

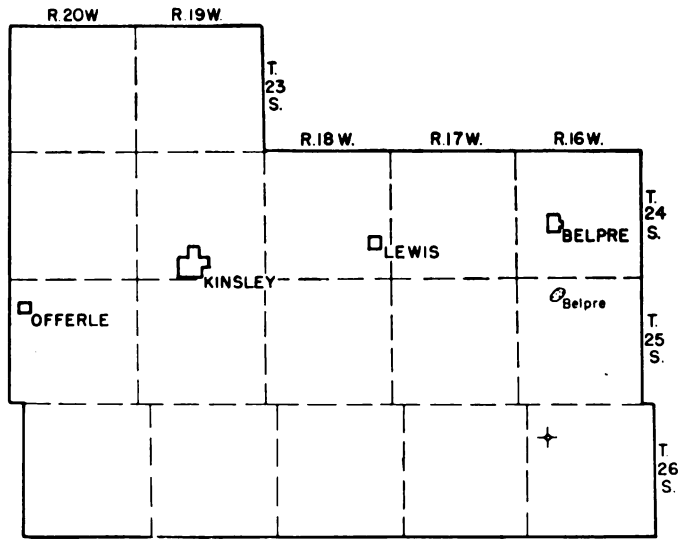

FIG. 14.—Map of Edwards County showing the Belpre gas pool and the dry wildcat test drilled during 1947.

the Martin farm in the NW¼ SW¼ NW¼ sec. 8, T. 26 S., R. 16 W. Careful analysis of the samples from this well by the Kansas Sample Log Service reveals that the top of the Stone Corral dolomite was found at 1,052 feet and the Wellington shales at 1,410 feet. The rather thick salt section of the Wellington extended from 1,600 to 2,015 feet. The Herington limestone was found at 2,150 feet and the Ft. Riley limestone member at 2,350 feet. The limestones of the Shawnee group, with the Topeka at the top, occupy the interval between 3,418 and 3,844 feet. The Kansas City-Lansing limestones were encountered at 3,972 feet (or possibly at 3,939 feet). Below the Pennsylvanian strata, residual Mississippian chert was found at 4,429 feet, the Kinderhookian at 4,469 feet, and the base of the Mississippian at 4,520 feet, from which detrital remains of the Viola group extended to 4,705 feet where the basal coarsely crystalline limestone of the Viola was found. Simpson green shales and thin sandy layers occur between 4,725 and 4,830 feet. The Arbuckle dolomite with some oölitic chert was encountered at 4,830 feet, and the hole ended at 4,880 feet still in this dolomite.

The only pool in the county at the present time is the small **Belpre** gas pool which produced 921,521 thousand cubic feet of gas during 1947 from two wells in the Kansas City-Lansing at a depth of 3,807 feet.

ELK COUNTY

Historical background.—The first oil or gas production in Elk County was in 1902 when gas was discovered at Moline. At that time it was said that the discovery was at least 20 miles farther west than gas had previously been known. The discovery of the Elk City gas field in 1918 seems to have been the next item of interest in the petroleum history of Elk County. The Elk City gas field is right on the line between Elk and Montgomery Counties, but the discovery well was on the Elk County side in the NE cor. sec. 27, T. 31 S., R. 13 E. The original open flow capacity of the first well was 10 million cubic feet. Some oil production had previously been obtained in the vicinity from the "Wayside sand" at a depth of 750 to 800 feet. Several Elk County pools were discovered in the 1920's—the Arbuckle (now abandoned), the Bush-Denton, and the Grand Summit in 1920; the Welch (now aband-

oned) and the Webb in 1924. The Mills was opened in October and the Moline in November 1927. Late in 1927 a well drilled in sec. 29, T. 31 S., R. 10 E. yielded high content of helium at a depth of 2,120 feet. The year 1928 was one of considerable activity in the Moline field where between 30 and 40 oil wells were drilled. Initial capacities were around 100 barrels per day from the top of the "Mississippi lime" at approximately 2,000 feet. An oil producer was drilled in the Ferguson field in July 1928 although a 6 million cubic foot gas well was completed in August 1926. Oil was found in the Kansas City-Lansing limestones. Initial flows ran from 600 to 700 barrels per day. The Schrader gas pool was discovered in November 1928 by a 14 million cubic foot well. It is impossible to say as to the discovery dates of several of the Elk County fields because records are not available.

At the end of 1947 there were two secondary recovery projects active in the Gardner pool under the operation of the Sagamore Oil and Gas Company of Independence.

Oil produced in the county in 1947 totaled 239,975 barrels. There were 19 active oil pools and two secondary recovery projects. No figures are available on the amount of gas produced but there was some production mainly for local consumption.

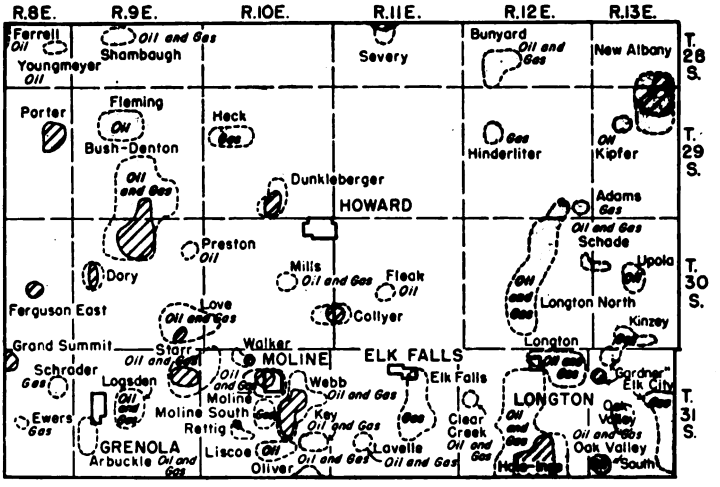

FIG. 15.—Map of Elk County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

TABLE 23.—*Oil production in Elk County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Bush-Denton	45	28,010
Collyer	11	12,781
Dory	1	78
Dunkleberger	29	24,340
Ferguson East	2	2,365
"Gardner"		1,505
Grand Summit[1]	11	10,875
Hale-Inge[2]	22	3,720
Love	4	7,527
Moline	13	11,060
New Albany		31,144
Porter	13	13,354
Rettig	1	420
Severy[3]	32+	19,954
Starr	6	10,496
Walker	2	1,597
Webb	78	60,683
Miscellaneous		66
Total	277+	239,975

[1] Field extends into Cowley County.
[2] Field extends into Chautauqua County.
[3] Includes some production from Greenwood County.

Developments during 1947.—No outstanding developments were reported in Elk County during 1947. One wildcat well, drilled in 1946, was worked over in 1947 without finding production. The well was drilled by K. T. Wiedemann on the Dixon-Fagerberg farm in sec. 27, T. 29 S., R. 8 E. The deepened test found the Arbuckle at 3,147 feet and had a total depth of 3,211 feet.

The active oil pools in Elk County and their 1947 productions are given in Table 23. The oil and gas producing areas are shown on Figure 15.

ELLIS COUNTY

Historical background.—A number of wildcat wells were drilled in this county after oil was discovered in near-by Russell County in 1923. However, none of these was successful. In November 1928 the Phillips Petroleum Company completed the first successful well in what was then called the North Ellis pool in sec. 5, T. 12 S., R. 17 W. (This later became the Shutts pool.) This well was the first to find production in the Arbuckle dolomite in

western Kansas. The Bemis pool was discovered seven years later, in 1935, when Roark completed the first test on the Bemis farm in sec. 16, T. 11 S., R. 17 W. Eventually these two pools were merged into the large Bemis-Shutts pool which contains 15,000 acres. By the end of 1937, this pool had produced 3,323,560 barrels of oil, and by the close of 1947 it had produced 49 million barrels. Subsequent drilling in this county resulted in the discovery of 37 additional pools that are still producing. Of these the Burnett is the most prolific. In fact, the Burnett pool and the Bemis-Shutts pool form almost a single producing area. The Burnett has produced almost 28 million barrels of oil.

Statistical summary for Ellis County, 1947

Oil produced	11,696,661	barrels
Gas produced	none	
Wells drilled: Oil	124	
Gas	none	
Dry	67	
Salt water disposal	6	
Total	197	
Wildcat wells	17	(included in above total)
New pools: Oil	2	
Revived pool: Oil	1	
Abandoned pools	none	
Secondary recovery operations	none	

Developments during 1947.—Two new pools were discovered during the year, the **Younger North** and the **Burnett South.** The latter was combined with the Burnett before the end of the year. The Younger North was found by Ben F. Brack on the Hoffman farm in sec. 32, T. 13 S., R. 17 W. The well produced 100 barrels of oil per day from the Arbuckle dolomite at a depth of 3,580 feet. The lower Pennsylvanian rocks are very thin and the base of the Kansas City-Lansing limestones is only 24 feet above the Arbuckle. No other wells were drilled in the vicinity during 1947.

The discovery well for the Burnett South pool was the Keyes Drilling Company No. 1 Marshall, sec. 25, T. 11 S., R. 18 W. The well had an initial potential of 3,458 barrels of oil per day from the Arbuckle dolomite at 3,618 feet.

The **Antonino** pool, first discovered in 1936, was revived in 1947 by the drilling of the No. 1 Feitz by the Trojan Oil and Gas Company. The well is located in sec. 27, T. 14 S., R. 19 W. An initial potential of 132 barrels was assigned to the well. It produces from the Arbuckle at a depth of 3,712 feet. The Barbara Oil Company drilled an offset test in sec. 26 northeast of the Feitz No. 1. This

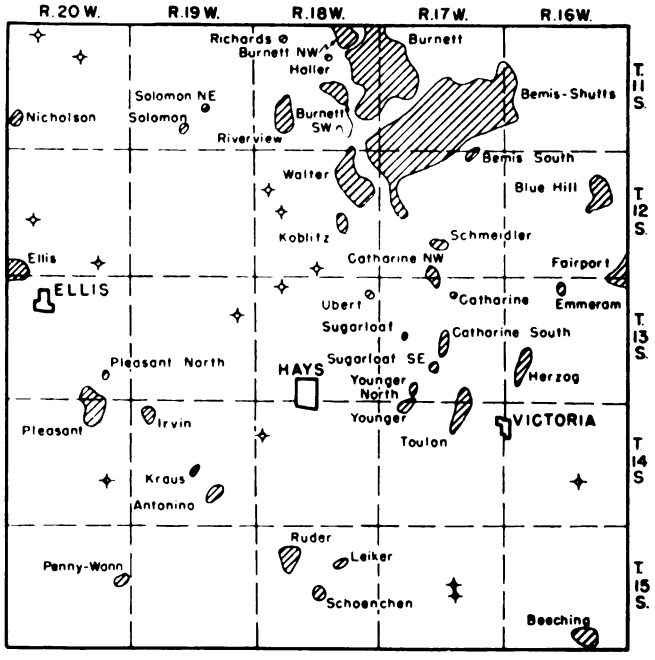

FIG. 16.—Map of Ellis County showing oil pools and dry wildcat tests drilled during 1947.

hole, which reached the Arbuckle 64 feet lower than it was found in the discovery well, was unproductive. The Trojan Oil and Gas Company then drilled a test on the Copeland farm one-quarter mile south of the discovery well. The Arbuckle dolomite was not found, but the well was completed as a producer in the Reagan sandstone at about the same elevation as production was found in the discovery well. Another test drilled in the SW cor. sec. 27 was dry. Here the Arbuckle dolomite was found 75 feet lower than in the discovery well.

During 1947 much activity centered around the **Burnett Northwest** pool located in secs. 2 and 3, T. 11 S., R. 18 W. The discovery of this pool, found in 1946, was described by VerWiebe (1947). Much drilling took place in sec. 2 adjoining the discovery well. Eighteen new oil wells and four dry holes were drilled in the Ellis County part of the Burnett Northwest pool during 1947. Dolomite was found between the green shale and the sandstone of the Simpson formation. The Simpson in sec. 2 ranges in total

thickness from a few feet to more than 43 feet. This new dolomite was first found in the Mid-States Oil Company No. 1 Cross well where it occurs beneath 11 feet of typical Simpson shale. The total thickness of the Simpson in this well is 35 feet, but it increases to 43 feet in the Shell No. 3 Ridler "E" well. A dry well in sec. 3 reached granite at a depth of 4,118 feet after passing through 414 feet of Arbuckle dolomite. A deep sink hole was found in the pre-Pennsylvanian surface by Mid-States Oil Company as they completed their No. 8 Cross well in sec. 2. They found the Pennsylvanian basal conglomerate nearly 200 feet thick and completed the well without drilling into the Arbuckle dolomite.

Drilling in the **Burnett Southwest** pool doubtless was stimulated by favorable results obtained only a few miles to the north. In and near the Burnett Southwest pool 10 new oil wells, 4 dry holes, and 1 salt water disposal well were completed in 1947. It is probable that this pool will be combined in due time with the main Burnett. Drilling in the Burnett Southwest pool indicates that the Simpson formation ranges from a featheredge to 34 feet in thickness. One well, the Blair No. 1 "C" Henderson in sec. 15, T. 11 S., R. 18 W., found the Arbuckle dolomite to be 412 feet thick.

The main **Burnett** pool was extended substantially by drilling in secs. 24, 25, and 26, T. 11 S., R. 18 W. During 1947, 32 holes were drilled in or near the Burnett pool. Of these 25 are producers, 5 are dry, and 2 of the new wells were converted to salt water disposal. In sec. 24, the Simpson formation ranges from a featheredge to 37 feet. Simpson dolomite similar to that found in sec. 2 was discovered by drilling in secs. 24 and 26, T. 11 S., R. 18 W. In sec. 24, the Lario Oil and Gas Company No. 11 Marshall "E" found the Simpson shale to be 14 feet thick and below it the dolomite to be 21 feet thick. A sandstone occurs below the dolomite in this well; the total thickness of the Simpson is 37 feet. In sec. 25, the Simpson attains a thickness of 61 feet in one well. The dolomite of the Simpson formation was also found in the Phillips No. 2 Ancobs in sec. 26. One well in the Burnett pool, the Shell No. 1 Ridler "W" in sec. 12, was drilled entirely through the Arbuckle dolomite into granite below. The Arbuckle was found to have a total thickness of 546 feet. By way of comparison, it may be added that one well in the **Bemis-Shutts** pool (Cities Service Oil Company No. 27 Colahan in sec. 24, T. 11 S., R. 17 W.) found the same group of

rocks to be only 358 feet thick. However, this test did not penetrate the entire thickness of the Arbuckle.

In the old Bemis-Shutts pool 27 new oil wells were added in 1947. Five dry holes were drilled and two new wells were converted to salt water disposal. In this pool, also, the Simpson formation ranges from a featheredge to 34 feet in thickness, the greatest thickness occurring in the southern part of T. 11 S., R. 17 W.

The **Richards** pool is located in the northwestern part of T. 11 S., R. 18 W. Here only one test, resulting in a dry hole, was drilled during the year. The Arbuckle dolomite was found at a relatively low elevation inasmuch as the conglomerate was 109 feet thick. In the **Riverview** pool, located in the southern part of the same township, one new oil well was completed during 1947. Four dry holes were drilled within 2 miles of this pool in the same period. Two rank wildcat tests were drilled in T. 11 S., R. 20 W.

Two new oil wells and two dry holes were completed in the **Blue Hill** pool which lies in T. 12 S., R. 16 W. In the **Schmeidler,** located in the southern part of T. 12 S., R. 17 W., three new oil wells and one dry hole were drilled during the year. In the **Walter** pool, which lies in the northern part of T. 12 S., R. 18 W., three dry holes and seven new oil wells were completed. Three rank wildcat tests were drilled in the southwestern part of the same township. All were dry. Two wildcats, also dry, were drilled in T. 12 S., R. 20 W.

The **Herzog** pool lies in T. 13 S., R. 16 W. Here three new oil wells and four dry holes were completed. The **Catharine South** pool, T. 13 S., R. 17 W., was very active during 1947. As a result, 14 new oil wells were completed here. However, there were three

TABLE 24.—*Oil pools of Ellis County*

Pool and location of discovery well	Discovery year	Area acres	1947 production, bbls.	Cumulative production to end of 1947, bbls.	Producing wells	Producing zone	Depth to producing zone, feet
Antonino* 27-14-19W	1947	80	9,481	9,481	2	Arbuckle	3,712
Beeching 34-15-16W	1943	300	23,539	167,134	6	K.C.-Lans.	3,156
Bemis-Shutts 16-11-17W	1935	15,000	6,013,003	49,056,378	507	Arbuckle	3,380
Bemis South 2-12-17W	1938	40	10,607	88,262	1	Arbuckle	3,592
Blue Hill 14-12-16W	1937	900	156,256	1,255,926	17	Topeka K.C.-Lans. Arbuckle	3,030 3,072 3,360

Burnett 1-11-18W	1937	6,000	3,207,931	27,983,641	238	K.C.-Lans. Arbuckle	3,093 3,570
Burnett Northwest 3-11-18W	1946	700	371,240	371,240	20	Arbuckle	3,617
Burnett South 25-11-18W	1947		combined with Burnett				
Burnett Southwest 22-11-18W	1946	1,000	131,290	149,870	21	K.C.-Lans. Arbuckle	3,207 3,633
Catharine 3-13-17W	1936	40	4,540	152,995	1	K.C.-Lans.	3,262
Catharine N'rthw'st 4-13-17W	1944	800	74,928	152,668	9	K.C.-Lans. Arbuckle	 3,590
Catharine South 15-13-17W	1946	200	122,099	122,935	16	Arbuckle	3,555
Ellis 31-12-20W	1942	700	136,606	677,486	16	Arbuckle	3,832
Emmeram 4-13-16W	1937	160	9,937	193,172	4	K.C.-Lans.	3,262
Fairport		see Russell County					
Haller 10-11-18W	1936	40	1,200	22,815	1	Topeka	3,045
Herzog 30-13-16W	1940	360	157,901	524,866	14	Arbuckle	3,450
Irvin 6-14-19W	1946	200	41,105	41,105	6	Arbuckle	3,860
Koblitz 23-12-18W	1937	840	73,086	606,936	10	Arbuckle	3,694
Kraus 22-14-19W	1936	100	6,005	84,825	2	Sooy	3,735
Leiker 14-15-18W	1943	80	13,324	62,714	2	K.C.-Lans. Arbuckle	3,292
Nicholson 30-11-20W	1945	250	55,249	101,209	6	Arbuckle	3,842
Penny-Wann 13-15-20W	1936	120	21,246	119,111	3	Sooy	3,653
Pleasant 2-14-20W	1944	1,000	170,274	432,119	17	Arbuckle Reagan	3,833 3,877
Pleasant North 26-13-20W	1946	40	268	268	1	Arbuckle	3,798
Richards 5-11-18W	1938	120	none	106,785	1	K.C.-Lans.	3,332
Riverview 19-11-18W	1943	900	228,702	876,192	20	Arbuckle	3,610
Ruder 17-15-18W	1935	950	40,541	956,661	9	K.C.-Lans. Arbuckle	3,422 3,572
Schmeidler 28-12-17W	1944	400	58,120	102,510	7	Arbuckle	3,625
Schoenchen 21-15-18W	1946	200	66,647	79,179	6	Arbuckle	3,569
Solomon 28-11-19W	1936	160	none	104,608	2	Arbuckle	3,629
Solomon Northeast 22-11-19W	1946	80	14,737	14,737	2	Arbuckle	3,639
Sugarloaf 17-13-17W	1941	80	24,382	169,002	2	Arbuckle	3,645
Sugarloaf S'theast 28-13-17W	1941	120	19,542	68,332	3	K.C.-Lans.	3,312
Toulon 3-14-17W	1935	200	30,630	348,885	7	K.C.-Lans. Arbuckle	3,298 3,512
Ubert 12-13-18W	1936	160	10,248	241,558	2	Arbuckle	3,707
Walter 2-12-18W	1936	1,600	357,618	3,872,443	44	Topeka Arbuckle	3,160 3,619
Younger 6-14-17W	1944	200	34,379	87,274	5	Arbuckle	3,574
Younger North 32-13-17W	1947	40	none	none	1	Arbuckle	3,580

*Old name revived.

dry holes drilled. One of the dry holes (Texas Company No. 3 "B" Dreiling) was drilled through the Arbuckle dolomite into quartzite below. The thickness of the Arbuckle dolomite here is 448 feet. The **Catharine South** pool now lacks less than a mile from connecting with the **Sugarloaf Southeast** pool where there were no new wells during 1947. Only a short distance separates the Sugarloaf Southeast pool from the relatively new Younger North pool in which there is only one well at present.

One dry hole was completed in the **Pleasant** pool which lies in the western part of the county a few miles southeast of the City of Ellis.

The **Irvin** pool in T. 14 S., R. 19 W. was discovered late in 1946. It received active attention during 1947 with the result that there are now six oil wells and only one dry hole in this pool. The Arbuckle dolomite, the producing zone, is reached ordinarily at about 1,600 feet below sea level. The well highest on the structure at present found the Arbuckle 1,605 feet below sea level; the lowest well found it 1,626 feet below sea level. The dry hole found the Arbuckle at minus 1,674 feet, some 50 feet lower than in the lowest producing well. This range in elevation suggests a possible sink hole in the Arbuckle dolomite.

The **Kraus** pool is located a few miles southeast of the Irvin. Here one new oil well was completed by Coppinger and Southern on the Kraus farm in the SE cor. sec. 16. Although early information listed the Reagan sandstone as the producing zone, it is not unlikely that sandstone in the Pennsylvanian basal conglomerate is the producing rock.

The **Ruder** pool is located in T. 15 S., R. 18 W. Here one new oil well was completed on the Madden farm by Jones-Shelburne. In the **Leiker** pool near by two dry holes were completed. The **Schoenchen** pool lies a short distance south of the Leiker pool. Here the H. H. & B. Drilling Company completed one new oil well on the Pivonka farm in sec. 22, T. 15 S., R. 18 W. The same operator drilled another producer (342 barrels of oil per day) and one dry hole in sec 21. The Skelly Oil Company drilled one dry hole in sec. 21 seeking a southwestward extension to the pool.

Three dry holes were drilled in an effort to extend production in the **Penny-Wann** pool located in T. 15 S., R. 20 W. In this locality the Arbuckle dolomite is absent, the Reagan sandstone lying directly beneath Pennsylvanian strata.

TABLE 25.—*Dry wildcat tests drilled in Ellis County during 1947*

Company and farm	Location	Depth to top of Lansing, feet	Depth to top of Arbuckle feet	Total depth, feet
Mid Continent & Barnett No. 1 Fischer "A"	NE. cor. SW¼ 5-11-20W	3,337	3,648	3,699
Ben F. Brack No. 1 Yohe	NW cor. SE¼ 10-11-20W	3,314	3,654	3,705
Derby Oil Co. No. 1 O'Laughlin	NW cor. NE¼ 18-12-18W	3,529	3,869	3,915
H. H. & B. Drlg. Co. No. 1 Blender	NW cor. NW¼ 20-12-18W	3,490	3,906	3,914
M. J. Sullivan No. 1 Reemsnyder	Cen. SE¼ SE¼ 33-12-18W	3,429	3,737	3,760
Sohio Pet. Co. No. 1 Erbert	NW¼ NE¼ SW¼ 20-12-20W	3,540	3,908	3,950
Continental No. 1 King	NE cor. SW¼ 35-12-20W	3,524	3,884	3,995
Royer-Farris Drlg. Co. No. 1 Albert	NW¼ SW¼ SW¼ 5-13-18W	3,519	3,855	3,900
Westgate-Greenland Oil Co. No. 1 Sack	NW cor. NW¼ 13-13-19W	3,424	3,733	3,776
Homer H. Luttrell et al. No. 1 Dreiling	NE cor. NW¼ 27-14-16W	3,100	3,350	3,410
Huber, Coppinger & Southern & W. C. McBride No. 1 Madden	SE¼ SW¼ SW¼ 7-14-18W	3,491	3,815	3,871
H. H. & B. Drlg. Co. No. 1 Pfannenstiel	NE cor. NE¼ 26-14-20W	3,389	3,737	3,767
Sohio & Brunson No. 1 Schmidt	NE cor. NW¼ 22-15-17W	3,287	3,603	3,637
E. H. Adair Oil Co. No. 1 Schmidt "B"	NE cor. SW¼ 22-15-17W	3,275		3,585

During 1947, 14 dry holes were drilled more than 2 miles from production in Ellis County. These are shown on Figure 16. One dry hole, located about 1½ miles from the Pleasant pool in sec. 23, T. 14 S., R. 20 W., found the Arbuckle to be only 27 feet thick and the Reagan below only 5 feet thick. The Reagan lies on Pre-Cambrian quartzite.

The oil pools of Ellis County are shown on Figure 16. The pools and pertinent facts pertaining to them are tabulated in Table 24. Dry wildcat tests drilled during 1947 are listed in Table 25 and shown on Figure 16.

ELLSWORTH COUNTY

Historical background.—Holes were drilled for oil in Ellsworth County during the first World War, and wildcatting continued

during the 1920's. No pool was opened, however, until October 1930, when a well drilled in sec. 25, T. 17 S., R. 10 W. began producing nearly 2,000 barrels of oil per day and considerable gas. This well, producing from the Arbuckle dolomite, was the beginning of the Heiken pool. From its discovery to the end of 1947 this pool produced a total of 379,864 barrels of oil.

The next year the Stoltenberg pool was found. It, like the Bloomer, part of which lies in this county, is one of the dozen most important oil pools in the State. Each has produced about 25 million barrels. Following the Stoltenberg, the Breford oil pool and the Satran gas field (no longer producing) were discovered in 1932. The Lorraine and the Wilkens were opened during 1934, and the Edwards pool, extending well into Ellsworth County from its discovery in Rice County, was discovered in 1936. Since that time, several smaller pools have been found in the southwestern part of the county.

Statistical summary for Ellsworth County, 1947

Oil produced		4,702,823 barrels
Gas produced		none
Wells drilled:	Oil	35
	Gas	none
	Dry	16
	Salt water disposal	1
	Total	52
New, revived, or abandoned pools		none
Secondary recovery operations		none

Developments during 1947.—Almost all the activity was centered in two pools, the **Edwards** and the **Stoltenberg.** The Stoltenberg is now 12 miles long, extending from sec. 6, T. 16 S., R. 10 W. southeastward almost to the county line. Undrilled locations and some fringe acreage in this pool were tested. The total number of new tests in the pool was 36; the total number of dry holes completed was 10. In this pool production is found in the Arbuckle dolomite which generally lies directly beneath Pennsylvanian strata. However, locally the Simpson formation is present. In the wells drilled during 1947, the Simpson ranges in thickness from a featheredge to 20 feet. An idea of the thickness of the Arbuckle dolomite was gained when the Vickers Petroleum Company drilled a salt water disposal well in sec. 14, T. 17 S., R. 10 W. as the No. 3 well on the Peterman lease; 360 feet of dolomite was penetrated without reaching the base of the Arbuckle.

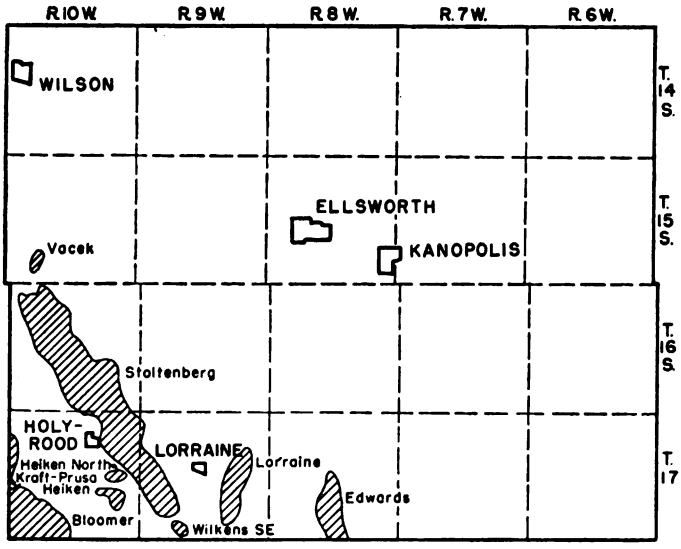

FIG. 17.—Map of Ellsworth County showing oil pools.

The Edwards pool, located in T. 17 S., R. 8 W., extends for some distance into Rice County on the south. In the Ellsworth part of this pool seven new oil wells were completed. The Arbuckle is the producing zone. Here, too, the Pennsylvanian rocks commonly lie directly upon the dolomite. However, the Simpson is present in many wells, ranging in thickness from a featheredge to 56 feet. Some wells with a thick Simpson cover over the Arbuckle dolomite are good oil producers. The presence or absence of the Simpson formation, therefore, seems to have no influence on the occurrence of oil in the dolomite below.

The **Lorraine** pool is located in T. 17 S., R. 9 W. Here only one new oil well was added to the 43 producers. A part of the **Bloomer** pool is located in the extreme southwestern corner of the county. Considerable rearrangement of the area of this pool occurred when the Nomenclature Committee decided to take out several sections and place them in the **Kraft-Prusa** pool of Barton County. In the remaining part of the original Bloomer pool there were two new oil wells and also two dry holes completed in Ellsworth County during 1947.

No rank wildcat tests were drilled in Ellsworth County during the year. The only tests which might approach the category of wild-

TABLE 26.—*Oil pools of Ellsworth County*

Pool and location of discovery well	Discovery year	Area acres	1947 production, bbls.	Cumulative production to end of 1947, bbls.	Producing wells	Producing zone	Depth to producing zone, feet
Bloomer	see Barton County						
Edwards	see Rice County						
Heiken 25-17-10W	1930	160	1,698	379,864	2	Arbuckle	3,269
Heiken North 24-17-10W	1942	180	22,590	121,935	3	Arbuckle	3,212
Kraft-Prusa	see Barton County						
Lorraine 13-17-9W	1934	5,500	133,891	9,898,206	38	K.C.-Lans. Arbuckle	3,060 3,200
Stoltenberg 22-16-10W	1931	9,500	2,795,777	25,052,427	325	K.C.-Lans. Arbuckle	3,333
Stoltenberg Southwest 20-16-10W	1940	combined with Stoltenberg					
Vacek 32-15-10W	1944	160	12,589	31,459	4	Arbuckle	3,315
Wilkens Southeast 32-17-9W	1942	600	49,278	289,333	6	Arbuckle	3,220

cats were some located less than 2 miles from production. One of these was drilled by the Bridgeport Oil Company on the Janda farm in sec. 28, T. 15 S., R. 10 W. approximately 1 mile north of the **Vacek** pool. During the year, the **Stoltenberg Southwest** pool was combined with the Stoltenberg and the former name dropped.

The oil pools of the county are shown on Figure 17 and listed in Table 26.

FINNEY COUNTY

Historical background.—Gas was first discovered in Finney County in December 1932, when the No. 1 Brown well in sec. 16, T. 25 S., R. 34 W. produced 5 million cubic feet of gas from depths of 2,635 and 2,774 feet. A few other gas wells were drilled in the southwest corner of the county in the next 6 years in what has since become the northeastern edge of the Hugoton gas field.

In 1938, the Nunn oil pool was discovered by the Atlantic Refining Company in sec. 27, T. 21 S., R. 34 W. Oil comes mainly from a porous zone in the "Mississippi lime" at a depth of 4,654 feet. The discovery well produced 600 barrels of oil per day. At present, the Nunn pool has 14 producing wells, and its cumulative production to the end of 1947 was 737,549 barrels.

Statistical summary for Finney County, 1947

Oil produced	192,424 barrels
Gas produced	not segregated from Hugoton production
Wells drilled: Oil	3

Gas	36
Dry	1
Total	40
New, revived, or abandoned pools	none
Secondary recovery operations	none

Developments during 1947.—At the present time there is only one oil pool, the **Nunn,** in Finney County. In July 1946 the Shallow Water Refining Company bought nine wells in the pool and approximately 5,500 acres of undeveloped leases near by. At the same time, the Shallow Water Refining Company also acquired the oil wells in the Shallow Water pool which lies 10 miles to the northeast in adjacent Scott County. The new owners drilled several additional wells to the Mississippian limestone and noted that each one had good saturation in a limestone near the base of the Pennsylvanian System. This was especially true in the No. 6 Gobleman well located in the Cen. NW¼ NE¼ sec. 34, T. 21 S., R. 34 W. The Shallow Water Refining Company used cable tools to rework a well completed by the Atlantic Refining Company in November 1944 as the No. 1 Patrick McHugh. The well, which was producing from the Kansas City limestone, was on the point of becoming exhausted. The casing was perforated with 47 shots between 4,303 and 4,312 feet opposite the Ft. Scott limestone. After the limestone was treated with 3,000 gallons of acid, oil rose in the hole at the rate of 1,400 feet in 5 hours. A swabbing test showed 7 barrels of oil in 1 hour and a final official test gave the well a rating of 779 barrels per day.

The success with this test caused the operators to test other wells which were nearly exhausted. The next one to be so tested was the No. 2 Davis well in the Cen. NW¼ NW¼ sec. 26. This well was originally completed in June 1944 with a potential capacity of 462 barrels of oil from the top part of the Mississippian limestone. The well was plugged back to 4,580 feet, shot between 4,286 and 4,293 feet and also between 4,301 and 4,312 feet. The use of 1,000 gallons of acid caused the limestone to yield 300 feet of oil in 5 hours. The gravity of this oil from the Ft. Scott limestone was 34°. The third well to be worked over, the Eva Nunn No. 1, also responded favorably. It was rated at 734 barrels per day after reconditioning.

In addition to the reworking of these old "Mississippi lime" wells, the Shallow Water Refining Company completed four new tests in the Nunn pool. Three of these were good producers in the

"Mississippi lime" and one was dry. Two of the new producers drilled near the center of sec. 27 found the producing limestone at 4,604 and 4,607 feet. The dry hole, located in the NE¼ sec. 23, found the same limestone at 4,706 feet showing a distinct structural drop-off in a northeasterly direction.

During 1947 an active drilling campaign was carried on in Finney County, which includes a part of the large Hugoton gas field. The 36 gas wells drilled in this county have capacities ranging from one-half to 32 million cubic feet of gas per day. It was necessary to use very large amounts of hydrochloric acid, as much as 40,000 gallons in some cases, to complete the wells.

The Nunn oil pool and gas wells drilled in the part of the Hugoton gas field in Finney County are shown on Figure 18.

Hugoton Gas Field

General statement.—The Hugoton gas field, with its extension southward across the Oklahoma "strip" and well into the panhandle of Texas, is regarded as containing the largest reserve of natural gas of which the petroleum industry has knowledge. Substantial additions will doubtless be made to the present area of the Hugoton field, but it seems probable that the main area of large gas production has been reasonably well outlined. Careful and generous acidizing and improvements in production techniques are expected to be largely responsible for future field extensions and new pool discoveries in southwestern Kansas and in the panhandle country.

The field is a bit colorless geologically in that its limits are not clearly marked by structural or stratigraphic consideration. Porosity of the producing members seems to be the main control in respect to productivity. The gas comes from thin, porous, dolomite rocks of lower Permian age. No oil has been found in the area of the field. Origin of the gas is debatable. There is no really important known deposit of oil with which the gas can be related in origin within miles of the Hugoton field. Production may come from one or several zones including the Herington, Krider, Winfield, Fort Riley, and Florence limestones. Most Hugoton gas production comes from a depth of about 2,500 feet.

Wells with initial potentials of less than 1 million cubic feet of gas per day are not likely to be saved by the larger companies;

those running 5 to 15 million cubic feet per day are "usual"; and "big" ones produce 30 million cubic feet or more. The limits of the field are by no means cleancut; production "featheredges" out, making the drawing of boundaries uncertain. A cut-off of 1 million cubic feet per day—a purely arbitrary figure—has been used as a guide in drawing the field boundary on the Hugoton map that accompanies this report. Smaller wells that are located near the field limits, have been left outside the boundary line, although such wells might be regarded as rather valuable if located in eastern Kansas. It is significant that there are several old holes, marked dry, which are located within the main Hugoton area of large gas production and which penetrated well beyond the present producing zones. These were drilled a number of years ago, —as long ago as the late 1920's. Modern methods and production techniques now are able to save wells that in former years were not regarded as having possibilities. By the same token, one may reasonably prophesy that the presence of dry wildcat wells of former years in many parts of western Kansas may not preclude the presence of important oil pools which may in the future be discovered by modern and scientific methods of exploration and production.

In physical appearance, the Hugoton gas field belies its true character. There is no forest of derricks, no profusion of pipelines and oil country gear one sees in most large oil fields. Drilling is done mainly by portable rotary rigs. A traveller through the area may see little but a white painted 6- by 8-foot "dog house" concealing a well head in the center of each section. The operators are good housekeepers.

The field is under rigid proration by the Corporation Commission, Division of Conservation, of Kansas. Only one well may be drilled in each 640 acres, and allowable production for groups of wells is established on a monthly basis, in a manner designed to conserve the gas reserve.

Gas from the Hugoton field has desirable quality. It carries about 4 gallons of gasoline per 1,000 cubic feet. Analyses show it to contain about 68 percent methane, 18 percent ethane, and 1½ percent butane. The heating value runs between 1,000 and 1,100 B. T. U.'s per cubic foot.

What many claim to have been the opening well of the Hugoton field was probably not even regarded as a discovery. That first

well was drilled in 1922 by the Defenders and Traders Gas Company on the Boles lease in sec. 3, T. 35 S., R. 34 W. in what is now the Liberal gas field. The well was rated at 5 million cubic feet of gas per day and is credited with drawing attention to the gas possibilities of the general area.

The first well drilled in what is now the Hugoton field proper, and often referred to as the discovery well, was not drilled until five years later, in 1927. It was the No. 1 Crawford well of the Independent Oil and Gas Company, in sec. 31, T. 33 S., R. 37 W. near Hugoton in Stevens County. The well is said to have produced 6 million cubic feet of gas per day. The field developed very slowly, in part because of the distance to consuming centers and in part because of the lack of pipeline facilities. The Argus Pipeline Company is said to have been first in the field with its gas line from Stevens County to Dodge City in 1930 and 1931. After that, drilling picked up somewhat. By 1938, only about 200 wells were in production. At that time, the two largest companies were the Panhandle Eastern Pipeline Company with a gas line to Detroit and other eastern cities, and the Republic Natural Gas Company supplying gas to communities in Kansas, Nebraska, Iowa, and Minnesota. At that time also, the Argus Pipe Line Company of Dodge City and the Central Gas Utilities of Abilene, both somewhat smaller companies, were supplying gas to communities in western Kansas and Colorado. Panhandle Eastern at that time —1938—had a natural gasoline plant at Arkalon producing 80,000 gallons of gasoline per day, and a subsidiary of the Columbian Fuel Corporation was operating a 6-burner carbon black plant near the town of Hickok in Grant County. In 1938 the producing area of the Hugoton field was about 187,300 acres; in 1942 it contained less than 190,000 acres. By the end of 1947 the area of the field had increased to nearly 2 million acres.

In other words, it was 20 years after discovery of the field before real interest in the big gas reserve became general. By the end of 1942 there were 327 gas wells in the field; 10 and 70 wells respectively were added in 1943 and 1944. Then came a great surge in the demand for gas, and field development increased accordingly. Greater demand came in part as a result of wartime technologic developments, and in part because of both domestic and industrial consumers' unhappiness over uncertain availability of solid fuel.

The number of gas wells drilled in the Hugoton field in 1945 was 181; in 1946 it nearly doubled,—to 286; and in 1947 the number of new wells added was 382, making cumulative total of 1,256 gas wells in the Kansas part of the Hugoton field at the close of 1947. The number tallies exactly with the number of gas wells plotted on the base maps of the State Geological Survey, within the boundary of the field as drawn at the end of 1947. The Hugoton field is probably the only large producing area in Kansas where such accurate record has been kept. Had the drilling record of the older Kansas fields been supplied by the oil companies and properly recorded by a public agency, much benefit could be realized at present by operators reviewing oil possibilities in deeper sands or secondary oil recovery.

Industrially, the Hugoton field has been rather slow to develop, mainly, as stated, because of its relative isolation from centers of population—that is, consuming centers. Industries which entered the Hugoton area were those which required not only fuel, but also natural gas as the fuel. Carbon black plants were the first important industries in the field. Three of these were operating by the end of 1947. Two natural gasoline plants have been built by natural gas companies who thus obtained a by-product return from the gas in their lines, and a third is under construction.

The Stanolind Oil and Gas Company announced plans to build an 80 million dollar chemical plant at Garden City. The plans called for a plant to treat daily 100 million cubic feet of natural gas for the production of gasoline, distillate, and organic chemicals. An outline of the principal chemical products that the big plant would produce was given by Sullivan (1947) in "Chemical Engineering Progress" for December 1947. The list is given in Table 27.

TABLE 27.—*Probable production of chemical products in Stanolind Garden City plant* (Generalized from Sullivan, 1947, p. 13)

Chemicals	Pounds per year (approx.)
Ethanol	64,000,000
Acetic acid	25,000,000
Alcohols	20,000,000
Butyric and propionic acids	13,000,000
Acetone	11,000,000
Ketones	5,000,000
Approximate yearly production	148,000,000

Late in August 1948 the Stanolind Oil and Gas Company announced that they would defer building of the plant at Garden City for which land had already been purchased and much preparatory work done. Mr. E. F. Bullard, president of Stanolind, is quoted as saying (*The Hutchinson News-Herald,* Aug. 20, 1948) "Estimated capital investment required for the project has more than doubled" (since the active program was initiated 2 years ago). President Bullard is also understood to have said that the halting of construction of the plant was caused by "increased costs and the unprecedented delay in obtaining essential building material."

