STATE GEOLOGICAL SURVEY OF KANSAS

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BULLETIN 42

EXPLORATION FOR OIL AND GAS IN WESTERN KANSAS DURING 1941

By WALTER A. VER WIEBE

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By Walter A. Ver Wiebe

ABSTRACT

During 1941 the oil and gas industries of Kansas went forward to new record heights. Of 2,113 wells drilled, 1,446 were oil wells and 76 were new gas wells. In western Kansas alone 1,186 new oil wells and 34 new gas wells were completed. Of the 286 wildcat wells drilled in western Kansas 25 percent were successful in finding new supplies of oil or gas. Of these, 147 were rank wildcats, located at least 2 miles from the nearest producing well, and among them only 16 percent were successful, showing a lack of success for this type of prospecting.

There were 21,838 oil wells in Kansas at the end of 1941, and these had accounted for a total of no less than 83 million barrels of oil. The monthly pipe line runs increased from slightly over 6 million barrels in January to about 7½ million barrels in December. During 1941 nearly 18 million more barrels of oil were produced than in 1940 and nearly 13 million more barrels than in the previous highest year, 1937.

The Trapp pool in western Kansas ranks highest with a production of 7½ million barrels during 1941. The Silica pool with 7 million barrels and the Bemis-Shutts pool with 4 million barrels follow. The Burnett pool and the Zenith pool also produced a large quantity of oil.

In the matter of gas production a new high record was attained in 1941 when over 93 billion cubic feet were marketed. The bulk of this total came from the phenomenal gas pool in the southwestern part of the state.

Exploration for new pools resulted in the discovery of 32 new oil pools and 6 new gas pools. The most sensational new oil pool is the Patterson pool, which lies many miles west of the present oil pools of western Kansas, in Kearny county. The five new pools in western Reno county probably will prove to constitute the largest new oil reserve discovered during the year.

INTRODUCTION

For a number of years the State Geological Survey of Kansas has published reviews of oil and gas development in the state. The first of these was published in 1928 as Mineral Resources Circular No. 1. The most recent report of the series was Bulletin 36, which appeared in August, 1941, and which provides an historical and statistical summary of oil and gas development in western Kansas to the end of 1940. The purpose of the present report is to furnish similar information for the year 1941.

Under the impetus of new demands of the defense program of the Federal Government, the oil and gas industries of Kansas swept forward during 1941 to new record heights. This is indicated partly by the fact that no less than 2,113 test wells were drilled in various parts of the state. Of these, 1,446 were new oil wells, 76 were new gas wells, and 592 were failures. Comparisons with the previous year reveal that these figures represent an increase in all three categories. Unfortunately, the most marked increase is in the class of failures. In fact, nearly 80 percent of the increase must be allocated to the category of dry holes.

This startling result is due partly to the fact that it is becoming increasingly difficult to find new reserve areas. It is also due partly to the erratic character of the production in the Arbuckle dolomite, which is now the chief producing zone. When the totals are broken down, it is to be noted that 415 of the dry holes were drilled in western Kansas.

The record shows that 1,635 test wells were completed in western Kansas. Of this number, 1,186 were successful in finding oil, 34 are gas wells, and the remainder, or 415, are dry holes. The successful wells have a potential daily capacity of 1,691,000 barrels of oil and 508,000,000 cubic feet of gas. Surprisingly enough, both of these figures compare unfavorably with those of 1940. In 1940 the comparable figures were 2,128,000 barrels of oil and 1,289,000,000 cubic feet of gas (daily potential).

Approximately half of the tests (791) drilled in western Kansas were drilled by independent operators. Of the major companies, the Cities Service Oil Company drilled 169 tests, the Stanolind Oil Company 101, the Continental Oil Company 99, the Skelly Oil Company 80, and the Shell Petroleum Company 63 test wells. Of the total of 844 tests completed by major oil companies, 678 were either oil or gas wells.

Wildcat Wells.—In Kansas an arbitrary rule has been adopted to designate a wildcat well as a test that is located half a mile or more from a producing well. According to this definition, 286 wildcats were drilled in western Kansas during 1941. Considerably more than half of these, or 200, were drilled by independent operators. On a percentage basis, 25 percent of all wildcat wells were successful in finding either oil or gas. Records indicate that 25 percent of the successful wells were drilled by independent operators and 27 percent by the major companies.

A revealing fact is brought out by the lack of success of test wells

that were drilled more than 2 miles from a producing well. It is customary to call such wildcat wells, *rank wildcats*. The records show that 147 of all wildcat tests in western Kansas fall into the category of rank wildcats. Only 24 of these discovered new oil or gas reserves; in other words, only 16 percent were successful and 84 percent were failures. These figures are significant and indicate that oil and gas discoveries no longer can be expected to pay profits if prices are held stationary.

Production figures.—In the matter of total oil production Kansas reached an all-time high during 1941. Approximately 83 million barrels of oil were produced from 21,838 wells throughout the state. The monthly total pipe-line runs increased steadily from January, with a total of 6,017,806 barrels, to December with an estimated total of 7,635,921 barrels. The daily average pipe-line runs increased from 194,123 barrels in January to 246,322 barrels in December. The over-all total for the state represents an increase of nearly 18 million barrels over the production for 1940 and an increase of 13 million barrels over the previous all-time high attained in 1937.

Pipe lines.—The notable increase in production was made possible by the construction of additional pipe lines. No fewer than 13 pipe-line projects were completed during the year. Although most of these involve distances of from 6 to 12 miles, they nevertheless permitted many previously untapped areas to come into large-scale production. The capacity of these additional pipe lines is nearly 300,000 barrels per day.

The Trapp pool in Russell and Barton counties again stood at the head of the list of pools. It produced 7½ million barrels of oil. The Silica pool of Rice and Barton counties ranked second with 7 million barrels, and the Bemis-Shutts pool (Ellis county) third with 4 million barrels. Two other pools that stood out because of their productive capacity were the Burnett pool (Ellis county) and the Zenith pool (Stafford county).

Gas production.—A new high record also was established in the category of gas production in Kansas. Somewhat more than 93 billion cubic feet of gas are estimated to have been marketed during 1941. The great bulk of this total came from the Hugoton area of southwestern Kansas. The building of additional pipe lines accounts for part of the increase over the 86 billion cubic feet of the previous year. Nine pipe-line projects were started during the year, and all except two were completed. The new pipe lines

range in length from a few miles to 200 miles. The most recently completed line is the Globe Oil and Refining Company pipe line from McPherson to Council Bluffs, Iowa. One of the unfinished lines is the 770-mile line from Hugoton to Milwaukee, Wisconsin.

New pools.—According to table 1, 32 new oil pools and 6 new gas pools were discovered in western Kansas during 1941. The most sensational of the new oil pools is the Patterson pool, of Kearny county, situated far west of any previously discovered pool. The discovery well was drilled on the Patterson ranch by the Stanolind Oil Company after several attempts in near-by locations had proved unsuccessful. The Patterson well found saturation and a large quantity of oil in a sandstone near the base of the Pennsylvanian subsystem. It nevertheless was drilled down to the Arbuckle dolomite and later was plugged back to the productive sandstone in the Cherokee formation and shot between the depths of 4,748 and 4,752 feet. An official test by the State Corporation Commission showed a capacity of over 3,000 barrels daily.

From the standpoint of actual future production, the new pools in western Reno county probably will prove to be the real find of the year. They are the Peace Creek, Peace Creek Northeast, Hendrickson, and Schweizer pools. They seem to lie along a trend that has the same geological conditions as the remarkable Zenith pool of southeastern Stafford county. In all probability the four pools will prove to be part of one large stratigraphic trap in which a large oil reserve is stored.

A somewhat similar condition exists in southeastern Rice county where the new pools, the Welch East and the Bornholdt West, give indications of a fairly large oil reserve. In these pools also the production is coming from a stratigraphic trap, which in all probability is the same as the one which now yields oil in the near-by Bornholdt and the Wherry pools. This statement holds true even though two different producing zones are involved.

The new Hewett pool in Norton county extends the productive limits of the Kansas oil areas far to the northwest and may have important implications. The same is true of the new Dayton pool in the northern part of Phillips county. The Ray Southeast pool in northwestern Rooks county seems to be on the same structure that is showing up so well in the Ray pool of southwestern Phillips county. In the Ray Southeast pool oil was found in an arkosic material at the base of the sedimentary rocks.

Drilling activity.—The areas that received most attention during

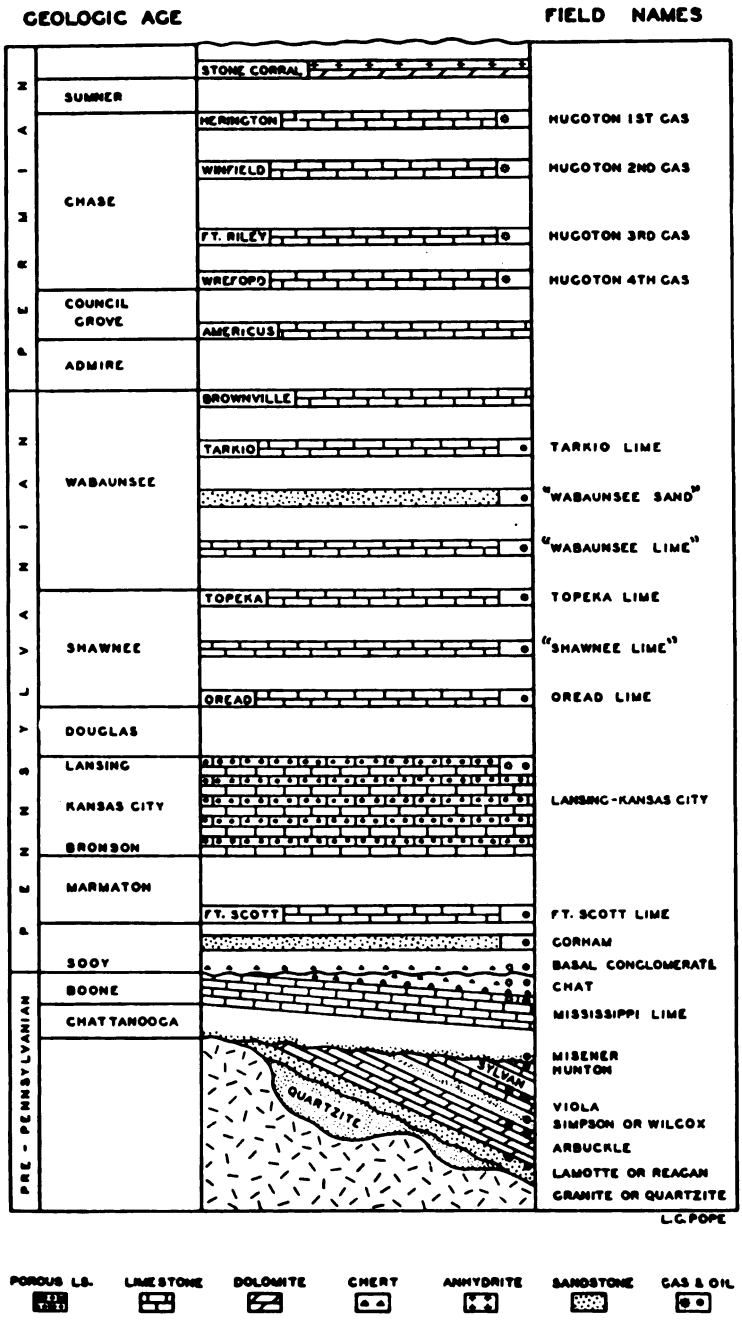

FIG. 1. Producing zones in western Kansas

1941 were the large pools in Russell and in Barton counties. For instance, the Hall-Gurney pool was intensively developed by inside wells and by wells on the periphery. Extensions in various directions make it seem probable that this pool soon will merge with several others. No less than 117 tests were drilled in this pool and only 7 were failures. In the famous Trapp pool of southern Russell county a total of 96 wells were completed, and 84 of these were oil wells. In the Silica pool of southeastern Barton county 95 test wells served to enlarge the area of production, 75 having been successful in finding oil.

In Rice county there has been special interest in the area around Chase. This pool now has spread out in all directions and promises soon to merge with the Campbell and Keesling pools and, possibly, also with the Haferman pool. Another area where many wells were drilled and where the merging of a number of pools is imminent is in the northeastern corner of Barton county. There, the Prusa, Krier, Kraft, and other smaller near-by producing areas were enlarged and extended until few drilling locations are left between them. In Ellis county a similar situation exists at the boundaries of the Bemis-Shutts and adjacent pools. There, also, many inside wells were completed, and enough border wells were drilled to cause a merging of pool boundaries.

Among the smaller pools, the record of the Ray pool in Phillips county drew the spotlight during 1941. No less than 32 additional wells in this pool were completed, and a new producing zone was discovered. Similarly, the Pawnee Rock pool in northeastern Pawnee county had some large wells, which so stimulated exploration that the pool itself was much enlarged and a large number of wells that tested an area with a radius of 20 miles in every direction from the pool were started. The Pawnee Rock East pool, a new discovery of 1941, represents either a long extension of the Pawnee Rock pool or a new pool, which will become the focal point of considerable drilling during the coming year.

Exploration record.—The record for 1941 is one of feverish activity in certain areas in western Kansas, activity that will make the year 1941 stand out as a year of determined wildcat exploration. One such area is in western Barber county. Two new pools were discovered there by wildcat drilling, and a new producing zone—the Kansas City-Lansing limestone—was found. In Graham county, on the northwestern fringe of the oil region, 10 exploratory test wells were drilled; they are scattered throughout the county. One of these opened a new pool, but the others were failures. In south-

eastern Kingman county, one promising outpost well was abandoned as a failure. In Ness county, also, a rather interesting wildcat was started, but the location proved to be dry.