Postponement of the building of this big plant by Stanolind is deeply regretted by Kansas people. It is hoped that the company will find conditions that will permit carrying through the construction of the plant at a reasonably early date.

There has been comment in the press on the undesirability of exporting so much natural gas from the State, to the embarrassment of present and future industrial and domestic users. Table 28 contains figures supplied by the State Corporation Commission which indicate that Kansas produces (183 billion) about what she uses (178 billion), and imports (100 billion) about the quantity she exports (105 billion).

Developments during 1947.—No single development during the year—except the final announcement of the building of the new Stanolind natural gas by-product plant at Garden City—can be said to have general significance affecting the Hugoton

TABLE 28.—*Statistical summary of natural gas production and use, 1947*
(From the Conservation Division, Kansas Corporation Commission)

	During 1947 M cu. ft.
Natural gas produced in Kansas—1947	183,527,266
Imported from outside of the State	100,700,000
Total to account for	284,227,266
Gas used in Kansas during 1947	
Domestic	39,383,000
Industrial	100,384,000
Carbon black	21,700,000
Miscellaneous and losses	17,090,915
Exported from State	105,669,351
Total	284,227,266
Cumulative to date	818,254,743

TABLE 29.—*Gas wells drilled in Hugoton field, by counties*

County	During 1947	Total to date
Finney	36	63
Grant	59	269
Hamilton	1	2
Haskell	19	125
Kearny	88	153
Morton	14	59
Seward	19	26
Stanton	52	93
Stevens	94	466
Total	382	1,256

field. Therefore, discussion of 1947 developments is given under the nine individual counties included in the field. A summary of the wells drilled in the field to the end of 1947 is given in Table 29.

FORD COUNTY

Historical background.—The Sinclair Prairie Oil Company drilled a well in sec. 34, T. 27 S., R. 21 W. in 1938 which tested 6 million cubic feet of gas, 48 barrels of oil, and 200 barrels of water per day. The elevation of the hole was 2,330 feet and the total depth 5,930 feet. What developed after the well was completed is not clear, but there was no offset drilling.

Additional wildcat drilling in the county has not as yet opened new pools.

Development during 1947.—In Ford County a wildcat test was drilled by the Texas Company on the Barngrover farm in sec. 35, T. 27 S., R. 24 W. The well cuttings from this test were examined by the Kansas Well Log Service from whose log the following stratigraphic data were taken. The elevation of the test is 2,528 feet above sea level. The Permian redbeds began at a depth of 860 feet, 30 feet of the Blaine gypsum at 1,010 feet, and the Stone Corral, which consists of 30 feet of anhydrite with 15 feet of dolomite at the base, at 1,505 feet. The top of the Wellington gray shales was found at 1,890 feet, the top of the salt at 2,070 feet, the base of the salt at 2,400 feet, and the Herington limestone at 2,630 feet. It is not possible to differentiate the Shawnee limestone sequence in the samples. The Kansas City-Lansing limestone was encountered at 4,360 feet. Some erosional chert of Mississippian age was found between 5,056 and 5,070 feet fol-

lowed by a long sequence of limestone to 5,540 feet. Here a zone of almost pure chert, the age of which is in dispute, was found to a depth of 5,660 feet. Another limestone sequence from 5,660 to 5,800 feet was also difficult to correlate. Typical Viola cherts and cherty dolomites occur between 5,800 and 5,920 feet. The Simpson formation (5,920 to 5,955 feet) consisted of green shale and much sandstone. At 5,955 feet the bit entered the Arbuckle dolomite, and the hole was abandoned at a total depth of 6,172 feet, still in the same dolomite. Some oölitic chert was found at the top of the Arbuckle. There was a show of oil between 5,056 and 5,069 feet in the residual chert of Mississippian age. Other small shows were encountered at 5,144, 5,138, and 5,162 feet, all in strata of Mississippian age. A drill stem test in the Arbuckle revealed only salt water.

FRANKLIN COUNTY

Historical background.—Oil was first produced in Franklin County about 1904 in the Rantoul field, although peak production was not reached in the county until 1926. Nearly all oil and gas produced in the county so far has come from the eastern part;

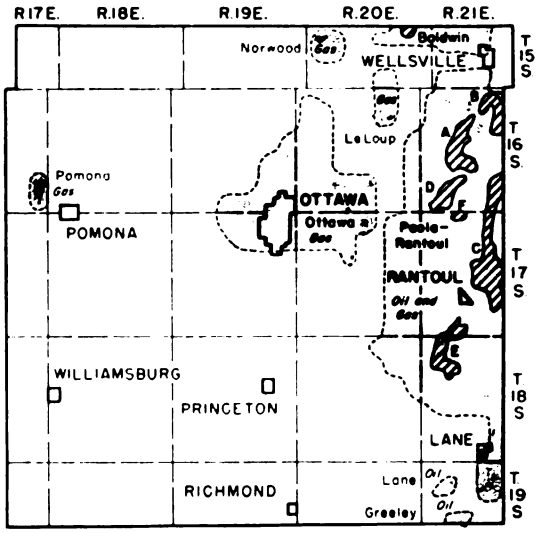

FIG. 19.—Map of Franklin County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

TABLE 30.—*Oil production in Franklin County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Baldwin	See Douglas County	
Paola-Rantoul[1]		
A	116	17,842
B	18	913
C	285	155,472
D	52	4,659
E	29	8,308
F	4	743
Miscellaneous	16	248
Total	520	188,185

[1]Field extends into Miami County.

exploration in the western part generally has been disappointing, although a few rather large gas wells were drilled there several years ago.

Exploration and discoveries in the eastern half of the county occurred along with those in western Miami County about 30 years ago.

Both oil and gas production have come only from the Pennsylvanian rocks. The chief producing formation has been the "Squirrel sand" in the upper part of the Cherokee shale, but other Pennsylvanian sandstones, including the "Bartlesville" and "Peru," have been productive.

Oil produced in 1947 totaled 188,185 barrels; no gas was produced. There were six active oil pools; 520 producing oil wells were reported.

Developments during 1947.—Several dry holes have been drilled recently in the western part of Franklin County, but the chief activity has been in connection with water-flooding operations in the eastern part. There were four reported waterflood projects in operation.

Production of oil in Franklin County during 1947 was segregated into six active fields (Table 30) which are generally areas within the large **Paola-Rantoul** field. The oil and gas producing areas are shown on Figure 19. No developments of especial note were reported for the county in 1947.

GOVE COUNTY

Historical background.—Wildcat wells have been drilled in Gove County at intervals through the years, but a producing pool has yet to be opened.

Developments during 1947. A wildcat test well was completed in Gove County early in 1947. It was drilled by the Jones-Shelburne interests on the Hewitt farm in sec. 15, T. 13 S., R. 30 W. Elevation of the hole is 2,847 feet. The stratigraphic information as determined by the Kansas Well Log Service indicates the presence of the Ft. Hays chalk at 585 feet, and the Codell sandstone at 650 feet. The Dakota sandstone between 1,020 and 1,560 feet contained the usual siderite concretions and considerable brownish shale; from 1,560 to 1,740 feet these strata were almost pure sandstone. In the Permian, which began at 1,740 feet, the Blaine gypsum was found at 1,820 feet, the Stone Corral anhydrite at 2,290 feet, the Herington limestone at 2,750 feet, and the Ft. Riley limestone at 2,910 feet. The Shawnee sequence of limestone is difficult to identify in this location, but the Kansas City-Lansing limestone was found at 3,872 feet. The Mississippian cherty limestones, found at 4,485 feet, extend to 4,620 feet where the oölitic St. Joe limestones begin. The top of the Viola, found at 4,701 feet, rests on the Arbuckle dolomite at 4,745 feet. Total depth of the test was 4,770 feet. Some oil with considerable water was found in the Arbuckle dolomite. Higher up in the hole only water was found.

GRAHAM COUNTY

Historical background.—Oil production in Graham County dates from 1938 when the Continental Oil Company opened the Morel pool in sec. 15, T. 9 S., R. 21 W. The discovery well was rated at 2,100 barrels per day from the Arbuckle between 3,718 and 3,720 feet. To the end of 1947, the Morel pool had produced more than 5.7 million barrels of oil. Following the opening of the Morel, the Penokee pool was discovered in 1940, and the Gettysburg in 1941. In 1944 and 1945, three small oil pools, the Alda, Faulkner, and Luck, were discovered. All of these produce oil from porous zones in the Kansas City-Lansing.

So far, only one really important pool—the Morel—has been found in the county.

Statistical summary for Graham County, 1947

Oil produced	1,655,876 barrels
Gas produced	none
Wells drilled: Oil	13

Gas	none	
Dry	27	
Salt Water Disposal	1	
Total	41	
Wildcat wells	18	(included in above total)
New pools: Oil	1	
Revived or abandoned pools	none	
Secondary recovery operations	none	

Developments during 1947.—The year 1947 was marked by an important increase in drilling activity in Graham County, but results of this activity as measured by new oil reserves were very disappointing. Only one of the 18 exploratory wells drilled found a new pool. The new pool, named the **Houston,** is located near the Cen. T. 6 S., R. 22 W., about 6 miles north of the previously discovered **Alda** pool. The discovery well of the new pool, drilled by Bennett and Roberts on the Rush farm in the NE¼ sec. 9, was rated at 297 barrels per day. The test was originally drilled into the Arbuckle dolomite which was found at 3,831 feet (1,581 feet below sea level), which was dry. The well was plugged back

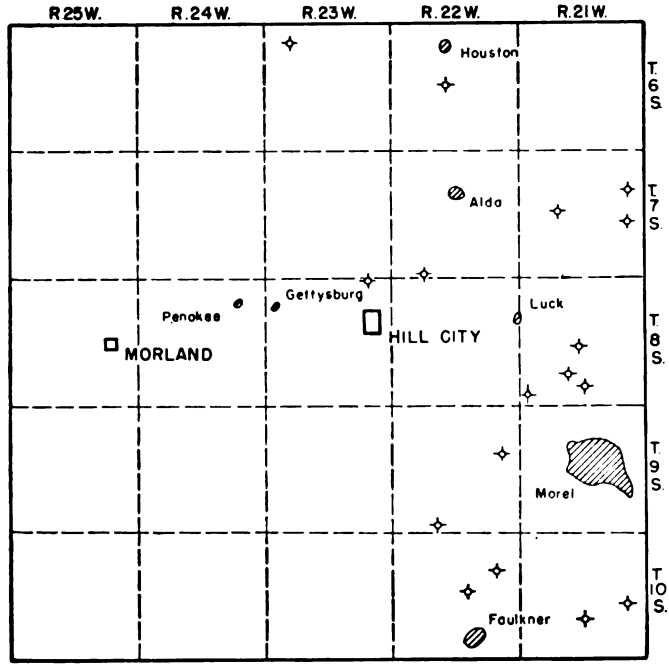

FIG. 20.—Map of Graham County showing oil pools and dry wildcat tests drilled during 1947.

to test three likely zones in the Kansas City-Lansing limestone. The best zone was found between 3,506 and 3,516 feet. The well was finally completed 19 feet below the top of the Kansas City-Lansing. An offset test completed later in the year in the SW¼ sec. 4 proved to be dry, although it was drilled 180 feet into the Lansing limestone.

Of the 41 tests drilled in the county during 1947, 13 were new oil wells. The **Morel** pool, discovered in 1938, had 72 wells at the close of 1946. During 1947, 12 additional oil wells were completed. They extended the pool about one-half mile toward the northwest. The depth of producing zones below sea level in the new wells in and north of sec. 23, T. 9 S., R. 21 W. varies considerably. The producing zone of the highest well was found 1,486 feet below sea level; in the lowest well the Arbuckle was found 1,523 feet below sea level. The highest well was offset by one drilled into a sink hole in the Arbuckle dolomite. This deep test was drilled by Barnett and Shields as the No. 4 well on the Boland lease in sec. 16. Here the conglomerate proved to be 50 feet thick, and the Arbuckle was found at 3,743 feet—1,558 feet below sea level. The test was then drilled deeper into the Pre-Cambrian granite which was found at 4,140 feet. Seemingly, the Arbuckle in this part of the State is approximately 400 feet thick. Another sink hole was found by the Continental Oil Company when the No. 6 Morel well was completed in sec. 15. Here the conglomerate was reached at 3,730 feet, but was still present at 3,785 feet where drilling stopped. This sink hole is more than 50 feet deep, judging by near-by producing wells. Three dry holes were drilled on the south side of

TABLE 31.—*Oil pools of Graham County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production bbls.	Cumulative production to end of 1947, bbls.	Producing wells	Producing zone	Depth to producing zone, feet
Alda 15-7-22W	1944	40	3,178	20,358	1	K.C.-Lans.	3,518
Faulkner 27-10-22W	1945	160	22,097	82,522	4	K.C.-Lans.	3,629
Gettysburg 7-8-23W	1941	40	3,942	28,332	1	K.C.-Lans.	3,725
Houston 9-6-22W	1947	40	3,748	3,748	1	K.C.-Lans.	3,506
Luck 13-8-22W	1945	40	155	12,765	1	K.C.-Lans.	3,418
Morel 15-9-21W	1938	4,300	1,618,589	5,736,569	84	Sooy Arbuckle	3,712 3,718
Penokee 11-8-24W	1940	40	4,167	56,522	1	K.C.-Lans.	3,750

the pool in secs. 26, 27, and 33. All these found at the top of the Arbuckle dolomite more than 1,500 feet below sea level. One found the Arbuckle 1,654 feet below sea level, suggesting either a very steep dip in that direction or another sink hole. The north and west sides of the Morel pool were tested by three holes, all of which were dry. These reached the Arbuckle more than 1,500 feet below sea level; whereas corresponding zones in the producing wells are approximately 1,450 feet.

Exploratory wells were drilled mainly in the eastern half of the county as shown on the map (Fig. 20). A test was made in

TABLE 32.—*Dry wildcat tests drilled in Graham County during 1947*

Company and farm	Location	Surface elevation	Depth to top of Lansing, feet	Depth to top of Arbuckle feet	Total depth, feet
Wilcox Oil Co. No. 1 Crawford	SW cor. SE¼ 18-6-22W	2,356	3,591	3,902	3,950
Wilcox Oil Co. No. 1 Gallantine	NW¼ SW¼ SW¼ 5-6-23W	2,399	3,605	4,015	4,055
N. Appleman Co. No. 1 Hibbitt	SW cor. SW¼ 12-7-21W	2,156	3,363		3,674
Harry Gore No. 1 Cook	SE cor. SE¼ 17-7-21W	2,147	3,385	3,698	3,731
Harry Gore No. 1 Alexander	Cen. S½ SW¼ NW¼ 24-7-21W	2,093	3,327	3,622	3,658
Anderson-Prichard Oil Corp. No. 1 Morris	SW cor. SE¼ 32-7-22W	2,139	3,365	3,749	3,783
Anderson-Prichard Oil Corp. No. 1 Brault	SE¼ NE¼ NE¼ 21-8-21W	2,079	3,287	3,615	3,670
Palmer Oil Corp. No. 1 Manny	NE cor. SW¼ 28-8-21W	2,143	3,364	3,736	3,760
Skelly Oil Co. No. 1 Andregg	NW cor. SW¼ 31-8-21W	2,167	3,384	3,741	3,766
Palmer Oil Corp. No. 1 Roberts	NW cor. NW¼ 34-8-21W	2,120	3,323	3,696	3,739
Royer-Farris Drlg. Co. No. 1 Jackson	NE cor. NE¼ 2-8-23W	2,242	3,511	3,904	3,935
Anderson-Prichard Oil Corp. No. 1 Buss "A"	SW cor. NW¼ 13-9-22W	2,321	3,542	3,883	3,933
Anderson-Prichard Oil Corp. No. 1 Loyd	NW cor. SW¼ 33-9-22W	2,367	3,608	4,020	4,117
Anderson-Prichard Oil Corp. No. 1 Klewer	SW cor. NW¼ 24-10-21W	2,190	3,435	3,855	3,870
Lowell-Voltz, Inc., et al. No. 1 Miller	NW cor. NW¼ 27-10-21W	2,198	3,474	3,794	3,830
Western Drlg. Co. No. 1 Johnson	SE cor. SE¼ 11-10-22W	2,292	3,553	3,978	4,021
Anderson-Prichard Oil Corp. No. 1 Griffith	SE¼ SW¼ SE¼ 15-10-22W	2,226	3,479	3,856	3,919

sec. 12, T. 7 S., R. 21 W., about 6 miles west of the Alcona pool in Rooks County. In this well the Arbuckle was absent, the Reagan sandstone lying beneath the Pennsylvanian conglomerate. The Reagan is 33 feet thick. The test was completed in the Pre-Cambrian quartzite. All other wildcat tests found the Arbuckle dolomite present below the Pennsylvanian conglomerate.

The oil pools of Graham County are listed in Table 31. The dry wildcat wells and their surface elevations are listed in Table 32 and shown on Figure 20.

GRANT COUNTY

Historical background.—The first gas well to be drilled in Grant County was the Sullivan No. 1, sec. 12, T. 29 S., R. 38 W. This was in 1930. As the gas came from the Permian rocks between 2,455 and 2,710 feet, it was correctly supposed that the discovery represented an extension of the large gas area—to be called the Hugoton field—already developed to some extent in Stevens and Morton Counties. A few wells were drilled each year for a dozen years, but production was handicapped by lack of pipeline facilities and outlets. In 1939, a Grant County gas well capable of producing almost 40 million cubic feet of gas per day was completed. This was the largest gas well in the Hugoton field up to that time. By the end of 1940 Grant County had 63 gas wells, the gas area covering approximately the southern two-thirds of the county. Drilling increased until 1945 when 48 wells were drilled in the county. The largest of these new wells, one drilled by the Columbian Fuel Corporation, had an initial production of 30.8 million cubic feet of gas per day. It was not until 1947 that the northern tier of townships in Grant County came into substantial production as a part of the Hugoton field. There are two townships in Grant County, T. 27 S., R. 37 W. and T. 29 S., R. 37 W,, in which no well has been drilled as yet and the east half of T. 30 S., R. 38 W. is not yet in production.

No oil was produced in the county during 1947; gas production was not segregated from that of the Hugoton field. There were 59 gas wells drilled, no oil wells or dry holes; no new pools were discovered.

Developments during 1947.—Of the 59 wells drilled in Grant County during 1947, 22 were located in the previously unde-

veloped northern tier of townships. Six wells were drilled south of the North Fork of the Cimarron River in T. 30 S., R. 38 W. The remaining 31 wells may be described as mainly fill-ins at locations not previously drilled. The largest well drilled during 1947, the No. 1 Jarvis owned by Osborne et al., is located in the Cen. sec. 5, T. 27 S., R. 36 W. It produced 30 million cubic feet of gas per day after treatment with 54,000 gallons of hydrochloric acid. The gas wells in Grant County are shown on Figure 18. More detailed information regarding the Hugoton field is given under Finney County.

GRAY COUNTY

Historical background.—Wildcat wells have been drilled in Gray County at intervals through the years, but a producing pool has yet to be opened.

Developments during 1947.—In Gray County the Cities Service Oil Company drilled a wildcat test on the Snyder farm in sec. 18, T. 28 S., R. 28 W. Elevation of the well is 2,795 feet. Here the Hollenberg limestone was found at 2,645 feet and the Herington at 2,702 feet. Other formations of the Hugoton gas series were found below them in normal sequence. The base of the Americus limestone was probably reached at 3,405 feet. The Shawnee limestone sequence probably began at 3,790 feet and extended down to 4,230 feet. The next limestone sequence (Lansing at the top) began at 4,350 feet, extending down to 4,956 feet. Mississippian oölitic limestones were encountered at 5,119 feet; below them is a long sequence of limestones, thin oölitic beds, and cherty limestones to the top of the Viola at 6,182 feet. The Viola samples consisted of cherty dolomite. The top of the Simpson sandstone, 46 feet thick, was found at 6,308 feet. The Simpson rests on Arbuckle dolomite at 6,354 feet. The total depth was 6,445 feet. No shows of either oil or gas were reported by the operators. The stratigraphic data given above were taken from a log of the Kansas Well Log Service.

GREENWOOD COUNTY

Historical background.—The first drilling in Greenwood County seems not to have been recorded, but there was some production of shallow gas about 1900. Eureka was supplied and

piped for gas in 1903 or 1904 (personal communication from John A. Edwards). About 40 producing wells were drilled within the townsite in those early years.

The first oil produced in the county seems to have been about 1905 or 1906 when a group of people from Massachusetts did some shallow drilling near Neal and also near Toronto on the west side of the Verdigris River. In 1907, seven or eight of these shallow wells were producing a low gravity oil which was shipped by John A. Edwards for fuel to one of the salt plants at Hutchinson.

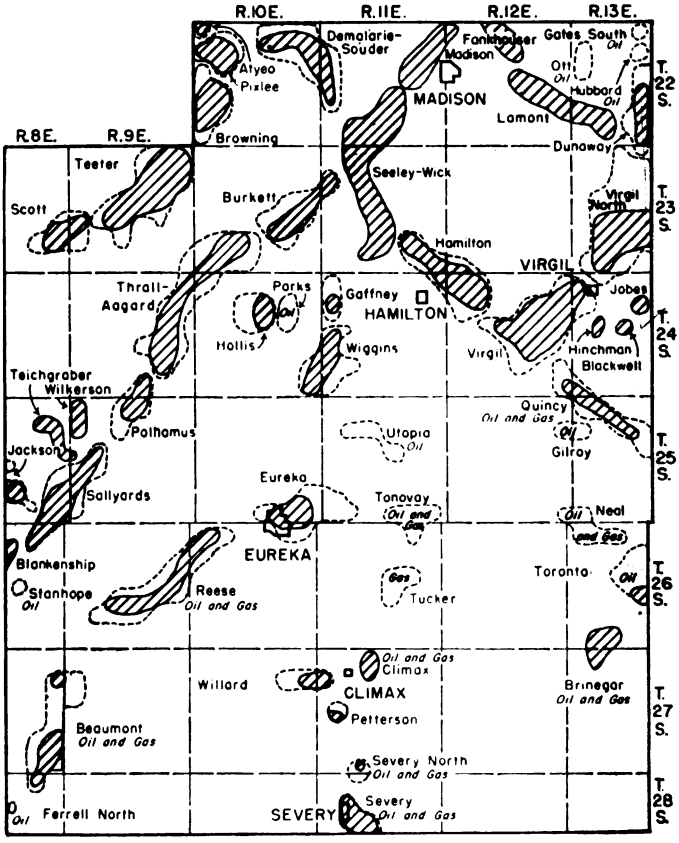

FIG. 21.—Map of Greenwood County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

One oil producer was drilled in the county during 1913 (Northrup, 1914, p. 927) and was producing at the end of the year. The location is not known. Eight dry holes were drilled during 1914; no activity was reported in 1915; but in 1916 two producing oil wells and six dry holes were drilled in the county. In that year, good showings of both oil and gas were reported from several parts of the county, including Virgil, Eureka, and a point east of Beaumont. Beginning in October 1916 (Northrup, 1917, p. 782), oil production was officially listed for Greenwood County. It started at 18 barrels per day.

Records show 23 wells drilled in the county in 1917; 14 were oil producers having initial capacities of 63 barrels (average) each. In that year an oil well was drilled in sec. 2, T. 26 S., R. 8 E. in the Sallyards pool (an extension of production from Butler County); another producer was opened near Virgil; one in sec. 9, T. 25 S., R. 11 E. near Utopia; one in sec. 2, T. 26 S., R. 10 E. probably the opener of the Eureka pool; and another producer in sec. 25, T. 27 S., R. 8 E. between Beaumont and Blodgett. The record for 1918 shows that 80 of the 186 tests drilled were dry holes (Lloyd, 1918, p. 1,060). By 1921 the Sallyards field was 6 miles long—the first typical shoestring field.

The major oil development of Greenwood County took place during the 1920's when the Teeter, Aagard, Seeley, Burkett, Browning, Blankenship, Madison, Polhamus, Thrall, Wick, Harris, DeMalorie-Souder, Pixlee, and some minor pools were developed. The significance of the shoestring sands in Butler and Greenwood Counties was rapidly becoming known. The high gravity of the oil they produced—around 40° Be.—the relative shallowness of the wells, 2,000 to 2,500 feet, and the size of the wells—not uncommonly 1,000 barrels per day—led this area to be a very popular part of Kansas. In 1927, a year when Kansas ranked fourth among oil-producing states in the nation, Greenwood County and its shoestring sands produced 27.8 percent of the State's 42-million barrel total (Kesler, 1927, p. 19).

Production leveled off during the 1930's, although pools and extensions continued to be found. At the present time, secondary oil recovery by water flooding accounts for much of the oil activity in the county. Twenty-three projects were under way during 1947 (Table 8). Water flooding began in the county in 1943, but more operations were started in 1947 than in any former year.

Statistical summary for Greenwood County, 1947

Oil produced	4,129,418 barrels	
Gas produced	Figures not available	
Wells drilled: Oil	44	
Gas	1	
Dry	29	
Salt water	11	
Total	85	
Wildcat wells	5	(included in above total)
New pools	none	
Active oil pools	37	
Secondary recovery operations	23	

Developments during 1947.—There was considerable activity in this county during the year as indicated by the large number of wells drilled. Much of the activity may be ascribed to water-flooding, the principal method of secondary oil recovery.

It is interesting to note that of the 37 active pools in 1947, only six, the Seeley-Wick, Thrall-Aagard, Burkett, Beaumont, Eureka, and Gaffney produced at rates greater than 5 barrels per day per well during the year. All the rest would be classed as strippers

TABLE 33.—*Oil production in Greenwood County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Atyeo	see Lyon County	
Beaumont	28	60,030
Blackwell	11	3,854
Blankenship	see Butler County	
Brinegar	20	6,059
Browning	99+	129,851
Burkett	100+	589,950
Climax		13,011
Demalorie-Souder	125	183,900
Dunaway	39	44,400
Eureka	12	31,410
Fankhouser	see Lyon County	
Gaffney	3+	8,880
Hamilton	82+	92,421
Hinchman	8	7,001
Hollis	2+	3,023
Jackson	2	1,530
Jobes	1	480
Lamont	106+	128,880
Madison	105+	110,370
Petterson	2	485
Pixlee	43	41,280
Polhamus	44	25,050
Quincy[1]	19	8,735
Reese	22	23,220
Sallyards	130	157,440
Scott	66	69,039
Seeley-Wick	219	898,320
Severy	see Elk County	

Severy North		1,402
Teeter[1]	190+	212,557
Teichgraber	17	13,980
Thrall-Aagard	251	649,200
Toronto	7	2,316
Virgil	118+	178,017
Virgil North[2]	307	376,771
Wiggins	41	27,600
Wilkerson	13	16,560
Willard	3	3,781
Miscellaneous		8,615
Total	2,235+	4,129,418

[1] Includes Chase County production.
[2] Field extends into Woodson County.

on the 5 barrel per day basis. Three of the pools, the Seeley-Wick, Thrall-Aagard, and the Burkett, produced an aggregate of 2,137,470 barrels of oil, or 52 percent of the county's total for the year. Those three pools had barrel-per-day averages of 11.5, 7.1, and 16.2, respectively.

As the number of secondary recovery operations in a county changes from time to time because units are consolidated, abandoned, or new ones started, it is sometimes difficult to report accurately on the number of active projects during a given period. However, it seems that Greenwood County had a larger number of water floods—the number reported was 23—producing during 1947 than any other county in the State. They produce mainly from the "Bartlesville sand." The shoestring sands seem to respond well to water flooding.

The county produces some gas, but the quantity is not segregated.

TABLE 33a.—*Dry wildcat tests drilled in Greenwood County during 1947*

Company and farm	Location	Depth to top of Lansing, feet	Depth to top of Mississippian, feet	Total depth, feet
Molter et al. No. 1 Zebold	NW¼ SW¼ NW¼ 10-24-8E	1,555	2,585	2,600
Well Jagrd Oil Co. No. 1 Reising	SE ¼SW¼ SW¼ 3-24-11E		1,964	1,987
Union Oil Co. of Calif. No. 1 Boone	NW cor. SE¼ 15-25-10E	1,010	2,115	2,140
Shaffer & Foster No. 1 Miller	SW cor. SE¼ 16-28-10E		2,242	2,285
Lee et al. No. 1 Morton	Cen. S½ SW¼ SW¼ 2-28-12E			1,337

Table 33 shows the active oil fields, their productions, and the approximate number of producing wells. The oil producing areas are also shown on Figure 21. The dry wildcat tests are listed in Table 33a.

HAMILTON COUNTY

Historical background.—The first successful gas well in Hamilton County was completed during 1946 on the Zook ranch in sec. 12, T. 26 S., R. 39 W. Two other holes, both dry, were drilled by the same company in 1946. One was in sec. 14, T. 25 S., R. 39 W.; the other was in sec. 23, T. 26 S., R. 40 W. No oil has been produced in the county.

No segregation of gas production of the Hugoton field into counties has been possible so far.

Developments during 1947.—The only well drilled in Hamilton County during 1947, the Stanolind No. 1 McDonald "B" in sec. 25, T. 26 S., R. 39 W., was capable of delivering nearly 16 million cubic feet of gas per day. The company used 12,000 gallons of acid to open the porous zones in the various limestone layers. It may be significant that the well in sec. 25 has such a high initial potential. It is not unlikely that there may be a slight embayment or extension to the westward of the Hugoton field boundary at this point.

The gas wells in Hamilton County are shown on Figure 18. More detailed information concerning the Hugoton field, including production figures, is given under Finney County.

HARPER COUNTY

Historical background.—Wildcat wells have been drilled in Harper County at intervals through the years, but a producing pool has yet to be opened.

Developments during 1947.—One unsuccessful wildcat well was drilled in Harper County during the year. The well was drilled by Bradley and Weller in sec. 5, T. 31 S., R. 9 W. Surface elevation of the test is 1,691 feet. According to the interpretation by the Kansas Well Log Bureau, the Mississippian was reached at 4,448 feet, the Viola at 4,730 feet, and the Arbuckle at 4,927 feet. Total depth was 4,971 feet. A drill stem test made between

4,448 and 4,463 feet showed salty water and a little gas (estimated at perhaps 100,000 cubic feet per day). No oil shows were reported.

HARVEY COUNTY

Historical background.—Harvey County's first oil pool, called the Walton, was discovered in 1923. It produced 123,000 barrels of oil before being abandoned in 1936.

In 1927, a small gas field, the Friesen, was discovered. One year later the Halstead field was opened. The first well was drilled by the Shell Oil Company on the Haury farm in sec. 11, T. 23 S., R. 2 W. The pool originally produced gas but began producing oil in 1929. In 1931, the Hollow-Nikkel pool was discovered. The Sperling pool was discovered in February 1935 with a well in sec. 23, T. 22 S., R. 2 W., which had an initial potential of 22 million cubic feet of gas per day. This production was in the Mississippian "chat" zone but the well was continued to the "Hunton" limestone at 3,279 feet where it was completed as a 1600-barrel oil well. The Stucky pool was discovered in 1942 and the Brandenberger in 1946. Five formations contribute oil in the various Harvey County pools. They are the Kansas City-Lansing limestone, the Mississippian "chat," the "Hunton" limestone, the "Wilcox" sandstone, and the Arbuckle dolomite.

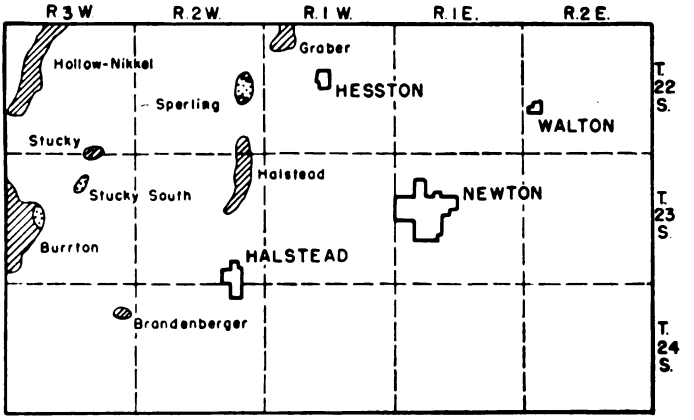

FIG. 22.—Map of Harvey County showing oil and gas pools. (Gas, dots; oil, diagonal lines.)

The Magnolia Petroleum Company started a small secondary recovery operation in the Hollow-Nikkel pool in 1940 which is reported still to be active.

During 1941, the Shell Oil Company also initiated a secondary recovery operation in the Hollow-Nikkel pool. About 270 acres in the Voth No. 2, Schmidt, and Nikkel No. 1 leases are included in the new operation. It is understood that salt water is being used for injection.

Statistical summary for Harvey County, 1947

Oil produced	232,056	barrels
Gas produced	266,695	thousand cubic feet
Wells drilled: Oil	4	
Gas	none	
Dry	2	
Total	6	
New, revived, or abandoned pools	none	
Secondary recovery operations	4	

Developments during 1947.—An offset well was drilled in 1947 to extend the **Brandenberger** pool discovered in the previous year. This offset, the Herndon No. 1 Frantz in sec. 11, T. 24 S., R. 3 W., found the Mississippian limestone at 3,356 feet and the Viola at 3,886 feet, 13 feet lower than in the Brandenberger discovery.

TABLE 34.—*Oil and gas pools of Harvey County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
			barrels				
Brandenberger 12-23-3W	1946	40	238	238	1	Viola	3,875
Burrton			see Reno County				
Graber			see McPherson County				
Halstead 36-22-2W	1929	1,500	61,822	1,727,842	20	"Chat"	3,005
Hollow-Nikkel 30-22-3W	1931	2,000	152,219	20,189,649	49	"Chat" "Hunton" Simpson	3,195 3,507 3,500
Sperling 23-22-2W	1935	500	17,622	533,467	5	"Hunton"	3,279
Stucky 3-23-3W	1942	40	155	1,372	1	"Chat"	3,224
			thousand cubic feet				
Burrton (gas)			see Reno County				
Sperling (gas) 23-22-2W	1935	600	67,479	6,358,387	2	"Chat"	2,955
Stucky South 10-23-3W	1944	200	199,216	199,216	1	Mississippian	3,269

In the **Stucky** pool one oil well was completed in 1947 in sec. 35, T. 22 S., R. 3 W. Its initial capacity was 25 barrels of oil per day and about 2 million cubic feet of gas. During 1947, three oil wells were completed in the **Burrton** pool. All derive their oil from the Mississippian limestone or the residual chert at the top of that system. Two of these wells have capacities of 30 barrels per day each. The third is rated at 18 barrels.

One wildcat well, commenced in 1947 and located in sec. 26, T. 22 S., R. 2 E., has not been fully reported on as yet. It may be a 1947 completion. It found the Kansas City-Lansing limestone at 2,433 feet and was drilled 400 feet lower to a depth of 2,855 feet.

Figure 22 shows the oil and gas pools in Harvey County. These pools are listed in Table 34.

HASKELL COUNTY

Historical background.—As this county includes a part of the Hugoton gas field, it is neither easy nor practical to segregate the petroleum history of the county from that of the great gas field which covers all or parts of nine counties in southwestern Kansas.

The first gas well to be completed in Haskell County was the Kuhn Brothers No. 1 Warner in sec. 29, T. 30 S., R. 34 W. It was drilled during 1931 and was rated at 13.6 million cubic feet of gas per day.

Up to the end of 1937, only five gas wells had been drilled in the county. Four of these were in the old Santa Fe pool near Sublette, the county seat. This pool was later joined to the Hugoton field.

At the end of 1947, there were 126 gas wells in Haskell County, 111 of which were drilled in between 1944 and 1947.

No oil was produced in the county during 1947, and gas production was not segregated from that of the Hugoton field. Nineteen gas wells were drilled, no oil wells or dry holes.

Developments during 1947.—The principal activity in Haskell County during 1947 was the completing of 10 wells in T. 27 S., R. 34 W. which is the northwesternmost township in the county. Three wells were drilled near the north line of the next township to the south. Five of the remaining six wells drilled during the year were fill-in locations in the producing field that had not been previously drilled for one reason or another. The sixth is a loca-

tion about a mile south of Sublette. It seems that this location is near the eastern edge of the Hugoton field. However, the well is a heavy producer. One report gives a gauge production of 10 million cubic feet of gas, and a later report gives the initial capacity as 24,687 thousand cubic feet; 32,000 gallons of acid was used in completing the well.

The Cities Service No. 1 Brinkman hole, located in sec. 23, T. 27 S., R. 34 W., is an example of the underground geology in these new wells. The elevation of the well is 3,001 feet. The Herington limestone occurs at 2,544 feet, the Krider limestone at 2,578 feet, the Winfield limestone at 2,630 feet, the Ft. Riley limestone at 2,686 feet, and the Florence limestone at 2,780 feet. In each of these there was porosity and gas. When the well was prepared for production the casing was perforated at five different levels, 24,000 gallons of acid being introduced into the porous zones to eat out channels in the dolomitic limestone members. The initial production of the well was 17 million cubic feet of gas per day.

The gas wells in Haskell County are shown on Figure 18. Additional information on the Hugoton field is given under Finney County.

JEFFERSON COUNTY

Historical background.—Gas was discovered in Jefferson County in the McLouth pool in November 1939. The discovery well is the McLaughlin and Sons No. 1 Fee in the NW¼ sec. 4, T. 10 S., R. 20 E. Production, originally gauged at 8½ million cubic feet per day, was first encountered in the McLouth sand (Lower Pennsylvanian) between 1,426 and 1,440 feet. An increase at 1,450 feet was reported.

Oil was discovered in Mississippian rocks in the McLouth field in 1940. The discovery well is the Young and Longwell No. 1 McLeod in the SW¼ sec. 4, T. 10 S., R. 20 E. Some free oil was found in the top of the Mississippian rocks at 1,469 feet in this well, but commercial production came from a zone between 1,594½ and 1,596 feet (Lee and Payne, 1944, p. 15). Later in the same year oil was found also in the McLouth sand in the McLouth field.

The McLouth North gas pool was discovered by the Anderson No. 1 McLeod-Wisdom well in the NW¼ sec. 29, T. 9 S., R. 20 E.

in July 1941. Production came from the McLouth sand. In October of the same year oil was found in the McLouth sand in the McLouth North pool in the SW¼ sec. 17, T. 9 S., R. 20 E.

The development of the McLouth area which extends into Leavenworth County has been discussed thoroughly by Lee (1941) and Lee and Payne (1944).

At the present time oil is produced chiefly from Mississippian rocks in the McLouth pool; a minor amount is produced from the McLouth sand in the McLouth North pool.

Oil produced in the county during 1947 totaled 109,702 barrels. There were two active pools with about 25 producing wells. Figures on gas production are not available.

Developments during 1947.—The **McLouth** pool, containing 19 wells, produced 101,874 barrels of low gravity oil (20° to 21°). The **McLouth North** pool produced 7,828 barrels of higher gravity oil from the Pennsylvanian rocks.

No noteworthy developments were reported from the county during 1947.

JOHNSON COUNTY

Historical background.—Because of promising discoveries of small oil and gas pools, the close market provided by Kansas City, and good structural conditions, especally in the northern part, Johnson County has attracted considerable interest from wildcat operators from time to time. However, oil and gas production in the county has been small. Several deep tests have been unsuccessful.

The most important oil field developed in Johnson County is the Dallas in T. 13 S., R. 25 E. It is now inactive. Twenty years ago the field had 75 wells, most of which produced oil from the "Bartlesville sand" at a depth of about 500 feet. Some gas was produced from higher rocks. Oil was found in the Gardner area in a Marmaton sandstone, in sec. 14, T. 14 S., R. 22 E., in 1928. Initial daily production of the pool opener was reported to be 100 barrels. In 1939 several more wells were drilled and initial daily productions ranging from 5 to 100 barrels were reported in sec. 15, T. 14 S., R. 22 E. A small amount of oil was produced in the Gardner field for several years.

The most important gas field that has been developed in Johnson County is the Craig-Monticello in T. 12 S., R. 23 E. For the past several years a part of the field has been used for underground storage, but some wells are still producing. Principal gas production came from the upper Cherokee rocks, but Marmaton and Pleasanton sandstones also contained small amounts of gas. Gas was formerly produced from seven Pennsylvanian sandstones in the northeastern part of T. 12 S., R. 25 E. The "Bartlesville sand" at a depth of about 690 feet was the most productive. Wells having a flow of about one-third million cubic feet of gas per day were reported. The Prairie Center gas field, secs. 19, 20, 28, 29, 30, 31, 32, 33, and 34, T. 13 S., R. 22 E. and secs. 3, 4, and 5, T. 14 S., R. 22 E., was developed in 1942 and the next few years. Production is from the Pleasanton, Marmaton, and upper Cherokee rocks. The larger wells had an initial daily production of about one-half million cubic feet.

No production of oil in Johnson County during 1947 was reported. Gas production is estimated at approximately 150 million cubic feet.

KEARNY COUNTY

Historical background.—The first record of oil development in Kearny County was a test drilled to a depth of 800 feet in 1921. It was called the No. 1 Bower located in sec. 9, T. 25 S., R. 37 W. The hole was dry.