In Phillips county, the success of drilling in the Ray pool spurred operators to spread their efforts in all directions, and one new pool was the reward for the drilling of five well-placed and scattered wildcat operations. In Pratt county, drilling was stimulated by the production obtained from the Viola limestone in the Cairo pool. Eleven tests, scattered over the area of the county, were completed during the year. Two of these opened up gas pools of doubtful value, and the rest were failures. In Rooks county, the favorable results of drilling in the Laton pool encouraged wildcatters to start 7 wells. One of these, situated several miles southeast of the Ray pool, was successful in finding a new oil pool. Another one, situated in the opposite corner of the county, opened a second pool (Erway pool), but the remaining tests were dry. In Rush county, 3 dry holes testify to the venturesome spirit of the wildcatter.

In no county was the search carried on in a more determined spirit than in Norton county. Here it was believed that the possibility of finding oil in stratigraphic traps perhaps was greater than elsewhere. Furthermore, the successful drilling campaign in near-by Phillips and Graham counties held considerable promise of similar conditions in Norton county. Also, it may be recalled that a very good showing had been found during the previous year in the short-lived Van Patten pool. Therefore, no less than 10 test wells were started in various parts of Norton county. Although only one of these was successful in finding oil, the search will go on.

This exploration record clearly demonstrates that the finding of oil is becoming more difficult each year, for practically all the test wells mentioned were located on good geographical premises. In many cases, expensive surveys of a geophysical nature had been made to corroborate the geological deductions from subsurface geology. In other cases, the exploratory work included core-drill information as well as information from other sources.

Acknowledgments.—The information contained in this report has been compiled from many sources. The cards of the Kansas Well Log Bureau have proved to be of great help, and information contained in the trade journals has been used. More valuable has been the generous help obtained from geologists in Wichita. Among those who furnished the most data are: Theo. Morgan, J. H. Page, Zenas Stucky, Anthony Folger, George Berry, Harold Smedley, Edward Koester, and Raymond Whortan.

TABLE 1.—*New pools found in western Kansas during 1941*

COUNTY AND POOL	Location	Discovery well	Producing zone	Depth	Date
Barber County:					
Skinner (oil)	21–31–14W	Deep Rock No. 1 Skinner	Viola	4531–95	September
Sun City (oil)	35–30–15W	Pryor and Lockhart No. 1 Massey	K. C.-Lans.	4344–55	December
Barton County:					
Ainsworth Northwest (oil)	28–16–13W	Continental No. 1 Stosskopf	Arbuckle	3391–3402	April
Ainsworth West (oil)	5–17–13W	Bartlett No. 1 Wondra	Arbuckle	3358–61	August
Bergtal (gas)	22–20–15W	Helmerick and Payne No. 1 Schmidt	Arbuckle	3667–92	September
Kowalsky (oil)	32–20–11W	Sinclair No. 1 Kowalsky	Arbuckle	3378–84	December
Kruckenberg (gas)	11–19–15W	Schermerhorn No. 1 Merten	Lamotte	3530–50	April
Kraft-Prusa Northeast (oil)	36–16–11W	J. J. Lynn No. 1 Kraft	Arbuckle	3348–55	December
Pawnee Rock East (oil)	17–20–15W	Helmerick and Payne No. 1 Unruh	Arbuckle	3814–19	November
Stickney (oil)	29–16–13W	Mabee No. 1 Stosskopf	Arbuckle	3373–79	August
Ellis County:					
High Spot (oil)	28–12–16W	Stearns Drilling No. 1 Witt	K. C.-Lans.	3620–26	February
Sugarloaf (oil)	17–13–17W	Derby No. 1 Miller	Arbuckle	3645–46	March
Sugarloaf Southeast (oil)	28–13–17W	Darby No. 1 "A" Dreiling	K. C.-Lans.	3348–51	September
Graham County:					
Gettysburg (oil)	7– 8–23W	Cities Service No. 1 Montgomery	K. C.-Lans.	3725–55	September
Kearny County:					
Patterson (oil)	23–22–38W	Stanolind No. 1 Patterson	Patterson	4748–52	August
Norton County:					
Hewett (oil)	11– 4–21W	Phillips No. 1 Hewett	K. C.-Lans.	3404–07	July
Pawnee County:					
Zook (gas)	16–23–16W	Stanolind No. 1 Smith	Arbuckle	4066–70	December
Phillips County:					
Dayton (oil)	36– 2–19W	Carter No. 1 Friebus	K. C.-Lans.	3430–38	June

TABLE 1—*Concluded*

COUNTY AND POOL	Location	Discovery well	Producing zone	Depth	Date
Pratt County:					
Stark (gas)	18–26–11W	Reeves No. 1 Stark	Viola	4121–25	April
Ward (gas)	11–26–12W	Central Petroleum No. 1 Ward	Viola	4107–21	December
Reno County:					
Friendship (oil)	30–25– 4W	Rocket Drilling No. 1 Soper	Viola	3981–86	November
Hendrickson (oil)	2–23–10W	Iron Drilling No. 1 Hendrickson	Simpson	3736–44	December
Peace Creek (oil)	21–23–10W	Simpson Oil No. 1 Showbarger	Viola	3773–76	July
Peace Creek Northeast (oil)	11–23–10W	Leader Oil No. 1 Tonn	Viola	3757–60	December
Schweizer (oil)	31–22– 9W	Hinckle No. 1 Schweizer	Viola	3720–25	December
Rice County:					
Bornholdt West (oil)	36–20– 6W	Westgate-Greenland No. 1 Harder	"Chat"	3330–70	November
Welch East (oil)	1–21– 6W	Aladdin No. 1 Lackey	"Chat"	3341–46	October
Rooks County:					
Erway (oil)	2–10–16W	Cities Service No. 1 Erway	K. C.-Lans	3136–3205	August
Ray Southeast (oil)	9– 6–20W	Derby No. 1 Steele	Lamotte	3601–20	December
Russell County:					
Forest Hill (oil)	29–15–12W	Central Petroleum No. 1 Steinle	Arbuckle	3318–20	July
Gustafson (oil)	14–15–12W	Central Petroleum No. 1 Gustafson	Arbuckle	3244–45	July
Mohl (oil)	18–14–13W	El Dorado Refining No. 1 Mohl	Lamotte	3255–58	October
Rusch (oil)	29–14–14W	Westgate-Greenland No. 1 Rusch	Arbuckle	3218–21	June
Stafford County:					
Ahnert (oil)	26–22–13W	Stanolind No. 1 Ahnert	Arbuckle	3748–52	June
Hitz (gas)	4–24–12W	Nelson Drilling No. 1 Hitz	Viola	3800–12	October
Macksville (oil)	3–24–15W	Stanolind No. 1 Nagel	K. C.-Lans	3811–27	March
Schaeffer (oil)	3–21–13W	Landon and Faulkner No. 1 Schaeffer	Lansing	3404–08	March
Trego County:					
Ogallah (oil)	1–28–21W	Shallow Water No. 1 Schaeffer	Arbuckle	3992–97	November

TABLE 2.—*Oil production (in barrels) by counties in western Kansas*

COUNTY	1941	Cumulative production, end 1941	Number of producing wells, end 1941
Barber	177,115	604,086	25
Barton	12,041,208	54,305,768	1,404
Clark	12,150	124,700	2
Ellis	8,740,076	25,575,545	769
Ellsworth	3,214,400	17,638,899	345
Finney	27,850	114,955	2
Graham	127,917	239,567	9
Harvey	687,600	20,417,311	114
Kearny	8,127	8,127	2
Kingman	512,700	2,718,703	82
McPherson	4,228,160	72,593,311	762
Ness	115,300	355,656	13
Norton	3,707	3,707	1
Pawnee	178,000	311,162	25
Phillips	200,836	219,761	32
Pratt	86,950	174,686	11
Reno	3,237,603	38,400,996	518
Rice	7,686,178	58,810,408	1,001
Rooks	686,867	1,869,942	98
Rush	160,300	1,602,826	26
Russell	15,705,665	84,149,972	2,029
Scott	137,150	1,039,612	9
Sedgwick	1,106,670	43,691,046	245
Stafford	5,454,693	15,510,599	531
Sumner	1,003,380	42,501,517	255
Trego	45,050	447,773	9

TABLE 3.—*Kansas natural gas production, in M cu. ft., according to records of Conservation Division, Kansas State Corporation Commission*

COUNTY AND FIELD	1940	1941	Increase or decrease
Barber county, Medicine Lodge	7,675,935	7,092,500	583,435
Barton county, miscellaneous	*	201,805	.....
Cowley, Sumner counties, miscellaneous	542,908	370,732	—172,176
Edwards county, McCarty	33,966	12,611	—21,355
Elk county, Schrader	447,627	379,810	—67,817
Ellsworth county, miscellaneous	*	24,083	.....
Harvey county, Hollow	190,318	103,013	—87,305
Sperling	59,960	34,956	—25,004
Jefferson, Leavenworth counties, McLouth	.....	1,667,101	1,667,101
McPherson county	5,122,903	4,175,090	—947,813
Pratt county, Cunningham	11,934,153	17,995,846	6,061,693
Reno county, Burrton	4,674,845	4,533,164	—141,681
Yoder	471,285	428,507	—42,778
Rice county, Lyons	2,955,567	2,422,392	—533,175
Orth	674,898	519,515	—155,383
Thurber (Alden)	405,805	3,358,303	2,952,498
Miscellaneous	*	11,901	.....
Rush county, Otis	9,709,901	8,988,337	—721,564
Stevens, Haskell, Morton counties, Hugoton	33,126,801	36,410,275	3,283,474
Sumner county, Wellington	639,809	696,832	57,023
Eastern Kansas, miscellaneous†	6,872,452	4,000,000	—2,872,452
Western Kansas, miscellaneous	78,652	.....	159,137
Totals	85,617,785	93,426,773	7,808,988 (Increase)

* Included with Western Kansas, miscellaneous.
† Partly estimated.

OIL AND GAS DEVELOPMENT IN WESTERN KANSAS COUNTIES

Barber County

The geology of Barber county and the significant data pertaining to the producing areas of this county have been described in previous publications of the State Geological Survey of Kansas (Mineral Resources Circular 13, and Bulletin 36). Up to the close of 1940, two gas pools and three oil pools had been found in Barber county. During the year 1941, two additional oil pools were found.

The oldest pool in the county is the Medicine Lodge pool, which is situated 10 miles south of the city of Medicine Lodge. The pool was discovered in 1927 and by the close of 1940 had a total of 34 gas wells and 2 oil wells extending over an area of approximately 6,400 acres. During 1941 the area of gas production was extended in a southwesterly direction by the successful completion of 2 wells in the northern half of sec. 20, T. 33 S., R. 13 W. Both wells were

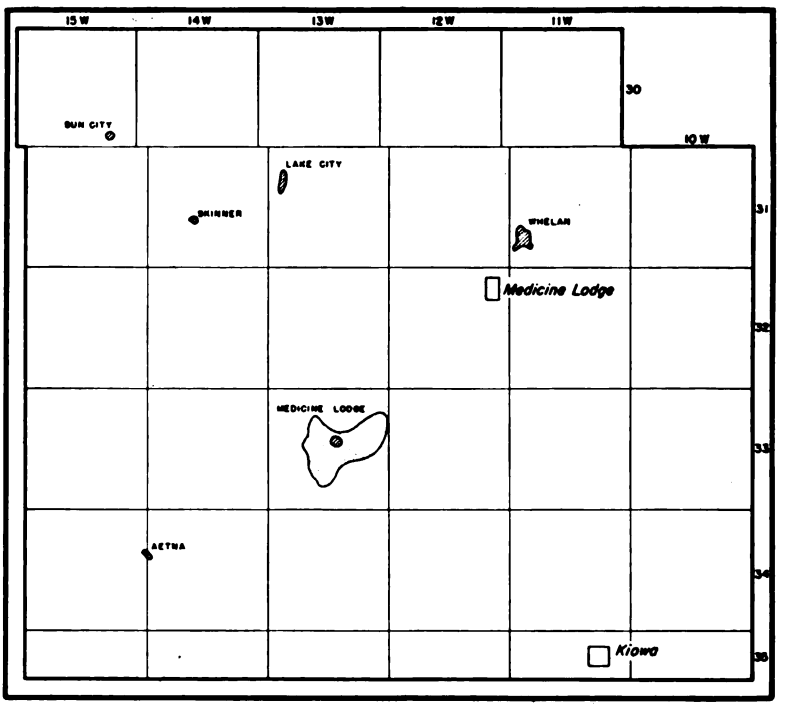

Fig. 2. Map of Barber county showing oil and gas pools. Oblique lines indicate oil pools; dots indicate gas pools.

drilled by the Barbara Oil Company. This company also drilled a test well in SE¼ sec. 15, which proved to be a failure.

The Whelan pool was the second to be discovered in Barber county. It is situated 3 miles northeast of the city of Medicine Lodge (fig. 2) and in the southwestern part of T. 31 S., R. 11 W. Up to the close of 1940 a total of 15 successful oil wells had been completed in this pool within an area of approximately 1,000 acres. During 1941 four additional test wells were drilled in an effort to extend the producing area. Two of these were successful in finding new supplies of oil, but the other two were dry holes. The successful wells are situated in sections 30 and 31, and both of the dry holes are situated in section 19.

Lake City pool.—The Lake City pool, discovered by Pryor and Lockhart in July, 1927, lies about 12 miles northwest of the city of Medicine Lodge in the northeastern portion of T. 31 S., R. 13 W. At the close of 1940 it had two producing oil wells, one of which obtained oil from the Viola limestone and the other from the Arbuckle dolomite. During 1941 Pryor and Lockhart drilled another test well on the Gant ranch (their No. 2 "C" well) in the northern half of NE¼ sec. 18. This well failed to produce from the Viola limestone and was drilled deeper to the Simpson formation, whch lies immediately below the Viola limestone. The top of the Simpson was found at 4,528 feet, and it was penetrated to a total depth of 4,541 feet, where a production test was made. This test showed approximately 300 barrels of oil per day and no water. The above discussion indicates that the Lake City pool now has three different producing zones, one for each of the three producing wells.