The first production in the county was in 1937 when two holes were drilled—one in sec. 32, T. 25 S., R. 35 W. and the other in sec. 36, T. 26 S., R. 35 W. These wells were assigned by the Nomenclature Committee to the Holcomb field which was later incorporated with the Hugoton gas field. Four producing gas wells were drilled in 1938. In the next 3 years three producing wells were drilled. In 1942, there were 3 new completions, in 1943, 7; in 1944, 14; and in 1945, 7. Then in 1946 and 1947 when 28 and 88 gas wells respectively were completed drilling in the county went ahead rapidly because of increased post-war demand for natural gas in 1946 and 1947. At the end of 1947, there were 153 gas wells in the Kearny County part of the Hugoton field.

The Patterson oil pool located in T. 22 S., R. 38 W. was found by the Stanolind Oil and Gas Company in 1941. The discovery well was the No. 1 Patterson with an initial production of 3,964

barrels per day. A second well, drilled by Stanolind in 1941, produced 461 barrels per day. A third test drilled by the same company in 1941 in sec. 26, T. 22 S., R. 38 W. was dry. In 1942, the same company drilled a dry hole in sec. 23, T. 22 S., R. 38 W. and later in the same year an oil well in sec. 25 of the same township. This well had an initial capacity of 266 barrels. In 1946, the Stanolind Oil and Gas Company drilled a well in sec. 25, T. 22 S., R. 38 W. which produced 212,000 cubic feet of gas per day. The six wells are all the wells drilled to date in the Patterson pool.

Statistical summary for Kearny County, 1947

Oil produced	40,374 barrels
Gas produced	Not segregated from Hugoton production
Wells drilled: Oil	none
Gas	88
Dry	1
Total	89
New, revived, or abandoned pools	none
Secondary recovery operations	none

Developments during 1947.—Kearny County, having 88 new wells, ranked second in new wells completed during 1947 in the Hugoton gas field. Sixteen producers were drilled in T. 26 S., R. 35 W. and T. 26 S., R. 36 W. Most of the remainder of the 88 wells drilled in the county were along the northwest fringe of the Hugoton gas field. For the most part the wells had rather heavy production, although a few wells along the extreme margin of the field were down to about 1 million cubic feet of gas per day. The largest well was the No. 1 Tate drilled by Osborne in sec. 3, T. 25 S., R. 35 W. This well was given an initial potential of 33½ million cubic feet of gas per day.

The gas well completed by Cities Service Oil Company on the Garden City lease in sec. 12, T. 24 S., R. 35 W. illustrates the sequence of producing zones. This well, at an elevation of 2,937 feet, found the Herington limestone at 2,408 feet, the Krider limestone at 2,438 feet, the Winfield limestone at 2,494 feet, the Ft. Riley at 2,552 feet, the Florence at 2,642 feet, and the Wreford at 2,694 feet. The casing was perforated at six points before acid was introduced. The initial production of the well was 9 million cubic feet of gas per day.

Very large quantities of hydrochloric acid are being used to advantage in completing wells having large initial capacities in the Hugoton area. Perhaps the largest amount used was in the

case of the No. 13 Campbell well drilled by the Fin-Ker Oil and Gas Production Company in sec. 24, T. 24 S., R. 36 W. where 65,000 gallons of acid were used.

The oil and gas wells in Kearny County are plotted on Figure 18. More detailed information on the Hugoton gas field is given under Finney County. The Patterson oil pool, discovered in 1941, produced 40,374 barrels of oil in 1947, making a cumulative total production of 224,594 barrels. The three wells produce oil from the "Patterson sand" at about 4,748 feet.

KINGMAN COUNTY

Historical background.—Attention was drawn to Kingman County in 1926 when oil was found on the Richardson farm in the northern part of the county by the Carter Oil Company. This well opened the Kingman pool. The discovery well produced 120 barrels of oil per day from the chert at the top of the Mississippian System. A month later, when deepened to the "Wilcox" sandstone, it flowed 800 barrels a day. After 27,000 barrels had been produced, the well was abandoned. Several offset wells were drilled, but all were failures. Interest in this part of the county

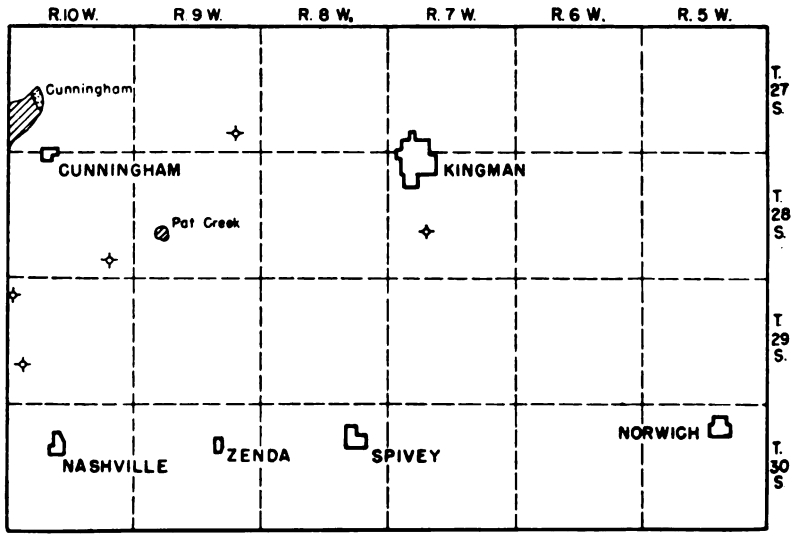

FIG. 23.—Map of Kingman County showing oil and gas pools and dry wildcat tests drilled during 1947. (Gas, dots; oil, diagonal lines.)

has persisted until recent years and many dry holes have been drilled in the vicinity of that original well.

The first important pool to be found in the county was called the Cunningham. It was found by the Skelly Oil Company. It has produced more than 6 million barrels of oil since it was discovered in February 1931. One of the remarkable features about this pool is the large number of zones which produce either oil or gas. They extend from the Herington limestone in the Permian to the Arbuckle dolomite at the base of the Ordovician System. In all, 12 zones were found to contain gas. The main oil zone lies in the Lansing limestone and seems to be a succession of oölitic limestones.

The only other Kingman County pool found so far, the Pat Creek, was discovered in 1946.

A secondary oil recovery operation in the Cunningham pool was started in 1936 by the Skelly Oil Company. The method used was gas injection and the large area affected, some 1,800 acres, extended well into both Kingman and Pratt Counties. There are reported to be 49 producing wells. Complete data on results to date are not available.

Statistical summary for Kingman County, 1947

Oil produced	166,258	barrels
Gas produced	430,799	thousand cubic feet
Wells drilled: Oil	2	
Gas	none	
Dry	8	
Total	10	
Wildcat wells	5	(included in above total)
New, revived, or abandoned pools	none	
Secondary recovery operations	1	

Developments during 1947.—Only 10 tests for oil were drilled in Kingman County during 1947. Two of these were new oil wells, and the rest were dry holes. The two oil wells were completed in the **Pat Creek** pool which was described by Ver Wiebe (1947, p. 47)

TABLE 35.—*Oil and gas pools of Kingman County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production bbls.	Cumulative production to end of 1947, bbls.	Producing wells	Producing zone	Depth to producing zone, feet
Cunningham			see Pratt County				
Pat Creek 20-28-9W	1946	120	36,258	36,258	3	Viola	4,406
Cunningham (gas)			see Pratt County				

TABLE 36.--*Dry wildcat tests drilled in Kingman County during 1947*

Company and farm	Location	Surface elevation	Depth to top of Lansing, feet	Depth to top of Arbuckle, feet	Total depth, feet
Gulf Oil Corp. No. 1 Calista State	NW¼ NE¼ NE¼ 35-27-9W	1,588	3,373	4,442	4,501
Ohio Oil Co. No. 1 Livingston	Cen. SE¼ SE¼ 20-28-7W	1,573	3,274	4,525	4,600
Earl F. Wakefield et al. No. 1 Albritten	NE cor. NE¼ 35-28-10W	1,764	3,686	4,660	4,690
Phil-Han & Gulf No. 1 Albritten	SW cor. SW¼ 6-29-10W	1,793	3,749	4,693	4,712
Berwick, Spruill, Harms No. 1 Cirkel	Cen. NW¼ NE¼ 30-29-10W	1,745	3,746	4,723	4,76(

One of the new oil wells was drilled in sec. 20, T. 28 S., R. 9 W. as an offset to the discovery well. It is on the Darlington lease of the Plains Exploration Company. The other oil well was drilled by the Phillips Petroleum Company on the Darlington farm in sec. 29 as a south offset to the discovery well. Three oil wells in the Pat Creek pool are closely comparable. The discovery well found the productive Viola limestone at a depth of 4,406 feet. The Plains No. 1 Darlington found the Viola at 4,412 feet, and the Phillips No. 2 Darlington found the Viola at 4,402 feet. A dry hole drilled by the Phillips Petroleum Company on the Darlington farm found the Viola at 4,407 feet. Another dry hole was drilled north of the pool by the Lario Oil and Gas Company on the Allen farm. In this well the Viola was found at a depth of 4,400 feet. It seems that the structural relief of the oil zone in this pool is only about 10 feet.

Three miles southwest of the Pat Creek pool, Marshall and Wakefield drilled a test well on the Albritten farm in sec. 35, T. 28 S., R. 10 W. Here the Viola was found 2,738 feet below sea level or approximately 50 feet lower than the producing wells in the Pat Creek pool. This test was drilled into the Arbuckle dolomite without finding shows of oil. Data on the other wildcat tests are presented in Table 36. Table 35 gives information on the oil and gas pools in Kingman County. These pools are shown on Figure 23.

KIOWA COUNTY

Historical background.—The first producing area in Kiowa County was the Alford gas pool, located in T. 30 S., R. 19 W., dis-

covered in 1944. The Lion Oil Company drilled the discovery. The well was given an initial production of 32 million cubic feet of gas per day, but so far it has not produced because of the lack of marketing facilities.

Six dry wildcat wells were drilled in the county during 1944 and one in 1945. During 1947, the second producing pool in the county was brought in.

Neither oil nor gas was produced during the year, although one new gas pool was discovered. Two wells—both wildcats—were drilled. One was a gas well; the other was dry.

Developments during 1947.—The new gas pool was found by the Stanolind Oil and Gas Company on the Repp farm in sec. 29, T. 28 S., R. 17 W. Here gas was found at the top of the Mississippian strata in some residual chert. The producing zone lies between 4,843 and 4,854 feet, and the well was capable of producing 7.3 million cubic feet of gas per day. The name of the new pool is **Brenham.** According to the sample log prepared by the Kansas Sample Log Service, the Kansas City-Lansing limestone in this well was found at 4,277 feet and the base of the formation at 4,595 feet. The top of the Mississippian chert was found at 4,840 and extended to 4,908 feet where the top of the "Misener" sand-

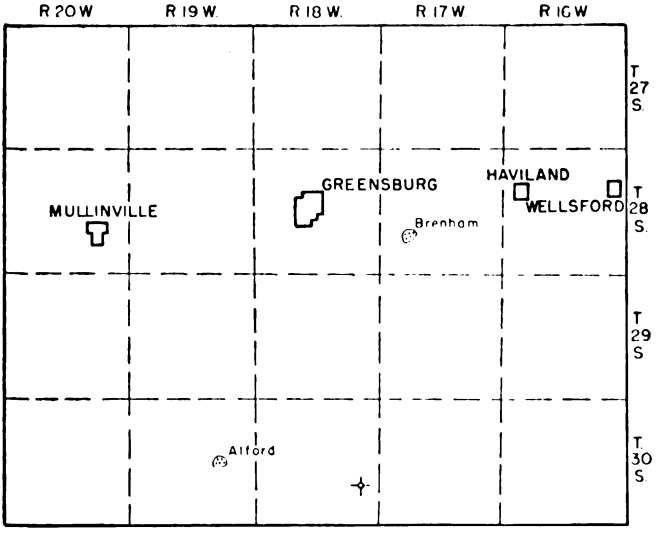

FIG. 24.—Map of Kiowa County showing gas pools and the dry wildcat test drilled during 1947.

stone was encountered. This sandstone is 50 feet thick and rests directly on the erosional Viola chert at 4,959 feet. The basal white coarsely crystalline Viola limestone was found at 5,060 feet and is 15 feet thick. The Simpson rocks in this test consist of sandy layers alternating with sandy dolomites between 5,078 and 5,143 feet. The underlying Arbuckle dolomite, which was found at 5,143 feet (minus 2,907 feet), consists of cherty dolomite to the total depth of the hole which was 5,159 feet. Elevation of the hole is 2,236 feet.

A wildcat test was drilled by the Stanolind Oil and Gas Company on the Sealey lease about 6 miles east of the Alford pool. sec. 25, T. 30 S., R. 18 W. The samples of drill cuttings from this test were studied by the Kansas Well Log Service, and their log revealed the following stratigraphic information. The "Cimarron anhydrite" (Stone Corral) was found at 1,080 feet and the top of the Wellington shales at 1,620 feet. The salt in the Wellington extended from 1,810 to 2,210 feet. The Herington limestone was found at 2,495 feet, the Ft. Riley limestone at 2,687 feet, and the Topeka limestone at 3,890 feet. The Lansing extended from 4,415 to 4,997 feet. The residual chert of the Mississippian began at 5,070 feet and was underlain by less-altered limestones down to 5,360 feet. A black shale, which may be the Chattanooga, was found between 5,360 and 5,380 feet. Under it the "Misener" sandstone, only 4 feet thick, was identified in the samples. The Viola group (top of the Ordovician) was found at 5,384 and extended to 5,600 feet where the Simpson rocks began. The Simpson in this location is dominantly green shale, but there are some thin layers of sandstone present. The Arbuckle dolomite, somewhat sandy in the upper part, was found at 5,735 feet. The well ended in Arbuckle dolomite at 5,794 feet. Its elevation is 2,214 feet.

Very intensive testing of this wildcat well resulted in the finding of a number of porous zones with good shows of oil and gas. The best showing was found between 5,110 and 5,135 feet near the top of the Mississippian. Final tests yielded small amounts of oil and water. The hole was finally abandoned as noncommercial.

The Bishop Oil Company took over the Phillips No. 1 Nora test which had been abandoned during 1946 at a total depth of 5,202 feet. It is located about 2½ miles east of the new Brenham gas pool, on the Evans farm in sec. 26, T. 28 S., R. 17 W. After cleaning out the hole below 4,900 feet, 5-inch casing was set at

TABLE 37.—*Gas pools of Kiowa County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
Alford 14-30-19W	1944	160	none	none	1	Spergen	5,040
Brenham 29-28-17W	1947	160	none	none	1	Miss. chert	4,841

4,878 feet. Perforations were made in the casing at four different levels between 4,767 and 4,793 feet. With the exception of very small amounts of gas, no encouraging shows were found, and, therefore, the test was abandoned.

During 1947, the discovery well of the **Alford** gas pool was worked over. The well was plugged back and shot in two places where oil and gas shows had been recorded when the well was drilled. Efforts to make either an oil well or a satisfactory gas well were abandoned judging by reports.

The two gas pools in Kiowa County are shown on Figure 24. There was no commercial production from either during the year. Other pertinent information concerning them is given in Table 37.

LABETTE COUNTY

Historical background.—There is record of a well drilled at the north edge of the town of Mound Valley that began producing gas in 1883 and was still producing in 1917 (Moore and Haynes, 1917, p. 295). More substantial production of gas took place in the early 90's. It is recorded that gas lines were laid in the streets of Cherryvale in 1893 and that adequate gas was available thereafter. In 1898 a large zinc smelter was built at Cherryvale, attracted by abundant natural gas. How much gas came from the Labette County side of the line is uncertain, but the history of petroleum in Labette County seemingly started with production of gas in the Cherryvale area. In 1904 (Moore and Haynes, 1917, p. 202) 31 wells producing oil or gas had been drilled in Labette County. In the following 9 years 4 more oil wells and 17 gas wells were added. In 1914, 8 oil and 28 gas wells were completed, and in 1915, 19 oil and 7 gas wells were added. Evidently some of these wells were short lived because there is record of only 10 wells producing on January 1, 1916. The initial production of wells drilled around 1914 and 1915 was 40 to 50 barrels per day. This

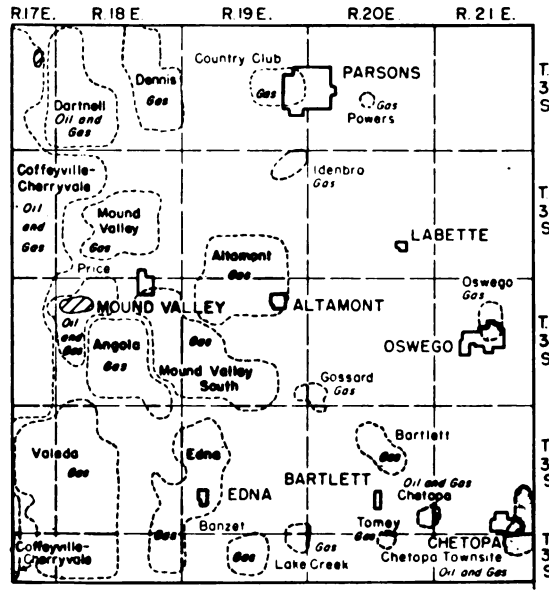

FIG. 25.—Map of Labette County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

was unusually good in view of the fact that the depths of the wells ranged from 50 to 200 feet. Important oil and gas activity occurred in Labette County between 1910 and 1920. The principal gas producing area seems to have been between Mound Valley and Cherryvale, whereas more oil was found to the southwest of Mound Valley in the direction of Coffeyville.

Oil and gas have been produced in Labette County from the Bandera shale, the Ft. Scott limestone, the Cherokee shale, Mississippian limestone, and the Arbuckle dolomite. The "Bartlesville sand" and the top of the "Mississippi lime" have been good producing zones.

Oil produced in the county in 1947 totaled 6,958 barrels. No figures were available for the amount of gas produced, or for the number of wells drilled. Two oil pools were active during the year, no new pools were discovered, and there were no secondary oil recovery operations.

Developments during 1947.—No developments of outstanding significance were reported from Labette County during 1947.

Gas was produced for local consumption at several points, but the quantity was not large.

The **Coffeyville-Cherryvale** pool, part of which is in Montgomery County, produced 3,735 barrels of oil during the year, reportedly from 15 wells. The **Price** pool—number of wells not reported—had an output of 3,223 barrels of oil during the period. Figure 25 shows the oil and gas producing areas in the county.

LEAVENWORTH COUNTY

Historical background.—There has been gas production, in small amounts, in Leavenworth County for many years, and oil has been produced in the Bankers Life and the Ackerland fields in the western part of the county since 1941.

The Six Corners and the Linwood gas fields are the oldest in Leavenworth County. The former has been abandoned, except for underground gas storage, for more than 10 years, but the Linwood field still has small production and new wells for local use are being drilled. The Six Corners field is in secs. 14, 15, 22, and 23, T. 12 S., R. 23 E. The Linwood field is in secs. 1, 11, 12, 13, and 14, T. 12 S., R. 21 E.; sec. 31, T. 11 S., R. 22 E., and secs. 6 and 7, T. 12 S., R. 22 E. Gas production is chiefly from the "Squirrel sand" in the upper part of the Cherokee rocks.

The Ackerland gas pool, secs. 1 and 12, T. 10 S., R. 20 E., and secs. 6 and 7, T. 10 S., R. 21 E. was discovered in 1941. Gas was found in the McLouth sand near the base of the Cherokee shale. Later oil was found in the McLouth sand in the Ackerland oil pool in secs. 6 and 7, T. 10 S., R. 21 E.

The Bankers Life oil pool, sec. 3, T. 10 S., R. 20 E., was discovered in May 1941. Oil production is from the McLouth sand.

Farther east in Leavenworth County the Maywood gas field (Wyandotte County) was extended into Leavenworth County a few years ago. The area is now known as the Roberts-Maywood gas area (Jewett and Abernathy, 1945, p. 162); the Leavenworth County part of the field is in sec. 12, T. 11 S., R. 22 E. Gas production is from the "Squirrel sand."

Late in 1944 the Lawrence gas field (Douglas County) was extended into Leavenworth County, in sec. 22, T. 12 S., R. 20 E., by the drilling of a commercial well, gauged at 627,000 cubic feet of gas per day. Gas for local use had been produced in this vicinity for several years.

Oil produced in the county totaled 13,995 barrels. Some gas was produced mainly for local consumption but no figures on quantity were available. There were two active oil pools.

Production and developments during 1947.—Some drilling was done during the year but the number of wells is not known. No developments of particular significance were reported. Some gas continues to be produced.

LINN COUNTY

Historical background.—The earliest prospecting for petroleum in Linn County is said (Haworth, 1908, p. 23) to have been immediately after G. W. Brown drilled his "famous first" near Paola in 1860. At that early date, the record states, a few wells were drilled in the vicinity of Mound City, producing both oil and gas. A very early resident of Mound City verified this matter in conversation with one of the authors some years ago, and gave the impression that these wells near Mound City may have been the first bona fide petroleum producers in Kansas.

Beginning in 1901 (Haworth, 1903, p. 35), sufficient gas was produced from wells south, southeast, and southwest of Pleasan-

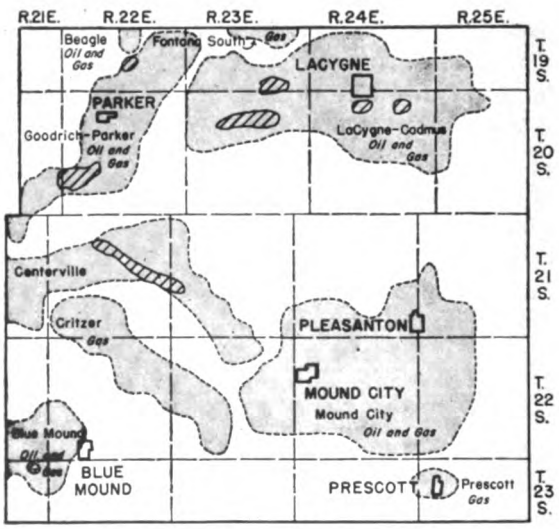

FIG. 26.—Map of Linn County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

ton to supply the town's needs for lighting and house heating. The wells were shallow—300 to 500 feet. Soon after, about 1902, a gas field was discovered (or re-discovered) at Mound City. Oil must of necessity have been discovered at the same time, but as there was little use for it at that time, it is not mentioned prominently in the old records. It is probable that oil in the various pools that are now known or known of, such as the Blue Mound, Mound City, Centerville Shoestring, Goodrich-Parker, and La-Cygne-Cadmus, was first developed not many years after 1900. The exact dates are obscure.

Oil production in the county in 1925 was about 80,000 barrels; by 1935 it had declined to about one-half that. At present it is up to the former figure and increasing.

Gas has been produced from at least seven zones in the Pennsylvanian System in Linn County. Sandstone in the Bandera shale has yielded gas in several areas; the "Peru sand" of the Labette formation yields gas near Pleasanton; the "Squirrel sand" within the Cherokee shale is a gas-producer over much of the county; and the "Bartlesville" produces gas in almost every township in the county. The "Tucker" or "Burgess sand," near the base of the Cherokee, is a producing sand, especially south and west of Mound City and south of Pleasanton. Oil has been found in various of the sands mentioned above. A small amount of oil was produced several years ago from the "Mississippian Chat" in the Blue Mound field.

In 1935, the Texas Company started a water-flooding operation in the Centerville pool. The Wallace Oil Company started another on the Laura Lee lease in sec. 10, T. 20 S., R. 23 E., in 1940. At the end of 1947, there were four secondary oil recovery projects under way in the county. Table 8 shows all the secondary oil recovery projects in the State.

TABLE 38.—*Oil production in Linn County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Blue Mound	9	3,703
Centerville[1]	113	16,858
Goodrich-Parker	59+	36,133
LaCygne-Cadmus	65+	16,469
Total	246+	73,163

[1] Field extends into Anderson County.

Oil produced in the county totaled 73,163 barrels; there were four active oil pools and four secondary recovery operations reported.

Production and developments during 1947—There was considerable activity in the county, especially in the area northwest of Pleasanton, during 1947. Some oil wells of low daily capacity were drilled. Between 60 and 70 wells were reported to have been drilled in the county, although no precise record is available. Some of the new wells were drilled in connection with waterflooding operations. Considerable gas is still produced in the county.

Table 38 lists the active oil pools in Linn County. The oil and gas producing areas are shown on Figure 26.

LYON COUNTY

Historical background.—Oil was first found in Lyon County in 1922 when the Bradfield pool was discovered in T. 21 S., R. 10 E. (Jewett and Abernathy, 1945, pp. 169, 172-173). Oil was produced from Ordovician rocks at depths ranging from about 2,200 to 2,600 feet. Some wells had initial productions of 1,000 barrels of oil per day.

The Atyeo and Fankhouser fields were extended into Lyon from Greenwood County in 1926. Production has been confined to the southern part of the county.

Oil produced totaled 135,480 barrels. Eight wells were drilled, including four oil wells and four dry holes. There were three active oil pools. One new oil pool was discovered. One secondary recovery operation was active during the year.

Production and developments during 1947.—The **Atyeo** and **Fankhouser** pools with 50 and 58 wells respectively produced about 65,000 barrels each during the year. A new pool,

TABLE 39.—*Oil production in Lyon County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Atyeo[1]	50+	66,780
Fankhouser[2]	58+	64,260
Rock Creek	4	4,440
Total	112+	135,480

[1] Includes production in Chase and Greenwood Counties
[2] Includes production in Greenwood County.

the **Rock Creek,** was discovered in 1947. The discovery well was the Murphy et al. No. 1 Lee in sec. 32, T. 21 S., R. 11 E. Initial production from the "Bartlesville sand" was reported to be 35 barrels daily (Jewett, 1947, p. 49, Table 1). Four wells were completed during the year. The production for the year was 4,440 barrels. Figure 27 shows the oil producing areas. Their productions during 1947 are given in Table 39.

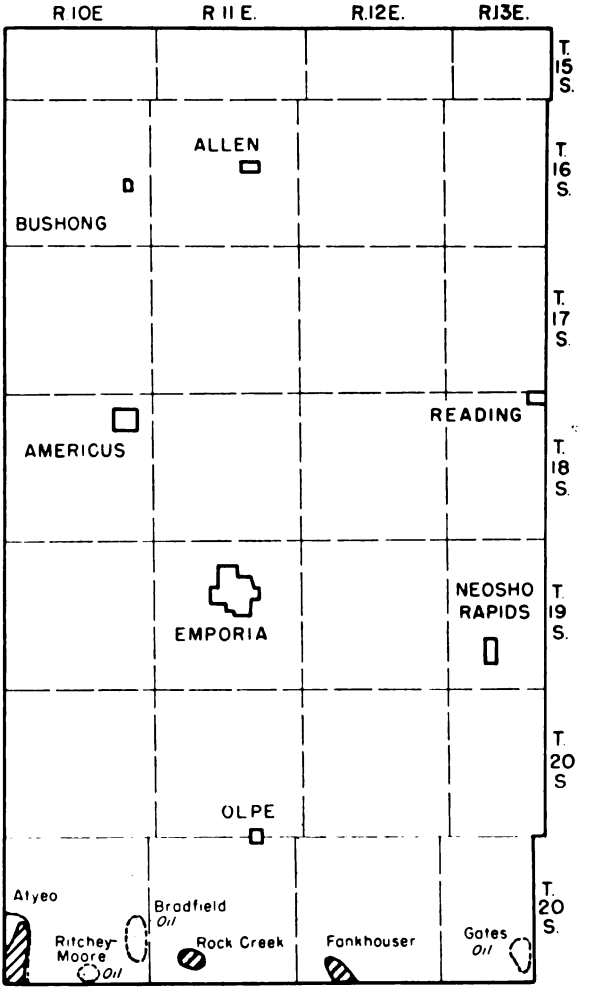

FIG. 27.—Map of Lyon County showing oil producing areas. Shaded areas represent oil fields; diagonal lines show areas of 1947 oil production.

McPHERSON COUNTY

Historical background.—The first production in this county was in 1926 when Merriam, Reeves, and Shidel found gas on the Anderson farm in what is now the McPherson pool. Since then, the pool has produced much gas and more than a million barrels of oil. Two years later, in October 1928, the McPherson Oil and Gas Company started their first well on the Wedel farm in sec. 12, T. 20 S., R. 2 W. This well was completed during January 1929 as a 5-million-cubic-foot gas well which opened the Ritz-Canton pool, the second pool in McPherson County. Since its discovery, the Ritz-Canton, which is the most important pool in the county, has produced 40 million barrels of oil.

The third McPherson County pool to be discovered was the Voshell which was found in August 1929. This pool, the second most important in the county, has produced almost 27 million barrels of oil since its discovery.

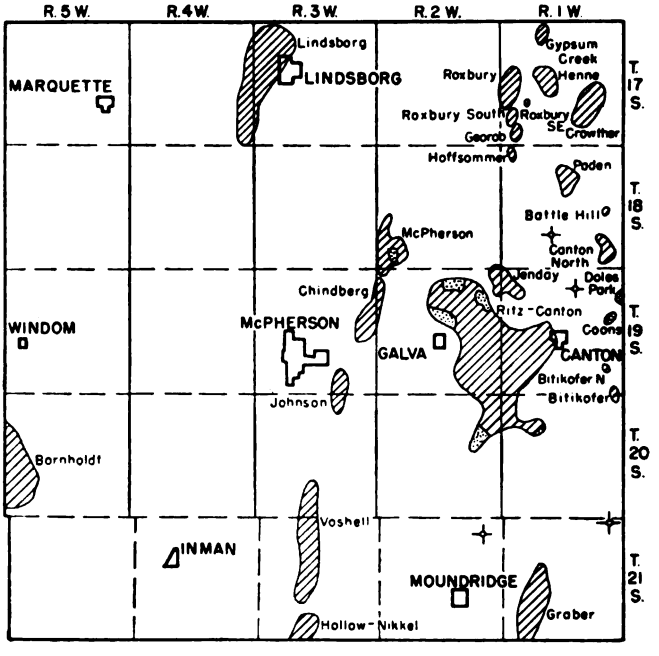

FIG. 28.—Map of McPherson County showing oil and gas pools and dry wildcat tests drilled during 1947. (Gas, dots; oil, diagonal lines.)

The fourth pool, the Chindberg, was discovered in November 1929 by the McPherson Oil and Gas Company. The location of the discovery well was in sec. 18, T. 19 S., R. 2 W.

Since 1930, 18 pools which are producing at the present time have been discovered in the county. The most important of these are the Johnson pool discovered in 1932, the Graber in 1934, and the Lindsborg in 1938. Oil and gas production in McPherson County comes rather largely from the "chat" formation of the Mississippian although the Viola and one or two other zones produce locally.

Applications to the Kansas State Corporation Commission Conservation Division for permits to initiate secondary recovery operations in McPherson County were first made in 1940. The Shell Oil Company started two operations in 1941 and one in 1942. Now, there are about 12 operations in the county with about 1,500 acres developed. They are listed in Table 8.

Statistical summary for McPherson County, 1947

Oil produced	4,821,421	barrels
Gas produced	619,857	thousand cubic feet
Wells drilled: Oil	51	
Gas	2	
Dry	35	
Total	88	
Wildcat wells	7	(included in above total)
New pools: Oil	2	
Gas	1	
Revived or abandoned pools	none	
Secondary recovery operations	12	

Developments during 1947.—Much drilling was done in McPherson County during 1947. Two of the 1947 wildcat tests were successful in finding new oil reserves. One of the new pools was the **Georob** in the southwestern part of T. 17 S., R. 1 W. This pool was opened by the Westgate-Greenland Oil Company and the Mallard Drilling Company when they completed the first test on the Robinson lease in sec. 31. Oil was found in the cherty part of the Mississippian limestone which is usually referred to as the Osagian Series. The oil seemed to be somewhat erratic in its occurrence and was found only where dolomite was present among the chert particles. A certain amount of secondary dolomitization seems to have taken place here and the distribution of the dolomite is therefore important.

Since the first well was completed in May in the NW cor. SE¼ sec. 31 at a total depth of 2,673 feet, nine other wells have been

successfully completed as oil producers. The original well had a potential capacity of 160 barrels of oil per day. Three of the later wells had rated potentials of nearly 3,000 barrels per day. The producing zone in the good wells ranges from 1,311 to 1,325 feet below sea level. Two of the dry holes found this zone 1,344 and 1,351 feet below sea level. One dry hole reached the supposedly productive zone 1,316 feet below sea level, which illustrates the somewhat erratic nature of oil occurrence here.

The second new pool was called the **Hoffsommer**. It was found less than a mile south of the Georob pool by the Mallard Drilling Company on the Hoffsommer farm in the NW cor. SE¼ sec. 6, T. 18 S., R. 1 W. The producing zone was the same as in the Georob pool. The depth to the producing zone in the discovery well is 2,745 feet, considerably lower than the production in the same zone in the Georob pool. The discovery well was completed in August 1947 with an estimated potential of 215 barrels per day. The oil was found not in the top of the Mississippian but 4 feet below the top between 2,752 and 2,772 feet. Before the close of the year three additional oil wells and two dry holes had been completed around the discovery well. The highest well structurally in the pool at the close of the year was the well in the SE cor. NW¼ sec. 6 which reached the producing zone at 2,756 feet.

Another well which may be declared a pool opener was completed by W. C. McBride, Inc. on the Waln farm in the SE¼ sec. 12, T. 19 S., R 1 W., about 1 mile north of the Coons gas pool. Production was found in the Mississippian chert at 2,843 feet (about 15 feet below the top). After treatment with 2,000 gallons of acid, the flow of gas was 283,600 cubic feet per day. The name **Doles Park** has been temporarily assigned to the new pool.

In the northeastern township of McPherson County there are seven pools at present. Considerable drilling was done in the **Gypsum Creek** pool, five new oil wells being added during the year. One dry hole was drilled in the **Henne** pool near the center of the township. Five new oil wells were added in the **Crowther** pool in the southeastern part of the township. The **Roxbury** pool is now separated from the **Roxbury South** by only about one-half mile. The Roxbury South pool is separated from the Georob pool by a distance of only two well locations. Considering the erratic

TABLE 40.—*Oil and gas pools of McPherson County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
			barrels				
Battle Hill 24-18-1W	1945	40	6,683	25,048	1	"Chat"	2,825
Bitikofer 1-20-1W	1940	200	18,524	172,684	5	"Chat"	2,885
Bitikofer North 25-19-1W	1946	40	2,705	2,705	1	"Mississippi lime"	2,892
Bornholdt 30-20-5W	1937	4,000	1,002,093	11,114,708	142	"Chat"	3,292
Canton North 26-18-1W	1936	400	65,462	365,862	12	"Chat"	2,803
Chindberg 18-19-2W	1929	700	43,399	1,646,169	26	K.C.-Lans. "Chat"	2,363 3,007
Crowther 26-17-1W	1942	1,500	575,677	1,713,497	50	"Chat"	2,778
Georob 31-17-1W	1947	300	56,081	56,081	10	"Chat"	2,665
Graber 32-21-1W	1934	2,800	232,009	8,649,649	118	"Misener" "Hunton"	3,323 3,274
Gypsum Creek 4-17-1W	1944	500	113,333	137,533	13	"Chat"	2,619
Henne 21-17-1W	1940	900	102,694	1,133,634	24	"Chat"	2,658
Hoffsommer 6-18-1W	1947	160	14,534	14,534	4	"Chat"	2,745
Hollow-Nikkel			see Harvey County				
Jenday 1-19-2W	1944	1,500	101,623	540,452	35	"Chat"	2,984
Johnson 25-19-3W	1932	1,000	42,501	3,079,896	11	"Chat"	3,032
Lindsborg 8-17-3W	1938	4,800	646,418	4,213,383	106	Viola Simpson	3,352 3,360
McPherson 29-18-2W	1926	2,000	48,590	1,199,780	25	"Chat" Viola	2,967 3,140
Paden 10-18-1W	1943	2,000	391,731	879,526	41	"Chat" Viola	2,752 3,153
Ritz-Canton 1-20-2W	1929	13,000	675,048	40,009,288	196	"Chat" Viola	2,935 3,412
Roxbury 18-17-1W	1938	1,500	180,730	2,457,130	36	"Chat"	2,684
Roxbury South 30-17-1W	1942	320	25,996	219,351	4	"Chat"	2,658
Roxbury Southeast 20-17-1W	1943	40	3,919	17,429	1	"Chat"	2,665
Voshell 9-21-3W	1929	3,500	471,671	26,898,186	68	"Chat" Viola	3,095 3,301
			thousand cubic feet				
Coons 13-19-1W	1940		incl. with Ritz-Canton				
Doles Park 12-19-1W	1947	160	none	none	1	"Chat"	2,843
McPherson (gas) 29-18-2W	1926		incl. with Ritz-Canton				
Ritz-Canton (gas) 12-20-2W	1929	1,500	619,857		19	"Chat"	2,935

TABLE 41.—*Dry wildcat tests drilled in McPherson County during 1947*

Company and farm	Location	Depth to top of Lansing, feet	Depth to top of Mississippian, feet	Total depth, feet
Lowell Drlg. Co. No. 1 Greenwood	SW cor. NE¼ 28-18-1W	2,220	2,804	3,365
Beardmore Drlg. Co. No. 1 Unruh	NW cor. NE¼ 10-19-1W	2,319	2,912	3,432
Wm. Ebke No. 1 Voth	NE¼ NW¼ NW¼ 1-21-1W	2,346	2,983 3,583*	3,612
E. K. Carey et al. No. 1 Rupp	NE¼ NW¼NW¼ 12-21-2W	2,330	2,972 3,553*	3,563

*Arbuckle

nature of oil occurrence in the Mississippian chert, these three pools are probably part of the same underground reservoir.

Since its discovery 110 wells had been completed in the **Lindsborg** pool. During 1947, three oil wells were added. One of the new wells found production in the Viola rocks, the other two in the Simpson sandstone at a greater depth. There was considerable drilling activity in the **Paden** pool in T. 18 S., R. 1 W. during 1947 when 15 new oil wells were completed to augment the 23 drilled previously. Eight of the new oil wells derive their oil from the Viola group. The other seven produce oil from the cherty part of the Mississippian System. In many wells the Warsaw, here a sugary dolomite, lies above the cherty zone. The oil seems to favor the cherty portions of the strata. In the **Canton North** pool, which lies in the southeastern part of the same township, one new oil well was completed, extending the pool a short distance to the northwest. In the **Jenday** pool, which lies on the boundary line between T. 19 S., R. 1 W. and T. 19 S., R. 2 W., one new well was completed.

Two new oil wells, one gas well, and five dry holes were completed in the **Ritz-Canton** pool. Three tests were drilled in the vicinity of the **Bitikofer** and **Bitikofer North** pools in an attempt to extend production. All were dry.

Two new oil wells were drilled, four old wells were worked over successfully, and four dry holes were drilled around the fringes of the **Voshell** pool. The two producers found oil in the Arbuckle. The oil and gas pools in McPherson County and dry wildcat wells drilled during 1947 are shown on Figure 28. The oil and gas pools are listed in Table 40 and the dry wildcat wells in Table 41.

MARION COUNTY

Historical background.—The first discovery of oil in this county was in June 1920 when the Elbing pool was extended into Marion from Butler County. Soon afterward, the Peabody, Covert-Sellars, and Florence pools were opened. These pools are close to one another in the southeastern corner of the county. Through 1945, three additional pools—more widely scattered—were opened in the north half of the county. These were the Propp gas field, dating from April 1926; the Lost Springs oil pool at the north county line, dating from November 1926; and the Hillsboro oil pool, dating from November 1928. The Propp and the Lost Springs pools have produced from the Mississippian "chat" but

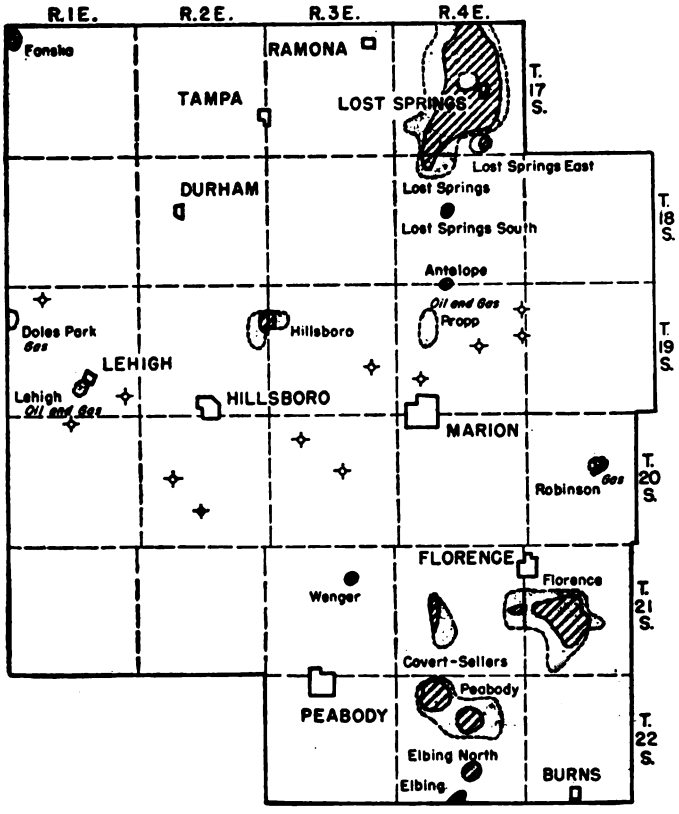

FIG. 29.—Map of Marion County showing oil and gas producing areas and dry wildcat tests drilled during 1947. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

the Viola has been the larger producer in the Hillsboro field. Peak oil production in the county was reached in the middle 20's. Production declined to roughly one-half million barrels per year in the middle 30's, and is at about the same figure at the present time.

One new pool, the Lehigh, was discovered in 1946.

One secondary oil recovery operation was active in Marion County during 1947. It was started in 1940 by the Harwood Oil Company in the Lost Springs pool. Production is from the Mississippian "chat."

Statistical summary for Marion County, 1947

Oil produced	506,442 barrels	
Gas produced	Figures not available	
Wells drilled: Oil	10	
Gas	none	
Dry	21	
Salt water disposal	1	
Total	32	
Wildcat wells	16	included in above total
Number of active pools	11	
New pools: Oil	4	
Secondary recovery operations	1	

Developments during 1947.—Petroleum development in this county in 1947 was noteworthy because of the discovery of four new oil pools. These were the Antelope, the Elbing North, the Lost Springs South, and the Wenger. (A fifth pool, the **Antelope North,** in sec. 33, T. 18 S., R. 4 E. may have been discovered during

TABLE 42.—*Oil production in Marion County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Antelope	2	90
Covert-Sellers	13	31,260
Elbing	see Butler County	
Elbing North	1	450
Fanska	8	36,437
Florence	9	10,824
Hillsboro	9	26,881
Lost Springs[1]	174	379,470
Lost Springs East	2	960
Lost Springs South	1	540
Peabody	2	16,770
Wenger	1	2,760
Total	222	506,442

[1] Includes Dickinson County production.

the year, but the date of completion of the pool opener has not been reported.)

The **Antelope** pool was discovered by Leiker et al. with a well on the Henke farm in sec. 33, T. 18 S., R. 4 E. The initial production was estimated at 25 barrels of oil per day with 10 percent water from the "chat" at 2,380 feet.

Another new pool, the **Lost Springs South,** was opened by Saco et al. with their No. 1 well on the Navrat farm in sec. 16, T. 18 S., R. 4 E. Initial production was 35 barrels of oil and the same amount of water from the Mississippian "chat" at 2,412 feet.

The **Elbing North** field was discovered in November by the E. H. Adair Oil Company. Their No. 1 Jensen in sec. 27, T. 22 S., R. 4 E. found production in the Mississippian "chat" at 2,439 feet. Production of 100 barrels of oil per day was assigned to the well.

The **Wenger** pool located 4 or 5 miles west of the normal trend in southern Marion County was discovered by Goering and

TABLE 43.—*Dry wildcat tests drilled in Marion County during 1947*

Company and farm	Location	Depth to top of Lansing, feet	Depth to top of Mississippian, feet	Total depth, feet
ElDorado Refg. Co. No. 1 Stauffer	NW cor. SE¼ 5-19-1E	2,312	2,893 3,517*	3,560
Kiowa Drlg. Co. et al. No. 1 Weinbrenner	NE cor. NW¼ 36-19-1E	2,168	2,744	3,251
Ward A. McGinnis No. 1 Schlotthauer	NE¼ SE¼ SE¼ 23-19-3E		2,400	2,784
M. & L. Oil Co. No. 1 Melcher	NE cor. NE¼ 12-19-4E		2,332	2,698
ElDorado Refg. Co. No. 1 Firebaugh	SE cor. NE¼ 13-19-4E		2,366	2,377
Joe Morine & H. & M. No. 1 Klenda	SE cor. SE¼ 15-19-4E		2,338	2,393
Hutchinson O. & G. Co. No. 1 Stenzel	SW cor. NW¼ 29-19-4E		2,290	2,610
Mallard Drlg. Co. No. 1 Peters	SE cor. NE¼ 4-20-1E	2,174	2,777	3,275
Lion & Veeder No. 1 Penner	SW cor. SE¼ 17-20-2E	2,046	2,628 3,153*	3,200
Veeder Supply & Dev. No. 1 Suderman	SE cor. NE¼ 28-20-2E	2,027	2,526	3,028
Davis, Aurell & Darrah No. 1 Olsen	NE cor. NW¼ 8-20-3E	1,870	2,442	2,950
Veeder Supply & Dev. No. 1 Rosenberg	SW¼ NW¼SW¼ 15-20-3E	1,877	2,432 2,902*	2,952

*Arbuckle

Branine with their No. 1 Wenger in sec. 11, T. 21 S., R. 3 E. Production was found in the "Hunton" at 2,771 feet. The initial rating of the well was 50 barrels of oil per day.

Evidence of the oil activity during the year in Marion County is shown by the fact that 16 wildcat wells were drilled. A feature of Marion County that lends attraction to prospecting is the fact that production, if found, commonly has occurred at depths of less than 3,000 feet.

Table 43 lists the wildcat wells drilled in the county during 1947 and Table 42 gives the active oil pools, their productions, and the approximate number of active wells. Figure 29 shows the oil and gas producing areas.

MEADE COUNTY

Historical background.—Production in Meade County started in 1945 with the opening of the Adams Ranch pool. The discovery well was in the SW¼ sec. 8, T. 35 S., R. 30 W. The well was reported to be capable of producing as much as 88 million cubic feet of gas per day, but later reports reduced this amount somewhat. Production is from the Mississippian between 5,850 and 5,890 feet.

By the end of 1947, four wells had been completed within a 6-mile radius of the Adams Ranch discovery well in sec. 8, T. 35 S., R. 30 W. One of these was a dry hole about 3 miles west across the line in Seward County; one was a dry hole about a mile to the east in sec. 9, T. 35 S., R. 30 W.; the third was 5 miles due east of the discovery in the SW cor. sec. 7, T. 35 S., R. 29 W.; and the fourth, a new pool opener, was drilled in the SE cor. sec. 36, T. 34 S., R. 30 W.

No oil was produced, and no gas could be produced for lack of marketing facilities. One gas well and one dry hole were drilled—both wildcats. The gas well brought in a new pool.

Production and developments during 1947.—During the year two deep tests were drilled in Meade County. The most northerly one of these was many miles from production and was designed to test the possibilities of a large area. It was drilled by the Stanolind Oil and Gas Company on the Rickers ranch in sec. 27, T. 32 S., R. 29 W. This location is 6 or 8 miles southwest of Meade, the county seat. The elevation of the test

was 2,703 feet above sea level. In a detailed examination of the samples made from this test by the Kansas Sample Log Service, the Stone Corral was found at 1,543 feet, the top of the Wellington formation at 2,025 feet, and the salt at 2,190 feet. The sequence of producing beds in the Hugoton gas area is noted in the log of the hole. The top of the Hollenberg was found at 2,700 feet. The Herington, Winfield, Ft. Riley, Florence, and Wreford showed up in normal thickness in the samples.

Below these, a thick sequence of limestones was found at this location. A small shale break above 3,810 feet may mark the position of the Topeka limestone. Between 3,810 and 4,210 feet the limestones contain chert at various levels. The interval to 4,455 feet is characterized by much shale, some of which is black. Another thick limestone sequence continues to 5,630 feet where sandstone occurs in the samples. The sandy layers continue to

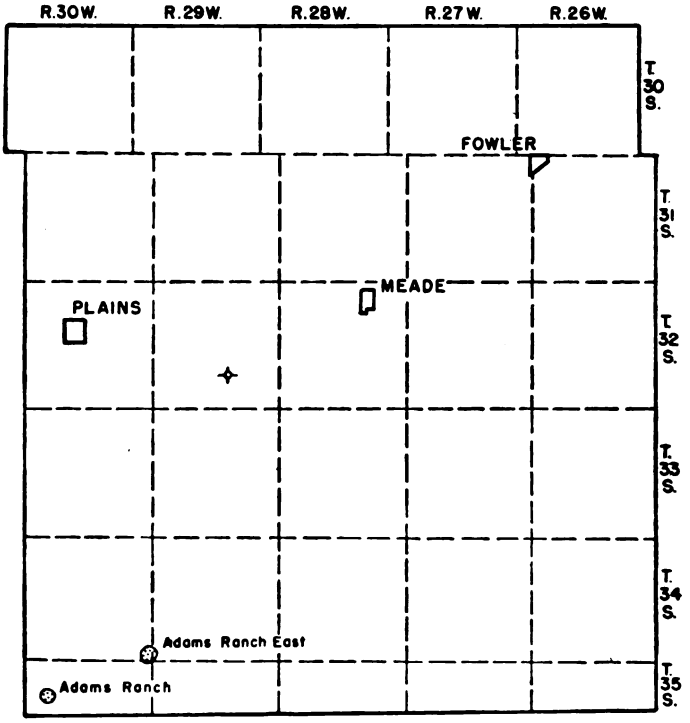

FIG. 30.—Map of Meade County showing gas pools and the dry wildcat test drilled during 1947.

5,763 feet where coarsely crystalline, crinoidal limestone, probably marking the top of the Mississippian System, was found. In the upper part of the Mississippian the limestones are mainly noncherty, and at certain levels oölitic limestone is prevalent. Very cherty limestones were found from 6,805 to 7,020 feet; below that they are somewhat less cherty. A very thin zone of sandy material between 7,285 and 7,290 feet may represent the "Misener." Below 7,290 feet the Ordovician cherty dolomites extend to 7,440 feet where the basal part of the Viola limestone was encountered. The Simpson formation (from 7,470 to 7,535 feet) is characterized by sandstone and thin layers of green shale. Arbuckle dolomite was encountered from 7,535 feet to the total depth of 7,637 feet. In this important test a slight show of oil was found at 6,100 feet. Good porosity was noted between 6,399 and 6,448 feet and also between 7,562 and 7,637 feet. The test was finally abandoned as a dry hole in February.

The No. 2 Adams test drilled by Helmerich and Payne near the **Adams Ranch** gas pool in the southwestern part of the county in sec. 36, T. 34 S., R. 30 W. was completed at a depth of 6,434 feet, about 500 feet below the top of the Mississippian System. The elevation of this hole was 2,519 feet above sea level. Here the "anhydrite" (Stone Corral) was found at 1,308 feet, the Hollenberg at 2,567 feet, the Kansas City-Lansing limestone at 4,455 feet, and the basal Pennsylvanian sandstone (Morrow?) at 5,874 feet. The Mississippian limestones were encountered from 5,904 feet to the bottom of the hole. Oölitic limestones are especially prominent between 6,277 and 6,360 feet. The testing of this hole was thorough. Considerable gas, estimated at more than 2 million cubic feet per day, was found between 5,875 and 5,992 feet. Shows of oil or gas were found at 6,195 and at 6,408 feet. When the test was plugged back, considerable gas was found between 5,910 and 5,922 feet. In the Morrow sand, between 5,874 and 5,895 feet, gas estimated at more than 4 million cubic feet per day was indicated after the well was acidized. Later the Nomenclature Committee declared the well to be a discovery well, and an initial potential of 2,860,000 cubic feet of gas per day was assigned. The new pool was named **Adams Ranch East**.

Information concerning the two gas pools in Meade County is tabulated in Table 44. The pools are shown on Figure 30.

TABLE 44.—*Gas pools of Meade County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
Adams Ranch 8-35-30W	1945	160	none		1	Mississippian	5,850
Adams Ranch East 36-34-30W	1947	160	none	none	1	Morrow sand Up. Miss. Lime	5,874 5,904

MIAMI COUNTY

Historical background.—The early exploration and discovery of natural gas and oil near Paola in Miami County has been described in several publications (Haworth, 1908, p. 22; Forbes, 1942, pp. 9-10; Moore and Jewett, 1942; Jewett and Abernathy, 1945, pp. 179, 181-192.)

It is reported that the first white settlers in the county took "axle grease" from asphalt seepages along Wea Creek, and the first attempt to produce petroleum probably took place as early as 1858. Two shallow wells were drilled and abandoned in 1860, but in the same year a third well found both oil and gas. The Civil War interfered with this early Kansas petroleum enterprise

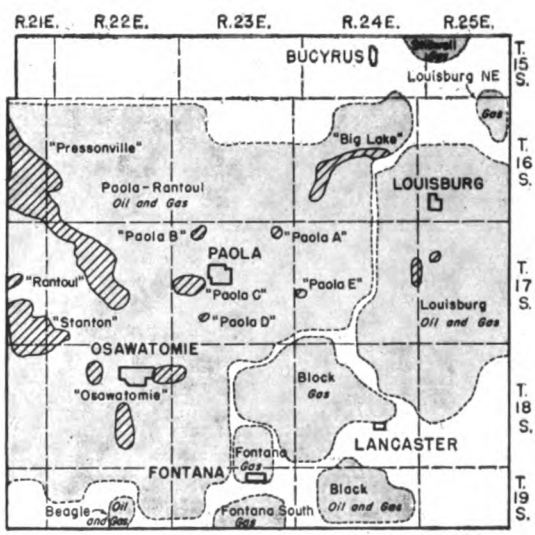

FIG. 31.—Map of Miami County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

and active development of the proved oil and gas did not take place until several years later.

Natural gas was piped into Paola in 1884, this city being the first in Kansas to be supplied with gas. In 1886, a refinery was built in Paola and refined oil was shipped to Omaha and Kansas City. This was probably the first commercial shipping of petroleum products out of Kansas. In 1889, the Paola field, the only oil field in Kansas, yielded 500 barrels of oil.

During the years that followed oil and gas were found at shallow depths in nearly all parts of Miami County, but only during the last 20 years has production been extended over the eastern part of the area.

Except for the original discovery of oil and gas, the most noteworthy discovery in Miami County was the Big Lake field in the fall of 1926. The discovery well in this field was drilled in sec. 20, T. 16 S., R. 22 E. The opening of the field resulted in an increase in the county's production from 13,153 barrels in 1925 to 752,102 barrels in 1927. Much prospecting in the eastern half of the county followed and several smaller fields were opened.

All the oil that has been found in Miami County is in Pennsylvanian rocks. In the eastern part depths range from 325 to 400 feet; in the western part wells are as deep as 700 feet.

Repressuring by air and water-flooding have been practiced in Miami County for several years, and water-flooding is now responsible for most of the oil production. Eight oil recovery projects were active during the year.

Oil produced totaled 290,806 barrels from 11 active pools. Nine water-flood projects were reported. The number of new wells drilled in 1947 was estimated at 125 to 150.

Production and developments during 1947.—There was a good deal of drilling activity in the county, both for oil and gas during the year. Some was reported to be due to the shortage of gas for use in Paola and near-by towns.

Roughly 1,000 oil wells supply the production of the county. The wells have an average daily output of about 0.8 barrels each. Drilling is so shallow that new wells producing only a few barrels per day make fairly attractive speculations.

Table 45 lists the active pools, their productions, and the approximate number of producing wells. The oil and gas producing areas are shown on Figure 31.

TABLE 45.—*Oil production in Miami County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Louisburg	20+	1,431
Paola-Rantoul[1]		
"Paola A"	9	297
"Paola B"	58	11,818
"Paola C"	53+	18,267
"Paola D"	9	1,508
"Paola E"	12	2,793
"Big Lake"	258	98,401
"Osawatomie"	85+	40,337
"Pressonville"	286+	48,245
"Rantoul"	12	149
"Stanton"	135+	67,485
Miscellaneous		75
Total	937+	290,806

[1] Field extends into Franklin County.

MONTGOMERY COUNTY

Historical background.—Gas was discovered near Independence in 1881. In 1889 gas was developed near Cherryvale and a year later near Coffeyville. The Cherryvale field supplied a substantial amount of gas in the early 90's. Gas was piped into Independence and Cherryvale for municipal lighting about 1893. From then on industrial activity increased substantially in Montgomery County as a result of abundant quantities of natural gas for fuel. About that time (1898) the county had a zinc smelter and several brick plants.

Oil was discovered in Montgomery County in 1903 with the opening of the Bolton field, which had been known as a gas field for a number of years. It had 200 producing wells in 1904. Some of these produced as much as 1,000 barrels per day and 150 and 200-barrel wells were common. Sudden impetus was given to the production of natural gas when the Caney and Independence gas fields were discovered in 1904. In the Caney field some wells had initial potentials of as much as 10 to 20 million cubic feet per day. In the Independence field some wells were even larger.

The number of oil wells drilled in 1904 was 715; by 1908, on account of the countrywide financial crisis and lessening of industrial activity, the number diminished to 1, although 79 new gas wells were drilled in that year. Drilling increased again and in 1912, 202 new oil and 116 new gas wells were opened. In 1914, the figure for new oil wells was 691 and for gas wells 137. Moore

and Haynes (1917, p. 206) report that on January 1, 1916, there were 1,048 producing wells in the county.

Up to about 1917 three sands were regarded as the most important in the district. The upper sand, called the "Wayside," was found at about 600 feet; another, the "Wieser," was found about 100 feet below; and the third, the "Bartlesville," was found at a depth of around 1,100 feet. Much of the gas came from a deeper sand.

The Elk City gas field was opened in July 1918 by a well on the Simmons farm in the NE¼ sec. 27, T. 31 S., R. 13 E. It was reported that the second well in this field, completed in August 1918, had a capacity of 32 million cubic feet per day, and that the well came in with a roar that could be heard several miles as soon as the bit broke into the sand.

By the end of the 1920's production of oil and gas had diminished somewhat, but much drilling was still going on. Oil production in Montgomery County reached its peak in 1925 when 1,136,654 barrels were produced.

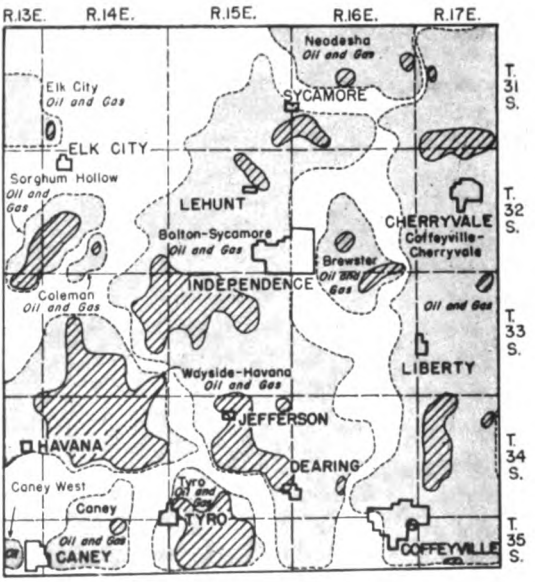

FIG. 32.—Map of Montgomery County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

Water flooding of the partially depleted oil-bearing zones was practiced in the county as early as 1920, but it was not on a sound basis until after 1935 when a law was passed legalizing the practice in the State. At the end of 1947, 21 secondary oil recovery operations were active in Montgomery County. For the most part, the "Wayside sand" was being flooded, although at least two operations were in the "Bartlesville."

Oil and gas have been produced in Montgomery County from the Lane-Vilas shales, the Bandera shale, the Labette shale, the Ft. Scott limestone, the Cherokee shale, the Mississippian limestone, and the Arbuckle group. Some of the more important producing sands have been the "Wayside," the "Wieser," the "Squirrel," the "Bartlesville," the "Burgess," and the Arbuckle. Pools in the Arbuckle are rather small and are related to anticlinal folds.

Oil produced totaled 890,426 barrels. Figures are not available for gas production. There were 10 active oil pools, and 21 secondary recovery operations. A considerable amount of gas was produced, mainly for local use.

Production and developments during 1947.—In view of the attractive price of oil and the relatively shallow depth of production in Montgomery County, there was considerable oil activity reported. Much of the drilling was in connection with secondary recovery operations which are accounting for an increasing amount of output each year.

TABLE 46.—*Oil production in Montgomery County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Brewster		3,491
Caney	9	4,017
Coffeyville-Cherryvale[1]	170+	22,011
Coleman	20+	2,278
Elk City		268
Bolton-Sycamore[2]	419+	671,462
Neodesha[3]	10+	874
Sorghum Hollow	60	7,389
Tyro	13	29,011
Wayside-Havana[4]	1,003+	147,847
Miscellaneous		1,778
Total	1,704+	890,426

[1] Field extends into Labette County.
[2] Bolton and Jefferson-Sycamore pools combined.
[3] Field extends into Wilson County.
[4] Field extends into Chautauqua County.

No new finds or developments of technical significance were reported from the county during 1947. Table 46 shows active oil pools and their productions. The oil and gas producing areas are shown on Figure 32.

MORRIS COUNTY

Historical background.—Gas discoveries have been more widespread than oil discoveries in Morris County. At present the only pool producing any oil is the Nelson in the extreme southwest corner of the county.

There is record of a well drilled by the Gilliland Oil Company in the NE cor. SE¼ sec. 30, T. 17 S., R. 5 E. which had a potential of 40 barrels of oil per day in March 1928. The next two producers in what is now the Nelson pool were drilled in 1945. All three wells are in SE¼ of the section. The area is near the Lost Springs pool of McPherson County. Production has been from the "chat."

Most of the several small gas fields that overlie the Nemaha anticline in Morris County were opened in the late 1920's. Gas was found in rather pronounced domes and in several zones at depths ranging from about 450 to 1,450 feet. The shallower gas is in basal Permian rocks and the deeper in the Kansas City-Lansing limestones.

Oil produced was 390 barrels from the one active pool.

Production and developments during 1947.—There was a small amount of drilling in the county during the year, but no noteworthy developments were reported.

It is estimated that 100 million cubic feet of gas or more was produced in the county, but no exact figures are available.

MORTON COUNTY

Historical background.—The Hugoton gas field which includes almost all Stevens County, also extends 6 or 8 miles to the westward into Morton County. It now seems that the western edge of the Hugoton producing area will traverse Morton County from north to south staying within the tier of townships representing R. 40 W.

The first drilling in Morton County to obtain commercial production of gas (the county has produced no oil) was in the summer of 1930 when the Argus Production Company completed six wells. One of these, the Littel No. 1, located in sec. 24, T. 34 S., R. 40 W. seems to have been the first producer in the county. Completion date of the well is given as June 18, 1930, the initial production being 4,158,720 cubic feet of gas per day. The Chambers No. 1 in sec. 25, T. 33 S., R. 40 W. drilled by the same company was completed in the following week, June 25, 1930.

Since that time some 60 gas wells have been drilled in the county.

No oil was produced in the county, and gas production was not segregated from that of the Hugoton field. Fifteen new wells (including one wildcat) were drilled. Of these, 14 were gas wells and one was dry. No new pools were discovered.

Developments during 1947.—The wells drilled in 1947 probably set the western limits to the Hugoton gas field in Morton County. Considering this fact, it is noteworthy that some of the most westerly wells have good productive capacities. A well in sec. 10, T. 32 S., R. 40 W. is rated at slightly more than 2 million cubic feet per day. Farther south, near the Oklahoma border, the western limits of the field have not yet been found. This is indicated by a well in sec. 7, T. 35 S., R. 39 W. drilled by the Panhandle Eastern Pipe Line Company on the North ranch which was rated at 33 million cubic feet per day. This is close to the maximum productivity for any well in the entire field.

In addition to the gas wells which were drilled in Morton County, one deep wildcat test was also completed by the Emergency Export Corporation on the Interstate lease in sec. 12, T. 34 S., R. 43 W. This location is about 15 miles west of the west edge of the Hugoton field. According to information furnished by the present operators, the Ft. Riley limestone was found at a depth of 2,262 feet, the limestones of the Shawnee group (Topeka at the top) at 2,810 feet, and the Kansas City-Lansing limestone at 3,002 feet. The basal Pennsylvanian Morrow formation was encountered at 4,572 feet and the sandstone within this formation at 4,622 feet. A small amount of gas was found in this sandstone zone. The top of the Mississippian strata was found at 4,724 feet and the top of the Viola group (Ordovician) at 5,618 feet. The Simpson was found at 5,718 feet and the Arbuckle dolomite at

5,735 feet. From an elevation of 3,474 feet, the hole was drilled to a total depth of 5,846 feet before it was abandoned. For several reasons this was a very important test well—it furnished some indication of the facies changes which take place in the dolomites that produce gas in the Hugoton field; it furnished information on the thickness of the older rocks in this part of the State; and it told something about the possibilities of finding oil in the older rocks which are productive in other parts of Kansas.

The gas wells and dry holes drilled in Morton County are shown on Figure 18. Additional information regarding the Hugoton gas field is given under Finney County.

Historical background.—The first petroleum development of record in Neosho county took place in 1894 when Guffey and Gailey drilled one or two tests near Chanute. They were unsuccessful, but started interest and a little later the Prairie Oil and Gas Company drilled a well about 16 miles west of Chanute, obtaining a strong flow of gas. This was piped to Chanute in the middle 1890's. The people of that city then became gas conscious and the city undertook drilling some wells in the Neosho River

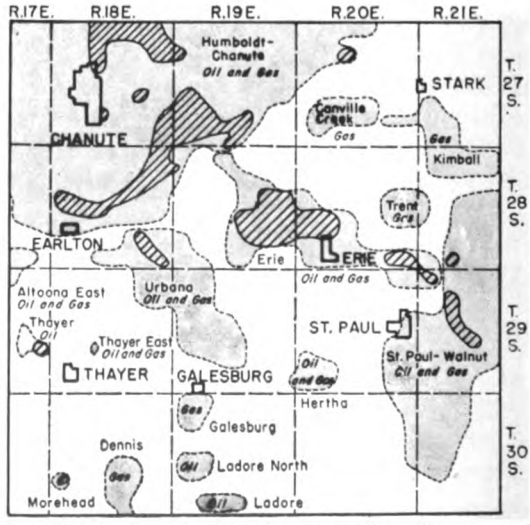

FIG. 33.—Map of Neosho County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

Valley east of town. Some production followed, and sufficient gas was soon developed to supply the city for lights and domestic use. Chanute was the first and for many years the only city in the State to own its own gas supply.

Oil had been noted in many gas wells drilled in the county, but it had been cased off or disregarded as of lesser value than natural gas in those years. In 1899, Mr. I. N. Knapp drilled some producing wells in the vicinity of Chanute. Haworth (1908, p. 33) reports that in 1900 Knapp started shipping oil on contract to Omaha and Kansas City gas companies. This was the beginning of oil development in the Chanute area. Prospecting began around Erie in 1900 and by 1903 there were at least 21 wells producing oil or gas in the area.

In general, oil and gas development followed the course of the Neosho River diagonally across the county southeastward from Chanute. Even now, production follows a definite trend from Chanute toward Erie, St. Paul, and beyond, keeping on the north side of the Neosho River for the most part.

There was great gas production and much related industrial activity in the Chanute-Humboldt-Iola area in the first two decades of this century. The gas fields declined steadily in production although there is still some gas produced in Neosho County, There has been a reasonable amount of oil production in the county through the years, it having been favored from the first by the building by the Standard Oil Company of a refinery at Neodesha in 1895.

At the end of 1947, three secondary recovery projects were reported as active in the county. One of these was started in 1937, another in 1941, and the third in 1947.

TABLE 46a.—*Oil production in Neosho County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Erie	36+	22,037
Humboldt-Chanute[1]	231	398,380
Morehead		442
St. Paul-Walnut[2]	1+	8,664
Thayer		239
Urbana		5,396
Total	268+	435,158

[1] Field extends into Allen, Wilson, and Woodson Counties
[2] Field extends into Crawford County.

Oil produced totaled 435,158 barrels. There were five active oil pools and three secondary recovery projects.

Production and developments during 1947.—There has been a modest amount of drilling activity in the county as a result of interest created by the higher price of oil. Some of the drilling was in connection with water-flooding which has gained impetus in recent years in this part of the State because of the number of partially depleted fields and the relatively shallow depth of the sands.

Table 46a lists the active oil fields and their productions, and Figure 33 shows the oil and gas producing areas in the county. A substantial amount of gas was produced in the county, but exact figures are not available.

NESS COUNTY

Historical background.—The Continental Oil Company found the first production in Ness County in 1929 when they completed the discovery well in what is now the Aldrich pool, located about 12 miles west of Ness City. Because of difficult transportation, it was not until mid-year 1936 that a second well was drilled in this pool.

Although there was wildcatting from time to time in Ness County, no additional pools were discovered until 1943 when the Arnold pool was opened by the drilling by Falcon-Seaboard and Sohio of a well in sec. 22, T. 16 S., R. 25 W. which produced about 150 barrels of oil per day from the Mississippian limestone at a depth of 4,564 feet. The Kansada pool was discovered in 1944 and the Manteno in 1945. Both pools produce from the Warsaw limestone.

Statistical summary for Ness County, 1947

Oil produced	239,854	barrels
Gas produced	none	
Wells drilled: Oil	1	
Gas	none	
Dry	2	
Total	3	
Wildcat well	1	(included in above total)
New, revived, or abandoned pools	none	
Secondary recovery operations	none	

Developments during 1947.—Three tests were drilled in Ness County during 1947. One of these resulted in a new oil well; the

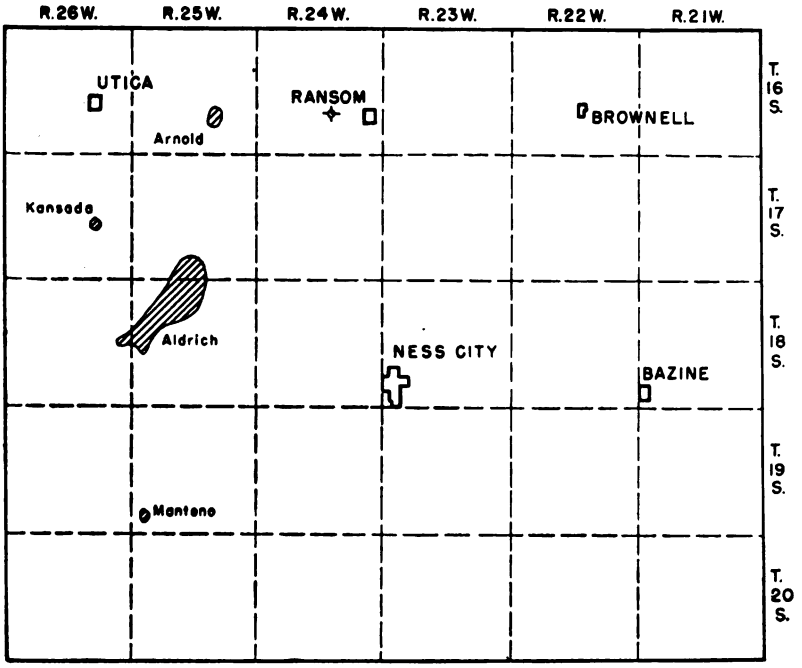

FIG. 34—Map of Ness County showing oil pools and the dry wildcat test drilled during 1947.

other two were dry holes. The new producer, located in the **Aldrich** pool, is the Magnolia No. 7 Olson well in sec. 33, T. 17 S., R. 25 W.

A wildcat test was drilled by Jones-Shelburne on the Miner farm about 6 miles east of the **Arnold** pool. In this well, at an elevation of 2,506 feet, the Mississippian was found at 4,541 feet. The hole was abandoned at a total depth of 4,610 feet still in the Mississippian strata. The third test was a dry hole in the **Manteno** pool. It is the No. 3 Gantz well of the Chalmette Petroleum Company in sec. 31, T. 19 S., R. 25 W. Here the Warsaw limestone, producing zone of the Manteno pool, was encountered at 4,572 feet. No lower zones of possible oil production were tested, and the hole was abandoned at a total depth of 4,615 feet.

Table 47 gives production data on the oil pools of Ness County. These pools are shown on Figure 34.

TABLE 47.—*Oil pools of Ness County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production bbls.	Cumulative production to end of 1947, bbls.	Producing wells	Producing zone	Depth to producing zone, feet
Aldrich 7-18-25W	1929	6,000	166,034	1,419,589	20	Warsaw	4,428
Arnold 22-16-25W	1943	200	62,342	149,787	5	Ft. Scott Warsaw	4,436 4,528
Kansada 23-17-26W	1944	160	736	7,581	1	Warsaw	4,450
Manteno 31-19-25W	1945	160	10,742	28,617	3	Warsaw	4,549

NORTON COUNTY

Historical background.—On the conclusion that Norton County is situated on the Central Kansas uplift, considerable wildcat drilling was done, but no encouragement resulted until the No. 1 Van Patten well was drilled in April and May 1939. This well, which swabbed about 200 barrels of oil per day, was classified as a pool opener. The pool, later abandoned, was located in sec. 26, T. 4 S., R. 21 W. Drilling in the area increased, nevertheless, and in 1941 almost 11 tests were put down. The Hewitt pool, located in sec. 11, T. 4 S., R. 21 W., was discovered in July 1941.

Although the Ray pool was discovered in Phillips County in 1940, its boundary was not extended westward into Norton County until 1942. This overlap occurred in secs. 25 and 36, T. 5 S., R. 21 W. The Ray West pool was discovered in 1945 by the Cities Service Oil Company and Helmerich and Payne on the Hansen farm in sec. 26, T. 5 S., R. 21 W.

Statistical summary for Norton County, 1947

Oil produced	15,163 barrels	
Gas produced	none	
Wells drilled: Oil	1	
Gas	none	
Dry	3	
Total	4	
Wildcat wells	2	(included in above total)
New, revived, or abandoned pools	none	
Secondary recovery operations	none	

Developments during 1947.—Only four test holes were drilled in this county during 1947. One of these was a new well in the **Ray** pool which lies in the extreme southeastern corner of the county. The new well is the No. 3 Kitzke of the Cities Service Oil Company drilled in the NE¼ NW¼ SE¼ sec. 36, T. 5 S., R. 21 W. In the absence of the Arbuckle dolomite, the Reagan sandstone was

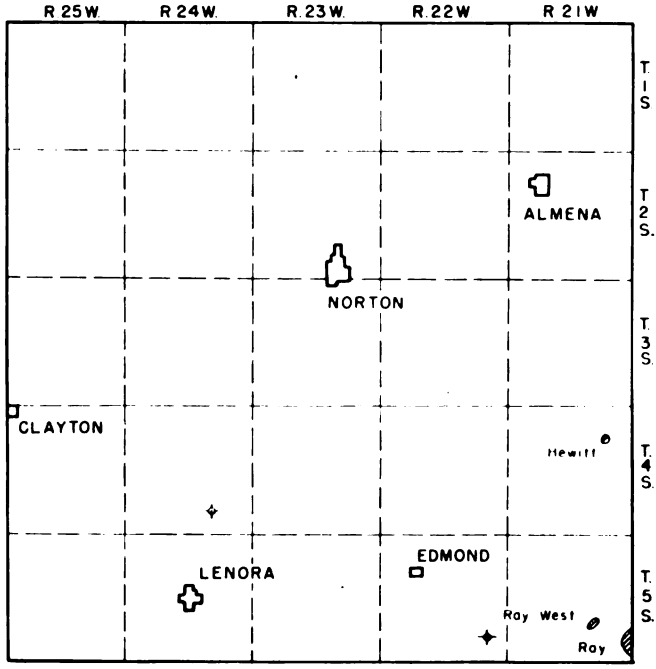

FIG. 35.—Map of Norton County showing oil pools and dry wildcat tests drilled during 1947.

tested and found to have a capacity of 36 barrels of oil per day. The Reagan in this location is only 6 feet thick, and the lower 2 feet is represented by hard quartzite. Below the Reagan, granite of Pre-Cambrian age was encountered.

A short distance north of the Ray pool George Johnston drilled a dry hole on the Kemper farm in sec. 25. Here the Arbuckle is present, but is only 64 feet thick. The Reagan was found at 3,703 feet (minus 1,490 feet). This depth is 67 feet farther below sea level than the same horizon of the No. 3 Kitzke well.

An exploratory well drilled 6 miles west of the Ray pool on the Armstrong farm in sec. 25, T. 5 S., R. 22 W. failed to find production although it was drilled into the Pre-Cambrian granite. The Reagan sandstone, here 20 feet thick, was found at 3,790 feet (minus 1,435 feet). Higher in the hole good saturation and porosity were found at three different levels in the Kansas City-Lansing limestone. In a test between 3,608 and 3,695 feet water with a show of oil was detected. Between 3,560 and 3,580 feet only water was recovered in a test run.

TABLE 48.—*Oil pools of Norton County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production bbls.	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
Hewitt 11-4-21W	1941	40	none	32,054	1	K.C.-Lans.	3,404
Ray	see Phillips County						
Ray West 26-5-21W	1945	80	15,163	38,343	2	Arbuckle	3,650

A rank wildcat test many miles from present pools was put down by the Wilcox Oil Company on the Wagoner farm in sec. 35, T. 4 S., R. 24 W. This test hole has an elevation of 2,413 feet. It found the Topeka limestone at 3,296 feet, the Kansas City-Lansing sequence of limestones at 3,528 feet, and the Pennsylvanian basal conglomerate, which is 26 feet thick, at 3,831 feet. It rested on the Arbuckle (Ordovician) dolomite at 3,855 feet.

The oil pools in Norton County are listed in Table 48 and shown in Figure 35.

OTTAWA COUNTY

Historical background.—Wildcat wells have been drilled in Ottawa County at intervals through the years, but a producing pool has yet to be opened.

Developments during 1947.—In Ottawa County the Westgate-Greenland Oil Company completed a test on the Beverly farm in sec. 17, T. 11 S., R. 2 W. which proved to be nonproductive. The well cuttings from this test were examined by the Kansas Well Log Service. The following stratigraphic data were taken from their log. Elevation of the well is 1,313 feet. No samples were collected above 1,730 feet. The Lansing limestone was found at 2,085 feet, the base of the Kansas City limestone at 2,440 feet, and the top of the Warsaw dolomite (Mississippian) which was 67 feet thick at 2,723 feet. Below it, the cherty limestones of the "Osagian" and the noncherty limestones of the St. Joe extended to 2,954 feet. An unusual dolomite 20 feet thick was found below 2,954 feet. The grayish-green Kinderhookian shale occupies the interval between 2,972 and 3,142 feet. It is spore-bearing at the base. The Silurian "Hunton" dolomite fills the interval between 3,142 and 3,283 feet where the Maquoketa shale was found in the samples. It is pale grayish green,

slightly dolomitic, and contains a few graptolite fragments. The Maquoketa rests on the Viola cherty dolomite at 3,395 feet. The Viola, 120 feet thick, rests on some sandy dolomite beds which may be Simpson in age. These sandy dolomites are 55 feet thick; below them (at 3,570 feet) the samples show the typical green shales and thin sandstones of the Simpson formation to 3,613 feet, where the Arbuckle dolomite, which is medium crystalline and slightly oöcastic, was found. It contains very little chert; the base was not reached. The total depth of the test was 3,646 feet. There were no shows of oil or gas.

PAWNEE COUNTY

Historical background.—The first oil to be found in Pawnee County was the Pawnee Rock pool in T. 20 S., R. 16 W. The discovery well, drilled in 1936 by Simpson and Noble on the Gage farm in sec. 13, T. 20 S., R. 16 W., came in for 187 barrels of oil and 4 million cubic feet of gas from the Arbuckle at a depth of 3,832 feet. During 1940 and 1941, additional wells were drilled to extend the limits of the Pawnee Rock pool and much wildcatting was done in the county.

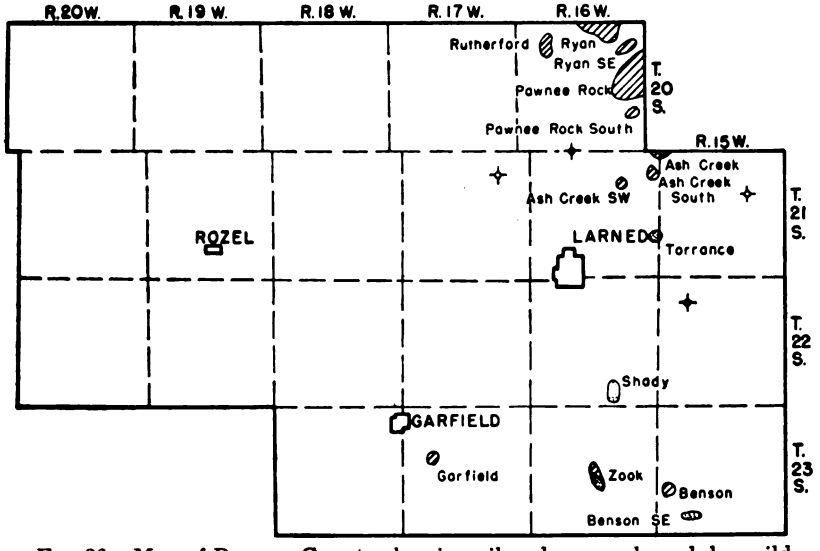

FIG. 36.—Map of Pawnee County showing oil and gas pools and dry wildcat tests drilled during 1947. (Gas, dots; oil, diagonal lines.)

A well started in December 1941 in sec. 16, T. 23 S., R. 16 W. by the Stanolind Oil and Gas Company known as the Rosine Smith No. 1 was completed as a producer on February 9, 1942, according to the log. This was the discovery well for the Zook pool. It was given an initial production of 6 million cubic feet of gas and a few barrels of oil.

About a month later the same company started a well in sec. 15 to extend the limits of the newly found Zook pool. This well, the Gilkison No. 1 was completed in April 1942 as a minimum oil well with a flow of about 3 million cubic feet of gas per day. The limits of the Zook pool have not since been extended.

The Pawnee Rock South was discovered in 1944 and the Benson, Shady, and Ryan Southeast pools were discovered in 1945. The Rutherford and Benson Southeast were found in 1946.