Sun City pool.—During 1941 two additional oil pools were found in Barber county. One of these was found in sec. 35, T. 30 S., R. 15 W., the extreme northwestern township of the county. The discovery well was drilled by Pryor and Lockhart as the No. 1 Massey well in NW¼ sec. 35. It encountered the Lansing limestone at a depth of 3,707 feet, the Viola limestone at 4,501 feet, and the Simpson formation at 4,596 feet. At 4,674 feet the top of the Arbuckle dolomite was found; this formation was penetrated 52 feet. Inasmuch as none of the Ordovician strata, which produce oil in the near-by Lake City pool, carried commercial quantities of oil, the well was plugged back to some favorable showings in the sequence of limestones known as the Kansas City-Lansing limestones. The casing was perforated between the depths of 4,342 and 4,356 feet. After proper treatment the well produced over 3,000 barrels, per day, of

oil having a gravity of 33 degrees A. P. I. This producing zone, although commonly productive in other counties farther northwest, heretofore has not been productive in Barber county. The discovery well in the Sun City pool was completed on November 21, 1941.

Skinner pool.—The second oil pool discovered during 1941 is the Skinner pool. The first well was drilled by the Deep Rock Oil Corporation on the Skinner ranch in the SW¼ sec. 21, T. 31 S., R. 14 W. The map (fig. 2) shows that this new pool lies 7 miles southwest of the Lake City pool and a somewhat greater distance southeast of the new Sun City pool. In the discovery well good saturation was found in the Viola limestone at 4,531 to 4,563 feet. Drilling was continued, however, down to the Arbuckle dolomite, the top of which was encountered at 4,780 feet. The Simpson sandstone, which in places contains commercial quantities of oil, was found at 4,665 feet, but was dry. After plugging back, the casing was perforated between 4,530 and 4,550 feet. Treatment with acid caused the well to flow approximately 30 barrels in 8 hours. The presence of some water with the oil has delayed completion of the hole, and the final status of the new pool, therefore, is still in doubt.

Dry holes.—Several rank wildcat wells were drilled in Barber county in an effort to find new production. One of these was drilled in the southeastern part of the county a few miles north of the city of Kiowa. It is the No. 1 Ishmael test, drilled by Pryor and Lock-

TABLE 4.—*Oil and gas pools of Barber county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Lake City, 7-31-13W	160	55,926	1 1 1	Arbuckle... Viola..... Simpson....	4,607 4,435 4,530
Medicine Lodge, 13-33-13W	80	45,703	2	Misener....	4,845
Whelan, 32-13-11W	700	502,457	18	"Chat"....	4,355
Medicine Lodge, (gas) 13-33-13W	5,000	51,205,000 M cu. ft.	33	"Chat"....	4,455
*Skinner, 21-31-14W	40	.....	1	Viola.....	4,531
*Sun City, 35-30-15	40	.....	1	K. C.-Lans.	4,344

* Discovered in 1941.

hart in sec. 35, T. 34 S., R. 11 W. With an elevation of 1,310 feet, this test hole encountered the Ft. Riley limestone at 1,930 feet, the Topeka limestone at 2,940 feet, and the Mississippian limestone at 4,646 feet. Inasmuch as Mississippian limestone has been found to contain both gas and oil in this county, the fact that it was completely dry in this test well was a disappointment. The limestone proved to be over 300 feet thick, the Kinderhook shale having been penetrated at 4,990 feet. Below the Mississippian formations the drill encountered the Ordovician Viola limestone at 5,052 feet, the Simpson formation at 5,142 feet, and the Arbuckle dolomite at 5,339 feet. The test was continued down to 5,351 feet, where it was abandoned as a dry hole.

Barton County

One of the most active areas in Kansas during 1941 was Barton county. No less than 315 test wells were drilled, of which 210 were oil wells, 4 were gas wells, and 100 were dry holes. Rank wildcat wells opened 5 new oil pools, 2 new gas pools and reëstablished the abandoned Straub pool to the ranks of producing areas. The most active areas in the county were the Kraft-Prusa and other pools in T. 16 S., R. 11 W., the southern end of the Trapp pool (Russell county), and the Silica pool. In the paragraphs below, the significant developments in these and all other active pools of the county are explained in detail. For convenience, the pools are described in alphabetical order, the same as in the table at the end of this chapter.

Beaver pool.—The Beaver pool is one of a large cluster of pools in the northeastern part of Barton county. In this pool 8 new oil wells were completed during 1941 and 3 dry holes were drilled within its area or close by. Some of the new wells received surprisingly large potential ratings. Three new oil wells in sec. 8 and one well in sec. 17, T. 16 S., R. 12 W., are producing from the Oread limestone at the base of the Shawnee group. The new well in section 21 of the same township and 4 wells in section 22 are producing from the Arbuckle dolomite.

Bloomer pool.—The Bloomer pool lies partly in Barton county and partly in adjoining Ellsworth county. During 1941, 22 new oil wells were completed, and 5 dry holes were drilled. Only 2 of the new oil wells lie in the Barton county portion of the pool. One of these is situated in sec. 25, T. 17 S., R. 11 W., and the other in section 36 of the same township.

Davidson pool.—The Davidson pool lies in the extreme northeastern part of the county. Three new oil wells were added to this pool during 1941.

Eberhardt pool.—The Eberhardt pool lies in the eastern part of Barton county several miles north of the Silica pool. Three additional oil wells were drilled in this pool in 1941. Two test wells were dry.

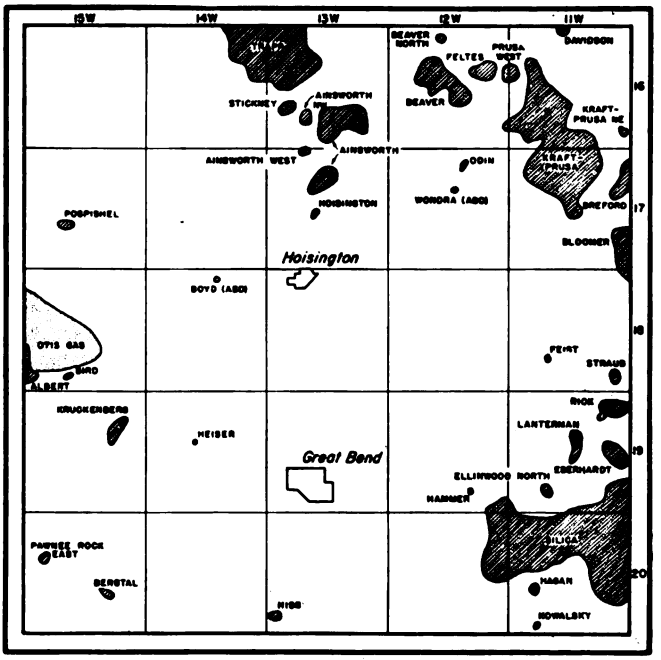

FIG. 3. Map of Barton county showing oil and gas pools. Oblique lines indicate oil pools; dots indicate gas pools.

Feltes pool.—In the Feltes pool, situated in the northeastern part of the county, 9 test wells were completed. Six of these are new oil wells and three are dry holes. Several of the wells have an extremely high potential oil capacity according to the depthograph method of measuring capacity.

Hiss pool.—The Hiss pool lies in the southern part of the county and rather apart from the other pools. It received an extension with the completion of a producer in sec. 31, T. 20 S., R. 13 W. One test well proved to be a failure.

Kraft-Prusa pool.—According to a list sent out by the Standing Committee on Oil Field Nomenclature and the special Oil Field

Nomenclature Committee of the Kansas Geological Society, in which all pools of Kansas are listed as of March 1, 1942, the numerous small producing areas in the northeastern portion of Barton county are united under one name. The new name of Kraft-Prusa eliminated the necessity of describing separately what formerly was known as the Kraft, Harzman, Krier, Prusa, Prusa Southeast, and Prusa North pools. The new name does not include, however, the Prusa West pool or the newly discovered Prusa Northeast pool. In this large area, no less than 75 new oil wells were added during 1941 and 16 dry holes were completed. The interesting stratigraphic relationships of this large producing area were described in June, 1940, in Bulletin 36 of the Kansas State Geological Survey.

Lanterman pool.—The Lanterman pool lies 3 miles north of the Silica pool in the southeastern part of Barton county. Considerable drilling took place here in 1941 and resulted in the completion of 8 test wells and the deepening of 2 old wells. In sec. 15, T. 19 S., R. 11 W., one new oil well was added, one dry hole was completed, and one well was recompleted at a greater depth. One dry hole was drilled in section 21. In section 22 three additional oil wells and two dry holes were completed, and one well was recompleted at a greater depth. At present, the pool has 6 wells producing oil from the Lansing limestone and 4 wells producing from the Arbuckle dolomite.

Rick pool.—The Rick pool is situated along the eastern border of Barton county about 6 miles north of the Silica pool. It experienced a sudden revival during 1941 because of the more or less accidental discovery that oil might be present in the Kansas City-Lansing limestone sequence. At the close of 1940, five Arbuckle wells were listed, but during 1941 one of these was plugged back to the Lansing limestone with very encouraging results. Several old dry holes, one of which was situated in a sinkhole of considerable depth, were reopened and completed as producing wells in the upper limestone zone. The pool now has 7 Lansing wells and 2 Arbuckle producers. In spite of this good showing there were 4 failures drilled in the area of the pool.

Silica pool.—The largest pool in Kansas at the present time is the Silica pool, part of which lies in Barton county and part in Rice county. Of a total of 95 test wells completed here during 1941, 76 were oil wells. The pool derives most of its oil from the Arbuckle dolomite, but a few wells obtain oil from the Lansing limestone. The production of the Silica pool for the year 1941 was 36,747,888

barrels. Wells situated in Barton county accounted for 20,059,694 barrels or more than half of the total. The area of the pool is now approximately 32,000 acres and the limits have not been found. The southern side of the pool had some important extensions during the year.

Trapp pool.—The Trapp pool, which lies mostly in Russell county, received some important extensions during 1941 in the Barton county portion. In fact, the extensions on the south suggest that before long this pool will merge with the rapidly expanding Ainsworth area. During 1941, the latter was expanded in two directions by the opening of the Ainsworth Northwest and the Ainsworth West pools. The distance separating the two areas is now less than 1.25 miles with no dry holes intervening. In the Barton county portion of the Trapp pool 36 new oil wells were added and 10 dry holes were drilled. The production of the Trapp pool during 1941 was 25,461,807 barrels. The wells situated in Barton county accounted for 5,800,818 barrels or approximately one-fourth of this total.

New pools.—During 1941 no less than 5 new oil pools were found in Barton county. One of these is the Ainsworth Northwest pool which was discovered by the Continental Oil Company when it completed the No. 1 Stosskopf well in the SW¼ sec. 28, T. 16 S., R. 13 W. At the time of discovery, this well was situated about three quarters of a mile from the nearest well in the Ainsworth pool. It produces oil from depths of 3,392 to 3,403 feet in the Arbuckle dolomite. Other wells were drilled rapidly, and before the end of the year the pool had 6 wells, 5 of which produce oil from porous zones in the Kansas City-Lansing limestone.

Ainsworth West pool.—The Ainsworth West pool was discovered by W. N. Bartlett in August, 1941. The first well was drilled on the Wondra farm in the NE¼ sec. 5, T. 17 S., R. 13 W. The discovery well, with an elevation of 1,903 feet, penetrated the Topeka limestone at 2,830 feet, the Lansing limestone at 3,118 feet, and the Arbuckle dolomite at 3,357 feet. A core taken from depths of 3,359 to 3,361 feet showed good saturation and porosity. The well filled with oil to a height of 1,800 feet in less than two hours. The State Corporation Commission assigned a potential of 296 barrels to this well. The nearest well in the Ainsworth pool is situated about three-quarters of a mile to the northeast.

Kowalsky pool.—On November 30, 1941, the Sinclair Oil Company completed a test well on the Kowalsky farm in the SW¼ sec. 32, T. 20 S., R. 11 W. With an elevation of 1,806 feet above sea

level, the test well reached the Topeka limestone at 2,915 feet and the Arbuckle dolomite at 3,377 feet. Porosity was found in the Arbuckle between 3,384 and 3,397 feet, from which depth the hole filled 1,900 feet in 12 hours. After 1,000 gallons of acid had been placed in the hole, the well made 40 barrels in 12 hours. It was reacidized twice, once with 1,000 gallons and again with 5,000 gallons, after which it pumped 80 barrels of oil in 12 hours. After further testing, the well was given a potential of 150 barrels per day. This new pool is situated almost 2 miles south of the nearest well in the Silica pool.

Kraft-Prusa Northeast pool.—In December, 1941, J. J. Lynn completed a test well on the Kraft farm in the southeastern part of T. 16 S., R. 11 W. This well found saturation in the Arbuckle dolomite between 3,369 and 3,370 feet, about 11 feet below the top of the formation.

Pawnee Rock East pool.—A number of large wells completed in the area of the Pawnee Rock pool of northeastern Pawnee county led to a marked drilling campaign in the vicinity of the pool. This excitement spread to adjacent parts of Barton county where 9 wildcat wells were completed. Of these, 2 were successful in finding new supplies of oil or gas. One was the Shell No. 1 Unruh well in the NW¼ sec. 17 S., T. 20 S., R. 15 W., which found oil in the Arbuckle dolomite. With an elevation of 2,083 feet above sea level, this test logged the Stone Corral dolomite at 1,099 feet, the Topeka limestone at 3,196 feet and the Lansing limestone at 3,506 feet. The top of the Arbuckle dolomite was penetrated at 3,799 feet. At 3,814 to 3,819 feet the porous zone was found, and the well swabbed 150 barrels in 24 hours. Acid was added, first 1,000 gallons and, later, 3,000 gallons, which caused the well to flow 40 barrels per hour. The oil has a gravity of 36 degrees A. P. I. A final test by the State Corporation Commission gave the well an official rating of 583 barrels per day. The well was completed on November 11, 1941.

New gas pools.—The determined drilling campaign in western Barton county, near the Pawnee Rock pool, was responsible for the discovery of the new *Bergtal* gas pool. The discovery well in this new pool was completed on September 26, 1941. It was the No. 1 Schmidt test drilled by Helmerick and Payne in the NW¼ sec. 22, T. 20 S., R. 15 W. The producing zone is the Arbuckle dolomite, which was penetrated at 3,667 feet. Porosity was found between 3,668 and 3,672 feet. The casing was perforated between 3,689 and 3,695 feet, where the well had a capacity of 14 barrels of oil and 1½ million cubic feet of gas per day.