Statistical summary for Pawnee County, 1947

Oil produced		404,626	barrels
Gas produced		2,839,573	thousand cubic feet
Wells drilled:	Oil	25	
	Gas	5	
	Dry	23	
	Total	53	
	Wildcat wells	8	(included in above total)
New pools:	Oil	3	
	Gas	1	
Revived or abandoned pools		none	
Secondary recovery operations		none	

Developments during 1947.—Drilling activity was widespread in the county during 1947, but the greatest interest centered in an area 5 or 6 miles northeast of Larned, the county seat where three new pools were discovered. These were the Ash Creek South, the Ash Creek Southwest, and the Torrance. A fourth new pool discovered late in the year 12 miles southeast of Larned near the village of Garfield was named the Garfield pool. The **Ash Creek South** pool was found by the Bay Petroleum Corporation in sec. 12, T. 21 S., R. 16 W. The discovery well was drilled on the Sara Smith farm. Oil was found at a depth of 3,766 to 3,788 feet in the Arbuckle dolomite. The top of the dolomite was found 1,786 feet below sea level—about the same as the producing zone in the main Ash Creek pool. The initial well has a flow potential of 272 barrels of oil per day. This new pool lies less than a mile south of the main Ash Creek pool, and there are no dry holes between them.

Another oil pool found during 1947, the **Ash Creek Southwest,** lies a little more than 1 mile southwest of the Ash Creek South pool. The Ash Creek Southwest was found by the Mid-Continent Petroleum Corporation when the first well on the Bowman lease in the SE¼ SE¼ NW¼ sec. 11, T. 21 S., R. 16 W. was completed. Oil was found in the Arbuckle dolomite between 3,779 and 3,789 feet. The top of the dolomite was found 1,803 feet below sea level, somewhat lower than the producing zone in the wells in the Ash Creek South pool.

The **Torrance** gas pool was found in April 1947 by the J. M. Huber Corporation in the SW cor. sec. 19, T. 21 S., R. 15 W. on the Torrance farm. Gas was found in the Arbuckle dolomite at 3,846 feet; the amount was estimated variously as 35 to 53 million cubic feet per day after 3,000 gallons of acid had been applied

TABLE 49.—*Oil and gas pools of Pawnee County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production	Cumulative production to end of 1947, bbls.	Producing wells	Producing zone	Depth to producing zone, feet
			barrels				
Ash Creek			see Barton County				
Ash Creek South 12-21-16W	1947	160	10,861	10,861	5	Arbuckle	3,766
Ash Creek S'thw'st 11-21-16W	1947	40	1,244	1,244	1	Arbuckle	3,779
Benson 30-23-15W	1945	200	40,333	67,833	5	K.C.-Lans.	3,853
Garfield 17-23-17W	1947	40	955	955	1	Kinderhookian	4,276
Pawnee Rock 13-20-16W	1936	2,700	195,065	1,703,450	36	Arbuckle	3,832
Pawnee Rock S'th 25-20-16W	1944	160	13,202	28,462	4	Arbuckle	3,819
Rutherford 8-20-16W	1946	300	78,479	86,934	8	Arbuckle	3,815
Ryan			see Rush County				
Ryan Southeast 12-20-16W	1945	300	64,487	111,147	7	Arbuckle	3,688
Zook 16-23-16W	1942	80	none	7,016	2	Arbuckle	4,066
			thousand cubic feet				
Benson Southeast 32-23-15W	1946	160	none	none	1	Arbuckle	4,048
Pawnee Rock (gas) 19 & 20-15 & 16W	1936		1,618,268				
Ryan (gas) 35-19-16W		incl. with Pawnee Rock					
Shady 34-22-16W	1945	160	277,237	277,237	1	Arbuckle	4,063
Torrance 19-21-15W	1947	160			1	Arbuckle	3,846
Zook (gas) 16-23-16W	1942	320	944,068	5,706,263	2	Arbuckle	4,066

TABLE 50.—*Dry wildcat tests drilled in Pawnee County during 1947*

Company and farm	Location	Surface Elevation	Depth to top of Lansing, feet	Depth to top of Arbuckle feet	Total depth, feet
Stanolind O. & G. No. 1 Bixby	SW cor. SE¼ 33-20-16W	2,026	3,467	3,782	3,839
Brack Oil Co. No. 1 Clutter	SE cor. SW¼ 11-21-15W	1,937	3,406	3,790	3,865
H. H. & B. Drlg. Co. et al. No. 1 Stueckemann	NW cor. NE¼ 11-21-17W	2,033	3,531	3,892	3,942
J. M. Huber Corp. et al. No. 1 Thompson	NW cor. NE¼ 8-22-15W	1,981	3,515	3,947	3,978

to the producing dolomite. One offset test, drilled in sec. 24, T. 21 S., R. 16 W. by the Magnolia Petroleum Company on the Hagen farm, found the producing zone 1,887 feet below sea level. This compares with a depth of 1,876 feet in the discovery well. Although the difference is only 11 feet, the Magnolia well failed to produce and was abandoned. Water was found instead of gas.

A fourth pool, the **Garfield**, was discovered by the Gabbert and Lindas well on the Hutchinson farm, sec. 17, T. 23 S., R. 17 W. It was first thought that this was a gas producer but the log gives an initial daily capacity of 44 barrels of oil.

A light gas well rated at about 500,000 cubic feet per day was drilled in sec. 22, T. 23 S., R. 16 W., about 1 mile south of the **Zook** pool. Production comes from the Arbuckle at 4,087 feet. This well may represent a southward extension of the original Zook discovery.

Most of the new oil producers were drilled in pools located in the northeast corner of the county. One oil well was added to the **Ryan** pool and three to the **Rutherford** pool. In the **Pawnee Rock** pool five new oil wells and one gas well were added. In the **Ash Creek** pool, which lies mainly in Barton County, three new oil wells were completed on the Pawnee County side of the boundary line. One new gas well was completed in the **Benson** pool, and one gas well and a dry hole in the **Benson Southeast** pool.

The oil and gas pools of Pawnee County are shown on Figure 36, and pertinent information regarding them is given in Table 49. Table 50 lists the dry wildcat tests drilled in the county during 1947.

PHILLIPS COUNTY

Historical background.—Although quite a number of test wells were drilled in Phillips County prior to 1939, none of them was successful in finding either oil or gas. However, in June 1939 the Blue Stem Oil Company found oil on the Donaldson farm in sec. 25, T. 5 S., R. 18 W. in the south-central part of the county —the Bow Creek pool. A porous zone in the Kansas City-Lansing limestone produced the oil from a depth of 3,111 feet. The initial production was 827 barrels of oil per day. One year later, July 1940, the important Ray pool was found in the southwestern part of the county. The discovery well was drilled by the Cities Service Oil Company on the Ray farm where oil was found in the Reagan sandstone. In subsequent tests, oil was also found in the Arbuckle dolomite and in the Kansas City-Lansing limestone. This pool has produced almost 7 million barrels of oil.

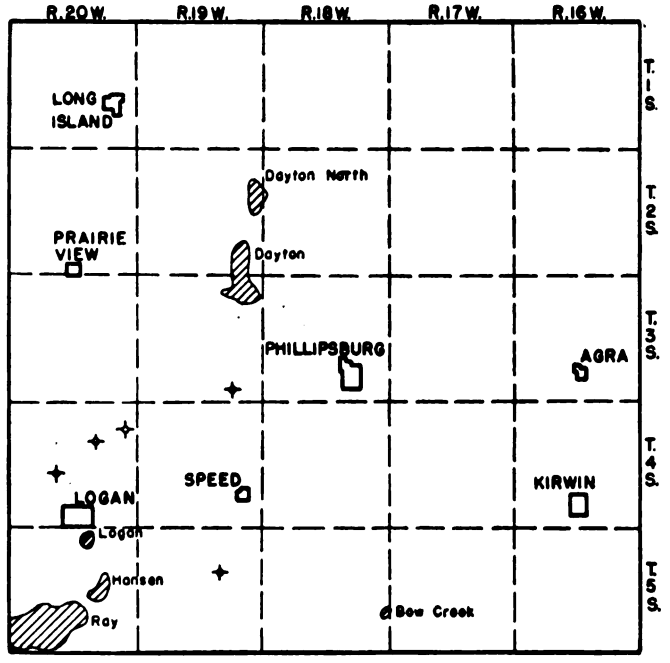

FIG. 37.—Map of Phillips County showing oil pools and dry wildcat tests drilled during 1947.

Four other pools—the Dayton, the Dayton North, the Hansen, and the Logan—have been found in Phillips County since the Ray pool was opened.

Statistical summary for Phillips County, 1947

Oil produced		1,894,238	barrels
Gas produced		none	
Wells drilled:	Oil	21	
	Gas	none	
	Dry	11	
	Salt water disposal	1	
	Total	33	
	Wildcat wells	5	(included in above total)
New, revived, or abandoned pools		none	
Secondary recovery operations		none	

Developments during 1947.—Most of the activity for the year 1947 consisted of drilling wells in established pools. Only five wildcat tests were drilled; all were dry holes.

The **Dayton North** pool, found in 1943, has received sporadic attention since its discovery. All the six new oil wells added during 1947 are located along the eastern side of the pool and all derive their oil from the porous zones in the Kansas City-Lansing limestones. All other new oil wells were completed in three pools located in T. 5 S., R. 20 W. The Logan pool, which lies in the northern part of the township, had five new oil wells drilled in 1947. Oil is produced from both the Kansas City-Lansing and Arbuckle rocks. Four of the five new wells produce oil from the Arbuckle; the other from the Kansas City-Lansing. The one well which produces from the Kansas City-Lansing is the Evans and White Eagle No. 1 Graham well in sec. 10. Here drilling was carried down to test the Arbuckle but found it dry. The hole was then plugged back to test a porous zone at 3,227 feet, about 116 feet below the top of the Kansas City-Lansing. After 250 gallons of acid had been applied, the well swabbed 47 barrels of oil in 6 hours. Later a test made to determine the potential capacity of the well resulted in a rating of 207 barrels of oil per day. The depth to the Arbuckle in the No. 1 Graham is 3,410 feet higher than the Arbuckle in most of the Logan pool wells. The depth of the Arbuckle below sea level in the producing wells ranges from 1,395 to 1,495 feet. This is a rather wide variation for Kansas. The thickness of the Arbuckle dolomite in this pool is 19 feet as determined in the No. 1 Graham test where at least 26 feet of

Reagan sandstone was found. A dry hole drilled in sec. 10 on the Burkley lease found the Arbuckle dolomite at 3,434 feet.

Another dry hole, a **Hansen** pool extension well in sec. 11, T. 5 S., R. 20 W. on the Ross lease, found the Arbuckle dolomite at 3,616 feet. This striking difference suggests the presence of a sink hole. A third dry hole in sec. 11 on the Lappin lease found the Arbuckle at 3,462 feet. These figures demonstrate considerable topographic relief on the top of the eroded Arbuckle in this part of the State.

In the Hansen pool four new oil wells were completed. They had initial potentials ranging from 375 to 956 barrels of oil per day. All produce from the Kansas City-Lansing.

The **Ray** pool lies in the southwestern corner of the county and extends slightly into adjacent counties. Here both the Arbuckle and the Reagan have been producing zones. In 1947, the Kansas City-Lansing limestone was also found to contain oil in commercial quantities. The first well to produce oil from the Kansas City-Lansing was the Cities Service Oil Company No. 3 "B" Pearson well in sec. 27, T. 5 S., R. 20 W. The well was drilled into the Reagan sandstone which was found at 3,576 feet. The Arbuckle also was tested for production at 3,566 feet. After plugging back, oil was found in the Kansas City-Lansing limestones between 3,328 and 3,338 feet, about 31 feet below the top of the group. Subsequently, four other wells were completed in the Reagan sandstone and two in the Arbuckle, making a total of six new oil wells in the Phillips County part of the pool. In the producing wells and near-by dry holes, varying thicknesses of Arbuckle and Reagan were found. The Arbuckle ranges

TABLE 51.—*Oil pools of Phillips County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
Bow Creek 25-5-18W	1939	40	2,954	38,119	1	K.C.-Lans.	3,111
Dayton 36-2-19W	1941	1,200	68,734	744,844	21	K.C.-Lans.	3,430
Dayton North 13-2-19W	1943	1,000	137,827	354,147	19	K.C.-Lans.	3,406
Hansen 14-5-20W	1943	1,000	243,556	628,371	24	K.C.-Lans. Arbuckle	3,363 3,530
Logan 3-5-20W	1945	360	67,575	81,035	9	K.C.-Lans. Arbuckle	3,149 3,381
Ray 32-5-20W	1940	3,500	1,373,592	6,998,857	97	K.C.-Lans. Arbuckle Reagan	3,297 3,575 3,540

TABLE 52.—*Dry wildcat tests drilled in Phillips County during 1947*

Company and farm	Location	Surface Elevation	Depth to top of Lansing, feet	Depth to top of Arbuckle, feet	Total depth, feet
Phillips Pet. Co. No. 1 Grau	NE cor. SW¼ 35-3-19W	2,071	3,219	3,562	3,615
Palmer Oil Corp. No. 1 Boethin	SW¼ SE¼ NW¼ 12-4-20W	2,069	3,267	3,612	3,645
Palmer Oil Corp. No. 1 Fox	NE cor. NE¼ 15-4-20W	2,078	3,266	3,616	3,645
Wilcox Oil Co. No. 1 Albright	NW cor. SW¼ 21-4-20W	2,062	3,256	3,547	3,602
Barnett & Wilcox No. 1 Pinkerton	NE¼ SE¼ NE¼ 15-5-19W	2,023	3,283	3,570	3,593

from a featheredge to 20 feet. The Reagan is absent in some wells, and in these the Pennsylvanian strata rest directly upon the Pre-Cambrian granite.

One of the five wildcat tests drilled in the county was located on the Grau farm in sec. 35, T. 3 S., R. 19 W. Here the Arbuckle was found 1,491 feet below sea level, about 120 feet below the base of the Kansas City-Lansing. Another wildcat drilled by the Palmer Oil Corporation on the Boethin farm in sec. 12, T. 4 S., R. 20 W. found the Arbuckle 1,537 feet below sea level. This location is about 6 miles north of the Logan pool. The Palmer Oil Corporation drilled another dry hole on the Fox farm in sec. 15, T. 4 S., R. 20 W., about 4 miles north of the Logan pool. Here the Arbuckle dolomite occurs 1,538 feet below sea level. A wildcat test drilled by the Wilcox Oil Company on the Albright farm in sec. 21, T. 4 S., R. 20 W. found the Arbuckle 1,485 feet below sea level. Barnett and Wilcox drilled a deep test about 4 miles northeast of the Hansen pool on the Pinkerton farm in sec. 15, T. 5 S., R. 19 W. Here the Arbuckle occurs 1,544 feet below sea level.

The oil pools of Phillips County and dry wildcat tests drilled during 1947 are shown on Figure 37. Table 51 gives information on the oil pools and Table 52 lists the dry wildcat tests.

PRATT COUNTY

Historical background.—An extension well of the Cunningham pool of Kingman County provided the first commercial oil well in Pratt County. It was drilled on the Maxedon farm in sec. 25, T. 27 S., R. 11 W. and was completed in July 1935. Production

was in the Kansas City-Lansing limestone. In December of the same year, a new gas well completed by the Skelly Oil Company in the Viola limestone several miles southwest of the Cunningham pool was the discovery of the Cairo pool. The well was drilled on the Gilchrist farm in sec. 7, T. 28 S., R. 11 W. This pool, as it developed, produced both oil and gas. It was combined later with the Cunningham pool which has been extended to the southwest and northeast until it now covers about 10,000 acres. It probably draws on an additional 3,000 acres.

The Iuka pool was discovered in August 1937 after which there was a lull in drilling until 1941. In April of that year, the Stark pool was opened as a strong gas producer. A few months later, October 1941, the Ward pool was discovered in sec. 11, T. 26 S., R. 12 W. This pool began as a gas pool, but was later combined, in 1943, with the Stark pool to form an area producing both gas and oil.

In 1942, the Carmi pool, located between the Iuka and the Stark, was discovered by the Hollow Drilling Company. The first well produced 3,000 barrels of oil per day and started an active drilling program in the area. Since its discovery, the Carmi pool has produced 6 million barrels of oil to equal the production of

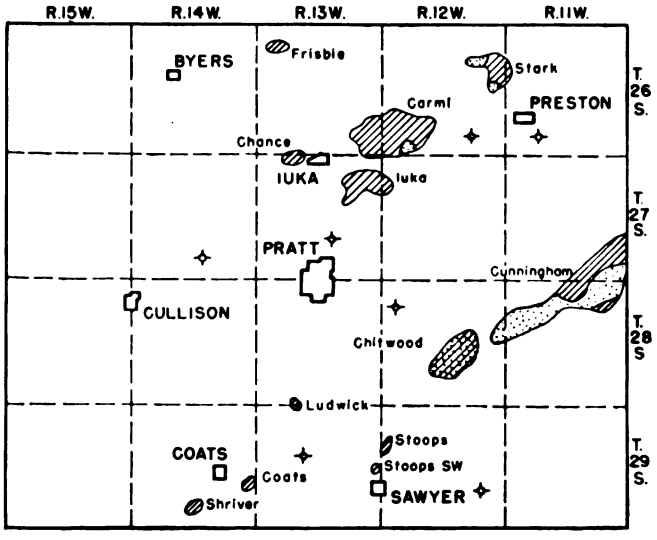

FIG. 38.—Map of Pratt County showing oil and gas pools and dry wildcat tests drilled during 1947. (Gas, dots; oil, diagonal lines.)

the Cunningham. The pool next in present importance in the county is the Chitwood discovered in 1943 by the Lion Oil Company.

A number of smaller pools such as the Shriver, Ludwick, Frisbie, Coats, and the Chance have been discovered since.

There are two secondary recovery operations in Pratt County, one of which crosses into Kingman County.

Statistical summary for Pratt County, 1947

Oil produced	2,911,933	barrels
Gas produced	2,299,902	thousand cubic feet
Wells drilled: Oil	6	
Gas	none	
Dry	14	
Total	20	
Wildcat wells	7	(included in above total)
New, revived, or abandoned pools	none	
Secondary recovery operations	2	
	See Kingman County also	

Developments during 1947.—Drilling activity in Pratt County during the year was well-distributed. Of the six new oil wells, four were completed in the **Chance** pool which lies along the north line of T. 27 S., R. 13 W. All these derive their oil from the Arbuckle dolomite at depths ranging from 2,478 to 2,498 feet below sea level. Three oil wells in which the Arbuckle was found about 2,500 feet below sea level were completed in the NW¼ sec. 4. One well in this pool produces from the Simpson sandstone. The only other pool in which successful new oil wells were drilled is the **Coats** pool near the south line of the county. Here two new oil wells were completed during the year, and one well was reworked into a successful producer. The oil wells found the Arbuckle 2,371 to 2,382 feet below sea level.

TABLE 53.—*Oil and gas pools of Pratt County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
			barrels				
Carmi 29-26-12W	1942	3,000	938,596	6,093,381	89	K.C. Simpson Arbuckle	4,271
Chance 4-27-13W	1946	400	87,220	93,175	10	Simpson Arbuckle	4,380 4,432
Chitwood 23-28-12W	1943	3,000	1,160,862	3,651,402	75	Viola Simpson Arbuckle	4,396
Coats 24-29-14W	1944	400	85,571	193,921	8	Simpson Arbuckle	4,402

Cunningham 7-28-11W	1931	1,400	373,040	6,287,978	121	K.C.-Lans.	3,390
Frisbie 5-26-13W	1943	400	43,926	179,436	4	K.C.-Lans.	3,947
Iuka 11-27-13W	1937	2,000	145,799	1,147,554	20	Simpson Arbuckle	4,292 4,354
Ludwick 4-29-13W	1944	80	1,656	22,726	2	Simpson	4,490
Shriver 33-29-14W	1944	400	92,071	220,876	7	Simpson	4,557
Stark 18-26-11W	1941	800	81,485	707,460	16	Viola	4,121
Stoops 7-29-12W	1946	160	27,962	42,697	4	Viola	4,446
Stoops Southwest 24-29-13W	1946	40	3,745	5,700	1	Viola	4,483
			thousand cubic feet				
Carmi (gas) 29-26-12W	1942	3,000	38,185	98,909	1	Viola	4,122
Chitwood (gas) 23-28-12W	1943	3,000	529,717	4,792,908	10	Viola	4,340
Cunningham (gas) 7-28-11W	1931	10,000	2,162,799 incl. Cairo pool prod.	46,082,512	28	Viola Arbuckle	4,278 4,094
Stark (gas) 13-26-12W	1941	600			1	Viola	4,121

Among the seven dry wildcat wells drilled in Pratt County during 1947, three were located at considerable distances from production. One dry hole was drilled in sec. 32, T. 26 S., R. 11 W. on the Simon farm. According to scout reports, it reached the top of the Kansas City-Lansing at 3,630 feet, top of the "Mississippi lime" at 4,094 feet, top of the Viola at 4,291 feet, top of the Arbuckle at 4,466 feet, and was abandoned at 4,535 feet

TABLE 54.—*Dry wildcat tests drilled in Pratt County during 1947*

Company and farm	Location	Depth to top of Lansing, feet	Depth to top of Viola, feet	Depth to top of Arbuckle, feet	Total depth, feet
Flynn Oil Co. & Herndon No. 1 Simon	Cen. N½ NE¼ NE¼ 32-26-11W	3,630	4,291	4,466	4,535
Harbar & Lion No. 1 Mardis	NW cor. NE¼ 35-26-12W	3,673	4,316	4,490	4,545
E. M. Swearer et al. No. 1 Hoffman	SE cor. SE¼ 22-27-13W	3,804	4,320	4,493	4,525
McBride, Carey & Derby No. 1 McBride	SW cor. SE¼ 27-27-14W	3,851	4,418	4,577	4,667
Harbar Drlg. Co. et al. No. 1 Keller	SE¼ NE¼ NE¼ 7-28-12W	3,733	4,338	4,492	4,547
Lion Oil Co. No. 1 Curry	NW cor. NW¼ 25-29-12W	3,888	4,512	4,708	4,775
Harbar Drlg. Co. et al. No. 1 Keller	SE cor. NW¼ 16-29-13W	3,919	4,512	4,796	4,850

A dry hole was drilled on the McBride farm in sec. 27, T. 27 S., R. 14 W. to a total depth of 4,667 feet. The top of the Kansas City-Lansing was found at 3,851 feet, top of the "Mississippi lime" at 4,329 feet, top of the Viola at 4,418 feet, and top of the Arbuckle at 4,577 feet.

The Lion Oil Company drilled a test on the Curry farm in sec. 25 T. 29 S., R. 12 W. which reached the top of the Arbuckle at 4,708 feet. The well was abandoned at 4,775 feet.

The oil and gas pools of Pratt County are shown on Figure 38 and listed in Table 53. The wildcat wells drilled during 1947 are listed in Table 54 and shown on Figure 38.

RENO COUNTY

Historical background.—The first oil to be discovered in Reno County was found in 1927 by Hartman and Skaer when they completed their test well on the Smith farm in sec. 24, T. 24 S., R. 8 W. This was the discovery well of the Abbyville pool. Oil was found in the Kansas City-Lansing limestone.

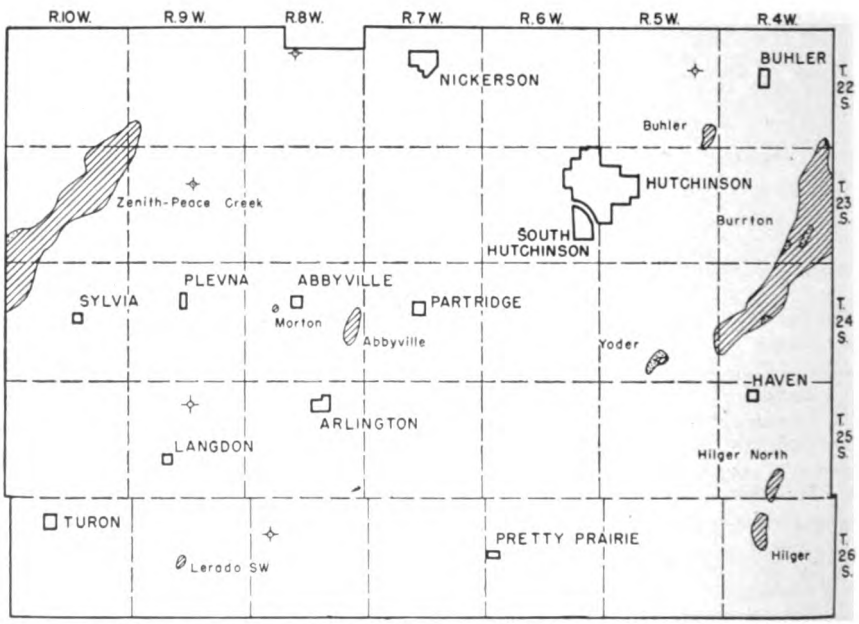

FIG. 39.—Map of Reno County showing oil and gas pools and dry wildcat tests drilled during 1947. (Gas, dots; oil, diagonal lines.)

The Burrton pool, largest in the county, was discovered in 1930. Here the first well was the Empire Oil Company No. 1 Haury in sec. 1, T. 23 S., R. 4 W. The well produced 23 million cubic feet of gas from the "chat" zone of the "Mississippi lime." The first oil well in this important pool was drilled the following year, 1931, by the Lloyd-Frost-Study Oil Corporation in the same section. The well was given an initial daily production of 327 barrels of oil and 7 million cubic feet of gas. Since discovery, the Burrton pool has produced 42 million barrels of oil and 64 billion cubic feet of gas.

The next pool to be discovered, the Hilger, was opened in 1934 and is still producing. The Yoder and the Lerado, both small pools, were discovered in 1935; the Buhler was found in 1938.

Next in size to the Burrton pool, the Peace Creek, which has produced a total of more than 10 million barrels of oil, was discovered in 1941. The discovery was a maximum well rated at 3,000 barrels of oil per day from the Viola limestone at 3,773 feet. In 1943, the Peace Creek was combined with the Zenith pool, which lies in Stafford County.

Since the discovery of the Peace Creek, several pools have been opened in Reno County but none so far has given indication of being outstanding in importance.

Most of the oil produced in Reno County has come from the "chat" but the Viola group is an important producer in the Peace Creek and in several of the lesser pools.

Statistical summary for Reno County, 1947

Oil produced	2,622,755	barrels
Gas produced	3,400,629	thousand cubic feet
Wells drilled: Oil	4	
Gas	none	
Dry	8	
Total	12	
Wildcat wells	5	(included in above total)
New or revived pools	none	
Abandoned pool: Oil	1	
Secondary recovery operations	2	

Developments during 1947.—Three additional oil wells were completed in the **Zenith-Peace Creek** pool during 1947. One was drilled in sec. 6, T. 23 S., R. 9 W. as the No. 2 on the Valdois farm. In this well the producing zone was the Viola which was found at 3,704 feet. The second well was completed as the No. 4 on the Werner lease of the Republic Natural Gas Company in sec. 15,

T. 23 S., R. 10 W. The third oil well was drilled by Shawver and Graham on the Hollenbeck lease in sec. 28, T. 23 S., R. 10 W. In this well the Viola was found at 3,791 feet. One dry hole was drilled near by on the Essley farm in sec. 27, T. 23 S., R. 10 W. where the Viola was found at 3,805 feet. Three miles east of the Zenith-Peace Creek pool, Helmerich and Payne drilled a wildcat test on the Geist farm in sec. 10, T. 23 S., R. 9 W. which found the Viola group at 3,927 feet. The test was drilled to the Arbuckle dolomite at 4,053 feet and was abandoned at a total depth of 4,100 feet according to the log of the hole.

The **Hilger North** pool is located in the southeastern part of Reno County. Here two tests were completed during the year. One new oil well was found by Harper as the No. 2 on the Terry farm in sec. 4, T. 26 S., R. 4 W. The producing zone, the Viola, was found at 4,096 feet. The well has a pumping potential of approximately 300 barrels per day. The other test was drilled by the Phillips Petroleum Company on the Beltz farm in sec. 27, T. 25

TABLE 55.—*Oil and gas pools of Reno County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
			barrels				
Abbyville 24-24-8W	1927	640	17,577	573,787	10	K.C.-Lans.	3,540
Buhler 25-22-5W	1938	500	28,224	572,914	4	Viola Simpson	3,890 3,897
Burrton 1-23-4W	1931	12,000	1,066,728	42,059,928	315	"Chat" "Hunton"	3,266 3,583
Hilger 16-26-4W	1934	600	43,045	3,189,270	17	Viola	4,062
Hilger North 34-25-4W	1943	500	172,970	613,535	13	Viola	4,099
Lerado 11-26-9W	1935	abandoned during 1947				Viola	4,128
Lerado Southwest 21-26-9W	1944	160	15,128	63,968	3	Viola	4,177
Morton 17-24-8W	1942	40	3,305	25,535	1	K.C.-Lans.	3,180
Peace Creek 21-23-10W	1941	6,000 (The Reno County part of the Zenith-Peace Creek pool)	1,273,581	10,357,181	126	Viola	3,773
Yoder 34-24-5W	1935	500	2,197	86,967	5	"Chat"	3,450
			thousand cubic feet				
Burrton (gas) 1-37-4W	1930	5,000	2,809,205	64,456,086	307	"Chat"	3,298
Yoder (gas) 34-24-5W	1936	800	591,424		8	"Chat"	3,402
Zenith-Peace Creek			see Stafford County				

TABLE 56.—*Dry wildcat tests drilled in Reno County during 1947*

Company and farm	Location	Depth to top of Lansing, feet	Depth to top of Viola, feet	Depth to top of Arbuckle, feet	Total depth, feet
Braden-Green No. 1 Duerksen	SW cor. SW¼ 12-22-5W	2,670	3,870	3,933	3,993
Flynn Oil Co. & Holm Drlg. No. 1 Mayer	NW cor. NE¼ 9-22-8W	3,020	did not reach	did not reach	3,443
Adams & Helmerich & Payne No. 1 Geist	SE cor. SW¼ 10-23-9W	3,264	3,927	4,053	4,100
Ben F. Brack No. 1 Hoelscher	Cen. NW¼ NW¼ 10-25-9W	3,356	4,098	4,285	4,331
Geo. F. Martin No. 1 Kolman	SE cor. SE¼ 7-26-8W	3,267	4,161	4,313	4,375

S., R. 4 W. It found the Viola at 4,085 feet. A drill stem test showed only water, and the test was abandoned.

The oil and gas pools and dry wildcat tests drilled during 1947 are shown on Figure 39. Information on the oil and gas pools is given in Table 55 and on the dry wildcat tests in Table 56.

RICE COUNTY

Historical background.—Rice County has the distinction of being the first county in western Kansas to reveal its oil and gas possibilities. The location of the first gas well drilled in western Kansas is just east of the town limits of Lyons. A concern called the Kansas Natural Gas and Oil and Mineral Products Company was formed in 1887 to prospect for valuable mineral substances. Their first venture was a success as they found gas at the relatively shallow depth of 1,230 feet. They also found thick salt beds which had much to do with the later industrial development of the area. Gas from the first well was piped into Lyons and used for a long time in the old Interstate Hotel and in many of the local residences. However, this early success did not stimulate the imagination of the oil producer.

It was 37 years later, March 1924, that the first oil pool, the Welch, was found in Rice County. The discovery well was drilled by the Prairie Oil and Gas Company in sec. 35, T. 20 S., R. 6 W. That pool, producing from the Mississippian "chat," is still a substantial contributor to the production of the county.

Five years later, July 1929, the Raymond pool was discovered in sec. 21, T. 20 S., R. 10 W. It has produced more than 11 million

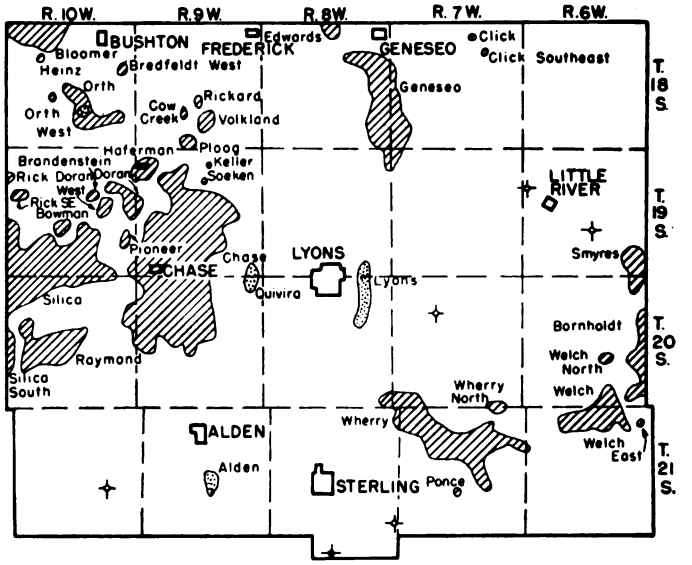

FIG. 40.—Map of Rice County showing oil and gas pools and dry wildcat tests drilled during 1947. (Gas, dots; oil, diagonal lines.)

barrels of oil from the Kansas City-Lansing and Arbuckle since its discovery.

The most important pool in the county, the Chase, was opened during February 1931. The pool has produced 46 million barrels of oil, largely from the Arbuckle dolomite. The Wherry pool, which has produced more than 10 million barrels of oil to date from the Sooy conglomerate, was discovered in September 1933; the Brandenstein, a much smaller pool, was found during the same year. The Geneseo pool was found in July 1934. It is the county's second pool in importance having produced nearly 22 million barrels of oil.

The Edwards pool was found in January 1936, 2 years later. It has produced nearly 10 million barrels of oil. The Arbuckle dolomite is the producing horizon in both the Geneseo and Edwards pools. Although many other pools have been found in the county, including three new oil pools and one gas pool during 1947, none has produced more than about 2 million barrels of oil to date.

The history of exploration in Rice County has not followed a set pattern in that a large number of formations through a con-

siderable vertical range have been found to be productive. The Arbuckle has produced most of the oil and the Kansas City-Lansing has been next in importance. Some oil has been produced from the Pre-Cambrian in the small Orth pool.

Three secondary oil recovery operations—by Shell, Barnsdall, and Continental—were active in the county last year. The first operation was started by Continental in 1945 in the Smyres pool. The other three were started in 1946; all are in the Silica pool and all produce from the Arbuckle dolomite. Table 8 gives details on secondary recovery operations.

Statistical summary for Rice County, 1947

Oil produced	11,528,761	barrels
Gas produced	474,665	thousand cubic feet
Wells drilled: Oil	103	
Gas	6	
Dry	49	
Salt water disposal	5	
Total	163	
Wildcat wells	10	(included in above total)
New pools: Oil	3	
Gas	1	
Revived or abandoned pools	none	
Secondary recovery operations	3	

Developments during 1947.—Of the 11 wildcat tests drilled in the county during 1947, 3 were oil wells, 2 were gas wells, and 6 were dry. In the northeastern part of the county the Phillips Petroleum Company found the new **Click Southeast** pool when the first test on the Newkirk farm was completed. The new pool is located in sec. 11, T. 18 S., R. 7 W., approximately 1 mile southeast of the main Click pool which was found in 1943. The test was drilled into the Arbuckle dolomite which was found at 3,438 feet. The lower likely oil zones were dry, so the test was plugged back to porous zones in the Kansas City-Lansing. At 3,065 feet, or 350 feet below the top of the Kansas City-Lansing, enough oil came into the hole to justify a rating for the well of 25 barrels per day. Considerable water was produced with the oil, so the future status of this pool remains in question.

In the southwestern part of the county Ed Adair and ElDorado Refining found the **Rick Southeast** pool when the first test on the Chamberlin farm was completed in sec. 18, T. 19 S., R. 10 W. The oil was found between 3,334 and 3,337 feet in the Arbuckle dolomite. A potential capacity test gave the new well a rating of 376 barrels of oil per day.

Another new oil pool, named the **Wherry North,** was located in the southeastern part of the county. It was found by Tom Allan and Keyes when the first well on the Chronister farm was completed in sec. 35, T. 20 S., R. 7 W. Here oil was found in the Pennsylvanian basal conglomerate, sometimes called the Sooy. The top of the conglomerate was found at 3,423 feet. The total depth was 3,426 feet, and the potential capacity of the discovery well was 67 barrels per day.

One additional oil producer was drilled in sec. 35, and two in sec. 36, T. 20 S., R. 7 W. and one in sec. 1, and two in sec. 2, T. 21 S., R. 7 W. The Sooy conglomerate which produces oil in this pool lies about 1,750 feet below sea level. The corresponding elevation of the producing zone in the part of the Wherry pool opposite the new discovery is roughly the same, ranging from 1,740 to 1,760 feet.

During 1947, one new gas pool was found in Rice County. The discovery was interesting inasmuch as the gas comes from a zone which hitherto has not been regarded as a likely zone for production. It is the new **Quivira** pool which was found by the Drillers Gas Company when they completed working over a well on the Dinsmore farm in sec. 36, T. 19 S., R. 9 W. This test was originally drilled to the Arbuckle dolomite by Max Steinbushel and completed as a dry hole in 1943. A good show of gas was found, however, at the level of the Tarkio limestone high up in the Pennsylvanian. The Drillers Gas Company decided to clean out the hole and test this showing. The casing was perforated with 24 holes and then 1,000 gallons of acid was applied to the limestone. The casing was also perforated opposite the Americus (Permian)

TABLE 57.—*Oil and gas pools of Rice County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
Bloomer	see Barton County						
Bowman 21-19-10W	1936	300	53,989	349,409	8	K.C.-Lans. Arbuckle	3,032 3,272
Bornholt	see McPherson County						
Brandenstein 10-19-10W	1933	300	42,909	510,969	9	K.C.-Lans. Arbuckle	3,014 3,269
Bredfeldt West 12-18-10W	1939	80	4,135	50,240	2	Arbuckle	3,260
Chase 32-19-9W	1931	16,000	2,924,937	46,053,902	403	K.C.-Lans. "Wilcox" Arbuckle	2,942 3,260 3,246
Click 3-18-7W	1943	40	none	5,632	1	"Misener"	3,182

Click Southeast 11-18-7W	1947	40	2,103	2,103	1	K.C.-Lans.	3,065
Cow Creek 28-18-9W	1946	40	196	765	1	Arbuckle	3,249
Doran 13-19-10W	1936	600	168,618	591,998	18	K.C.-Lans. Arbuckle	3,291
Doran West 14-19-10W	1944	700	132,287	309,212	15	Arbuckle	3,264
Edwards 3-18-8W	1936	3,000	1,199,581	9,222,356	105	Arbuckle	3,278
Geneseo 25-18-8W	1934	5,600	2,569,579	21,842,494	188	Arbuckle	3,132
Haferman 6-19-9W	1936	900	133,365	1,038,620	6 11	K.C.-Lansing Arbuckle	2,876 3,192
Heinz 8-18-10W	1938	80	4,476	81,306	2	K.C.-Lans. Arbuckle	3,000 3,254
Keller 3-19-9W	1943	40	3,971	30,056	1	Sooy	3,240
Orth 27-18-10W	1932	1,000	139,783	1,533,948	24	Shawnee K.C.-Lans. Pre-Cambrian	2,915 3,240
Orth West 21-18-10W	1944	40	1,817	10,447	1	Arbuckle	3,235
Pioneer 25-19-10W	1942	160	23,389	68,204	4	Arbuckle	3,281
Ploog 33-18-9W	1930	500	21,531	1,462,566	4	Arbuckle	3,252
Ponce 28-21-7W	1936	40	2,775	47,905	1	Sooy	3,388
Raymond 21-20-10W	1929	2,500	561,841	11,106,466	69	K.C.-Lans. Arbuckle	3,130 3,330
Rick		see Barton County					
Rick Southeast 18-19-10W	1947	40	704	704	1	Arbuckle	3,334
Rickard 22-18-9W	1935	200	10,872	151,712	4	Arbuckle	3,324
Silica		see Barton County					
Silica South		see Barton County					
Smyres 36-19-6W	1942	1,200	254,086	1,301,961	29	"Chat"	3,339
Soeken 10-19-9W	1937	40			1	K.C.-Lans.	3,339
Volkland 27-18-9W	1943	300	82,277	350,137	7	Arbuckle	3,221
Welch 35-20-6W	1924	2,000	180,316	4,896,466	46	"Chat"	3,370
Welch East 1-21-6W	1941	80	1,732	27,807	2	"Chat"	3,341
Welch North 23-20-6W	1937	160	6,143	80,298	4	"Chat"	3,334
Wherry 11-21-7W	1933	7,200	241,965	10,063,380	64	Sooy	3,358
Wherry North 35-20-7W	1947	250	48,500	48,500	7	Sooy	3,423
			thousand cubic feet				
Alden 22-21-9W	1937	400	39,352	13,801,113	6	"Misener"	3,317
Haferman (gas) 6-19-9W	1936		100,695	100,695		Arbuckle	3,192
Lyons 35-19-8W	1888	1,500	107,770	12,199,689	4	Simpson Arbuckle	3,290 3,277
Orth (gas) 27-18-10W	1933	640	83,862		2	K.C.-Lans.	2,906
Quivira 36-19-9W	1947	640	142,986	142,986	1	Tarkio	2,117

limestone between 1,974 and 1,985 feet. After a test for productivity the well was gauged at 2½ million cubic feet of gas per day. The top of the Tarkio limestone was found at 2,117 feet.

Before the close of the year, three additional gas wells were completed in sec. 36, T. 19 S., R. 9 W., and one in sec. 1, T. 20 S., R. 9 W. The sequence of important marker beds in these wells was: Florence limestone, 1,515 feet; Wreford limestone, 1,550 feet; Neva limestone, 1,750 feet; Foraker limestone, 1,780 feet; Americus limestone, 1,900 feet; and Tarkio limestone, 2,117 to 2,127 feet.

A gas well was drilled by H. H. Blair on the Goodwin farm in sec. 2, T. 18 S., R. 8 W. This well was completed in 1947 at a depth of 3,302 feet. The Arbuckle at 3,297 feet was dry so the well was plugged back to a good showing in the Simpson at a depth of 3,239 feet. The well was acidized and opened as a gas producer, rated at 1 million cubic feet per day. The record is not entirely clear as to whether the gas came from the Simpson or from the Kansas City-Lansing between 2,849 and 2,870 feet. This well may extend the Geneseo pool a half mile to the north or it may be a new discovery. The matter has not been decided by the Nomenclature Committee.

In the Rice County part of the **Edwards** pool, which lies in T. 18 S., R. 8 W. and extends well into Ellsworth County to the north, one additional oil well and three dry holes were completed during 1947. One deep salt water disposal well was drilled in the **Geneseo** pool which found a thick section of Arbuckle dolomite. To the **Bloomer** pool, in the northwestern corner of the county, one more oil well was added. In the **Orth** pool located in the center of T. 18 S., R. 10 W., 13 test holes were drilled during the year resulting in 10 new oil wells. Of these, two produce oil from the Kansas City-Lansing and two from the Arbuckle. The remaining six produce from the Topeka (or Shawnee) limestone. Three of the test holes were drilled into the Pre-Cambrian quartzite and then plugged back. In one of the tests the Arbuckle was found to have a thickness of 36 feet (Artnell No. 1 Herzog in sec. 27, T. 18 S., R. 10 W.). In the other two wells Pennsylvanian strata rest directly on the Pre-Cambrian

The **Smyres** pool lies in T. 19 S., R. 6 W. along the eastern side of the county. It produces oil from the Mississippian chert. Here seven new oil wells were completed. Much farther west, the

Haferman pool in the northwestern corner of T. 19 S., R. 9 W., received six new oil wells during 1947, all of which produce from the Kansas City-Lansing limestone, although four of the wells tested the Arbuckle. All previous wells in this pool have produced from the Arbuckle dolomite.

The large **Chase** pool was extended by additions to the north end, to the west side, and to the south end. That part which lies in T. 19 S., R. 9 W. had 11 new oil wells added. Nine of these found oil in the Arbuckle dolomite and two in the Kansas City-Lansing limestone. That part which lies in T. 19 S., R. 10 W. received three new oil wells, one of which found production in the "Wilcox" sandstone and two in the Arbuckle dolomite. In that part of the Chase pool which lies in T. 20 S., R. 9 W. six oil wells were completed, five in the Arbuckle and one in the Kansas City-Lansing. In T. 20 S., R. 10 W. only one new oil well was added to the Chase pool total. This well was the Hyde No. 1 Miller well in sec. 13, T. 20 S., R. 10 W. which found oil in the "Wilcox" sandstone at 3,344 feet.

The **Doran** pool, located west of the Chase, was extended by the addition of eight new oil producers. In the area of the Doran, Doran West, and Brandenstein, the pool boundaries are difficult to draw since the Doran pool was extended westward almost to the Cen. sec. 11, T. 19 S., R. 10 W. in 1947. Five new oil wells were added to the **Brandenstein** pool; all are Kansas City-Lansing. Three wells were added to the **Doran West** pool which is separated from the Doran by less than a mile.

In the **Silica** pool, which now almost joins the Doran West, 10 new oil wells were added to the previous total. Six of these produce oil from the Arbuckle dolomite and four produce from the Kansas City-Lansing limestones. In the **Bowman** pool two new oil wells were completed and the same number in the **Pioneer** pool near by.

Only two new oil wells were completed in the **Raymond** pool which lies in T. 20 S., R. 10 W. One deep salt water disposal well was drilled in which a thick section of Arbuckle dolomite was found.

In the southernmost tier of townships there was great activity during 1947. This was due largely to the discovery of oil in the new **Wherry North** pool. As a result, 13 additional new oil wells

TABLE 58.—*Dry wildcat tests drilled in Rice County during 1947*

Company and farm	Location	Depth to top of Lansing, feet	Depth to top of Viola, feet	Depth to top of Arbuckle, feet	Total depth, feet
W. L. Hartman No. 1 Wolf	NE cor. SW¼ 7-19-6W	2,757	3,461	3,562	3,594
Jones-Shelburne, Inc. No. 1 West	NE cor. SW¼ 22-19-6W	2,769	3,400	3,474	3,525
Russell MaGuire No. 1 Potwin	SW cor. NW¼ 9-20-7W	2,868	3,537	3,659	3,677
Helmerich & Payne No. 1 Russ	SE cor. NE¼ 36-21-8W	2,964	3,760	3,855	3,880
Three Way Drlg. Co. No. 1 Heckel	SW cor. SW¼ 23-21-10W	3,063		3,456	3,506
John Stark No. 1 Mayer	SW¼ SE¼SE¼ 4-22-8W	2,997	did not reach	did not reach	3,410

and one dry hole were drilled in the western part of the old **Welch** pool. The dry hole was drilled entirely through the Mississippian limestone, with a thickness of 97 feet, into the Kinderhookian shale. This was the Branine and Holl No. 3 Fee test in sec. 4, T. 21 S., R. 6 W. In the **Wherry** pool in T. 21 S., R. 7 W., two new oil wells were added. One produces from the Pennsylvanian basal conglomerate and the other from the Mississippian.

The oil and gas pools of Rice County and the dry wildcat tests drilled during 1947 are shown on Figure 40. The pools are listed in Table 57 and the dry wildcat tests in Table 58.

ROOKS COUNTY

Historical background.—In Rooks County the first commercial oil pool was found in 1927 by the Vickers Petroleum Company. The discovery well was on the Luhman farm in sec. 11, T. 9 S., R. 16 W., in what is now the Laton pool. The producing zone, then called the "Oswald lime," is now referred to as the Kansas City-Lansing. The Laton pool was not drilled extensively until about 1940. However, it now covers about 3,600 acres, has 93 wells, and has produced almost 3 million barrels of oil.

In January 1928, the Derby Oil Company discovered the Kruse pool with a test in sec. 3, T. 10 S., R. 16 W.

The Webster pool was opened in November 1930 after which no discoveries were made until the Dopita pool was opened in August 1934. The Zurich was opened in 1935, and two additional pools, the Faubion and the Westhusin, in 1936. The Stockton and the Nyra were discovered in 1937.

The Nyra and Webster, abandoned soon after discovery, were both revived by new discovery wells in 1946.

From 1937 until 1941, drilling did not show up any new pools in Rooks County. In the latter year the Erway pool was opened. In the following year, 1942, four pools resulted from an intensive program of drilling in the county. The four pools in order of discovery were the Ray Southeast, the Baum, the Dorr, and the Barry.

In general, much drilling has taken place in Rooks County in recent years although no outstanding pool has been developed. The Palco, Kriley, and Marcotte were discovered in 1943; the Hobart and Zurich Townsite in 1944; and the Vohs, McClellan, and Palco Townsite pools in 1945.

Three pools were discovered in 1946: Alcona, Barry Southeast, and Webster Northwest.

Statistical summary for Rooks County, 1947

Oil produced	2,506,085	barrels
Gas produced	none	
Wells drilled: Oil	93	
Gas	none	
Dry	75	
Total	168	
Widcat wells	30	(included in above total)
New pools: Oil	9	
Revived pools	none	
Abandoned pool: Oil	1	
Secondary recovery operations	none	

Developments during 1947.—More wildcat wells were drilled in Rooks County in 1947 than in any other county. Discovery of good pools in 1946 stimulated active exploration.

Nine new oil pools were discovered in the county during 1947. Listed in order of their discovery, they were: Paradise Creek, Silvers, Vohs Northwest, Paradise Creek South (later joined to the Paradise Creek), Barry East, Finnesy, Vohs South, Gick, and Jelinek.

The **Paradise Creek** pool was discovered by Willis Hartman when the first well on the Rempe farm in the NW cor. SE¼ sec. 21, T. 9 S., R. 18 W. was successfully completed. The test, which found production in the Arbuckle at 3,576 feet, produced 284 barrels of 25½° gravity oil in 24 hours. Later an echometer test rated the well at 1,470 barrels of oil per day. Other operators with acreage near by immediately started drilling offset wells. These followed in rapid succession so that by the end of the year this

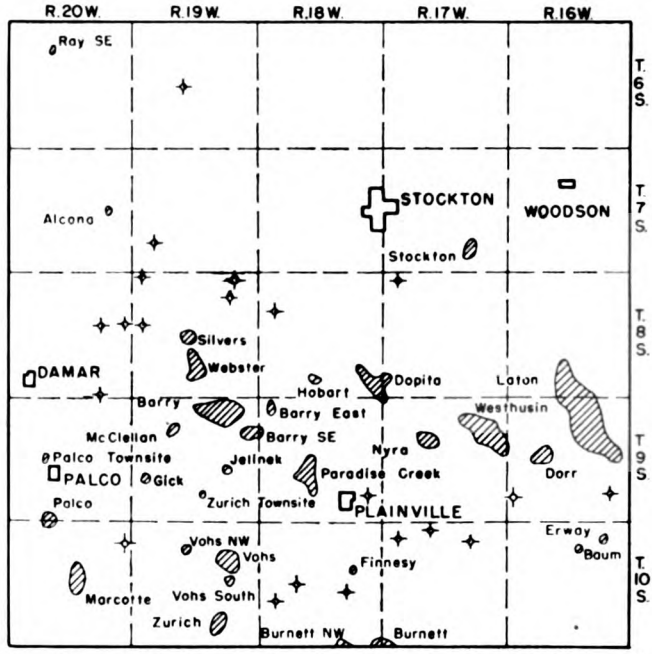

FIG. 41.—Map of Rooks County showing oil pools and dry wildcat tests drilled during 1947.

new pool had 27 oil wells. Not all the wells produce from the Arbuckle group as did the discovery well. In the southern part of the pool five wells produce oil from the Kansas City-Lansing limestone. Generally, the Arbuckle here has the Pennsylvanian basal conglomerate directly above it. However, in three wells a thin wedge of Simpson was also found. In one well the Viola group of rocks is also reported in addition to the Simpson. This well is the Gulf Oil Corporation No. 2 Stahl located in the SE¼ NE¼ NW¼ sec. 21, T. 9 S., R. 18 W. The Viola was found at 3,732 feet and the Arbuckle dolomite at 3,762 feet. The greater depth to the Arbuckle suggests the presence of a deep sink hole on the old karst topography; all the producing wells in sec. 21 found the Arbuckle dolomite between 1,401 and 1,423 feet below sea level. Another sink hole is indicated by the Cities Service Oil Company test on the Toelkes farm in sec. 22 where the Arbuckle was found at 3,652 feet. The producing wells in the southern part of the pool (secs. 27 and 28) found the Arbuckle between depths

of 3,569 and 3,603 feet. This suggests that the oil reservoir has considerable thickness and that the reserves should be large.

The **Paradise Creek South** pool was discovered 6 months after the Paradise Creek. The two pools were soon combined and the year's total of wells applies to the combined pool.

The **Barry East** pool was discovered by the Continental Oil Company on the Gilbert farm in sec. 6, T. 9 S., R. 18 W. The test found the Arbuckle at 3,487 feet, and oil came into the hole between 3,489 and 3,498 feet. On a preliminary test the well swabbed 224 barrels of oil in 8 hours. It was later given a pumping potential of 609 barrels of oil per day. Before the end of the year, an additional oil well and two dry holes were drilled in sec. 6. The oil wells produce from depths of 3,487 and 3,489 feet respectively. The dry holes found the Arbuckle at 3,547 and 3,554 feet.

The **Jelinek** pool was discovered by the Derby Oil Company when the first test on the Jelinek farm was completed in the NW¼ NE¼ SE¼ sec. 23, T. 9 S., R. 19 W. Here oil was found in the Arbuckle dolomite in December 1947. The depth to the Arbuckle is 3,537 feet.

The **Gick** pool was found by the Continental Oil Company on the Gick farm in sec. 30, T. 9 S., R. 19 W. The discovery well found a show of oil within the Kansas City-Lansing limestone between 3,502 and 3,506 feet. The hole was completed in the Arbuckle dolomite which was found at 3,578 feet. On a swabbing test the well produced 240 barrels of oil in 24 hours after acidizing. Later the well received a pumping potential of 611 barrels per day. The Sunray Oil Corporation drilled an offset test which found the Arbuckle 20 feet lower than in the discovery well. Only water was found in the porous zone, and, therefore, the test was abandoned.

The **Finnesy** pool was opened by the Continental Oil Company in the SE cor. NE¼ sec. 14, T. 10 S., R. 18 W. on the Finnesy farm. Here the top of the Arbuckle dolomite was found rather low, 3,763 feet, and proved to be dry. Then, the Kansas City-Lansing limestone was tested first between 3,542 and 3,558 feet where swabbing produced 25 barrels in 24 hours. Later the casing was perforated between 3,419 and 3,437 feet. One thousand gallons of acid produced a daily flow of 25 barrels of oil and much water. The test was finally given a rating of 26 barrels of oil and 65 barrels of water per day.

The **Vohs Northwest** pool was discovered by the Harbar Drilling Company during the working over of an old well on the Baldwin farm in sec. 9, T. 10 S., R. 19 W. The discovery well found the Arbuckle at a relatively low depth of 3,727 feet. Later the Kansas City-Lansing was tested at 3,574, 3,581, 3,652, and 3,488 feet without favorable results. However, at 3,446 to 3,450 feet considerable oil came into the hole, and the well received a potential rating of 771 barrels of oil when tested.

The **Vohs South** pool is located one-half mile south of the main Vohs pool in the NE cor. sec. 23, T. 10 S., R. 19 W. Here Armer

TABLE 59.—*Oil pools of Rooks County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production bbls.	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
Alcona 14-7-20W	1946	40	637	2,772	1	Arbuckle	3,499
Barry 11-9-19W	1942	1,200	784,378	2,484,783	36	K.C.-Lans. Arbuckle	 3,435
Barry East 6-9-18W	1947	40	6,274	6,274	1	Arbuckle	3,489
Barry Southeast 13-9-19W	1946	700	249,915	253,340	16	Arbuckle	3,479
Baum 10-10-16W	1942	40	1,377	10,202	1	K.C.-Lans.	3,057
Burnett			see Ellis County				
Dopita 31-8-17W	1934	600	49,952	485,082	9	K.C.-Lans. Arbuckle	3,212 3,409
Dorr 20-9-16W	1942	600	70,429	214,294	10	K.C.-Lans.	3,230
Erway 2-10-16W	1941	40	7,468	49,153	1	K.C.-Lans.	3,136
Faubion 12-6-18W	1936	abandoned during 1947			1	K.C.-Lans.	3,128
Finnesy 14-10-18W	1947	40	433	433	1	K.C.-Lans.	3,419
Gick 30-9-19W	1947	40	none	none	1	Arbuckle	3,578
Hobart 33-8-18W	1944	120	4,329	35,589	3	K.C.-Lans.	3,209
Jelinek 23-9-19W	1947	40	none	none	1	Arbuckle	3,537
Laton 11-9-16W	1927	3,600	165,822	2,996,012	93	K.C.-Lans.	3,228
Marcotte 15-10-20W	1943	500	139,043	500,443	11	Arbuckle	3,752
McClellan 9-9-19W	1945	120	10,696	28,616	2	K.C.-Lans.	3,343
Nyra 16-9-17W	1946	160	13,031	21,186	4	K.C.-Lans.	3,429
Palco 5-10-20W	1943	250	62,139	196,994	5	Arbuckle	3,824
Palco Townsite 20-9-20W	1945	40	3,927	8,177	1	Arbuckle	3,847
Paradise Creek 21-9-18W	1947	1,000	217,021	217,021	26	Arbuckle	3,576
Paradise Creek South 28-9-18W	1947	combined with Paradise Creek					

Ray Southeast 9-6-20W	1942	40	7,626	52,971	1	Reagan	3,600
Silvers 21-8-19W	1947	120	9,397	9,397	3	Arbuckle	3,466
Stockton 35-7-17W	1937	160	14,316	55,496	4	Shawnee K.C.-Lans.	2,692 3,180
Vohs 14-10-19W	1945	900	257,907	445,652	21	K.C.-Lans.	3,365
Vohs Northwest 9-10-19W	1947	40	9,943	9,943	1	K.C.-Lans.	3,446
Vohs South 23-10-19W	1947	40	1,502	1,502	1	K.C.-Lans.	3,303
Webster 27-8-19W	1946	640	296,124	339,064	19	Arbuckle	3,403
Webster Northwest 21-8-19W	1946	combined with Webster					
Westhusin 11-9-17W	1936	1,200	99,483	1,108,448	23	K.C.-Lans.	3,231
Zurich 26-10-19W	1935	600	17,577	213,982	7	K.C.-Lans.	3,340
Zurich Townsite 27-9-19W	1944	80	5,339	24,649	2	Arbuckle	3,647

completed a well capable of producing 82 barrels of oil per day on the Catudal farm. This test found the Arbuckle rather low, at 3,603 feet. The Kansas City-Lansing was then tested between 3,303 and 3,310 feet, and a swabbing test showed 28 barrels of oil per hour. This new well is located about 1½ miles north of the Zurich pool, but is separated from it by several dry holes.

In April 1947, a new pool, the **Silvers**, extended a trend from the Barry pool 3 miles to the northwest. The new pool, located almost in the center of T. 8 S., R. 19 W., was found by the Aylward Production Company. The discovery well is the No. 1 Silvers, sec. 21, T. 8 S., R. 19 W. An Arbuckle producer, the well was given a rating of 249 barrels of oil plus 30 percent water.

In northern Rooks County the **Faubion** pool had been a one well pool since 1936. During 1947, one new oil well was completed here. It was rated at 15 barrels per day from the Kansas City-Lansing limestone. In November 1947, the Faubion pool was abandoned. The **Stockton** pool also has been neglected for some time. Here, too, one new well, producing 60 barrels of oil per day, was completed.

The old **Laton** pool, discovered in 1927, received three new oil wells during 1947. The **Webster** pool, T. 8 S., R. 19 W., was discovered in 1930, then abandoned, and revived in 1946. During 1947, 12 new oil wells were completed in this pool. All produce from the Arbuckle dolomite. The **Dorr** pool, which lies in the eastern part of the county southwest of the Laton pool, received six additional oil wells during the year.

One new Kansas City-Lansing well was added to the **Westhusin** pool, a few miles west of the Dorr pool and mainly in T. 9 S., R. 17 W. During 1947, one new oil well was completed in the **Nyra** Pool.

The **Barry Southeast** pool was discovered in 1946 and received active attention during 1947. Twelve new oil wells were completed in the pool during the year. All produce from the Arbuckle dolomite between 1,408 and 1,423 feet below sea level. Around the periphery of the pool some dry holes which reached the dolomite at levels down to 1,576 feet below sea level were drilled. A deep dry hole, located in the NE¼ sec. 13, T. 9 S., R. 19 W., reached the Arbuckle at 3,560 feet; offset wells found the Arbuckle considerably shallower. A sink hole is suggested. Only one such dry hole now separates the main **Barry** pool from the Barry Southeast. The distance between producing wells is now only a little more than half a mile.

In the **Zurich** pool two deep dry holes were drilled in 1947. This pool lies about 4 miles south of the Vohs. The **Palco** pool, located about 7 miles west of the Zurich Townsite pool has two new oil wells, one in T. 9 S., R. 20 W. and the other in T. 10 S., R. 20 W. In the **Vohs** pool, which lies some 4 miles south of the Zurich Townsite, oil is produced from the Kansas City-Lansing. Here two new oil wells were completed during 1947. In these wells the Simpson is present above the Arbuckle dolomite. The southwestern township of the county fared somewhat better. Here three test holes in the **Marcotte** pool of which two found oil in the Arbuckle dolomite were drilled. The dry hole was drilled in the Shaw farm, sec. 21, T. 10 S., R. 20 W. Here Viola limestone was found at 3,762 feet, the Simpson formation at 3,803 feet, and the Arbuckle dolomite at 3,823 feet. The Arbuckle in this well was found approximately 100 feet lower than in the two producing wells.

A large number of wildcat tests were drilled in Rooks County during 1947. They line up along a trend reaching northwestward from the prolific Burnett pool. In the **Burnett** and **Burnett Northwest** pools three oil wells and five dry holes were completed on the Rooks County side of the line. Table 60 shows the ownership and location of all dry wildcat tests drilled in Rooks County during 1947. These tests and the oil pools are shown on Figure 41. The oil pools are listed in Table 59.

TABLE 60.—*Dry wildcat tests drilled in Rooks County during 1947*

Company and farm	Location	Depth to top of Lansing, feet	Depth to top of Arbuckle, feet	Total depth, feet
Veeder Supply & Development No. 1 Brobst	SE cor. SW¼ 16-6-19W	3,335		3,650
N. Appleman No. 1 Mathews	NW cor. SW¼ 29-7-19W	3,120	3,400	3,471
Stanolind O. & G. No. 1 Stamper	SE cor. NE¼ 6-8-17W	3,005	3,309	3,386
Phil-Han et al. No. 1 Veverka	SE cor. SE¼ 7-8-18W	3,116	3,405	3,415
Mallard & Westgate-Greenland No. 1 Ellis	NE cor. NE¼ 2-8-19W	3,018	3,350	3,390
Anderson-Prichard Oil Corp. No. 1 McCormick	NE cor. NW¼ 6-8-19W	3,104	3,368	3,425
M. B. Armer No. 1 Skenyon	Cen. W½ NE¼NE¼ 11-8-19W	3,049	3,389	3,420
Bird & Boreing No. 1 Talley	SE cor. NW¼ 18-8-19W	3,173	3,464	3,516
Lowell-Voltz, Inc., et al. No. 1 Radke	SW cor. NE¼ 13-8-20W	3,229	3,486	3,524
B. & R. Drlg. Co. No. 1 Roy	SW cor. NE¼ 14-8-20W	3,193	3,462	3,495
Bridgeport & Phillips No. 1 Meade "A"	SE cor. SW¼ 35-8-20W	3,303	3,650	3,678
Cities Service Oil Co. No. 1 Beisner	SW cor. SW¼ 25-9-16W	3,217	3,593	3,609
Herndon Drlg. Co. No. 1 Overholster	NW cor. NW¼ 31-9-16W	3,246	3,675	3,740
N. Appleman No. 1 Schrandt	SW cor. SE¼ 25-9-18W	3,328	3,640	3,678
Palmer Oil Corp. No. 1 Wickman	NE cor. SW¼ 4-10-17W	3,224	3,519	3,543
Palmer Oil Corp. No. 1 Henderson	SE cor. SE¼ 6-10-17W	3,302	3,687	3,737
Palmer Oil Corp. No. 1 Darland	NW¼ NE¼ NW¼ 11-10-17W	3,170	3,458	3,512
Cities Service Oil Co., et al. No. 1 Wise "B"	SE cor. SE¼ 19-10-18W	3,320	3,667	3,746
H. H. & B. Drlg. Co. et al. No. 1 Ordway "A"	NE¼ NW¼ NW¼ 21-10-18W	3,338	3,697	3,725
Aylward Production Co. No. 1 Shepard	SW cor. NE¼ 23-10-18W	3,365	did not reach	3,891
Sohio & Rine Drlg. Co. No. 1 Desbien	NE cor. NE¼ 12-10-20W	3,478	3,964	3,990

RUSH COUNTY

Historical background.—The first well in Rush County was drilled by the Danciger Oil Company during November 1928. Judging by former records this producing area was first called the LaCrosse gas field and later the Bison pool. The discovery well was located in sec. 27, T. 17 S., R. 17 W., and had an initial production of 13.2 million cubic feet of gas. Production came from the Pennsylvanian basal conglomerate at a depth of 3,573 feet. The Kansas Pipe Line and Gas Company produced 203,647 thousand cubic feet of gas from the well from April 1 to December 31, 1929. Production diminished and the pool was abandoned after a few years with a recorded total production through pipe lines of 524,000 thousand cubic feet of gas. There is no production in that area at the present time.

In March 1930, the discovery well of the Otis gas field was completed by the Milmac Oil Company (or Morgan and Flynn) in sec. 11, T. 18 S., R. 16 W. The initial production was 16.5 million cubic feet of gas per day from the Reagan sandstone at 3,507 feet. To the end of 1937 about 35 gas wells had been drilled in the Otis field, but meantime oil also had been found in the producing area. The first well to produce oil in the field was one

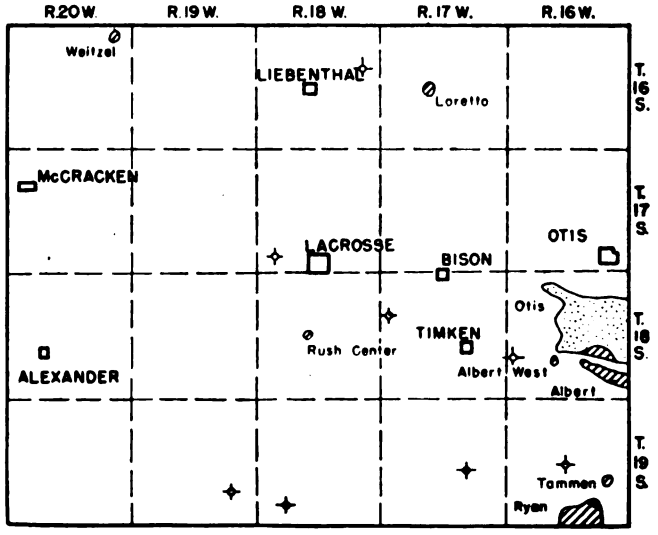

FIG. 42.—Map of Rush County showing oil and gas pools and dry wildcat tests drilled during 1947. (Gas, dots; oil, diagonal lines.)

drilled in 1934 by the Mid-Kansas Oil and Gas Company in sec. 10, T. 18 S., R. 16 W. The initial production of the well was 153 barrels of oil and 12 million cubic feet of gas per day. Production came from the Reagan sandstone. Since its discovery the Otis pool, including the area in both Barton and Rush Counties, has produced a cumulative total of 116,544,996 thousand cubic feet of gas and 3,276,671 barrels of oil.

The Winget pool, sec. 15, T. 16 S., R. 16 W., was discovered in 1936, but has been idle in recent years. Production was from the Kansas City-Lansing.

The next discoveries in Rush County were the Loretto and Ryan pools, opened in 1945. The latter has been a consistent producer.

Two other pools, the Ryan West and the Albert West, were discovered in 1946.

Although found first in Barton County, the Albert pool was about equally divided in area between Barton and Rush Counties until the Albert and Merten pools were combined in 1947.

Production of oil and gas in Rush County is fairly well divided between the Arbuckle dolomite and the Reagan sandstone.

Statistical summary for Rush County, 1947

Oil produced	496,428	barrels
Gas produced	2,237,925	thousand cubic feet
Wells drilled: Oil	14	
Gas	1	
Dry	19	
Total	34	
Wildcat wells	11	(included in above total)
New pools: Oil	3	
Revived pools	none	
Abandoned pool: Oil	1	
Secondary recovery operations	none	

Developments during 1947.—In Rush County oil activity during 1947 was somewhat more intensive than in recent years. Three of the 11 wildcat tests drilled were successful in finding new oil pools. One of the new pools, named the **Weitzel**, was discovered in the northwestern part of the county. The first well drilled in this pool was by Darby and Bothwell in sec. 1, T. 16 S., R. 20 W. The new pool lies about 4 miles south of the Penny-Wann pool of western Ellis County. Oil was found in a sandstone, probably the Gorham, within the Pennsylvanian basal conglomerate at a depth of 3,674 feet. Later the discovery well was plugged

back to a porous zone in the Kansas City-Lansing where it produced a commercial amount of oil.

Two other tests were drilled in the new pool before the close of the year. One of these (Phillips No. 1 Doerr), drilled into the Reagan sandstone, found that zone dry, and then was plugged back. After testing a number of porous zones in the Kansas City-Lansing, the well was finally completed in a zone between 3,415 and 3,424 feet. This horizon lies approximately 25 feet below the top of the Kansas City-Lansing limestone. Later a pumping potential of 400 barrels per day was assigned to the well. The other test was drilled into granite at a depth of 3,765 feet finding the Reagan, 14 feet thick, beneath the Pennsylvanian. No shows were found in any part of the section. The Weitzel pool will undoubtedly receive further attention during 1948.

The second pool to be discovered was called the **Rush Center**, sec. 16, T. 18 S., R. 18 W. It was found by the Great Lakes Carbon Corporation when their test on the Dirks ranch was completed in May. Oil was found in the Arbuckle dolomite between 3,836 and 3,851 feet. The initial potential of the new well was 122 barrels of oil per day. The second test on the Dirks lease found the Ar-

TABLE 61.—*Oil and gas pools of Rush County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
			barrels				
Albert	see Barton County						
Albert West 28-18-16W	1946	40	3,459	6,509	1	Reagan	3,628
Loretto 21-16-17W	1945	40	none	none	1	K.C.-Lans.	3,280
Otis 10-18-16W	1934	1,300	207,611	3,276,671	33	Reagan	3,527
Rush Center 16-18-18W	1947	40	4,065	4,065	1	Arbuckle	3,836
Ryan 35-19-16W	1945	1,200	166,186	573,446	37	Arbuckle	3,656
Ryan West 33-19-16W	1946	combined with Ryan					
Tammen 24-19-16W	1947	40	2,605	2,605	1	Arbuckle	3,661
Weitzel 1-16-20W	1947	80	9,362	9,362	2	Gorham	3,674
Winget 15-16-16W	1936	abandoned during 1947				K.C.-Lans.	3,243
			thousand cubic feet				
Otis (gas) 11-18-16W	1930	15,000	4,475,849	116,544,996	66	Neva Reagan	3,507
Ryan (gas) 36-19-16W	included with Pawnee Rock see Pawnee County						

buckle at 3,876 feet and was abandoned as a dry hole. One offset test drilled by the Republic Natural Gas Company found the Arbuckle at 3,852 feet. Another offset, also drilled by the same operator, found the Arbuckle at 3,859 feet. In all four tests the Arbuckle lies directly below the Pennsylvanian basal conglomerate.

The third new pool, the **Tammen,** is 1 mile north of the Ryan pool. Here the Solar Oil Company drilled a successful test on the Tammen farm in the SW cor. sec. 24, T. 19 S., R. 16 W. Oil was found in the Arbuckle dolomite between 3,661 and 3,666 feet. A swabbing test revealed a flow of 5 barrels of oil per hour. Some gas and a show of oil were found at 3,697 feet. The top of the Arbuckle was found at 3,659 feet.

Five dry holes were drilled in the **Albert** pool in the southeastern part of the county. In the **Ryan** pool, along the Pawnee County border, eight new oil wells and one gas well were completed in the part of the pool which lies in Rush County. The Ryan and **Ryan West** were combined during 1947 and the name of Ryan West was dropped.

Table 61 gives information concerning the oil and gas pools and Table 62 gives data regarding the dry wildcat tests drilled during 1947. The oil and gas pools and dry wildcat tests are shown on Figure 42.

TABLE 62.—*Dry wildcat tests drilled in Rush County during 1947*

Company and farm	Location	Depth to top of Lansing, feet	Depth to top of Arbuckle, feet	Total depth, feet
Iron Drlg. Co. No. 1 Herrman	NW cor. NW¼ 13-16-18W	3,310	3,568	3,579
Sohio & Lion No. 1 Wilson	NE cor. NE¼ 31-17-18W	3,484	3,895	3,929
L. H. Wentz No. 1 Rodie	SW cor. SW¼ 19-18-16W	3,315	3,643*	3,670
J. M. Huber Corp. et al. No. 1 Weichen	SE cor. SW¼ 7-18-17W	3,432	3,816	3,866
Ben F. Brack et al. No. 1 Hagerman	NW cor. NW¼ 22-19-16W	3,452	3,884	4,065
H. H. & B. Drlg. et al. No. 1 Bortz	SW¼ SE¼ NW¼ 23-19-17W	3,518	3,864	3,950
J. M. Huber Corp. & Wakefield No. 1 Ficken	NW cor. NE¼ 32-19-18W	3,640	4,055	4,095
Crown Oil Co. et al. No. 1 Josefiak	SE cor. NE¼ 26-19-19W	3,710	4,180	4,232

* Reagan

RUSSELL COUNTY

Historical background.—Russell County stands out prominently in the history of oil production in the State for it was here in 1923 that the first important "western Kansas" pool was found. The Valerius Oil and Gas Company drilled a test well in sec. 8, T. 12 S., R. 15 W. on an anticline which can be seen in the surface rocks. Anticlines had been found to contain oil in Oklahoma in such pools as the Cushing, and, therefore, this anticline was also believed to have possibilities. At that time there was no oil pool closer than Butler County, more than 100 miles away. The first well in the pool, to be called the Fairport, was drilled on the Oswald farm. For that reason the producing zone was given the name of "Oswald." The name has persisted to this day although it is now known that the "Oswald" zone or zones are layers of limestone within the 250-foot sequence of the Lansing, Kansas City, and Bronson beds. Later, it was found that nine such zones are productive in the Fairport pool. In recent years some oil has

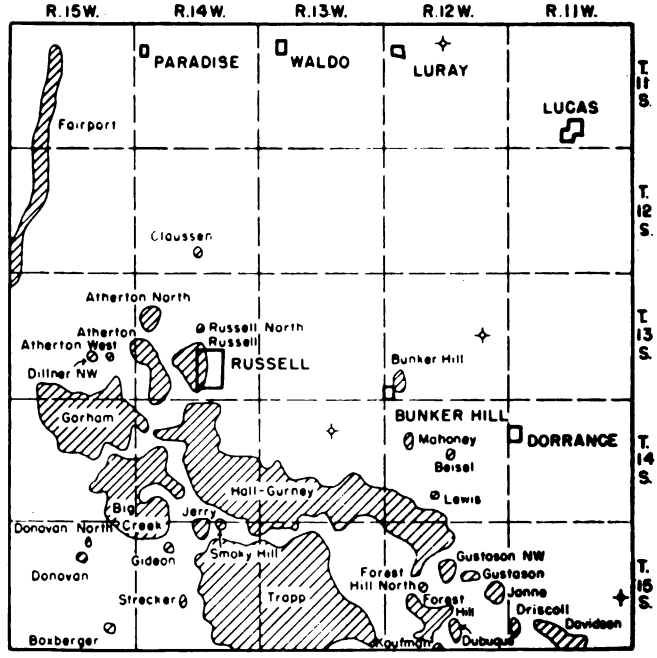

FIG. 43.—Map of Russell County showing oil pools and dry wildcat tests drilled during 1947. (Gas, dots; oil, diagonal lines.)

also been found in lower producing zones including the Arbuckle and the Reagan. The total oil produced in the Fairport pool has been slightly more than 19 million barrels.

Despite the good results obtained at Fairport, it was 3 years before oil operators became thoroughly interested in Russell County. In 1926, the Gorham pool was found, and in 1929 the Sellens and the Ochs pools were opened. After 1930, the search for oil was more intensive and new pools were found in rapid succession.

About 22 pools—most of them later abandoned—are said to have been found during 1935, 1936, and 1937. At present there are 32 pools in the county. Several are the result of merging two or more smaller units. Among the ones which have been thus enlarged are the Hall-Gurney and the Trapp pools. The first well in the former was drilled in 1931; now the pool has 660 wells.

An interesting feature of the Hall-Gurney pool is the large number of producing zones. The Wabaunsee, Topeka, and Oread limestones, and a number of zones in the Kansas City-Lansing produce oil. In addition, some oil comes from the Gorham sand and some from the Arbuckle dolomite. A few wells produce oil from crevices in the Pre-Cambrian granite. No other pool in the county has such a series of producing zones. Total production of oil from the Hall-Gurney pool has been almost 34 million barrels.

The large Trapp pool, which now covers more than 38,000 acres, was discovered in 1936. It has produced almost exclusively from the Arbuckle dolomite. A few Trapp wells derive their oil from the Kansas City-Lansing limestones and a still smaller number from limestone members in the Shawnee group. The number of wells in the pool is more than 1,200. The total production to date has been more than 95 million barrels, making this pool the most important in western Kansas. Its only rival is the ElDorado pool of Butler County which has produced about twice as much oil in its long history.

The Stanolind Oil and Gas Company has a secondary oil recovery operation in the Hall-Gurney pool that dates from 1947. It is reported that about 160 acres are under flood, and that a salt water drive is being established by pumping through one input well.

Statistical summary for Russell County, 1947

Oil produced	15,153,795	barrels
Gas produced	none	
Wells drilled: Oil	112	
Gas	1	
Dry	40	
Salt water disposal	8	
Total	161	
Wildcat wells	7	(included in above total)
New pools: Oil	3	
Revived or abandoned	none	
Secondary recovery operations	4	

Developments during 1947.—Russell County accounted for a large number of 1947 test holes. Seven wildcat tests were drilled, three of which were successful in finding new oil pools. The Harbar Drilling Company found oil in the Arbuckle dolomite when their first well on the Meier farm in sec. 20, T. 15 S., R. 12 W. was completed. The new producing area was called the **Forest Hill North** pool. It lies less than 1 mile northeast of the main Forest Hill pool. No other wells were completed in this new pool during the year.

The second new pool, named **Kaufman,** was discovered by Willis Hartman when he completed the first test on the Kaufman farm in sec. 33, T. 15 S., R. 12 W. The Dubuque pool lies 1 mile to the northeast; the Forest Hill pool 1 mile to the northwest; and the Beaver North pool less than 1 mile to the southeast. Oil was found in the Arbuckle dolomite from 3,311 to 3,318 feet.

A third new pool was found when Kissinger and Stearns completed the No. 1 "C" Billings test in sec. 27, T. 13 S., R. 15 W. Oil was found in the Arbuckle dolomite at 3,318 feet. The pool was named the **Dillner Northwest**.

In the older established pools of Russell County the greatest activity was centered in the Trapp and the Hall-Gurney pools. The **Trapp** pool occupies more than 30 square miles in T. 15 S., R. 13 W. and T. 15 S., R. 14 W. During 1947, 40 new oil wells were completed in various parts of this pool. Among them, 27 produce oil from the Arbuckle dolomite, 11 from the Kansas City-Lansing limestone, 1 from the Topeka limestone, and 1 from the Dodge limestone. The last named is a new producing zone in this pool. The first well to find oil in the Dodge was the No. 6 Anschutz test of the Sohio Petroleum Company in the SW¼ SE¼ NW¼ sec. 10, T. 15 S., R. 13 W. After drilling into the Arbuckle and finding it dry, this well was plugged back to 3,040 feet and per-

forated with 76 shots between 2,966 and 2,984 feet. The Dodge occurs at a depth of 2,974 feet. The well produced 55 barrels of oil per day.

A dry hole in the pool penetrated 268 feet of Arbuckle rocks before reaching the Pre-Cambrian granite. This well is the Gulf No. 16 Hoffman in sec. 31, T. 15 S., R. 13 W. Another dry hole, Sylva No. 8 in sec. 20, T. 15 S., R. 13 W., found an even greater thickness of the Arbuckle, but failed to reach the granite at a total depth of 3,513 feet. Quartzite was found beneath the Reagan sandstone in one test hole. This was in the Phil-Han Oil Company well in NE¼ NE¼ SE¼ sec. 22, T. 15 S., R. 14 W. where the Reagan is only 14 feet thick.

In the **Hall-Gurney** pool 34 new oil wells were completed during 1947. This pool extends a long distance from east to west and will probably merge with the Trapp at the latter's northern boundary in the near future. Among the new wells drilled in the Hall-Gurney pool, four produce oil from the Tarkio limestone, high in the Pennsylvanian System. One of the new wells produces oil from the Topeka limestone. Two produce from the Gorham sand at the base of the Pennsylvanian System. The Kansas City-Lansing limestone yields oil in 22 of the new wells, and the Arbuckle dolomite supplies oil in the remaining five.

Considerable excitement was created when Alva Billings found oil unexpectedly at 1,980 feet in his No. 3 well on the Dumler lease in a zone which seems to correspond to the Indian Cave sandstone. The No. 1 Dumler on the same lease produces from the Kansas City-Lansing limestone and the No. 2 Dumler produces from the Tarkio limestone. The No. 3 well was later drilled into the Tarkio limestone from 2,270 to 2,281 feet. It was completed for a daily potential of 170 barrels from the Tarkio.

In the oldest pool in the county, the **Fairport,** an additional six oil wells were completed in 1947. Most of these new wells obtain their oil from the Arbuckle dolomite. One, however, produces from the Kansas City-Lansing limestone and one from the Gorham sand. In the **Atherton** pool six new oil wells were completed. In the old **Gorham** pool, which lies in the southern part of the county, three new oil wells were added. Of the 12 new oil wells in the Big Creek pool eight are in the Kansas City-Lansing, three in the Arbuckle, and one in the Reagan.