Kruckenberg gas pool.—The second gas pool discovered in Barton county was the Kruckenberg gas pool. The discovery well was the Schermerhorn Oil Company No. 1 "B" Merten, completed in the SW¼ sec. 11, T. 19 S., R. 15 W. Inasmuch as this well is situated only 1.5 miles southeast of the large Otis gas pool, it may be a long extension of the Otis reservoir. The producing horizon is either the Lamotte sandstone or the "granite wash," which overlies the granite in this part of the county. The gas flow was estimated at 8½ million cubic feet per day, from a depth of 3,530 to 3,550 feet. The top of the Lamotte sandstone was found at 3,515 feet, and the "granite wash" was entered at 3,530 feet.

Exploratory wells.—In addition to the 9 wells drilled near the Pawnee Rock pool, at least 12 other rank wildcat wells were completed in Barton county during 1941. In T. 17 S., R. 12 W., Piggott and Johnson completed a dry hole in section 24 on the Beran farm. The Arbuckle dolomite was found here at 3,375 feet. In T. 17 S., R. 14 W., two wildcat tests were drilled. One of these is situated in section 10 and the other in section 24. In T. 18 S., R. 11 W., two dry holes were completed. The Derby Oil Company No. 1 Heinz, in section 10, found the Arbuckle dolomite at 3,330 feet. The other test was drilled by R. W. Shields on the Kimpler farm in section 31. In T. 18 S., R. 12 W., one well was completed in section 2 and another in section 12; both were dry. The Continental Oil Company completed its No. 1 Eveleigh, in sec. 11, T. 18 S., R. 13 W., as a dry hole. The top of the Arbuckle dolomite was encountered at 3,351 feet. In T. 20 S., R. 12 W., an interesting test well was drilled by the Kiowa Drilling Company, on the Christensen farm in section 17. Here the Stone Corral dolomite was logged at 665 feet, the Topeka limestone at 2,800 feet, the Lansing limestone at 3,187, and the Arbuckle dolomite at 3,467 feet. In the next township to the west the Rine Drilling Company drilled a test well on the Hart farm in sec. 9, T. 20 S., R. 13 W. It was dry with a total depth of 3,524 feet. Still farther west, in T. 20 S., R. 14 W., Earl Wakefield completed a test well on the McGill farm in section 18. Here the Stone Corral dolomite was encountered at 845 feet, the top of the Lansing limestone at 3,287 feet, and the Arbuckle dolomite at 3,628 feet. The stratigraphic sequence in T. 20 S., R. 15 W., was explored by a well drilled on the Mull farm in section 2. In this well the Stone Corral dolomite was penetrated at 901 feet, the Ft. Riley limestone at 1,935 feet, the Topeka limestone at 2,975 feet, the Lansing limestone at 3,308 feet, the Sooy conglomerate at 3,575 feet, and the Arbuckle dolomite at

TABLE 5.—*Oil and gas pools of Barton county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Ainsworth, 26-16-13W	5,000	2,108,193	1	Oread	2,925
			62	Arbuckle	3,390
*Ainsworth Northwest, 28-16-13W	200	14,625	5	K. C.-Lans	3,140
			1	Arbuckle	3,391
*Ainsworth West, 5-17-13W	40	3,840	1	Arbuckle	3,358
Albert, 30-18-15W	1,600	660,533	18	Lamotte	3,601
Beaver, 16-16-12W	1,200	983,593	6	Oread	2,885
			24	Arbuckle	3,348
			1	Lamotte	3,335
Beaver North, 4-16-12W	160	208,958	3	Arbuckle	3,316
*Bergtal (gas), 22-20-15W			1	Arbuckle	3,763
Bird, 33-18-15W	40	6,115	1	Lamotte	3,508
Bloomer, 36-17-11W	4,600	8,832,826	34	K. C.-Lans	3,044
			1	Sooy	3,310
			187	Arbuckle	3,257
Breford (see Ellsworth county)					
Davidson, 4-16-11W	300	66,500	3	K. C.-Lans	3,016
			4	Arbuckle	3,314
			2	Sooy	3,317
Eberhardt, 14-19-11W	320	228,300	1	K. C.-Lans	3,094
			7	Arbuckle	3,311
Ellinwood North, 33-19-11W	80	44,800	2	Arbuckle	3,328
Feist, 29-18-11W	40	50,856	1	Arbuckle	3,430
Feltes, 14-16-12W	600	251,475	13	Sooy	3,342
			1	Arbuckle	3,350

TABLE 5.—Continued

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Hagan, 20-20-11W	80	31,060	2	Arbuckle	3,323
Hammer, 35-19-12W	40	8,050	1	Arbuckle	3,348
Harzman, 33-16-11W (now part of Kraft-Prusa)	500	63,600	10	K. C.-Lans	3,124
Heiser, 16-19-14W	40	22,500	1	K. C.-Lans	3,228
Hiss, 31-20-13W	200	289,100	5	K. C.-Lans	3,270
Hoisington, 21-17-13W	160	83,100	1	K. C.-Lans	3,222
			2	Arbuckle	3,440
*Kowalsky, 32-20-11W	40		1	Arbuckle	3,378
Kraft, 10-17-11W (now part of Kraft-Prusa)	5,000	1,668,800	89	Arbuckle	3,281
*Kraft-Prusa Northeast, 36-16-11W	40		1	Arbuckle	3,357
Kraft-Prusa Northeast					
Krier, 30-16-11W (now part of Kraft-Prusa)	1,000	252,400	2	Topeka	2,845
			6	Shawnee	2,885
			7	K. C.-Lans	3,030
			11	Sooy	3,327
			2	Arbuckle	3,330
Kruckenberg, 14-19-15W	160		1	K. C.-Lans	3,342
			1	Arbuckle	3,580
*Kruckenberg (gas), 11-19-15W			1	Lamotte	3,325
Lanterman, 15-19-11W	400	315,400	6	K. C.-Lans	3,109
			4	Arbuckle	3,235
Odin, 10-17-12W	80	14,400	1	Arbuckle	3,340
Otis (see Rush county)					
*Pawnee Rock East, 17-20-15W	80	1,620	1	Arbuckle	3,814
Pospishel, 20-17-15W	80	15,500	1	Arbuckle	3,548

TABLE 5.—Concluded

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Prusa, 20-16-11W (now part of Kraft-Prusa)	1,000	903,300	1	Topeka	
			4	K. C.-Lans	3,160
			33	Arbuckle	3,335
			2	Lamotte	3,310
Prusa North, 18-16-11W (now part of Kraft-Prusa)	600	157,875	1	Shawnee	
			12	K. C.-Lans	3,133
			2	Arbuckle	3,328
Prusa Southeast, 34-16-11W (now part of Kraft-Prusa),	80	9,800	2	Arbuckle	3,394
Prusa West, 18-16-11W (now part of Kraft-Prusa)				K. C.-Lans	3,207
				Arbuckle	3,321
Rick, 1-19-11W	400	256,470	7	K. C.-Lans	3,106
			2	Arbuckle	3,355
Silica, 12-20-11W	32,000	36,747,900	10	K. C.-Lans	2,955
			783	Arbuckle	3,328
*Stickney. 29-16-13W			3	Arbuckle	3,390
†Straub, 36-18-11W	40	4,239	1	K. C.-Lans	3,122
Trapp (see Russell county)					
Wondra, 15-17-12W (abandoned)				K. C.-Lans	3,054

* Discovered in 1941.
† Reopened during 1941.

3,652 feet. Six other dry holes were completed in the same township. All were drilled to the Arbuckle dolomite and must be considered adequate test holes for the locations drilled. One dry hole was completed in each of sections 8, 9, 16, 20, 23, and 30.

Clark County

The history of oil and gas development in Clark county has been summarized in previous reports of the State Geological Survey of Kansas. In Mineral Resources Circular 13 the stratigraphic section is described and the early history of the Morrison oil and gas pools is described. In Bulletin 36 the history of oil and gas development to the end of 1940 is presented. During the year 1941 no wells were drilled in Clark county.

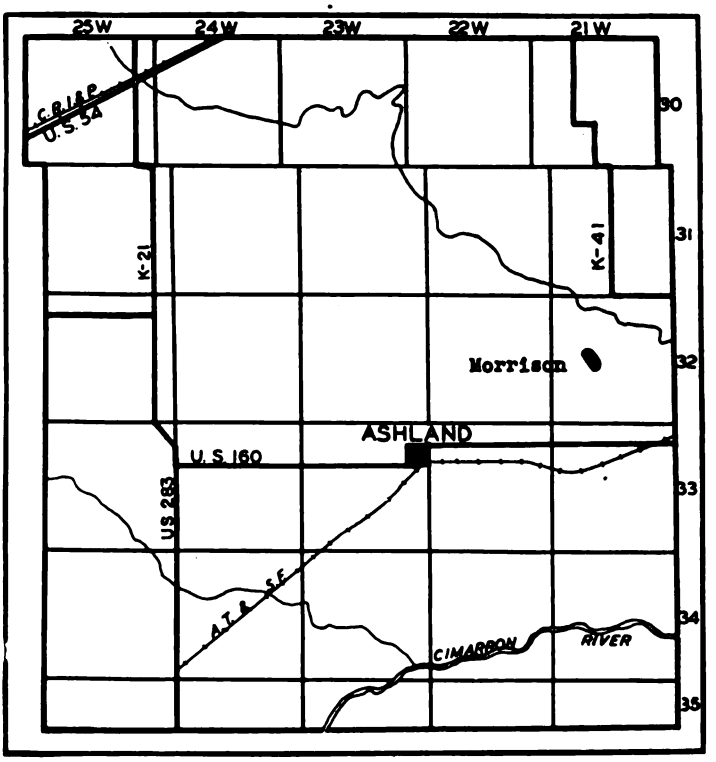

Fig. 4. Map of Clark county showing oil and gas pools.

TABLE 6.—*Oil and gas pools of Clark county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Morrison (oil), 17-32-21W.	160	124,700	2	Viola.....	6,467
Morrison (gas), 21-32-21S.	1,000	.....	1	Sooy.....	5,443

ELLIS COUNTY

During the year 1941 much drilling took place in Ellis county, and no less than 161 test wells were completed. Of these, 129 were successful in finding oil, and the remaining 32 were dry holes. Three of the rank wildcat wells uncovered new reserves of oil and opened 3 new pools, the High Spot, Sugarloaf, and Sugarloaf Southeast pools. As in former years, the most intensive drilling took place in and around the Bemis-Shutts pool and the Burnett pool. In these two pools no less than 111 test wells were started, among which only 8 were failures. The early history of the pools in Ellis county is described in Mineral Resources Circular 10; and in Mineral Resources Circular 13 and Bulletins 28 and 36 developments are brought up to the end of 1940. The developments which form the record for the year 1941 are discussed in the paragraphs below. For the sake of convenience, the pools are described in geographic groups, beginning with the ones in the northern part of the county.

Bemis-Shutts pool.—According to a list prepared by the Nomenclature Committee of the Kansas Geological Society, the Bemis-Shutts pool now includes all production in the three eastern rows of sections in T. 11 S., R. 17 W., with the exception of one well in section 35. It also includes all production in section 29 and the eastern half of section 32. All production in T. 12 S., R. 17 W., the next township to the south, is included, with the exception of the NW¼ sec. 6. Thus, the pool now covers an area of about 20 sections or 12,800 acres. During 1941, the pool was extended into sec. 19, T. 11 S., R. 16 W., where the Sinclair Oil Company and the Cities Service Oil Company completed 6 additional wells in section 19. An important extension also was recorded along the western side of the pool, with the completion of additional wells in secs. 21 and 29, T. 11 S., R. 17 W.

An interesting well in this pool is the Phillips Petroleum Company No. 1 Kessler well in sec. 32, T. 11 S., R. 17 W. This well originally was completed in 1930 at 3,285 feet with a potential of 20 barrels per hour. In 1933 it was deepened to 3,305 feet, where it swabbed 160 barrels in 22 hours with a small amount of water. During 1941 this well was drilled to 3,490 feet and received a new potential rating of 830 barrels per day. There are 3 dry holes immediately east of the well.

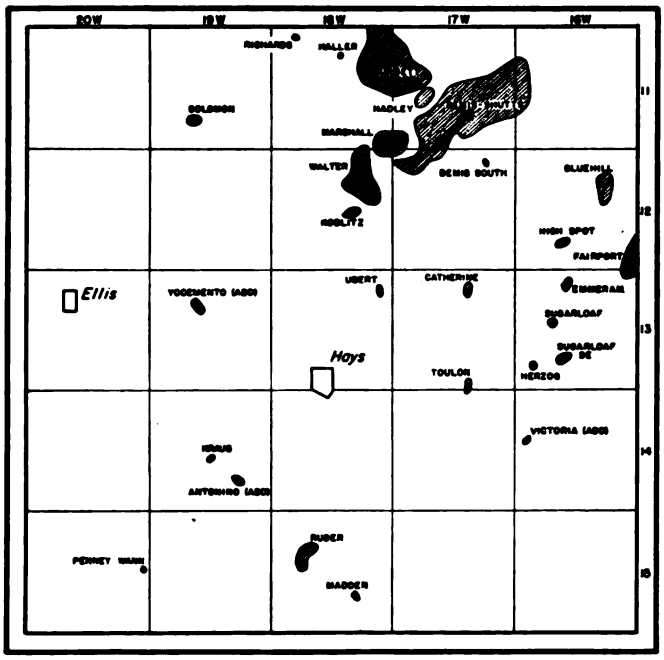

FIG. 5. Map of Ellis county showing oil pools.