TABLE 63.—*Oil pools of Russell County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production bbls.	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
Atherton 30-13-14W	1935	1,900	119,458	1,998,628	32	Arbuckle	3,284
Atherton North 7-13-14W	1945	80	14,257	43,172	2	Arbuckle	3,195
Atherton West 23-13-15W	1945	40	none	629	1	K.C.-Lans.	3,269
Beisel 15-14-12W	1944	40	4,529	11,909	1	Arbuckle	3,266
Big Creek 36-14-15W	1935	6,800	761,404	9,568,819	142	K.C.-Lans. Gorham Arbuckle	2,908 3,152 3,171
Boxberger 36-15-15W	1935	160	5,009	197,094	3	K.C.-Lans.	3,147
Bunker Hill 31-13-12W	1935	200	none	74,828	1	K.C.-Lans.	2,965
Claussen 27-12-14W	1944	40	2,285	6,892	1	K.C.-Lans.	2,855
Davidson		see Barton County					
Dillner Northwest 27-13-15W	1947	40	none	none	1	Arbuckle	3,318
Donovan 10-15-15W	1935	200	13,663	169,173	3	K.C.-Lans.	3,193
Donovan North 3-15-15W	1945	40	none	none	1	Arbuckle	3,216
Driscoll 30-15-11W	1940	160	none	65,007	1	Arbuckle	3,255
Dubuque 34-15-12W	1935	700	43,775	476,835	6	K.C.-Lans. Arbuckle	3,275 3,330
Fairport 8-12-15W	1923	3,600	724,295	19,264,990	156	K.C.-Lans. Gorham Arbuckle Reagan	2,950 3,211 3,312 3,350
Forest Hill 29-15-12W	1941	1,000	419,777	1,277,202	36	K.C. Shawnee Arbuckle	2,918 2,560 3,320
Forest Hill North 20-15-12W	1947	40	none	none	1	Arbuckle	3,270
Gideon 8-15-14W	1930	40	669	49,834	1	Soqy	3,266
Gorham 32-13-15W	1926	9,000	1,862,481	32,816,546	267	Shawnee Arbuckle Reagan	2,765 3,289 3,299
Gustason 14-15-12W	1941	160	11,260	97,570	3	K.C.-Lans.	3,050
Gustason N'thwest 15-15-12W	1943	500	57,342	238,987	10	K.C.-Lans. Arbuckle	3,021 3,322
Hall-Gurney 30-14-13W	1931	29,000	3,386,651	33,919,716	660	Indian Cave Wabaunsee Topeka Oread K.C.-Lans. Gorham Arbuckle Pre-Cambrian	1,985 2,400 2,675 2,813 2,985 3,165 3,192 3,156
Janne 24-15-12W	1943	320	14,267	86,457	6	K.C.-Lans. Arbuckle	3,319
Jerry 4-15-14W	1942	320	3,757	42,512	1 1 1	Wabaunsee K.C.-Lans. Arbuckle	2,985
Kaufman 33-15-12W	1947	40	2,416	2,416	1	Arbuckle	3,311
Lewis 28-14-12W	1940	40	418	12,753	1	Wabaunsee	2,317

Mahoney 8-14-12W	1940	40	none	44,489	1	K.C.-Lans.	2,977
Russell 22-13-14W	1934	1,500	521,677	7,567,732	63	K.C.-Lans. Arbuckle	3,195 3,280
Russell North 15-13-14W	1942	40	none	21,103	1	K.C.-Lans.	2,978
Smoky Hill 2-15-14W	1938			124,429	5	K.C.-Lans.	2,950
Strecker 21-15-14W	1943	80	4,405	34,470	2	Arbuckle	3,342
Trapp 23-15-14W	1936	38,000	11,326,520	95,260,320	1,232	Shawnee Dodge K.C.-Lans. Arbuckle	2,889 2,966 3,062 3,252

In the southeastern part of Russell County, one new gas well was completed in the **Gustason** pool. It was drilled by Stearns Drilling Company on the Kaufman farm in sec. 14, T. 15 S., R. 12 W. It was given an initial capacity of 11 million cubic feet per day. The producing zone is the Kansas City-Lansing limestone. Gas wells are rare in Russell County. In fact, the writers do not know of any other producing gas well in the county.

In the **Forest Hill** pool five additional producers, four in the Arbuckle and one in the Kansas City-Lansing, were completed during 1947. In this pool quartzite was found in one well beneath 79 feet of the Arbuckle dolomite (Gore No. 1 Kluesner in sec. 28, T. 15 S., R. 12 W.) Quartzite was also found in one dry hole in the **Davidson** pool in the Herndon Drilling Company No. 1 Phillips well located in sec. 34, T. 15 S., R. 11 W. These wells are approximately 7 miles apart.

The oil pools of Russell County and dry wildcat tests drilled during 1947 are shown on Figure 43. The pools are listed in Table 63 and the wildcat tests in Table 64.

TABLE 64.—*Dry wildcat tests drilled in Russell County during 1947*

Company and farm	Location	Depth to top of Lansing, feet	Depth to top of Arbuckle, feet	Total depth, feet
Dutton & Briggs No. 1 Steinle	SE cor. SE¼ 4-11-12W	2,938	did not reach	3,142
El Capitan Oil Co., Inc. No. 1 Hoke	SE cor. SE¼ 14-13-12W	2,968	did not reach	3,251
Brunson Drlg. Co. et al. No. 1 Boller	NE cor. SW¼ 10-14-13W	3,020	3,367	3,400
Musgrove Pet. Corp. et al. No. 1 Hock	SW cor. NE¼ 24-15-11W	3,000	3,340	3,390

SALINE COUNTY

Historical background.—The first oil production in Saline County was supplied by a well drilled by the Dixie Oil Company, now Stanolind, on the Olsson farm in sec. 10, T. 16 S., R. 3 W. The well was completed in December 1929 producing only 10 barrels per day. The well was abandoned a year later, in December 1930, but it nevertheless served as the pool opener. The Arbuckle was dry, but production was found in a cherty dolomite near the base of the Maquoketa, according to the old record.

Drilling was continued without productive results for a dozen years before another pool that is producing at the present time was discovered. Three pools—Salina, Hunter, and Pliny—were discovered in 1943. Another, the Mentor, was found in 1944, and the Salina South was discovered in 1946. In this county the Arbuckle has been disappointing. Oil has been found mainly in the Viola.

Statistical summary for Saline County, 1947

Oil produced	336,161	barrels
Gas produced	none	
Wells drilled: Oil	13	
Gas	none	
Dry	10	
Total	23	
Wildcat wells	4	(included in above total)
New or revived pools	none	
Abandoned pool: Oil	1	
Secondary recovery operations	none	

Developments during 1947.—Of the 23 test wells drilled in the county during the year, 13 were oil wells. Four of the 10 dry holes were wildcats. No new pools were found.

Eight of the new oil wells were drilled in the **Salina** pool. All produce from the Viola limestone between 1,955 and 1,975 feet be-

TABLE 65.—*Oil pools of Saline County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production bbls.	Cumulative production to end of 1947, bbls.	Producing wells	Producing zone	Depth to producing zone, feet
Hunter 20-16-1W	1943	850	124,357	691,467	19	"Chat"	2,681
Mentor 13-15-3W	1944	40	2,476	6,716	1	Viola	3,258
Olsson 10-16-3W	1929	160	13,851	64,266	3	Viola	3,303
Pliny 9-16-1W	1943	abandoned during 1947				K.C.-Lans.	1,989
Salina 30-14-2W	1943	800	170,393	387,128	22	Viola	3,223
Salina South 32-14-2W	1946	300	25,084	29,174	7	Viola	3,246

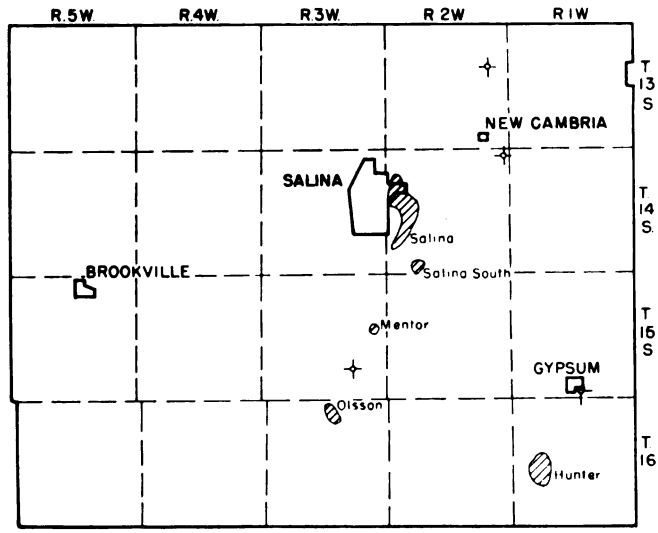

FIG. 44.—Map of Saline County showing oil pools and dry wildcat tests drilled during 1947.

low sea level. In one dry hole drilled on the east side of the pool the Viola was found at 3,243 feet which makes the location slightly higher structurally than the producing wells in the field. In this well the Viola group of rocks had a thickness of 204 feet. Another dry hole in sec. 21, about 1 mile farther east, found the Viola at a depth of 3,230 feet. In this test the Viola was only 81 feet thick.

In the **Salina South** pool five new oil wells were completed. The producing zone in the Viola ranges from 1,969 to 1,974 feet below sea level.

One test was drilled near the **Olsson** pool in the south-central part of the county. Although drilled beyond the Viola to test the Arbuckle dolomite, no oil was found.

Among the wildcat wells, one was drilled by the Lowell Drilling Company on the Maneval farm in sec. 12, T. 13 S., R. 2 W. This test, at an elevation of 1,258 feet, found the Mississippian at 2,579 feet, the Kinderhookian at 2,720 feet, the Viola at 3,195 feet, and the Simpson at 3,289 feet. The total depth was 3,359 feet. Another wildcat test was drilled about 6 miles east of the Salina pool. It was the No. 1 Stauffer test drilled by H. H. Meyer in sec. 1, T. 14 S., R. 2 W. Here the Kansas City-Lansing was found at 1,935 feet, the Mississippian at 2,580 feet, the "Hunton" at 2,980

TABLE 66.—*Dry wildcat tests drilled in Saline County during 1947*

Company and farm	Location	Surface Elevation	Depth to top of Miss., feet	Depth to top of "Hunton," feet	Depth to top of Viola, feet	Depth to top of Arbuckle, feet	Total depth, feet
Lowell Drlg. Co. et al. No. 1 Maneval	SW cor. SW¼ 12-13-2W	1,258	2,579	3,155	3,195		3,359
Central States & H. H. Meyer, No. 1 Stauffer	Cen. N½ NE¼ NE ¼ 1-14-2W	1,193	2,580 1,935*	2,980	3,180	3,235	3,406
R. J. Wilson No. 1 Garber	SE cor. SW¼ 34-15-1W	1,231	2,605	did not reach	did not reach	did not reach	2,700
Lowell Drlg. Co. No. 1 Miller	SE cor. NW¼ 26-15-3W	1,268	2,747	3,172	3,264	3,483	3,525

* Lansing

feet, and the Viola at 3,180 feet. The test was abandoned as a dry hole at a total depth of 3,408 feet. The elevation of the well is 1,193 feet above sea level. The dry wildcat tests drilled during 1947 are listed in Table 66 and shown on Figure 44. The oil pools are shown on Figure 44 and listed in Table 65.

SCOTT COUNTY

Historical background.—The first production in Scott County was in January 1935 when the Atlantic Oil Producing Company completed a well on the Vaniman farm in sec. 15, T. 20 S., R. 33 W. with an initial production of 600 barrels per day. The record is not clear as to whether this well was completed in December 1934 or January 1935, but, at any event, it was an important well for the county. Oil of 26° gravity was found at a depth of 4,660 feet, according to the record, in the "Mississippi lime." Other wells were soon drilled in the new producing area which was named the Shallow Water pool. Later, the Shallow Water Refining Company built a 1,500-barrel refinery to treat the crude.

At present there are a dozen wells in the pool, which from its discovery to the end of 1947 had produced a total of 1,632,452 barrels of oil.

Oil production totaled 79,892 barrels; no gas production was reported. No new wells were drilled.

Production and developments during 1947.—Two old wells in the **Shallow Water** pool were worked over. One of these was declared dry and abandoned; the other was given an initial produc-

tion of 15 barrels of oil per day. The pool contains 10 wells which produce from the Ste. Genevieve at a depth of about 4,670 feet.

SEDGWICK COUNTY

Historical background.—Following the series of sensational oil discoveries in adjacent Butler County, which began in 1914, many test wells were drilled in various parts of Sedgwick County. None of these was fortunate enough to find the hoped for large deposits. The first successful test was the one which found the Valley Center pool in August 1928. This pool now has an area of 1,500 acres and has produced about 21 million barrels of oil. On a per acre basis this pool, therefore, ranks with the best in the western part of the State. The good results obtained at Valley Center resulted in much wildcatting and the discovery of the Goodrich pool in the same year, 1928. The Greenwich, the Eastborough, the Cross, and the Robbins pools date from 1929. Three of these—the Valley Center, Greenwich, and Eastborough—have

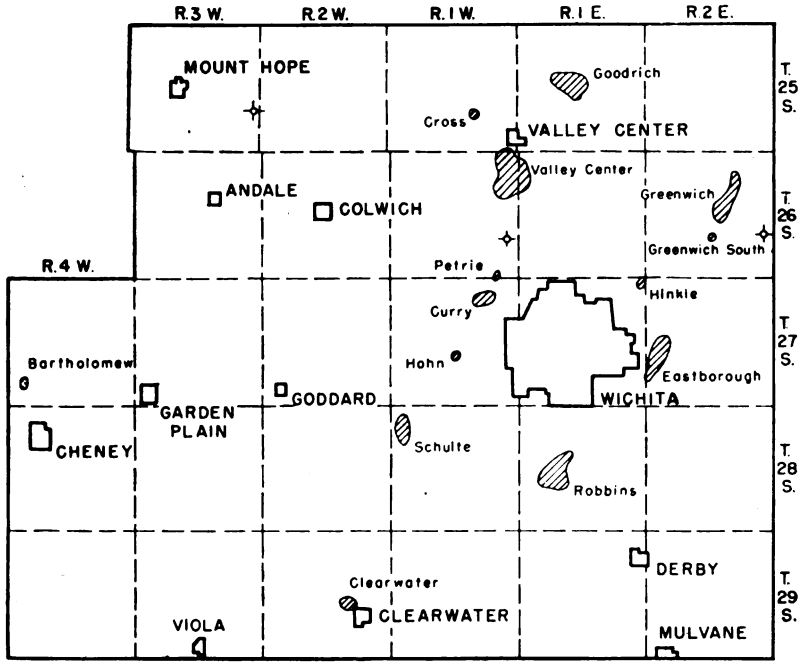

FIG. 45.—Map of Sedgwick County showing oil and gas pools and dry wildcat tests drilled during 1947. (Gas, dots; oil, diagonal lines.)

proved to constitute the largest underground reservoirs in the county. Although other pools were found subsequently, none has proved to approach these three in importance.

The search for oil slackened after 1935, but was revived in 1944 when the Clearwater pool was found. In 1947, the old Curry pool, originally discovered in October 1929, was revived by a well which obtains its production from the Kansas City-Lansing limestone.

One secondary oil recovery operation was started by the Solar Oil Company in 1941. Another was begun by the Magnolia Petroleum Company in the Robbins pool in 1943. Information on the former is not at hand. Table 8 summarizes secondary oil recovery operations.

Statistical summary for Sedgwick County, 1947

Oil produced	629,619 barrels	
Gas produced	none	
Wells drilled: Oil	7	
Gas	1	
Dry	15	
Salt water disposal	1	
Total	24	
Wildcat wells	5	(included in above total)
New pools	none	
Revived pools: Oil	2	
Abandoned pools: Oil	2	
Secondary recovery operations	2	

Developments during 1947.—Sedgwick County saw a revival of interest during 1947. Twenty-four test wells were drilled, 7 of which were new oil wells, 1 was a gas well, and 15 were dry holes. Two wildcat tests succeeded in finding new oil pools. The old **Curry** pool, which was discovered in October 1929 and abandoned in February 1931 after producing 25,151 barrels of oil from the Simpson, was revived. The usually limy Viola is dolomitic here. In 1947, the Drillers Gas Company made another attempt to find oil in this vicinity. Late in the year their No. 1 Rombach well was completed as a producer when oil was found in the Kansas City-Lansing limestone, the top of which was found at 2,594 feet. The casing was perforated between 2,715 and 2,720 feet where the well swabbed 5 barrels per day. After acid had been applied, the well was rated as having a daily capacity of 72 barrels. The discovery well was located in the Cen. NL NW¼ NE¼ sec. 11, T. 27 S., R. 1 W. The pool will be called Curry inasmuch as the original Curry well was located in sec. 2 just north of the new well.

Another pool, named **Schulte**, was revived when the Aladdin Oil Corporation completed the first successful well on the Dugan

lease in sec. 7, T. 28 S., R. 1 W., approximately 10 miles southwest of Wichita. Here the Simpson sandstone was found productive at 3,658 feet. After complete tests were made for production the well received a rating of 2,955 barrels of oil per day. Considerable gas was found in the Mississippian. Nine offset tests were drilled before the close of the year. Five of these produce oil and one produces gas. Three of the new offsets produce oil from the Simpson formation while the other two secure their oil from the Mississippian chert. In the No. 2 well drilled on the Dugan lease, the Simpson sandstone was found 8 feet lower than in the discovery well. This small structural difference seemingly was enough to prevent production from the Simpson. The well was then plugged back to a good showing 29 feet below the top of the

TABLE 67.—*Oil and gas pools of Sedgwick County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production bbls.	Cumulative production to end of 1947, bbls.	Producing wells	Producing zone	Depth to producing zone, feet
Clearwater 22-29-2W	1944	300	14,526	59,666	5	K.C.-Lans.	2,913
Cross 29-25-1W	1929	160	2,753	69,693	2	K.C.-Lans.	2,690
Curry* 11-27-1W	1947	80	806	806	2	K.C.-Lans.	2,715
Eastborough 19-27-2E	1929	1,000		8,538,252	28	"Chat" Viola	2,956 3,238
Eastborough North 8-27-2E	1938	abandoned during 1947				Viola	3,258
Goodrich 16-25-1E	1928	780	136,509	4,207,469	29	K.C.-Lans. "Chat" Kinderhookian Arbuckle	2,614 3,010 3,334 3,339
Greenwich 14-26-2E	1929	700	212,010	10,556,175	34	"Chat" Viola	2,885 3,321
Greenwich South 22-26-2E	1945	80	632	9,232	1	"Chat"	2,896
Hinkle 1-27-1E	1946	80	3,322	9,092	2	"Burgess"	2,980
Hohn 22-27-1W	1945	40	2,067	6,414	1	K.C.-Lans.	2,779
Oatville 18-28-1E	1937	abandoned during 1947				Simpson	3,489
Petrie 36-26-1W	1945	40	12,986	27,521	1	Viola	3,387
Robbins 20-28-1E	1929	640	58,251	3,361,856	48	"Mississippi lime"	3,090
Schulte* 7-28-1W	1947	250	41,203	41,203	6	Mississippian Simpson	3,349 3,658
Valley Center 1-26-1W	1928	1,500	144,554	21,523,934	52	K.C.-Lans. Kinderhookian Viola	2,860 3,380 3,366
Bartholomew (gas) 30-27-4W	1946	40	none	none	1	"Mississippi lime"	3,732
Derby (gas) 32-28-2E	1937	1,800	**		1	Stalnaker K.C.-Lans.	2,215 2,228

* Old name revived.
** Pool no longer productive; used for gas storage only.

Mississippian. Here enough oil came into the hole to allow a rating of 532 barrels of oil per day. The No. 2 Woolf well in the NW¼ SW¼ NE¼ sec. 7 also tested the Simpson sandstone. At a depth of 3,674 feet, it proved to be too low for production. Gas was found later at a point about 6 feet below the top of the Mississippian. The initial production was 2 million cubic feet of gas per day. The Simpson sandstone in the producing wells ranges from 2,320 to 2,323 feet below sea level.

In the **Cross** pool Shawver and Graham drilled a successful well on the Underwood lease in sec. 26, T. 25 S., R. 1 W. It produces from the Kansas City-Lansing limestone at 2,727 feet, about 50 feet below the top of that group.

The oil and gas pools are shown on Figure 45 and information regarding them is tabulated in Table 67.

SEWARD COUNTY

Historical background.—The first well that drew attention in what has become the important Hugoton gas field in Kansas was drilled in Seward County. Actually it is in the Liberal gas field rather than in the Hugoton field proper. The well was drilled in 1922 by the Defenders and Traders Gas Company on the Boles lease in sec. 3, T. 35 S., R. 34 W., about 5 miles west of Liberal. It was rated at 5 million cubic feet of gas per day.

Production in what is now the Hugoton field proper began 5 years later when a well was drilled in Stevens County. The Liberal gas field has never been joined to the Hugoton, but it is reasonable to suppose that sometime it may be.

In the northwest part of Seward County 24 gas wells have been drilled, mainly in recent years, as a part of the east fringe of the Hugoton field.

The Hugoton field is discussed fully under Finney County. All drilling is shown on Figure 18.

Statistical summary for Seward County, 1947

Oil produced	5,905	barrels
Gas produced	1,049,363	thousand cubic feet (exclusive of Hugoton field production)
Wells drilled: Gas	19	
Total	19	
Wildcat well	1	(included in above total)
New pool: Gas	1	
Revived pool: Gas	1	
Abandoned pools	none	
Secondary recovery operations	none	

Developments during 1947.—Seward County lies partly within the Hugoton gas field. A total of 19 test wells were drilled during the year in search for oil and gas.

Thirteen new gas wells were completed in T. 32 S., R. 34 W. and three in T. 31 S., R 34 W. The new wells range from 3 to 28 million cubic feet of gas per day in initial capacity; 16 of the wells are located in what is now the southeastern edge of the Hugoton field. It is possible that the field may be limited on the southeast by a deep dry hole drilled in sec. 14, T. 33 S., R. 33 W. This hole was drilled in 1927. It is entirely possible, however, that present-day methods and techniques of bringing in gas wells in the Hugoton field would have saved this well.

Two deep tests were drilled by the Stanolind Oil and Gas Company near the Oklahoma line in T. 35 S., R. 33 W., about 3 miles southeast of Liberal. The first of these wells, completed January 3, 1947, was drilled on the Feathers lease in sec. 15, T. 35 S., R. 33 W. The elevation of the well is 2,823 feet. Samples from this test were examined by the Kansas Well Log Service. According to their report the Hollenberg limestone was found at 2,599 feet, the Herington limestone at 2,630 feet, and the top of the Lansing at 4,419 feet. The basal Pennsylvanian sandstone, composed of poorly sorted angular grains of sand with phosphatic fossil fragments and traces of glauconite, was found at 6,160 feet. At 6,200 feet the Mississippian limestones were identified. They are extremely cherty between 7,430 and 7,660 feet, and sandstone between 7,830 and 7,834 feet may be the equivalent to the "Misener." Cherty dolomites of the Viola group fill the interval between 7,834 and 7,945 feet where the coarsely crystalline basal member of the Viola was found. The Simpson here consists almost entirely of sandstone with phosphatic material imbedded. It extends from 7,965 to 8,004 feet where the top of the Arbuckle dolomite was encountered. The hole was finished in the Arbuckle at a total depth of 8,243 feet.

The porous zones in this well were intensively tested to see if any of them would produce commercial quantities of oil or gas. Some free oil was found at 7,845 feet in the upper part of the Viola. At 7,872 and 8,108 feet only salt water came into the hole. Later the test was plugged back to 6,206 feet to test the basal Pennsylvanian sandstone mentioned above. A final production test there showed that the sand was capable of producing 5 mil-

TABLE 68.—*Oil and gas pools of Seward County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production	Cumulative prduction to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
			barrels				
Liberal Southeast 15-35-33W	1947	160	5,905	5,905	1	Penn Sand	6,202
			thousand cubic feet				
Hugoton			see Finney County				
Liberal*	1947	300	392,762	392,762	7	Permian	2,800±
Liberal Southeast 15-35-33W	1947	160	656,601	656,601	1	Penn Sand.	6,202

* Old name revived.

lion cubic feet of gas per day. This well is the discovery well of the **Liberal Southeast** pool.

To test the capacity of this same sand, another test was drilled on the Matkin farm 1 mile east of the Feathers well, sec. 14, T. 35 S., R. 33 W. Here the Kansas City-Lansing limestone was found at 4,370 feet and the Pennsylvanian basal sandstone at 6,085 feet. The sandstone was glauconitic and phosphatic, and showed slight oil stains. The top of the Mississippian limestone was found at 6,143 feet. The total depth was 6,238 feet. The final production test shows that the basal Pennsylvanian sand was capable of yielding 12 million cubic feet of gas per day.

Another well completed in April 1947 but not reported until 1948 was drilled by Ted R. Lofland in sec. 15, T. 35 S., R. 32 W., about 10 miles southeast of Liberal and 6 miles east of the new Liberal Southeast pool. It is probable that this represents an extension of the Liberal Southeast pool inasmuch as it found production at about the same structural horizon, in the basal part of the Pennsylvanian. An initial potential of 33 million cubic feet (estimated) per day was assigned to the new well which found gas between 6,113 and 6,126 feet.

Table 68 gives oil and gas production figures for Seward County. The production of the Hugoton field is given under Finney County. The location of all wells in Seward County is shown on Figure 18.

SHERIDAN COUNTY

Historical background.—The first hole was drilled in Sheridan County in 1932 when Flo et al. made a test in sec. 27, T. 7 S., R. 26 W. The well was drilled to total depth of 4,540 feet. A show

of gas occurred at 3,625 feet, but the hole was declared dry. The next test was drilled in sec. 34, T. 9 S., R. 26 W. by Otis Roberts in 1936 and completed in February of the following year. It, also, was a dry hole.

The Studley pool was discovered in 1943 when the Union Oil Company of California completed their No. 1 Pratt test in sec. 23, T. 8 S., R. 26 W. The well was given an initial potential of 689 barrels of oil from the Arbuckle at a depth of 4,313 feet.

The Adell pool was discovered the following year. The pool opener was the Continental Oil Company Cramer well located in sec. 11, T. 6 S., R. 27 W. This well found production in the Kansas City-Lansing between 3,755 and 3,765 feet.

The Studley Southwest pool was discovered in 1945 by the Continental and Cities Service test well in sec. 32, T. 8 S., R. 26 W. Production was found in this well in the Kansas City-Lansing between 3,758 and 3,773 feet. An initial production of 280 barrels per day was assigned to this well. The three pools mentioned are

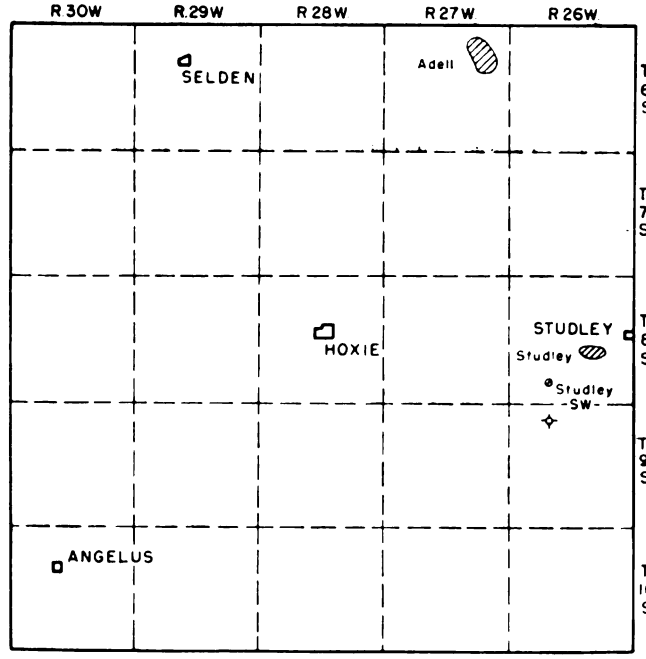

FIG. 46.—Map of Sheridan County showing oil pools and the dry wildcat test drilled during 1947.

all that are producing in Sheridan County at the present time, although it is an area in which there has been considerable recent wildcat drilling.

Statistical summary for Sheridan County, 1947

Oil produced	371,187	barrels
Gas produced	none	
Wells drilled: Oil	13	
Gas	none	
Dry	4	
Total	17	
Wildcat wells	1	(included in above total)
New, revived, or abandoned pools	none	
Secondary recovery operations	none	

Developments during 1947.—Seventeen test holes were drilled in the county during the year; 13 were new oil wells and 4 were dry holes. All the new producers were drilled in the **Adell** pool. Here the Kansas City-Lansing, which is the producing zone, is found about 950 to 975 feet below sea level corresponding to a total depth of 3,500 to 3,600 feet. The principal producing zone seems to lie about 100 feet below the top of the Kansas City-Lansing.

The wells with high structural locations produce 500 to 1,000 barrels of oil per day. One well, the No. 4 Foster, in sec. 2, T. 6 S., R. 27 W., found the Kansas City-Lansing at 3,602 feet. From an elevation of 2,595 feet, the well was drilled into the Arbuckle which was reached at a depth of 4,055 feet. The hole was finally completed as a small well in a zone between 3,748 and 3,772 feet, about 150 feet below the top of the Kansas City-Lansing.

A dry wildcat well was drilled by Royer-Farris, sec. 5, T. 9 S., R. 26 W. At an elevation of 2,617 feet, this test reached the top of the anhydrite at 2,209 feet, the Heebner at 3,723 feet, and the Kansas City-Lansing at 3,763 feet. Small shows of oil were recorded from 3,777 to 3,782 feet, from 3,807 to 3,812 feet, from 3,815 to 3,821 feet, and from 3,839 to 3,844 feet. The Arbuckle was not tested.

TABLE 69.—*Oil pools of Sheridan County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production bbls.	Cumulative production to end of 1947, bbls.	Producing wells	Producing zone	Depth to producing zone, feet
Adell 11-6-27W	1944	1,000	339,729	753,709	36	K.C.-Lans.	3,755
Studley 23-8-26W	1943	300	23,066	228,141	6	K.C.-Lans.	3,810
Studley Southwest 32-8-26W	1945	40	8,392	20,132	1	K.C.-Lans.	3,758

The oil pools of Sheridan County are listed in Table 69. These pools and the dry wildcat well drilled during 1947 are shown on Figure 46.

STAFFORD COUNTY

Historical background.—The first pool found in Stafford County, the Richardson in sec. 36, T. 22 S., R. 12 W., was opened by the Mid-West Exploration Company in September 1930. The Richardson pool, which is still active, has produced more than 8 million barrels of oil since its discovery. In 1933, the Gates pool, second to be discovered, was opened by the Atlantic Refining Company as a result of much geophysical investigation.

Pools were discovered in rather rapid succession after 1933. The Neola pool was discovered in March 1934, the St. John in 1935, and two pools—the Snider and Jordan—in 1936. Four additional pools were added in 1937—the Drach, Sittner, Kipp, and Zenith. The Zenith pool, together with its extensions in adjoining Reno County, covers about 16,000 acres and has produced more than 33 million barrels of oil.

Most of the oil of Stafford County has come from the Arbuckle although the Viola, Kansas City-Lansing limestone, and the Simpson sandstone each has supplied oil in more than one pool. A sandstone of Kinderhookian age produces in the Farmington pool.

Four companies have about 900 acres under secondary recovery operation in Stafford County. The Texas Company, which started recovery work in 1945, is the largest operator with three projects in the Zenith pool. Other secondary recovery operations, mainly in the Zenith pool, began in 1946. The secondary recovery operations in the State are summarized in Table 8.

Statistical summary for Stafford County, 1947

Oil produced	5,340,888	barrels
Gas produced	1,154,593	thousand cubic feet
Wells drilled: Oil	34	
Gas	2	
Dry	48	
Total	84	
Wildcat wells	15	(included in above total)
New pools: Oil	5	
Gas	1	
Revived: Gas	1	
Abandoned pools	none	
Secondary recovery operations	7	

Developments during 1947.—Drilling activity in Stafford County during 1947 was great. Six of the 15 wildcat tests were successful in finding new oil or gas pools.

Of the 84 tests, 34 were new oil wells, 2 were new gas wells, and 48 were dry holes. The percentage of dry holes was quite high.

One of the new oil pools was the **Sandago** found by the Sohio Petroleum Company when the first well on the Schrepel lease was completed in sec. 12, T. 21 S., R. 12 W. It found oil in the Arbuckle dolomite at 3,480 feet. The well was given an initial production of 363 barrels of oil per day. Shortly after the completion of this hole, an offset drilled by the Magnolia Petroleum Company on the Schlochtermeyer lease, tested the Arbuckle with unfavorable results. This well was then plugged back to produce from one of the porous zones of the Kansas City-Lansing limestone. Owing to this development, the Sohio Petroleum Company plugged back the discovery well also in the Kansas City-Lansing. It was recompleted in the Kansas City-Lansing with a potential capacity of 186 barrels per day.

Before the close of the year 5 offset wells were completed around the discovery well. Three dry holes were also completed to set temporary limits to the new pool. The Arbuckle in the new producers ranges from 1,636 to 1,684 feet below sea level, a rather large differential. One of the dry holes, the No. 1 "C" Schlochtermeyer, ended in the Simpson formation at a total depth of 3,743 feet and thus did not test the Arbuckle. This hole was tested thoroughly in a number of porous zones in the Kansas City-Lansing and found that group to be unproductive.

The second pool found during 1947, the **Pundsack** in sec. 19, T. 21 S., R. 13 W., was opened by the Stanolind Oil and Gas Company who found oil in the Arbuckle dolomite at 3,735 feet. The well was rated at 89 barrels of oil per day. The porous zone, 6 feet thick, was found 2 feet below the top of the Arbuckle. No offset tests were drilled during 1947.

The new **Heyen West** pool was discovered in sec. 23, T. 22 S., R. 12 W. by the Musgrove Petroleum Corporation when a test on the Lanterman farm was successfully completed. The top of the producing zone, the Arbuckle, was reached at 3,675 feet. The potential capacity of the new well is 1,842 barrels of oil per day. In the discovery well 46 feet of the Viola and 50 feet of the Simpson formation were found above the Arbuckle dolomite. These

thicknesses are rather common throughout central Stafford County.

The new **Kenilworth** pool lies in T. 22 S., R. 13 W. about 1 mile west of the Drach West pool and 2 miles west of the Drach pool. It was found by the E. H. Adair Oil Company who drilled the first successful well on the Howard farm in sec. 15. This well was drilled into the Arbuckle dolomite which was found at 3,797 feet, but failed to find sufficient oil at that level. It was then plugged back to one of the porous zones in the thick Pennsylvanian limestone sequence. The best zone was found between 3,505 and 3,511 feet, about 120 feet below the top of the Kansas City-Lansing limestone. At this level the well was rated at 307 barrels of oil per day. The top of the Viola was logged at 3,682 feet. The Simpson is 59 feet thick. Before the close of the year, two other oil wells had been completed as offsets to the discovery well. They found the Arbuckle at 1,897 and 1,916 feet below sea level. Two of the wells produce from the Kansas City-Lansing, and one from the Arbuckle dolomite. One dry hole offsets the discovery well on the

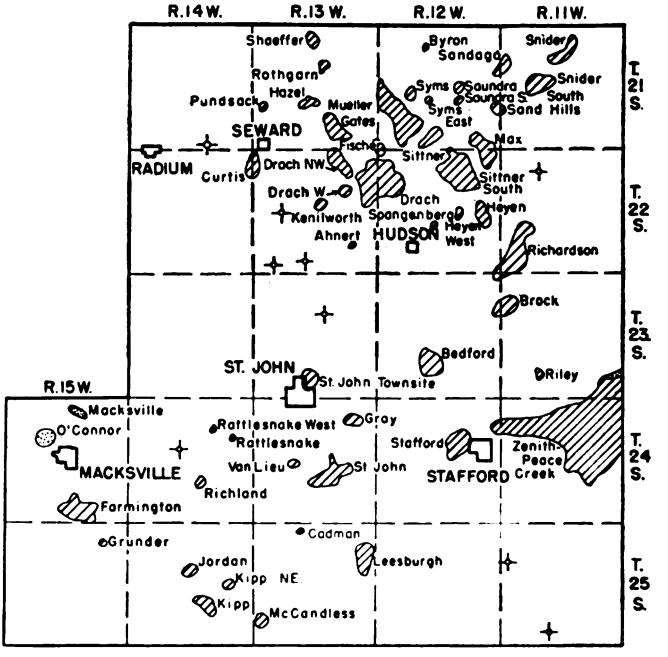

FIG. 47.—Map of Stafford County showing oil and gas pools and dry wildcat tests drilled during 1947. (Gas, dots; oil, diagonal lines.)

north. It is the Sinclair Prairie No. 1 Soeken, which was completed at a total depth of 3,910 feet still in the Pennsylvanian basal conglomerate which here was more than 220 feet thick. This situation suggests the presence of a sink hole in the Ordovician dolomite. In one the producing wells the conglomerate rests directly on the Arbuckle, in two others on the Simpson.

Another new pool, the **Syms East,** was opened during the year between the Saundra and Mueller pools, and about 1 mile east of the Syms. Armer and Lindas drilled the well, the No. 1 Hammeke, in the SE¼ sec. 21, T. 21 S., R. 12 W. The well was assigned a potential of 50 barrels per day. Production was found in the Ar-

TABLE 70.—*Oil and gas pools of Stafford County (continued)*

Pool and location of discovery well	Discovery year	Area, acres	1947 production	Cumulative production to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
			barrels				
Ahnert 26-22-13W	1941	40	2,762	33,537	1	Arbuckle	3,784
Bedford 21-23-12W	1940	850	91,526	1,162,031	14	Arbuckle	3,859
Brock 12-23-12W	1944	700	92,819	179,004	9	Arbuckle	3,680
Byron 4-21-12W	1943	40	871	11,146	1	Arbuckle	3,460
Cadman 4-25-13W	1944	40	421	4,571	1	Viola	4,064
Curtis 6-22-13W	1942	400	93,128	283,863	9	Arbuckle	3,693
Drach 12-22-13W	1937	2,200	543,899	2,792,794	44	Arbuckle	3,690
Drach Northwest 11-22-13W	1944	120		14,271	4	Arbuckle	3,738
Drach West 14-22-13W	1938	40		100,738	2	Arbuckle	
Farmington 34-24-15W	1943	640	134,787	632,907	1 15	Kinderhookian Arbuckle	4,417
Fischer 31-21-12W	1938	160	18,225	290,925	3	Arbuckle	3,641
Gates 27-21-13W	1933	700	87,502	1,402,657	13	Arbuckle	3,679
Gates South 3-22-13W	1943	combined with Drach Northwest					
Gray 11-24-13W	1946	120	15,448	20,611	3	K.C.-Lans.	3,762
Grunder 11-25-15W	1943	40	1,775	14,965	1	K.C.-Lans.	3,945
Hazel 21-21-13W	1942	250	22,903	198,628	6	Arbuckle	3,692
Heyen 24-22-12W	1943	400	26,375	137,150	7	Arbuckle	3,652
Heyen West 23-22-12W	1947	40	5,959	5,959	1	Arbuckle	3,675
Jordan 15-25-14W	1936	300	32,938	612,408	7	K.C.-Lans.	3,722
Kenilworth 15-22-13W	1947	160	6,655	6,655	4	K.C.-Lans.	3,505

Kipp 27-25-14W	1937	500	27,461	522,721	11	K.C.-Lans.	3,827
Kipp Northeast 23-25-14W	1946	120	45,467	65,612	3	K.C.-Lans.	3,844
Leesburgh 12-25-13W	1938	700	207,181	1,983,461	16	Arbuckle	4,153
McCandless 30-25-13W	1944	200	46,079	160,919	4	Simpson	4,251
Max 35-21-12W	1938	600	169,343	981,473	14	K.C.-Lans. Arbuckle	3,356 3,570
Mueller 29-21-12W	1938	1,600	589,231	1,471,945	13	Arbuckle	3,594
Pundsack 19-21-13W	1947	10	3,388	3,388	1	Arbuckle	3,735
Rattlesnake 13-24-14W	1938	40	4,900	84,175	1	K.C.-Lans.	3,608
Rattlesnake West 11-24-14W	1944	40	1,800	13,590	1	K.C.-Lans.	3,759
Richardson 36-22-12W	1930	1,200	751,113	8,552,658	61	Arbuckle	3,537
Richland 27-24-14W	1944	200	35,716	133,131	5	Arbuckle	4,232
Riley 28-23-11W	1940	120	10,294	103,829	2	K.C.-Lans.	3,323
Rothgarn 10-21-13W	1943	120	7,008	66,763	2	Arbuckle	3,569
Sandago 12-21-12W	1947	250	18,301	18,301	7	Arbuckle	3,480
Sand Hills 19-21-11W	1944	80	8,476	28,066	2	Arbuckle	3,548
Saundra 14-21-12W	1946	280	48,527	50,217	7	Arbuckle	3,546
Saundra South 22-21-12W	1946	40	1,931	1,931	1	Arbuckle	3,586
Shaeffer 3-21-13W	1941	300	13,548	266,398	5	K.C.-Lans. Arbuckle	3,404 3,546
St. John 23-24-13W	1935	1,200	138,595	2,167,460	1 25	K.C.-Lans. Arbuckle	3,588 4,075
St. John Townsite 33-23-13W	1944	300	34,588	196,408	6	K.C.-Lans. Arbuckle	3,919
Sittner 33-21-12W	1937	1,000	631,334	1,784,072	53	K.C.-Lans. Arbuckle	3,278 3,600
Sittner South 3-22-12W	1938	1,000	114,539	1,409,019	21	Arbuckle	3,501
Snider 3-21-11W	1936	400	24,071	333,431	2	Simpson	3,362
Snider South 16-21-11W	1938	500	105,131	704,381	11	Simpson Arbuckle	3,402
Spangenberg 21-22-12W	1943	40	10,728	53,123	1	Arbuckle	3,691
Stafford 15-24-12W	1940	800	249,145	2,253,020	22	Viola Arbuckle	3,836 3,945
Syms 20-21-12W	1943	120	22,788	71,418	3	Arbuckle	3,580
Syms East 2-21-12W	1947	40	none	none	1	Arbuckle	3,565
Van Lieu 20-24-13W	1943	120	14,343	160,383	3	Arbuckle	4,069
Zenith 23-24-11W	1937	10,000	827,869	23,732,909	315	Viola	3,860
(The Stafford County part of the Zenith-Peace Creek Pool)							
			thousand cubic feet				
Macksville* 3-24-15W	1947		59,981	59,981		K.C.-Lans.	
O'Connor 16-24-15W	1947	160	none	none	1	Arbuckle	4,061
Zenith-Peace Cr'k 23-24-11W	1937	1,800	1,094,612		6	Viola	3,860

* Old revived name

buckle which was reached at 3,565 feet. The total depth of the hole was 3,575 feet.