Burnett pool.—The Burnett pool is situated northwest of the Bemis-Shutts pool. At present, the distance separating the two pools is less than one mile, and it is reasonable to assume that within a year the pools will merge to form one producing area. During 1941, 59 test holes were drilled in and near the Burnett pool, of which 54 are new oil wells; only five were failures. Most of the new wells were drilled in sec. 17, T. 11 S., R. 17 W., and in secs. 11 and 14, T. 11 S., R. 18 W. Further extension seems probable, although a number of dry holes on the west side may indicate the limits of the pool in that sector. The pool now has an area of approximately 5,000 acres.

One of the significant developments of the past year was the success attained in 3 wells that had been completed as dry holes but later were converted into oil wells by an engineering feat. One of these is the No. 11 "D" Hadley well of the Champlin Refining Company, in sec. 17, T. 11 S., R. 17 W., which was completed originally as a dry hole in May, 1941. This well evidently found a sinkhole in the Arbuckle dolomite, inasmuch as the original total depth of 3,750 feet was insufficient to reach the fresh Arbuckle rock. Reworked Arbuckle was logged from 3,681 to 3,750 feet. This well was plugged back to 1180 and redrilled by means of a shipstock technique. In this manner the sinkhole was avoided, and the bit drilled into the fresh Arbuckle dolomite at a new depth of 3,466 feet. The well was completed at 3,480 feet and acidized with 1,000 gallons; the new potential capacity was 1,578 barrels. The difference in elevation of the Arbuckle dolomite thus is at least 284 feet, and one must postulate a sinkhole of considerable size and depth to account for this difference. The other two wells thus restored are the Dickey No. 7 Husted in section 18, and the Carmichael No. 3 "D" in section 8. These 3 restored wells have been described by Joseph Kornfeld in the February, 1942, issue of Petroleum Engineer.

Marshall pool.—The Marshall pool lies west of the Bemis-Shutts pool. At present, the distance between the margins of two pools is about three quarters of a mile, and it seems reasonable to suppose that they will be merged in the near future. Dry holes in the center of sec. 32, T. 11 S., T. 17 S. and sec. 6, T. 12 S., R. 17 W. seem to constitute a barrier between the two producing areas. During 1941 five new oil wells were added in the Marshall pool.

Koblitz pool.—The Koblitz pool lies 6 miles southwest of the Bemis-Shutts pool. It was discovered in May, 1937, and had 6 wells at the close of 1940. During 1941 three additional oil wells were added. All produce from the Arbuckle dolomite.

Bluehill pool.—Along the eastern side of Ellis county there are 4 pools in which some drilling was done during 1941. They are the Fairport, Bluehill, Emmeram and Herzog pools. In the Bluehill pool 3 additional oil wells were completed. One test in the SW¼ sec. 2, T. 12 S., R. 16 W. was a dry hole.

In the *Fairport* pool, which lies mainly in Russell county, one well was reconditioned by plugging back 31 feet. It is the Mid-West No. 2 Austin well in sec. 36, T. 12 S., R. 16 W. This well originally was completed in 1930 at a depth of 3,069 feet and with a capacity of 250 barrels. In 1932 it was deepened to 3,070 feet, where it was ca-

pable of producing 50 barrels of oil. In 1941 it was reworked and plugged back to 2,999 feet, where a new potential of 48 barrels was established. A dry hole in section 35 of the same township was the only other completion.

In the *Emmeram* pool 3 new oil wells were added. A dry hole in sec. 9, T. 13 S., R. 16 W., tested both the Lansing and the Arbuckle producing horizons without favorable results.

In the *Herzog* pool 2 wells with large initial potential production were completed during 1941. This pool was opened to production by the Gulf Oil Company in 1940. The same company completed one new oil well in sec. 30, T. 13 S., R. 16 W., and another in section 31.

New pools.—During 1941 three new oil pools in Ellis county were uncovered by wildcat test holes. One of these is the *High Spot* pool in T. 12 S., R. 16 W., midway between the Bluehill and the Emmeram pools. The Stearns Drilling Company drilled the discovery well in section 28 on the Katie Witt farm. The log shows the top of the Topeka limestone at 3,020 feet and the Lansing limestone at 3,342 feet. At 3,502 feet a good show of oil gave promise of production; the test nevertheless was drilled down to the Arbuckle dolomite, the top of which was penetrated at 3,609 feet. The well was then plugged back to 3,527 feet, and a test was made of the porosity in the Kansas City-Lansing limestones. The well later received a potential rating of 650 barrels per day. An offset well drilled by the Cities Service Oil Company in the NE¼ sec. 28 proved to be a dry hole.

Sugarloaf pool.—The second pool discovered in Ellis county during 1941 was the Sugarloaf pool. The discovery well was drilled by the Derby Oil Company on the Miller farm in the SW¼ sec. 17, T. 13 S., R. 17 W. With an elevation of 2,143 feet above sea level, the test well encountered the top of the Stone Corral dolomite at 1,348 feet, the Ft. Riley limestone at 2,235 feet, the Topeka limestone at 3,151 feet, and the Lansing limestone at 3,426 feet. Oil shows appeared at 3,426 to 3,429, at 3,469 to 3,472, and at 3,486 to 3,501 feet. The last showing was in an oolitic limestone. The gravity of the oil is 30 degrees A. P. I. At greater depths in the well, oil was found in the Arbuckle dolomite, the top of which was entered at 3,645 feet. The porous zone in the dolomite extends from depths of 3,645 to 3,648 feet. The initial potential production of the well is 482 barrels. Before the close of the year one additional producer and three dry holes had been completed in this pool.

TABLE 7.—*Oil pools of Ellis county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Bemis-Shutts, 16-11-17W	12,000	15,944,700	425	Arbuckle	3,380
Bemis South, 2-12-17W	40	15,800	1	Arbuckle	3,592
Blue Hill, 14-12-16W	700	374,450	3	Topeka	3,030
			14	K. C.-Lans	3,072
			2	Arbuckle	3,360
			1	Wilcox	3,391
Burnett, 1-11-18W	5,000	5,446,000	2	K. C.-Lans	3,093
			203	Arbuckle	3,570
Catherine, 3-13-17W	160	123,700	2	K. C.-Lans	3,262
Emmeram, 4-13-16W	160	64,512	4	K. C.-Lans	3,260
Hadley, 20-11-17W	40	58,562	1	K. C.-Lans	3,428
Haller, 10-11-18W	40	13,860	1	Topeka	3,036
Herzog, 30-13-16W	120	48,140	3	Arbuckle	3,450
*High Spot, 28-12-16W	40	2,694	1	Arbuckle	3,620
Koblitz, 23-12-18W	800	132,707	8	Arbuckle	3,694
Kraus, 22-14-19W	100	58,900	2	Sooy	3,735
Madden, 26-15-18W					
Marshall, 36-11-18W	1,000	653,750	18	Arbuckle	3,638
Penny Wann, 13-15-20W	40	34,100	1	Sooy	3,653
Richards, 5-11-18W	120	81,150	2	K. C.-Lans	3,332
Ruder, 17-15-18W	700	692,950	12	K. C.-Lans	3,422
			2	Arbuckle	3,572
Solomon, 28-11-19W	160	78,800	3	Arbuckle	3,629
*Sugarloaf, 17-13-17W	80	10,325	2	Arbuckle	3,645
*Sugarloaf Southeast, 28-13-17W	40	2,935	1	K. C.-Lans	3,312
Toulon, 3-14-17W	200	173,900	4	K. C.-Lans	3,298
			1	Arbuckle	3,512
Ubert, 12-13-18W	160	155,050	5	Arbuckle	3,707
Walter, 2-12-18W	1,400	1,398,550	1	Topeka	3,160
			41	Arbuckle	3,619

* Discovered in 1941.

Sugarloaf Southeast pool.—The Sugarloaf Southeast pool is situated 1½ miles southeast of the Sugarloaf pool. The discovery well was drilled by the Darby Petroleum Company on the Dreiling farm in the NW¼ sec. 28, T. 13 S., R. 17 W. It obtained production from the Lansing limestone between the depths of 3,348 and 3,351 feet.

Exploratory wells.—Five test wells situated a considerable distance from known productive areas, and therefore entitled to the rating of rank wildcat wells, were completed in Ellis county during 1941. One of these was the Falcon-Seaboard No. 1 Wassinger well, in sec. 20, T. 11 S., R. 18 W. In this test the Ft. Riley limestone was penetrated at 2,065 feet, the Topeka limestone at 2,940 feet, and the Lansing limestone at 3,193 feet. At greater depths the bit entered the Simpson formation at 3,488 feet and the Arbuckle dolomite at 3,516 feet. The showings were not sufficiently important to indicate that this well would be a producer, and it was abandoned at 3,538 feet.

Ellsworth County

The oil pools of Ellsworth county lie mostly in the southwestern part of the county and have a strike parallel to the axis of the Central Kansas uplift. The Lorraine pool is an exception to this rule inasmuch as it trends northeast and southwest, due, no doubt, to the arching of the strata. The Edwards pool extends into the adjacent county on the south. The Breford and Bloomer pools also extend into adjacent counties. For details regarding the early history of development in this county the reader is referred to Mineral Resources Circular 10 and subsequent reports issued by the State Geological Survey. The areal geology and the subsurface geology were described in the first-named report. Bulletin 36 presents statistical data up to the close of 1940. In the present report the developments of 1941 are treated. For the sake of convenience, the pools are described in geographic order from east to west. During 1941, 123 test wells were drilled in Ellsworth county. Of these, 99 proved to be oil wells, 1 was a gas well, and the remaining 23 were dry holes.

Edwards pool.—In the portion of the Edwards pool that lies in Ellsworth county considerable drilling took place during 1941. No less than 22 new oil wells were added to the previous total of this pool. These wells all found production in the Arbuckle dolomite.

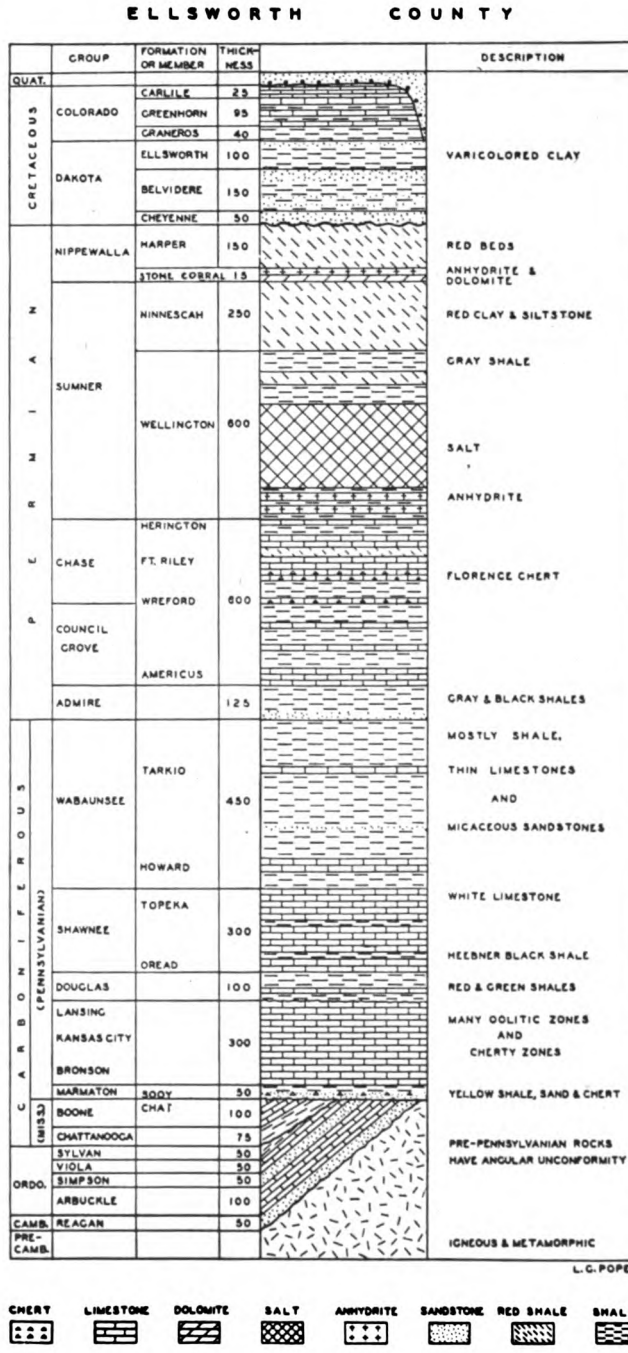

FIG. 6. Columnar section of rocks in Ellsworth county. "Reagan" should be read "Lamotte." Drawn by L. G. Pope from data prepared by author.

Lorraine pool.—The Lorraine pool was discovered in November, 1934, by the Twin Drilling Oil Company. It produces oil from the Arbuckle dolomite and also from the Kansas City-Lansing limestone. Inasmuch as the pool seems to be well defined, the drilling during 1941 was on a very restricted scale. The Texas Oil Company reworked one of its wells, the No. 1 Rolfs in sec. 13, T. 17 S., R. 9. W. Completed originally in 1935 with a potential capacity in the Arbuckle dolomite of 1,350 barrels at 3,212 feet, this well was plugged back to 3,081 feet in the Lansing limestone for a new potential of 16 barrels.

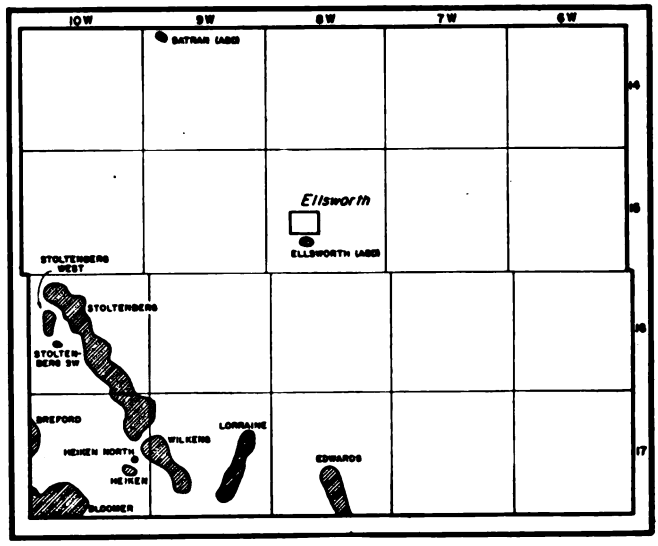

FIG. 7. Map of Ellsworth county showing oil pools.

Stoltenberg pools.—The main Stoltenberg pool extends in a northwest-southeast direction from the northwestern part of T. 16 S., R. 10 W., to the northeastern part of T. 17 S., R. 10 W. It has seen rapid development during the past 3 years. Incidental to the drilling of this pool was the discovery of oil in two closely adjacent areas, the Stoltenberg West and the Stoltenberg Southwest pools. In this general producing area a large number of additional wells were drilled during 1941. Of the total, 31 are new oil wells and 8 are dry holes. One of the early wells drilled by Stanolind on the Julius Stoltenberg farm (No. 2 well) and completed with a very large potential production, was deepened from 3,308 feet to 3,318 feet without any production increase. It therefore was plugged back to the

old depth and recompleted for a potential of 19 barrels of oil and 35 barrels of water in 8 hours. The Skelly Oil Company drilled a salt water disposal well on the Louis Meyer farm in sec. 35, T. 16 S., R. 10 W.

Wilkens pool.—The Wilkens pool lies on the same trend as the Stoltenberg pool and, at present, is separated from the latter by a distance of less than one mile. Considerable drilling took place in 1941. Of 24 attempts to find production, 19 were successful and 5 were failures. The new wells are situated mostly in secs. 18 and 19, T. 17 S., R. 9 W. One well completed in 1940 was drilled 107 feet deeper to increase production. It is the No. 3 Frances well of the Central Petroleum Company in section 19. The pool now has 62 oil wells producing from the Arbuckle dolomite.

Breford pool.—The Breford pool was discovered in September, 1932. By the close of 1940 it had been extended to include 700 acres and 19 wells. Two producing horizons have been found, the Arbuckle dolomite and the Lansing limestone. During 1941, the pool was enlarged still further and now contains 28 producing wells. In the Ellsworth county portion of the pool one new producer and three dry holes were completed. In addition, one of the older wells was drilled deeper. It was the Magnolia Petroleum Company No. 5 Louisa Andrea well, in sec. 7, T. 17 S., R. 10 W. Originally completed in 1937 for 400 barrels at 3,087 feet, it was recompleted at 3,333 feet for a potential capacity of 280 barrels. The new producing zone is in the Arbuckle dolomite.

Bloomer pool.—The Bloomer pool extends northward into Ellsworth county from Rice county to the south. It has been a very prolific producing area in the past, and a goodly number of additional wells were drilled during 1941. In the Ellsworth portion of the pool area, 19 test wells were completed. Of these, 16 proved to be new oil wells and only 3 were dry holes.

Ellsworth gas pool.—The Ellsworth gas pool was discovered in April, 1935, when a flow of gas was found in the Wabaunsee formation at a depth of 2,195 to 2,200 feet. The pool later was abandoned. During 1941, this pool was reopened when Donald Ingling obtained a flow of gas from a depth of 2,555 feet in the SW¼ sec. 29, T. 15 S., R. 8 W. The gauge showed gas amounting to 2,176,000 cubic feet per day.

TABLE 8.—*Oil pools of Ellsworth county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Breford, 7-17-10W	1,200	1,259,950	8 20	K. C.-Lans. Arbuckle	3,140 3,368
Edwards (see Rice county)					
Heiken, 25-17-10W (now part of Wilkens pool)				Arbuckle	3,269
Heiken North, 24-17-10W					
Lorraine, 13-17-9W	5,500	8,288,950	30 59	K. C.-Lans. Arbuckle	3,060 3,200
Stoltenberg, 22-16-10W	5,200	6,607,222	158	Arbuckle	3,333
Stoltenberg Southwest, 20-16-10W	320	15,470	8	Arbuckle	3,349
Stoltenberg West, 17-16-10W (now part of Stoltenberg)				Arbuckle	3,365
Wilkens, 13-17-10W	3,600	1,467,307	62	Arbuckle	3,260

FINNEY COUNTY

A full account of the areal geology and stratigraphy of Finney county is contained in Mineral Resources Circular 10 published in 1938 by the State Geological Survey of Kansas. The history of oil and gas development has been brought up to date, year by year, in Mineral Resources Circular 13 and in Bulletins 28 and 36. Bulletin 36 describes the developments for the year 1940 and indicated that the gas wells in Finney county now are incorporated in the *Hugoton* gas field of southwestern Kansas. It also describes the Nunn oil pool, situated in the extreme northwestern township of the county. During 1941 two additional gas wells were drilled in Finney county, raising the total number of such wells to five. One of the new gas wells was drilled by the Kansas Pipe Line and Gas Company on the Spratt ranch, in sec. 31, T. 24 S., R. 33 W. This well was rated as having a potential capacity of 5,291,000 cubic feet of gas per day with a pressure of 395 pounds at the well head. The total depth of the well is 2,763 feet, and the gas comes from the porous lime-

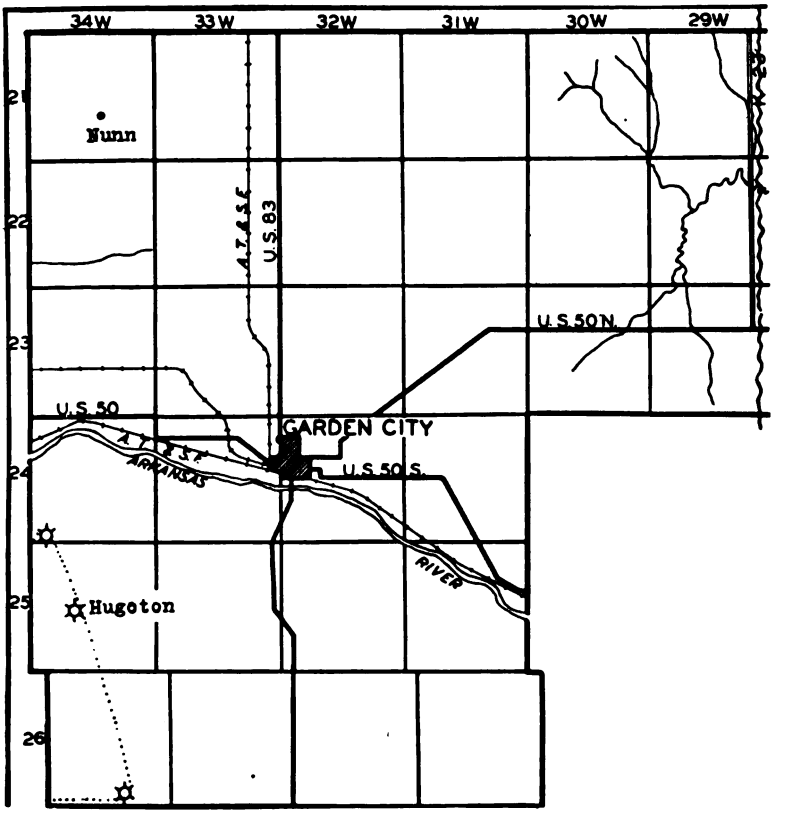

FIG. 8. Map of Finney county showing oil and gas pools.

stone of the Big Blue division of the Permian system. The second well was drilled on the Brown ranch, in sec. 20, T. 25 S., R. 34 W., by the Northern Natural Gas Company. It is rated as having a daily capacity of 3½ million cubic feet of gas.

TABLE 9.—*Oil pool of Finney county*

POOL AND LOCATION	Area, acres	Cumulative prodution to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Nunn, 27-21-34W.....	800	114,955	2	"Mississippi lime"	4,654

Graham County

Graham county was first listed in 1938, as a producing county. The areal geology and the stratigraphy of the oil-producing area was described in Bulletin 28, published in 1939 by the State Geological Survey of Kansas. Subsequent developments were described in Bulletin 36, which treats the history up to the close of 1940. At that time there were two oil pools in the county, the Morel and the Penokee pools.

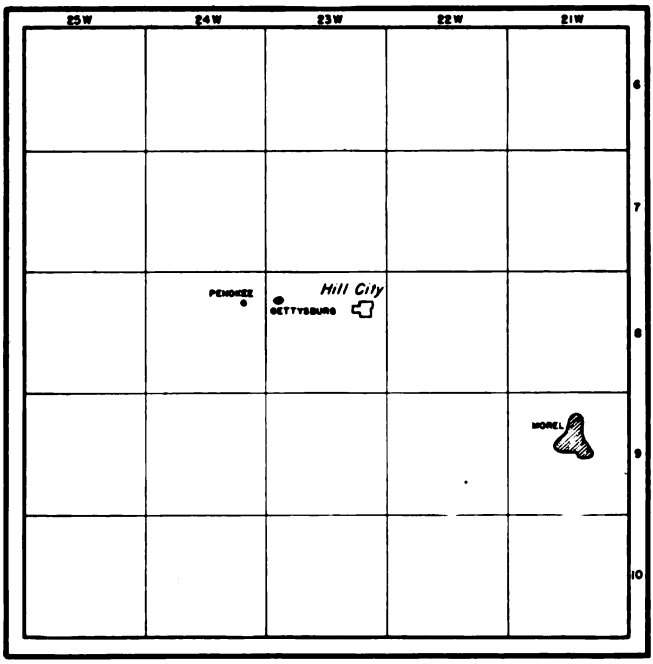

Fig. 9. Map of Graham county showing oil pools.

During 1941 a total of 14 test wells were drilled in Graham county in an attempt to increase the area of the known pools and, if possible, to find new pools. One of the test wells was successful in uncovering new supplies of oil and led to discovery of the Gettysburg pool in sec. 7, T. 8 S., R. 23 W. Most of the other test wells proved to be failures.

Morel pool.—The Morel pool is situated in T. 9 S., R. 21 W. (See map, fig. 9.) At the end of 1940 it had 6 wells that derived oil from the Arbuckle dolomite. During 1941 the Continental Oil Company completed its No. 2 Trexler well (in section 15) with a potential

producing capacity of 1,550 barrels per day. About the same time the Cities Service Oil Company completed, as a very large producer, its No. 1 "B" Morel, in section 22. Thus, the pool had 8 wells at the close of 1941. In an effort to extend the pool southward, the Cities Service Oil Company drilled a test well in section 27 on the Teall farm. The Arbuckle was found at a depth of 3,921 feet, but proved to be barren. In another venture, one mile farther south (section 34), the same company drilled another wildcat well in which the top of the Arbuckle dolomite was encountered at a somewhat greater depth and also proved to be without oil.

Penokee pool.—The Penokee pool was discovered in 1940 when R. W. Shields completed the first well on the Paxson farm in sec. 11, T. 8 S., R. 24 W. This well produced 7,500 barrels during the year 1941, bringing the total recovery up to 12,250 barrels. No additional oil wells were drilled in the area of the pool. Near by, however, four test wells were drilled in an effort to extend the producing limits or to find a new pool. One of the dry holes was drilled by the Cetal Oil Company on the Lyon farm in section 1, about 1.5 miles northeast of the Penokee pool. With an elevation of 2,349 feet above sea level, this test found the Ft. Riley limestone at 2,560 feet, the Topeka limestone at 3,210 feet, and the Lansing limestone at 3,608 feet. It was abandoned at 3,840 feet, without testing the Ordovician zones of possible production.

Two miles west of the Penokee pool, R. W. Shields drilled a well on the Belveal farm, in sec. 9, T. 8 S., R. 24 W. With an elevation of 2,327 feet, this test found the Stone Corral dolomite at 2,035 feet, the Topeka limestone at 3,270 feet, and the Lansing limestone at 3,663 feet. Deeper penetration of the strata uncovered the Sooy conglomerate at 4,105 feet, the Mississippian limestone at 4,186 feet, and the Arbuckle dolomite at 4,290 feet. The test was abandoned at a total depth of 4,319 feet.

In T. 7 S., R. 24 W., which lies just north of the township containing the Penokee pool, two important wildcat wells were drilled. One of these is the No. 1 Wells test, drilled by the Harbar Drilling Company in section 18. In this well the Stone Corral dolomite was found at 2,220 feet, the Topeka limestone at 3,538 feet, and the Lansing limestone at 3,765 feet. At greater depths the drill entered the Viola limestone of Ordovician age at 4,275 feet, the Simpson formation at 4,367 feet, and the Arbuckle dolomite at 4,382 feet. After penetrating 12 feet of the Arbuckle without favorable indications of oil, the well was abandoned at 4,395 feet. In section 28,

some 2 miles southeast, R. W. Shields drilled a test well on the Waggle farm. It also failed as a producer and was abandoned at a total depth of 4,333 feet.

Gettysburg pool.—The Cities Service Company drilled a test well on the Montgomery farm in sec. 7, T. 8 S., R. 23 W., three miles east of the Penokee pool. With an elevation of 2,302 feet above sea level, this well found the Stone Corral dolomite at 1,970 feet and the Ft. Riley limestone at 2,660 feet. The Lansing was penetrated at 3,550 feet and the Arbuckle dolomite at 3,980 feet. Good saturation was discovered between the depths of 3,602 and 3,692 feet. This was corroborated by a core taken between the depths of 3,745 and 3,752 feet. The well, therefore, was plugged back to 3,755, and the casing was perforated between 3,725 and 3,755 feet. The hole filled with 2,100 feet of oil that had a gravity of 39 degrees A. P. I. After 1,500 gallons of acid had been poured into the hole, the well swabbed 10 barrels of oil per hour. Later, it was given a potential rating of 71 barrels per day by the State Corporation Commission.

Wildcat wells.—It is evident from the above discussion that considerable time and effort were expended during 1941 by various individuals and companies in attempts to find additional oil pools in Graham county. In addition to the dry holes listed above, 4 rank wildcat wells were drilled. One of these, the Cetal No. 1 Hixenbaugh, in sec. 1, T. 6 S., R. 21 W., may be considered as a dry hole marking the boundary of the Ray pool, which lies in Phillips county less than 2 miles to the northeast. An interesting test well was drilled by the Cities Service Oil Company in sec. 1, T. 8 S., R. 22 W., about 9 miles northwest of the Morel pool. With an elevation of 2,146 feet above sea level, this test found the Stone Corral dolomite at 1,670 feet, the Topeka limestone at 3,100 feet, and the Lansing limestone at 3,352 feet. The Sooy conglomerate, sometimes termed the Pennsylvanian basal conglomerate, was encountered at 3,654 feet and the Arbuckle dolomite at 3,671 feet, only 17 feet lower. Inasmuch as the Arbuckle was dry, the well was plugged back in order to test porous zones in the Kansas City-Lansing limestones at 3,553 feet. These zones proved to be of no commercial importance and the hole was abandoned.