One gas pool, the **O'Connor**, was found during 1947. It is located in the southwestern part of the county near Macksville. The discovery well was drilled by the J. M. Huber Corporation on the O'Connor farm in sec. 16, T. 24 S., R. 15 W. Gas was found in the Arbuckle dolomite at 4,061 feet. The well was given an initial potential of 26 million cubic feet of gas per day. The dolomite was treated with 2,000 gallons of acid before completion. Here the Viola is 31 and the Simpson 34 feet thick. A good show of oil was found in the Kansas City-Lansing. Before the close of the year, four other test holes were drilled around the discovery well. One of these was completed as another gas well, and the others were dry holes. The second gas well was drilled by the Cities Service Oil Company on the Suiter farm in sec. 9. It, also, was rated at 26 million cubic feet per day. Here, the top of the Arbuckle was found at 4,051 feet. One of the dry holes was drilled into the Arbuckle at 4,125 feet which indicates a location 75 feet lower structurally. The other two dry holes were not drilled deep enough to test the Arbuckle.

In the older pools of the county relatively few wells were completed during the year. The **Saundra** pool now has four producing wells which form an unbroken line to connect with the **Saundra South** pool. In the **Mueller** pool, which lies a few miles west of the Saundra, four new wells were added. The **Sittner** pool received one new oil well. In the **Max** pool three new wells were added to the previous total of 12. The **Gates South** pool was combined with the **Drach Northwest** pool during the year. The test which served to establish the link between the two pools was the No. 2 Batman well drilled by the Plains Exploration Company in sec. 2, T. 22 S., R. 13 W. Here the Arbuckle was found at 3,709 feet. Two offset wells found the same zone at depths of 3,696 and 3,686 feet One dry hole was drilled to the southwest of the Kisner test in sec. 3; the Arbuckle was found at 3,723 feet. The Arbuckle is the producing zone in these wells, and above it both the Simpson and Viola were found in each. The average thickness of the Simpson formation here is 50 feet, but the thickness of the Viola varies considerably.

In the **Brock** pool one deep salt water disposal well was drilled. It is interesting to note that here the Arbuckle is more than 200

TABLE 71.—*Dry wildcat tests drilled in Stafford County during 1947*

Company and farm	Location	Depth to top of Lansing, feet	Depth to top of Sooy, feet	Depth to top of Viola, feet	Depth to top of Arbuckle, feet	Total depth, feet
Berwick-Spruill & Harms & Continental No. 1 Schmidt	SW¼ SE¼SE¼ 34-21-14W	3,437	3,689	3,718	3,811	3,855
Sohio Pet. Co. No. 1 Fair	SE cor. SE¼ 5-22-11W	3,166		3,467	3,552	3,588
Stanolind O. & G. No. 1 Moses	SE cor. SW¼ 17-22-13W	3,448		3,786	3,875	3,900
Virginia Drlg. Co. No. 1 Rusco	SW cor. NW¼ 32-22-13W	3,502	3,824	3,856	3,960	4,000
Virginia Drlg. Co. et al. No. 1 Durham	NW¼ SW¼NE¼ 33-22-13W	3,465		3,763	3,881	3,912
Magnolia Pet. Co. No. 1 Garvin	SW cor. SE¼ 10-23-13W	3,417	3,744	3,751	3,850	3,872
Jones-Shelburne et al. No. 1 Thurow	NE cor. SW¼ 16-24-14W	3,690	3,985	4,110	4,296	4,339
Nu Enamel No. 1 Watson	NE cor. NW¼ 18-25-11W	3,483	3,904	3,968	4,134	4,200
Cities Service Oil Co. No. 1 Helmer	SE cor. NW¼ 33-25-11W	3,553		4,051	4,223	4,257

feet thick. Two new oil wells were also added. Two new oil wells were added in the **Farmington** pool which lies in the southwestern part of the county.

Although the **Macksville** pool was opened as an oil producer in 1941, it was abandoned in March 1944. Later in 1944 a gas well, rated at 3.5 million cubic feet per day, was discovered in sec. 3, T. 24 S., R. 15 W. No mention of the gas production or of the pool is made for 1945 or 1946, but the pool is given a production of 59,981 thousand cubic feet of gas for 1947. If production continues, the Nomenclature Committee presumably will declare this a revived pool.

The nine dry wildcat tests drilled in Stafford County during 1947 are listed in Table 71. These tests and the oil and gas pools are shown on Figure 47. The pools are listed in Table 70.

STANTON COUNTY

Historical background.—Stanton County includes part of the west edge of the Hugoton gas field. The first gas well in the county was drilled in 1944 by the Stanolind Oil and Gas Company in

sec. 32, T. 30 S., R. 39 W. It produced about 3 million cubic feet per day, and, therefore, was believed to be an edge well.

Additional wells drilled in 1945, 1946, and 1947 indicate that the west edge of the Hugoton field crosses Stanton County from north to south 6 to 10 miles from the east line of the county.

No oil was produced in the county, and gas production was not segregated from that of the Hugoton field. There were 52 gas wells drilled, no oil wells or dry holes, and no new pools were discovered.

Production and developments during 1947.—The 52 gas wells drilled in the county were rather well distributed from north to south. In T. 27 S., R. 39 W. 14 wells were drilled. Most of these are relatively small producers as would be expected from their marginal location. An average of 15,000 gallons of acid was used to bring each of the new wells to maximum productive capacity, which ranges from less than 1 million to about 8 million cubic feet per day.

In T. 28 S., R. 39 W., 16 additional wells were completed. These wells range in capacity from 1 to 9 million cubic feet of gas per day.

Five additional wells were completed in T. 29 S., R. 39 W. All five tests drilled in T. 29 S., R. 40 W. in 1947 are producers. They range in productivity from 600,000 to 4.5 million cubic feet per day. Evidently these wells are close to the limits of the productive area.

In T. 30 S., R. 40 W., four gas wells were added in 1947. Their average productivity after acidizing was about 4 million cubic feet per day.

Detailed information on the Hugoton gas field is given under Finney County. All gas wells and dry tests drilled in Stanton County are shown on Figure 18.

STEVENS COUNTY

Historical background.—Stevens County has been regarded as virtually the heart of the great gas field of southwestern Kansas. In fact, the field was named for Hugoton, county seat of Stevens County.

Although the well that is credited by some with the discovery of the Hugoton field was not drilled in Stevens County, but rather in Seward County in 1922, it is fairly well agreed that the Hugoton field proper had its discovery in the Independent Oil

and Gas Company's Crawford No. 1 in sec. 31, T. 33 S., R. 37 W. That well was completed in 1927 and was reported (Garlough and Tayler, 1941) to have had an open flow of 6 million cubic feet of gas per day. Development of the gas reserve was given impetus by the building of the first pipe line by Argus in 1930 and 1931. More important developments occurred in the late 1930's when Panhandle Eastern built pipe lines and a natural gasoline plant.

Real development and more complete drilling out of the county area occurred in the middle 1940's when it became possible to utilize the gas either in carbon black plants located in the field or by piping it to distant consuming centers.

No oil was produced in the county and gas production was not segregated from that of the Hugoton field. There were 94 gas wells drilled, no oil wells or dry holes, and no new pools were discovered.

Production and developments during 1947.—The 94 new gas wells were rather well distributed over the county. Many were fill-ins or locations that were not previously drilled.

Although a great amount of drilling has been done in the field in recent years, there are many undrilled locations. Stevens County, however, has been more completely drilled than any other county in the field.

Most of the new gas wells in Stevens County are large producers. The Republic Natural Gas Company No. 1 Lemert, sec. 35, T. 31 S., R. 37 W., was assigned an initial potential of 38 million cubic feet of gas per day. Another well, drilled by Republic on the Hulpieu lease in sec. 28, T. 32 S., R. 37 W., was rated at more than 46 million cubic feet of gas per day.

A comparison of records indicates that in most Stevens County tests about 15,000 gallons of 15 percent hydrochlic acid was used in completing the wells before production tests were made. Such amounts of acid are far larger than amounts used even a few years ago, so the capacities of wells drilled in 1947 are difficult to compare with those of wells drilled 10 years ago.

A complete discussion of the development and production of the Hugoton field is given under Finney County. The gas wells are shown on Figure 18.

SUMNER COUNTY

Historical background.—Sumner County is contiguous to Butler County where oil was discovered in 1914. Therefore, it is not surprising to find that wildcat wells were drilled in Sumner County shortly after. The first discovery was made in June 1915 when the Empire Gas and Fuel Company successfully completed a gas well in what is now known as the Vernon North pool. The first oil in Sumner County was discovered in May 1925. Oil was found in the "Mississippi lime" in sec. 22, T. 34 S., R. 2 E. by the Continental Oil Company in their No. 1 Thiessen well. This was the beginning of the Padgett pool. In 1930, the Prairie Oil and Gas Company drilled a deep test in this same pool and found oil in the "chat" at 3,443 feet.

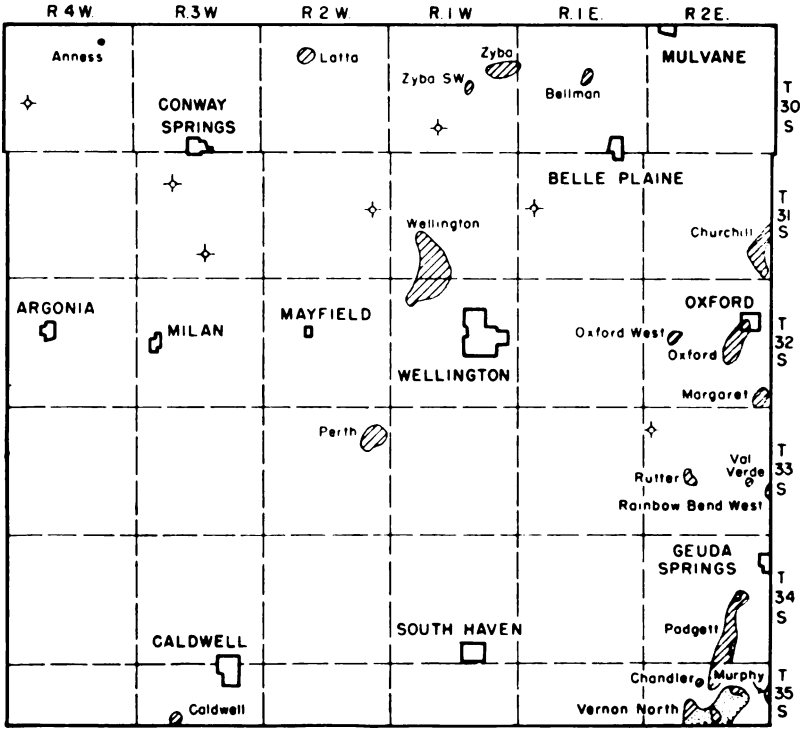

FIG. 48.—Map of Sumner County showing oil and gas pools and dry wildcat tests drilled during 1947. (Gas, dots; oil, diagonal lines.)

Between 1915 and 1930 the Anson, Caldwell, Churchill, Hunnewell, Oxford, Padgett, Rainbow Bend West, Rutter, Miller, Douglas, Love, Latta, and Wellington pools were found. Among these the Oxford and the Churchill have been the outstanding producers. The Oxford pool has yielded 15 million barrels while the Churchill pool has yielded more than 19 million barrels. Only two pools that are still producing, the Anness and the Zyba, were found in the county during the 1930's—both of these in 1937. Six pools, none of which has shown promise of outstanding production, were discovered from 1940 through 1947.

In this county much of the oil comes from the upper part of the Mississippian System, either from limestone or from cherty rubble. In a few pools like the Anness, Bellman, and Caldwell the oil occurs in the Simpson sandstone. The Arbuckle produces in the Margaret, Oxford West, and Rainbow Bend West pools. A great deal of the early production from the Oxford and the Churchill pools came from the Stalnaker and the "Layton" sands high in the Pennsylvanian System.

The Shell Oil Company started two secondary recovery projects in Sumner County in 1941 in the Churchill pool. In 1946, another was placed in operation in the Oxford pool by Lario and Barnsdali.

Statistical summary for Sumner County, 1947

Oil produced	1,171,718	barrels
Gas produced	none	
Wells drilled: Oil	39	
Gas	none	
Dry	19	
Total	58	
Wildcat wells	7	(included in above total)
New, revived, or abandoned pools	none	
Secondary recovery operations	3	

Developments during 1947.—A revival of interest was noted in Sumner County during the year. Of 58 test wells drilled, 39 were new oil wells, and 19 were dry holes. No new pools were discovered although seven wildcat tests were completed in various parts of the county.

In the **Zyba** pool two new oil wells were drilled. Oil was found in the "Wilcox" (Simpson) sandstone. The two new wells found the producing sand at 3,839 and 3,844 feet. Both were drilled in sec. 12, T. 30 S., R. 1 W.

The most active pool was the **Wellington** located on the boundary between T. 31 S., R. 1 W. and T. 32 S., R. 1 W. Oil was found along the western side of the previously prospected area, 24 new oil wells being completed here and in the southern end of the pool. The structural elevations are highest in the north end and gradually decrease toward the south. Oil occurs in the cherty residue

TABLE 72.—*Oil and gas pools of Sumner County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production	Cumulative prduction to end of 1947	Producing wells	Producing zone	Depth to producing zone, feet
			barrels				
Anness 2-30-4W	1937	40	10,497	108,867	1	Simpson	4,394
Bellman 15-30-1E	1945	300	64,098	118,743	6	Simpson	3,798
Caldwell 17-35-3W	1929	200	34,423	1,279,618	4	Simpson	4,765
Chandler 4-35-2E	1942	40	967	8,457	1	"Mississippi lime"	3,450
Churchill 25-31-2E	1926	1,000	115,962	19,197,864	46	Stalnaker Arbuckle	1,820 2,632
Latta 9-30-2W	1927	500	42,658	1,026,908	12	K.C.-Lans.	3,042
Margaret 36-32-2E	1946	300	49,367	49,367	6	Arbuckle	3,474
Murphy 7-35-3E	1933	see Cowley County					
Oxford 14-32-2E	1927	800	138,681	15,504,801	38	Stalnaker "Layton" Arbuckle	2,020 2,510 2,890
Oxford West 17-32-2E	1926	160	10,160	566,745	3	Arbuckle	
Padgett 22-34-2E	1925	1,800		1,702,306	18	"Mississippi lime"	3,474
Perth 12-33-2W	1945	400	75,506	83,276	10	"Wilcox"	4,264
Rainbow Bend West 24-33-2E	1925		*10,000	453,000	3	Arbuckle	
Rutter 21-33-2E	1926	80	4,193	95,853	2	"Mississippi lime"	3,315
Val Verde 23-33-2E	1945	40	791	2,626	1	"Bartlesville"	3,280
Vernon North 15-35-2E	1930	1,200	75,000	658,623	20	"Mississippi lime"	3,443
Wellington 33-31-1W	1929	2,400	493,094	6,392,154	122	"Chat"	3,655
Zyba 7-30-1E	1937	360	37,817	171,547	8	Simpson	3,866
Zyba Southwest 22-30-1W	1944	80	8,504	35,284	2	Simpson	3,918
			thousand cubic feet				
Padgett (gas) 23-34-2E	1924	1,800			10	"Mississippi lime"	3,474
Vernon North, (gas) 15-35-2E	1915	640			4		
Wellington (gas) 33-31-1W	1929	1,200	**			"Chat"	3,655

* Production for 1946 and 1947.
** Pool no longer productive; used for gas storage only.

TABLE 73.—*Dry wildcat tests drilled in Sumner County during 1947*

Company and farm	Location	Depth to top of Kans. City, feet	Depth to top of Miss., feet	Depth to top of Arbuckle, feet	Total depth, feet
Falcon-Seaboard Drlg. Co. No. 1 Stewart Est.	Cen. NE¼ SE¼ 18-31-1E	2,935	3,585	4,114	4,164
D. R. Lauck et al. No. 1 Potucek	NE¼ NW¼ NW¼ 7-33-2E	2,825	3,399	3,807	3,815
McBride, Carey & Derby No. 1 Kraft	SE cor. SW¼ 28-30-1W		3,583	4,076	4,125
Bridgeport Oil Co. No. 1 Kelly "A"	Cen. E½ SE¼ SE¼ 19-30-4W	3,588	did not reach	did not reach	3,638
ElDorado Rfg. Co. et al. No. 1 Botkin	SW cor. SE¼ 13-31-2W	3,119	3,770	did not reach	3,825
Wakefield & Flynn No. 1 Frantz	NE cor. SE¼ 8-31-3W	3,335*	3,969	4,492	4,522
Bradley & Weller No. 1 Hand	SW cor SE¼ 27-31-3W	3,282	3,947		4,398

* Lansing.

found at the top of the Mississippian System in the Boone limestone of the Osagian Series. This zone is 2,394 feet below sea level at the north end of the newly prospected area. Farther south, in sec. 32, it is between 2,400 and 2,410 feet below sea level. In sec. 5, T. 32 S., R. 1 W., still farther south, the "chat" lies between 2,425 and 2,435 feet below sea level. Farther east, in sec. 4, a few new wells found the producing zone between 2,411 to 2,416 feet below sea level. Several dry holes ran high structurally with respect to near-by producers.

The **Perth** pool, discovered during 1945, received active attention during 1947. Seven new oil wells and two dry holes were completed in this pool. They found production in the "Wilcox" (Simpson) sandstone. The depth to this sandstone is approximately 4,240 feet. The surface elevation of the wells is about 1,230 feet. The depth of the "Wilcox" below sea level did not vary more than 14 feet in the producing wells. The highest well structurally in the pool was the Falcon-Seaboard No. 1 Skaggs; the lowest producing well was the Carter No. 1 Smiley (a 1948 well) in sec. 11. The producing well found production at a point 6 feet lower than the corresponding top of the sand in a dry hole drilled by Carter on the Wycoff lease in sec. 12.

In the southeastern part of the county one new well was completed in the **Padgett** pool in T. 34 S., R. 2 E. In the old **Murphy** pool, which lies in T. 35 S., R. 2 E., two new oil wells were com-

pleted. Three completions were made in the **Vernon North** pool. The oil and gas pools in Sumner County are listed in Table 72. The dry wildcat tests drilled during 1947 are given in Table 73. These wells and the pools are shown on Figure 48.

THOMAS COUNTY

Historical background..—Wildcat wells have been drilled in Thomas County at intervals through the years, but a producing pool has yet to be opened.

Developments during 1947.—One wildcat test, the No. 1 Meeks, was drilled in Thomas County in 1947 by the Texas Company in sec. 36, T. 8 S., R. 31 W. This test at an elevation of 2,984 feet found marly Cretaceous shales to 1,035 feet where the Ft. Hays chalk was encountered. The Codell sandstone was found at 1,095 feet, the Carlile shale at 1,130 feet, and the Greenhorn chalky limestone, 65 feet thick at this location, at 1,330 feet. The Dakota sandstone and miscellaneous interbedded materials fill the interval between 1,490 and 2,030 feet. The green and pink waxy clays of the Morrison formation were found at 2,030 feet; they contain highly colored chalcedony near the base, and thin layers of anhydrite and gypsum at various levels. The top of the Permian redbeds was found at 2,240 feet, the top of the Stone Corral anhydrite at 2,600 feet, the top of the first dolomite (Herington?) at 2,960 feet, and the base of the Americus limestone at 3,532 feet. A thick sequence of limestones which may represent the Shawnee group was present between 3,688 and 4,012 feet. A thin black shale at 3,989 feet may be the Heebner shale. The Kansas City-Lansing limestone was found at 4,026 feet and the base of the Kansas City-Lansing (probably) at 4,362 feet. The Mississippian cherty limestones, found at 4,490 feet, show the effects of deeply penetrating solutions. A conglomerate made up of much chert with green and red clays was found between 4,600 and 4,625 feet, the top of the oölitic St. Joe limestone at 4,790 feet, and the Arbuckle dolomite at 4,852 feet. The dolomite here was medium crystalline without chert of any kind. The test ended in the Arbuckle at 4,942 feet. A porous zone between 4,920 and 4,942 feet yielded only salt water.

TREGO COUNTY

Historical background.—Oil was first found in Trego County in May 1929 when the Central Commercial Oil Company completed the King well in sec. 20, T. 13 S., R. 21 W. Oil was found in the Marmaton cherty limestone. The pool, named Riga, produced 15,000 barrels of oil during a limited time before it was abandoned. During 1947, the pool was revived when the Doley Oil Company completed a good producer on the Moon lease in sec. 20, T. 13 S., R. 21 W. The Wakeeney pool, found in 1934, proved to be the most prolific pool in the county. The Alma Petroleum Company made the discovery with their well on the Rhodes Estate, finding oil in the Kansas City-Lansing limestone. A third pool, called the Gugler, was found in December 1936 by the York State Oil Company. Very little oil was taken from this pool, and it was later abandoned. The Ellis Northwest pool was found in 1944 and the Cotton in 1945.

Statistical summary for Trego County, 1947

Oil produced	**87,699**	barrels
Gas produced	none	
Wells drilled: Oil	5	
Gas	none	
Dry	12	
Total	17	
Wildcat wells	6	(included in above total)
New pool: Oil	1	
Revived pool: Oil	1	
Abandoned pools	none	
Secondary recovery operations	none	

Developments during 1947.—The good results of drilling in Ellis and Rooks Counties stimulated the search for oil in Trego County. Of the 17 test holes drilled during the year, five were new oil wells and 12 dry holes. Two of the wildcat tests were successful in finding new oil pools. One of them is the **Cotton East** pool which was discovered by the Continental Oil Company when the first well was completed on the Cotton ranch in the SE cor. NW¼ sec. 14, T. 12 S., R. 21 W. Elevation of the hole is 2,316 feet. The oil was found in the Arbuckle dolomite at a depth of 3,942 feet. The casing was perforated between 3,942 and 3,948 feet. After using 3,000 gallons of acid, the well swabbed 63 barrels of oil per day. A pumping potential of 125 barrels of oil per day was later assigned to the well.

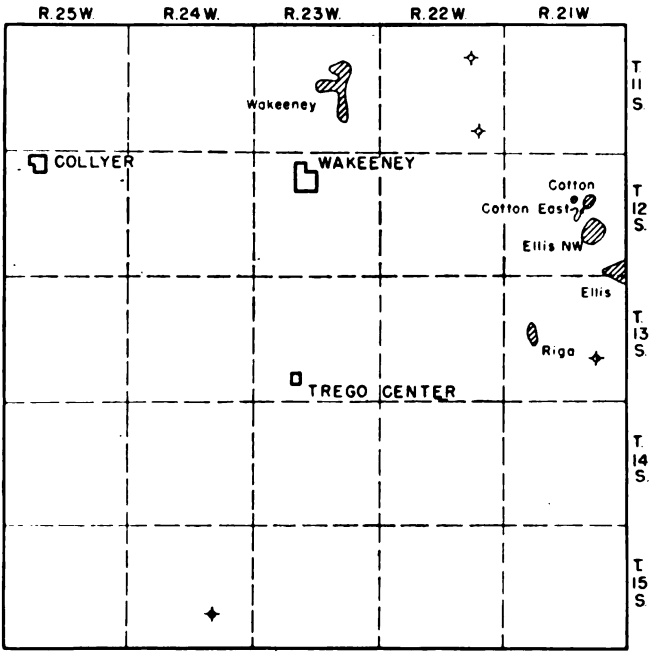

FIG. 49.—Map of Trego County showing oil pools and dry wildcat tests drilled during 1947.

One offset well on the Baugher ranch was productive in the Arbuckle about 25 feet lower than in the discovery well. One-half mile away, in the SE cor. sec. 15, the J. M. Huber Corporation drilled a dry hole on the Huber farm. Here the Arbuckle was found at 3,980 feet.

In 1947, the Doley Oil Company completed a test on the Moon farm in sec. 20, T. 13 S., R. 21 W. to revive the **Riga** pool. This well found oil in the Marmaton cherty limestone between 3,902 and 3,938 feet. On a later official test the well was given a rating of 138 barrels of oil per day. The bottom of the test was at 3,938 feet, still in conglomerate.

One of the new oil wells was drilled in the **Ellis Northwest** pool. The Marmaton chert was found at 3,910 feet, the conglomerate at 3,946 feet, and the top of the Arbuckle, which produces the oil, at 3,985 feet. In the main **Ellis** pool one new well was added in the NE¼ sec. 1, T. 13 S., R. 21 W. Here the conglomerate was found at 3,790 feet and the Arbuckle (the producing zone) at 3,806 feet. One-half mile to the southwest the Bridgeport Oil

TABLE 74.—*Oil pools of Trego County*

Pool and location of discovery well	Discovery year	Area, acres	1947 production bbls.	Cumulative production to end of 1947, bbls.	Producing wells	Producing zone	Depth to producing zone, feet
Cotton 15-12-21W	1945	40	5,104	13,804	1	Arbuckle	3,958
Cotton East 14-12-21W	1947	40	3,394	3,394	1	Arbuckle	3,942
Ellis		see Ellis County					
Ellis Northwest 26-12-21W	1944	250	28,143	100,793	5	Arbuckle	3,925
Riga* 20-13-21W	1947	40	16,045	16,045	1	Marmaton	3,902
Wakeeney 14-11-23W	1934	640	35,013	671,538	6	K.C.-Lans.	3,619

* Old name revived.

Company drilled a test well on the Egger farm in the NW cor. sec. 12. In this test no Arbuckle was found. The conglomerate rested directly on the Reagan sandstone which was encountered at 3,872 feet. The Reagan here was only 12 feet thick, and the test was completed in Pre-Cambrian granite at a total depth of 3,887 feet. This test offered a sharp contrast with a wildcat test drilled by the Republic Natural Gas Company on the Hille farm in sec. 26, T. 15 S., R. 24 W., where the conglomerate rested on Mississippian rocks at 4,291 feet. The Mississippian strata were 220 feet thick and rested upon Viola (Ordovician) limestone at 4,511 feet. Below the Simpson, the Arbuckle dolomite was found at 4,603 feet.

The oil pools of Trego County are shown on Figure 49 and listed in Table 74. The dry wildcat wells drilled during 1947 are listed in Table 75 and shown on Figure 49.

TABLE 75.—*Dry wildcat tests drilled in Trego County during 1947*

Company and farm	Location	Surface Elevation	Depth to top of Lansing, feet	Depth to top of Arbuckle feet	Total depth, feet
Continental No. 1 Hillman	NW cor. SE¼ 11-11-22W	2,141	3,418	3,852	3,879
Continental No. 1 Hillman	NE cor. NE¼ 35-11-22W	2,328	3,621	4,098	4,130
Continental No. 1 Egger	NE¼ NW¼NE¼ 26-13-21W	2,310	3,612	4,033	4,071
Republic Nat. Gas Co. No. 1 Hille "Q"	SW cor. NW¼ 26-15-24W	2,317	3,738	4,596	4,653

WICHITA COUNTY

Historical background.—Wildcat wells have been drilled in Wichita County at intervals through the years, but a producing pool has yet to be opened.

Developments during 1947.—A very interesting test well in Wichita County was drilled deeper during 1947. Some information on this test was given by Ver Wiebe (1947, p. 107). The well was started by K. E. Jones early in 1946 on the Deal ranch in sec. 25, T. 18 S., R. 37 W. but was abandoned at a depth of 4,998 feet. Later the test was deepened by E. M. Swearer and called the No. 1 Freeland. The well cuttings were studied by the Kansas Well Log Service; the following stratigraphic data are taken from their log. Elevation of the well is 3,305 feet. Surface materials composed the cuttings to 290 feet. Calcareous shale and some chalk were logged from 290 to 730 feet where the Dakota sandstone was encountered. The Dakota contains much gravel and pyrite, and chalcedonic chert occurs near the base. The Permian redbeds were found in the samples at 1,260 feet, the Blaine gypsum at 1,590 feet, and the Stone Corral anhydrite at 2,370 feet. The gray Wellington shales, at 2,560 feet, show much anhydrite near the base. The Herington limestone was found at 2,852 feet, the Ft. Riley at 2,971 feet, and the base of the Americus limestone at 3,507 feet. Below this level, the samples show unbroken sequences of limestone in which it is impossible to pick the Topeka or the Lansing with any assurance. Thin layers of black shale are present at 10 levels down to 4,394 feet where sandstone was found. The top of the Mississippian oölitic limestones was found at 4,921 feet, typical Osagian cherty limestone at 5,230 feet, and typical St. Joe noncherty limestone at 5,405 feet. A sequence of dolomitic layers was found between 5,484 and 5,550 feet. The age of these beds is not known at present. A very thin sandstone at 5,550 may be the "Misener" sandstone. The rocks from 5,555 feet to the total depth of 5,630 feet seem to be the cherty dolomites of the Arbuckle group.

WILSON COUNTY

Historical background.—The first discovery of oil in Wilson County dates from the early 1880's. A report (Peckham, 1895, p.

375) referring to early petroleum development in Kansas, states, "The most extensive field, however, was developed in 1883 and 1884 in Wilson, Neosho, and Montgomery Counties, some 40,000 barrels having been produced in these counties within a radius of some 20 miles of Neodesha, in Wilson County, in 1894." Neodesha was supplied with gas on July 4, 1894, and by the close of that year more than 40 wells near the city were producing gas. In 1900, both oil and gas were found near Fredonia, Benedict, and Buffalo.

The early history of oil and gas development in Wilson County has been discussed by Moore and Boughton (1921). Most of the productive sands are thick, lenticular bodies in the lower-middle part of the Cherokee shale and are commonly called "Bartlesville." Some production is from the top of the Mississippian limestones and the top of the Ordovician.

Water-flooding in "Bartlesville sands" has become an important phase in oil production in Wilson County where repressuring projects have been in operation for more than 10 years (Grandone, 1944, pp. 142-144; Jewett and Abernathy, 1945, p. 230).

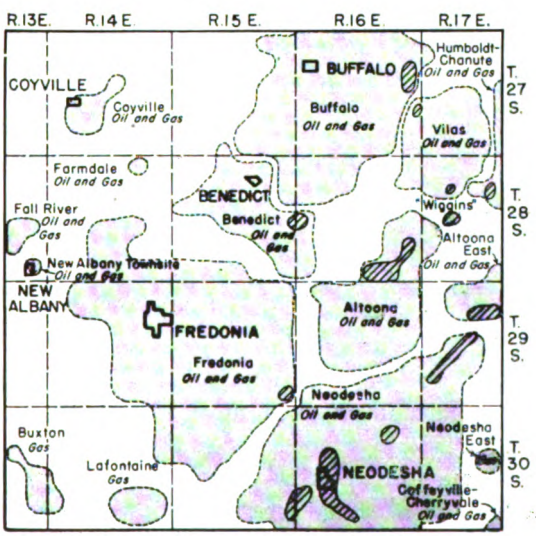

FIG. 50.—Map of Wilson County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

TABLE 76.—*Oil production in Wilson County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Altoona		1,711
Altoona East		3,325
Benedict		923
Buffalo[1]		5,297
Fredonia		6,563
Humboldt-Chanute[2]		1,590
Neodesha[3]	188+	41,225
Vilas		11,382
"Wiggins"		5,205
Miscellaneous		60
Total	188+	77,281

[1] Field extends into Woodson County.
[2] Field extends into Allen, Neosho, and Woodson Counties.
[3] Field extends into Montgomery County.

Oil produced totaled 77,281 barrels. There were nine producing oil pools and one secondary project in operation.

Production and developments during 1947.—No noteworthy developments in the county were reported during the year. The **Neodesha** pool ranked first in production by a wide margin, although the average daily production for its 188 wells was only about 0.6 barrel of oil per well. A substantial amount of gas was produced, but exact figures are not available.

Table 76 shows the active fields in the county and their production during 1947. The oil and gas producing areas are shown on Figure 50.

WOODSON COUNTY

Historical background.—Most of the oil production in Woodson County comes from the west-central part of the county and is found in the "Bartlesville sand" and the upper part of the Mississippian limestone. Most of the pools that are known were discovered nearly 30 years ago, but the Neosho Falls pool, in Mississippian rocks, was not found until 1928. Later discoveries resulted in the extension of the Quincy field into Woodson from Greenwood County and the opening of the Sheedy pool in 1932.

Largely because of unusual structural and lithologic conditions in parts of the county (Jewett and Abernathy, 1945, pp. 231-234) and because of relatively large producers, exploration in the county has not lagged. Recent discoveries include the Silver City pool in 1946 and the Teichnor gas pool in 1947.

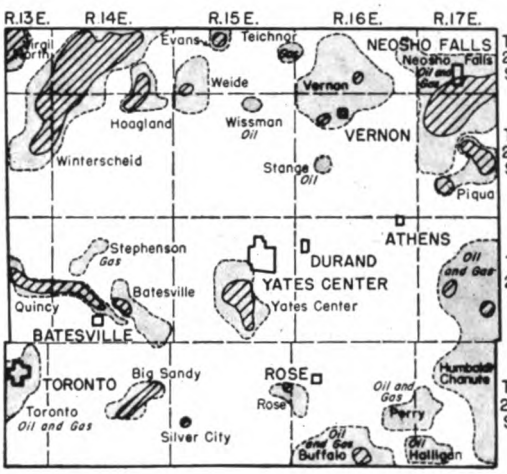

FIG. 51.—Map of Woodson County showing oil and gas producing areas. Shaded areas represent oil and gas fields; diagonal lines show areas of 1947 oil production.

Statistical summary for Woodson County, 1947

Oil produced	404,026 barrels	
Gas produced	Figures not available	
Wells drilled: Oil	9	
Gas	3	
Dry	21	
Total	33	
Wildcat wells	3	(included in above total)
Number of active oil pools	13	
New pools: Gas	1	
Secondary recovery operations	1	

Developments during 1947—The **Teichnor** gas pool was found early in 1947. The discovery well was the King et al. No. 1 Teichnor in the SE¼ SE¼SE¼ sec. 24, T. 23 S., R. 15 E. Production was found in the Mississippian rocks. Initial daily production of the discovery well was reported as 1 million cubic feet.

Production in the various fields in the county is shown in Table 77. The **Winterscheid** pool has by far the largest production, but its 215 wells produce less than 3 barrels each per day on the average. The oil and gas producing areas are shown on Figure 51.

TABLE 77.—*Oil production in Woodson County during 1947*

Producing area	Producing wells as reported	1947 production, bbls.
Batesville	1+	No Runs
Big Sandy	18+	53,428
Buffalo[1]		2,304
Evans	10	9,203
Hoagland	18	13,159
Humboldt-Chanute[2]	4+	2,207
Neosho Falls[3]	39	17,372
Piqua	16	8,081
Quincy[4]	78+	89,854
Rose	2+	4,500
Silver City	1+	1,000
Virgil North[4]	4	5,940
Vernon	2+	942
Weide	4	3,361
Winterscheid	215+	176,836
Yates Center		15,714
Miscellaneous		125
Total	412+	404,026

[1] Field extends into Wilson County.
[2] Field extends into Allen, Neosho, and Wilson Counties.
[3] Field extends into Allen County.
[4] Field extends into Greenwood County.

WYANDOTTE COUNTY

Historical background.—Gas was discovered in Wyandotte County soon after the first drilling for oil in Miami County. The first wells were within the present Kansas City area. For many years small amounts of gas have been produced in several areas (Jewett and Abernathy, 1945, pp. 237-238). Shows and small amounts of oil have been reported in several Pennsylvanian sandstones in Wyandotte County. In 1904, a well drilled near Argentine is said to have produced about one barrel of oil in 24 hours from a depth of 139 feet. About 20 years ago a small amount of oil was produced from a well in the SE¼ sec. 1, T. 11 S., R. 23 E.; and a few years ago some oil was bailed from the "Peru sand" and used as fuel when a well in sec. 33, T. 10 S., R. 23 E. was being drilled.

The Roberts-Maywood area in the northwestern part of T. 11 S., R. 23 E., and the northeastern part of T. 11 S., R. 22 E. (partly in Leavenworth County) is now the most important gas producing area in the county. Production is from a Marmaton sandstone, locally called "Peru," and from the "Squirrel sand." Several wells were drilled in this field during 1947.

In Wyandotte County there are several gas fields that are abandoned except for a few wells that supply gas for local use. The Fairfax field which was in the present Fairfax Industrial District of Kansas City was opened in 1931. There were about 40 wells, some of which had initial daily productions as high as 2 million cubic feet. The average was slightly less than 1 million. Gas in this field was found in a zone 225 to 275 feet below the land surface, and in the "Peru sand" at a depth of 350 to 400 feet. The "Peru" sandstone has an average thickness of about 30 feet. Some years ago the Bethel gas field contained 60 or more producing wells. The Marmaton and the "Squirrel" sandstones were the reservoir rocks.

Data on gas production in Wyandotte County are not available. The Roberts-Maywood field was the principal producer. Small amounts of gas used locally were produced in the Bonner Springs and Edwardsville areas, in Kansas City, and in the old Welborn and Bethel fields.

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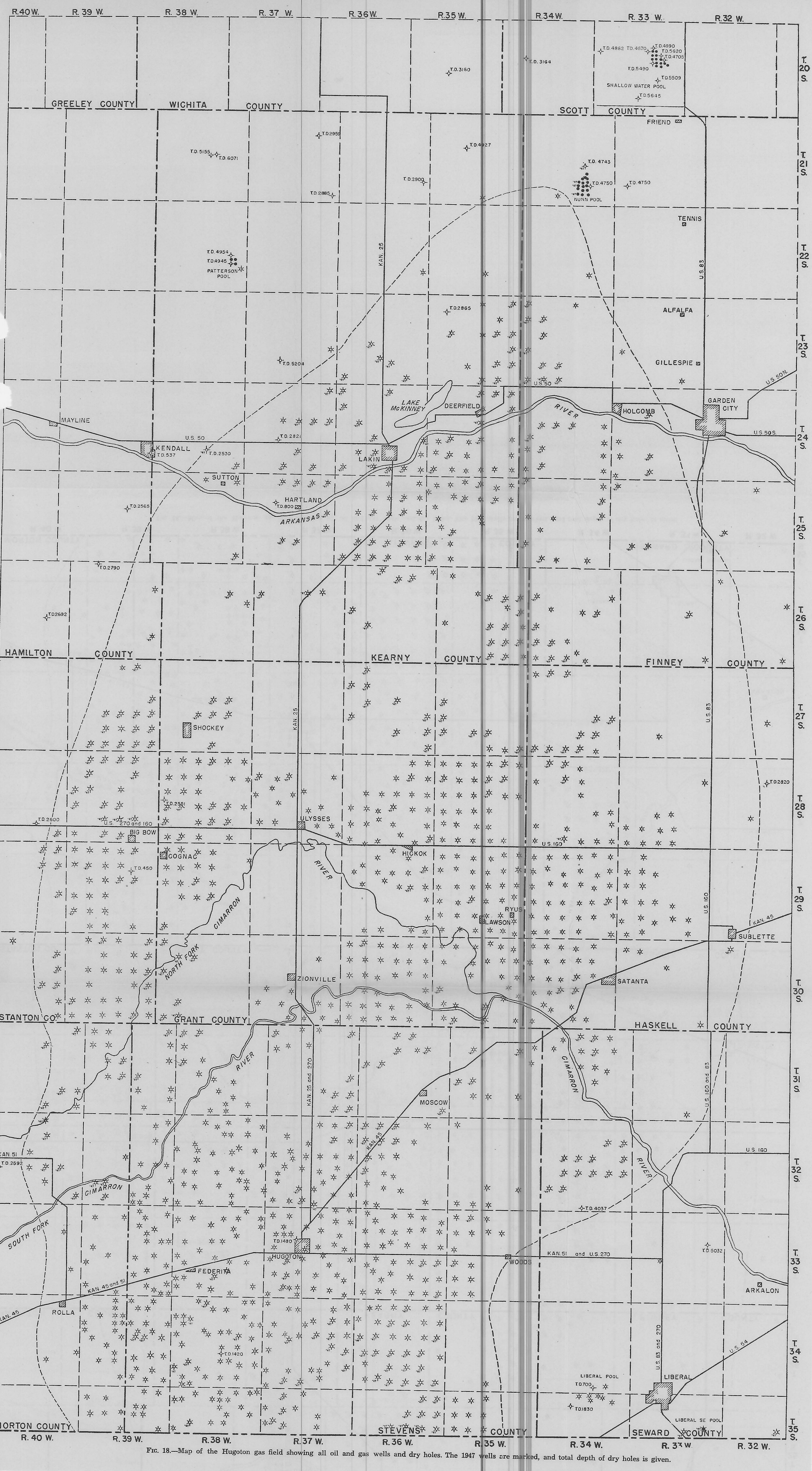

FIG. 18.—Map of the Hugoton gas field showing all oil and gas wells and dry holes. The 1947 wells are marked, and total depth of dry holes is given.