Two important dry holes were drilled in T. 9 S., R. 22 W., some 5 miles west of the Morel pool. One of these, the Ewers-Simpson No. 1 Bundy well, in section 12, was started at 2,305 feet above sea level. It penetrated the top of the Stone Corral dolomite at 1,817 feet, the Ft. Riley limestone at 2,500 feet, and the Lansing limestone at 3,564

feet. The Arbuckle dolomite, a potential producing zone, was encountered at 3,869 feet, but proved to be barren. The well was abandoned 30 feet lower at 3,899 feet. The other test hole was drilled by the Cities Service Oil Company on the Barber farm, in section 27, about 3 miles farther southwest. With an elevation of 2,353 feet above sea level, this test found the Stone Corral dolomite at 1,813 feet, the Topeka limestone at 3,330 feet, and the Lansing at 3,550 feet. In this part of the state the Kansas City-Lansing limestone is only 185 feet thick. The Sooy conglomerate was found at 3,880 feet and the most likely producing zone, the Arbuckle dolomite, at 4,018 feet. The test was abandoned at a total depth of 4,058 feet.

TABLE 10.—*Oil pools of Graham county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
*Gettysburg, 7-8-23W	40	1,017	1	K. C.-Lans.	3,725
Morel, 15-9-21W	1,200	226,300	7	Arbuckle	3,718
Penokee, 11-8-24W	40	12,250	1	K. C.-Lans.	3,750

* Discovered in 1941.

GRANT COUNTY

The history of oil and gas exploration in Grant county was presented, in 1939, in Mineral Resources Circular 13 of the State Geological Survey. Further developments were described in Bulletins 28 and 36, which bring the data to the end of 1940, at which time there were 63 gas wells in Grant county. The northernmost of these gas wells is situated in sec. 15, T. 28 S., R. 37 W., and was completed during 1941. In the adjacent row of townships to the south there are a number of gas wells. They are clustered about the center of T. 29 S., R. 36 W., and the eastern half of T. 29 S., R. 35 W. In the southernmost row of townships the wells are scattered and are situated on both sides of the Cimarron River. At present, all of these gas wells are considered as part of the Hugoton pool, which is described in the chapter on Stevens county. During 1941 two new gas wells were drilled in Grant county. They derive their gas from the upper dolomitic limestones of the Wolfcamp-Leonard

(Big Blue) division of the Permian system. The No. 1 Henthorne well, drilled by Clay Brothers in sec. 15, T. 28 S., R. 37 W., was rated as having a daily potential of 9,645,000 cubic feet of gas with a rock pressure of 415 pounds per square inch at the casing head.

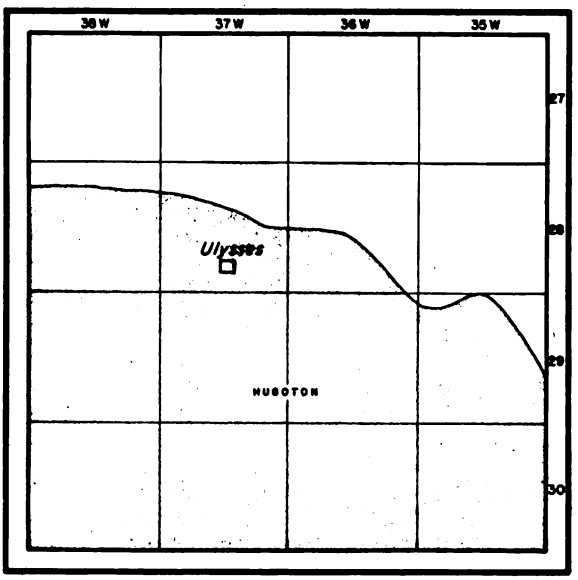

FIG. 10. Map of Grant county showing extent of Hugoton gas field.

HARVEY COUNTY

The areal geology and stratigraphy of Harvey county have been described in Mineral Resources Circular 10, published by the State Geological Survey in 1938. Subsequent developments in this county have been described, year by year, in Mineral Resources Circular 13 and Bulletins 28 and 36. Bulletin 36 includes data to the end of 1940, at which time there were 3 oil pools and 1 gas pool in the county. During 1941 eleven test holes were drilled in Harvey county, 7 of which found oil and 4 of which were dry holes. The map (fig. 11) shows that Harvey county has wells which are part of the Graber pool of McPherson county and of the Burrton pool of Reno county. The new wells were mostly drilled as extensions of these two outside pools.

Hollow-Nikkel pool.—The Hollow-Nikkel pool was discovered in December, 1931, and it proved to be one of the sensational finds of the year. It was drilled rapidly and reached its peak of pro-

duction many years ago. During 1941 it produced 523,100 barrels and now has a cumulative total of nearly 19 million barrels. Four old wells in this pool were cleaned out and deepened with the expectation of finding additional oil supplies at greater depths. The Sinclair Oil Company deepened its No. 4 Ediger well 25 feet to establish a new potential of 50 barrels natural with no water showing. The same company deepened its No. 2 "A" Neufeldt without finding oil and continued down to 4,365 feet to make a salt water disposal well of the hole. This represents an additional deepening of nearly 900 feet from the old depth of 3,471 feet reached in 1935.

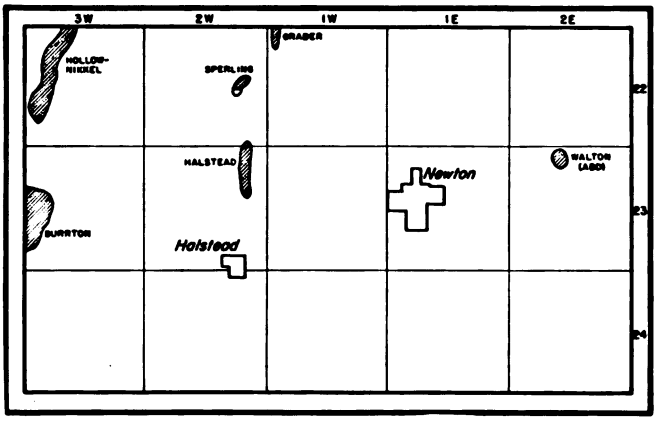

FIG. 11. Map of Harvey county showing oil and gas pools.

The Magnolia Petroleum Company deepened 2 wells on the Katie Schmidt lease in sec. 30, T. 22 S., R. 3 W. One of these, the No. 2 well, was deepened from 3,536 to 3,563 feet, at which depth a new potential of 175 barrels per day was established. The well originally had been completed in 1933. The No. 3 well on the same lease was drilled 68 feet deeper and was given a rating of 60 barrels of oil, with one barrel of water per day.

Burrton pool.—The main part of the Burrton pool lies in Reno county adjacent to Harvey county. It lies on the same trend as the Hollow-Nikkel pool and has proved to be an equally prolific oil-producing area. Sporadic drilling on the eastern flank of the large Burrton anticline gradually has extended the producing area into Western Harvey county, and the limits of production in this direction have not yet been found. During 1941, drilling of this type accounted for the bulk of the drilling in Harvey county. Seven

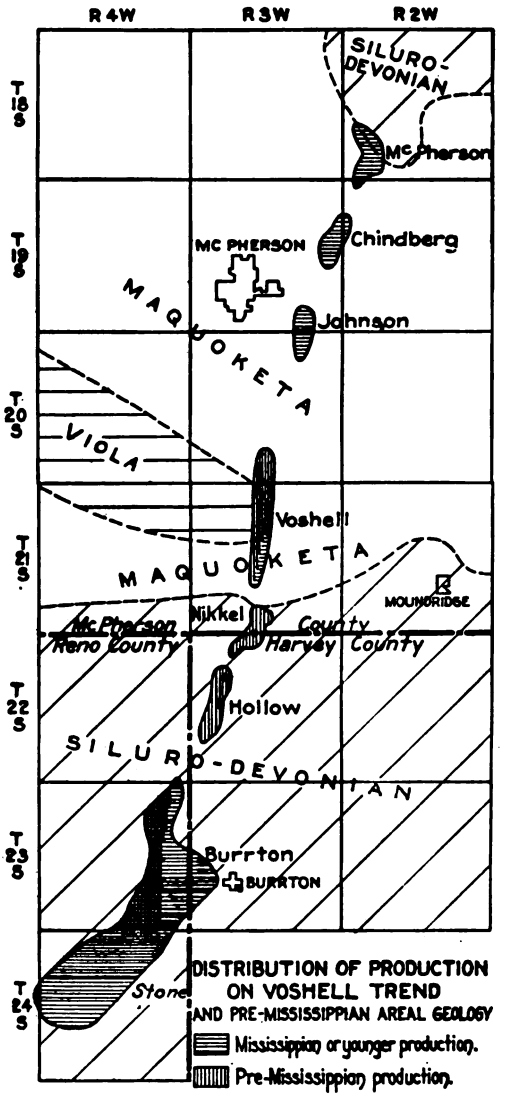

FIG. 12. Distribution of production on Voshell trend.
(After Bunte and Fortier, Am. Assoc. Petroleum Geologists)

new oil wells were added in this manner, one well was deepened, and one proved to be dry. The dry hole was drilled in sec. 17, T. 23 S., R. 3 W. One of the new oil wells is situated in the same section; four of the new oil wells are situated in section 18; and two are in section 19. The hole that was deepened is the No. 2 Wiley, in the

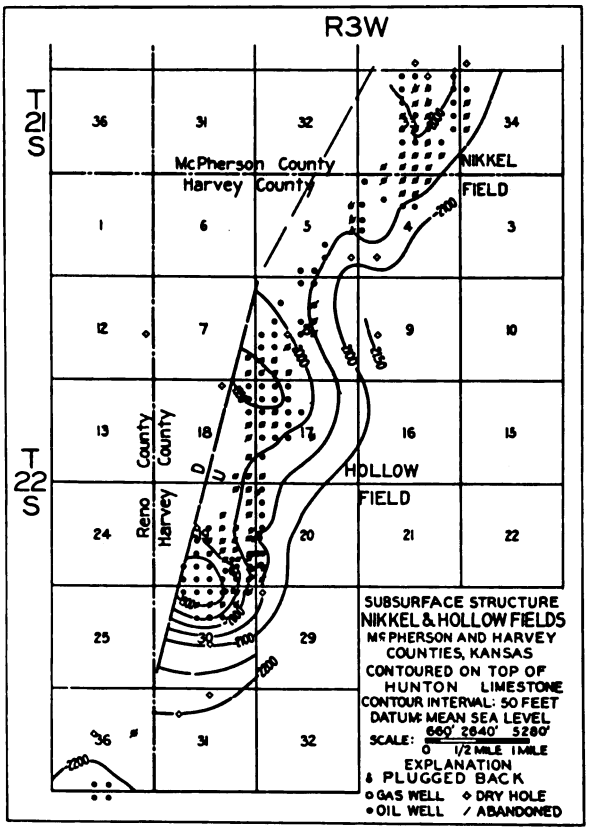

FIG. 13. Subsurface structure of the Nikkel and Hollow fields. (After Bunte and Fortier, Am. Assos. Petroleum Geologists)

NE¼ sec. 18, owned by the Aylward Production Company. It was drilled 21 feet deeper without favorable results.

Wildcat wells.—Three important wildcat wells in Harvey county were completed during 1941. Two of these were drilled at the southern end of the Graber pool in the hope of extending production. One of these is the McBride No. 1 Stucky well, in sec. 6, T. 22 S.,

R. 1 W., and the other is the W. K. Royalty Company No. 1 Kaufman, in sec. 8, T. 22 S., R. 1 W.

An interesting wildcat well was drilled by Alf Landon on the Gray farm, in sec. 15, T. 22 S., R. 2 E. This well encountered the base of the Oread limestone at 1,848 feet, the Lansing limestone at 2,120 feet, and the Marmaton shales at 2,547 feet. The Pennsylvanian basal conglomerate was encountered at 2,730 feet and the Mississippian "chat" at 2,765 feet. This cherty material, known as "chat," represents residual material from the solution of the Mississippian limestone; it proved to be very thick and only a slight portion of the limestone remained to be logged. The Kinderhook shales were found at 2,970 feet and the basal Misener sand at 3,049 feet. This sandstone proved to be very thick and extended down to 3,078 feet, at which point the Viola limestone was encountered. The well was abandoned as a dry hole after having been drilled 5 feet into the Viola.

TABLE 11.—*Oil and gas pools of Harvey county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Burrton (see Reno county)					
Graber (see McPherson county)					
Halstead, 36-22-2W.....	1,200	1,291,850	20	"Chat"....	3,005
Hollow-Nikkel, 30-22-3W..	1,500	18,784,807	.....	K. C.-Lans.	2,499
				"Chat"....	3,195
			86	Hunton....	3,507
				Simpson....	3,500
				Arbuckle...	.....
Sperling, 23-22-2W.....	500	340,654	8	Hunton....	3,279
				Simpson....	3,447
Sperling (gas), 23-22-2W...	600	6,193,000 M. cu. ft.	2	"Chat"....	2,955

Kearny County

The oil and gas developments in Kearny county have been described in previous publications of the State Geological Survey of Kansas. The reader is referred to Mineral Resources Circular 13 and Bulletins 28 and 36 for details regarding the years 1937 to 1940, inclusive. During 1940 the Stanolind Oil and Gas Company started

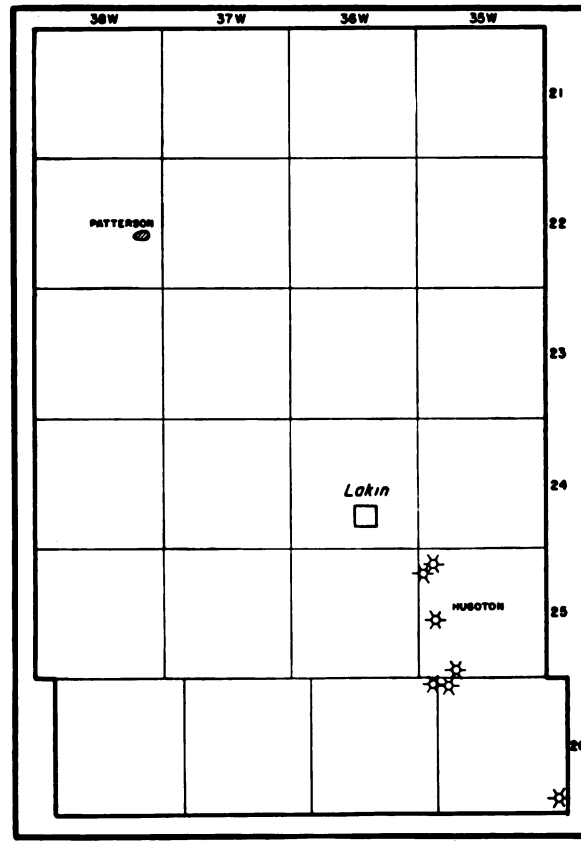

Fig. 14. Map of Kearny county showing location of Patterson pool and gas wells of Hugoton pool.

an aggressive drilling campaign on a block of acreage in Kearny county. The first well drilled is on the Judd ranch and proved to be a dry hole; it was drilled down to and well into the pre-Cambrian rocks. The second test well was drilled on the near-by Bellinger ranch, in sec. 15, T. 21 S., R. 38 W., with similar results. This well furnished a great deal of interesting geological information and gave

some encouragement for further drilling. It began in Cretaceous rocks and logged the Codell sandstone at 100 feet, the Greenhorn limestone at 420 feet, the Graneros shale at 490 feet, and the basal member of the system, the Dakota sandstone, at 540 feet. The strata of Jurassic age were penetrated from 930 feet to 980 feet, at which point the bit entered the Permian red beds. An interesting marker bed, the Blaine gypsum, was found at 1,400 feet, and another gypsum layer was encountered at 1,580 feet; the Cedar Hills siltstone was penetrated at 1,820 feet. The Salt Plain siltstone and clay began at 1,920 feet and the Harper sandy rock at 2,070 feet. The important reference horizon, the top of the Stone Corral dolomite, was logged at 2,170 feet. At greater depths in the Permian the Wellington shales were encountered at 2,380 feet and the first dolomite in the "Big Blue" sequence (Hollenberg?) at 2,580 feet. The base of this sequence (base of the Americus limestone) was found at 3,350 feet. In the Pennsylvanian sequence, the top of the Topeka limestone appeared at 3,660 feet, the Douglas group at 3,970 feet, and the top of the Lansing limestones at 4,040 feet. The red shales of the Marmaton formation were entered at 4,290 feet and the dark shales of the Cherokee formation at 4,560 feet. The calcareous rocks referred to the Morrow formation were found at 4,780 feet and the top of the Mississippian limestones at 4,823 feet. Inasmuch as the sandy zones that had given encouragement in the earlier well were missing in this test, it was abandoned at 5,155 feet without testing the Ordovician zones.

Patterson pool.—Shortly after the completion of the Bellinger well, another test well was started on the Patterson ranch. This is situated in the SE¼ sec. 23, about 7 miles southeast of the Bellinger dry hole. With an elevation of 3,322 feet, this test found the Stone Corral dolomite at 2,127 feet and the Topeka limestone at 3,680 feet. The Mississippian limestone was encountered at 4,879 feet, the Viola at 5,536 feet, and the Arbuckle dolomite at 5,655 feet. Good saturation was noted in a sandstone layer in the Cherokee formation, between the depths of 4,748 and 4,752 feet; the top of this sand was at 4,740 feet. The hole was plugged back and the casing perforated at the depth of this zone. The well filled with oil at the rate of 1,000 feet in the first hour; eventually it rose to a height of 3,300 feet. The gravity of the oil, according to tests, was 34 degrees A. P. I. After production tests had been completed, the official rating of the State Corporation Commission was 3,964 barrels per day. Before the end of 1941, a second well in this new pool was completed by the Stanolind Oil and Gas Company on the Gropp

ranch in sec. 24, T. 22 S., R. 38 W. In this well the Cherokee was found at 4,435 feet and the Patterson sand at 4,741 feet. The gas wells in the southeastern portion of Kearny county are part of the Hugoton gas field, which is described in the chapter on Stevens county.

TABLE 12.—*Oil pool of Kearny county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
*Patterson, 23-22-38W....	80	8,127	2	Patterson sand.....	4,740 to 4,752

* Discovered in 1941.

KINGMAN COUNTY

The geology and rock sequence in Kingman county were described rather fully in Mineral Resources Circular 10, published by the State Geological Survey in 1938. Subsequently, developments were reported in Mineral Resources Circular 13 and Bulletins 28 and 36. Bulletin 36 presents data up to the end of 1940. During 1941 new activity was at a low ebb, only five test wells having been completed. Of these, two were oil wells, one was a gas well, and two were dry holes.

Cunningham pool.—The only important pool in Kingman county is the Cunningham pool, discovered by the Skelly oil company in January, 1931. This pool lies on the western border of the county and extends over into adjoining Pratt county. The total number of completions in both counties during 1941 was 27 holes, of which 23 are oil wells, two are gas wells, and two are dry holes. The bulk of the drilling took place in Pratt county, and a discussion of the wells located there is given in the chapter on Pratt county.

Besides the 2 new oil wells drilled in the Kingman portion of the Cunningham pool, several old wells were deepened with interesting results. The Skelly Oil Company deepened its No. 4 Miles well (sec. 19, T. 27 S., R. 10 W.) to the Viola limestone and converted it into a gas well capable of producing 34 million cubic feet per day. The same company drilled the No. 5 Miles (section 30) to the Viola limestone and obtained a gas well with similar capacity. The No. 7 Ratcliff well (section 30), which had been a shallow gas well at 2,200 feet, was deepened to 4,212 feet, where it was rated as a new

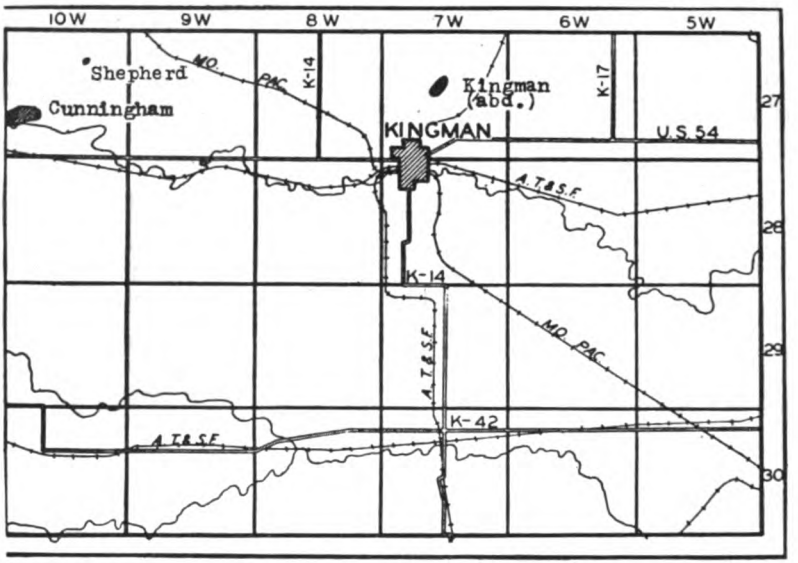

FIG. 15. Map of Kingman county showing oil and gas pools.

gas well with a capacity of 19 million cubic feet per day in the Viola limestone. The dry hole mentioned above was drilled by Tomlinson in section 20 on the Rouse farm.

Exploratory wells.—One rank wildcat well was completed in Kingman county during 1941. It is the Magnolia Petroleum Company No. 1 Banta well in sec. 26, T. 30 S., R. 5 W. This test hole, with an elevation of 1,409 feet, logged the Lansing limestone at 3,526 feet and the top of the Mississippian limestone at 4,165 feet. The Mississippian limestone proved to be 310 feet thick, the top of the Kinderhook shales having been entered at 4,475 feet. Below the Kinderhook shales, the bit entered the Ordovician Simpson formation at 4,606 ("Wilcox" sandstone) and found the top of the Arbuckle dolomite at 4,714 feet. Drilling was continued to a total depth of 4,474 before the test was abandoned as a dry hole.

TABLE 13.—*Oil pool of Kingman county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Cunningham, 30-27-10W...	1,400	2,718,703	74	K. C.-Lans.	3,390

McPherson County

The history of oil and gas production in McPherson county dates back to September, 1926, when Merriman, Reeves, and Shidel completed a successful gas well on the Anderson farm in sec. 29, T. 18 S., R. 2 W. This area later became known as the McPherson pool and now produces both oil and gas. In December, 1928, the prolific Ritz-Canton area was discovered. During the ensuing year the Chinberg pool and the remarkable Voshell pool were discovered. In

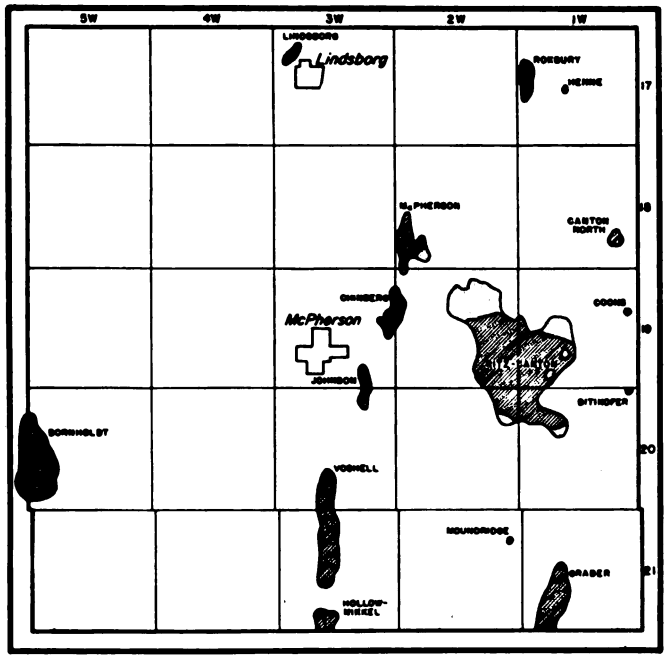

Fig. 16. Map of McPherson county showing oil and gas pools. Oblique lines indicate oil pools; dots indicate gas pools.

succeeding years the remaining pools listed in the table at the end of this chapter were discovered. Perhaps the most remarkable find of that period was the Bornholdt pool, although its capabilities were not realized until several years later. The history of oil and gas exploration has been set forth in Mineral Resources Circular 10. In the present report the reader will find a rather complete account of the geology and the structure of the rocks in McPherson county. For further details regarding exploration the reader is referred to Bulletins 28 and 36, published by the State Geological Survey.

By the end of 1940 McPherson county had a total of 724 oil wells in the various pools. During 1941 some 53 test wells permitted the addition of 38 new oil wells. The remaining 15 test holes were dry. The largest number of new wells is in the Bornholdt pool, and the second largest number is in the Roxbury pool. A considerable number also were drilled in the Graber, the Henne, and the Ritz-Canton pools.

Bitikofer pool.—The Bitikofer pool lies 6 miles east of the large Ritz-Canton pool along the eastern border of the county. One new well was added there during 1941 when Shawver successfully completed his No. 1 Weaver well in sec. 1, T. 20 S., R. 1 W. The producing zone is the Mississippian "chat."

Bornholdt pool.—The first well in the Bornholdt pool was drilled in August, 1937. Subsequently, the area was neglected because of the small potential of the first well. A second well, completed in May, 1939, served to focus attention on the possibilities of the area. Thereafter, drilling took place at an accelerated rate, and by the end of 1940 the pool had 143 wells, some of which lie in adjacent Rice county to the west. During 1941 seven producers were added, three of which are situated in McPherson county. The best of these is the Transwestern No. 5 Peterson, in sec. 18, T. 20 S., R. 5 W.

Canton North pool.—The Canton North pool lies 7 miles northeast of the large Ritz-Canton area. It was doubled in size during 1941 by the addition of the Johnson No. 1 Keefer well in sec. 25, T. 18 S., R. 1 W. This well is capable of producing 45 barrels per day, but a showing of water with the oil makes the life of the well seem problematical.

Graber pool.—The Graber pool was discovered in June, 1937, and by the close of 1940 its boundaries were well defined. During 1941 five additional wells were added to raise the total to 136 wells. In the McPherson county portion of this pool one well was deepened as a salt water disposal well. It is the Continental No. 6 Blair well in sec. 21, T. 21 S., R. 1 W. The well was deepened from 3,317 to 3,919 feet. Of the five new wells, one is in section 29, one in section 31, and the remaining three in section 32. All produce from the Hunton limestone, which is the chief producing zone of the pool.

Henne pool.—The Henne pool is situated approximately in the center of the northeastern township of the county. This pool was increased considerably in size during 1941 when six new wells were added to the one listed at the close of the previous year. All new

wells are in sec. 21, T. 17 S., R. 1 W. The potential producing capacity ranges from 70 to 745 barrels per day.

Lindsborg pool.—The Lindsborg pool is the northernmost pool in McPherson county. It produces from the Viola limestone at a depth of approximately 3,350 feet. During 1941 one new well was added to raise the total to three producers. This new well was drilled by the M. & L. Oil Company on the Johnson farm, in sec. 7, T. 17 S., R. 3 W. The top of the producing zone was found at 3,347 feet.

Ritz-Canton pool.—In this very large and prolific producing area drilling was almost at a standstill during 1941. Six small producing wells were added in various parts of the area. One well, the Magnolia No. 1 "B" Classen, was drilled deeper without finding

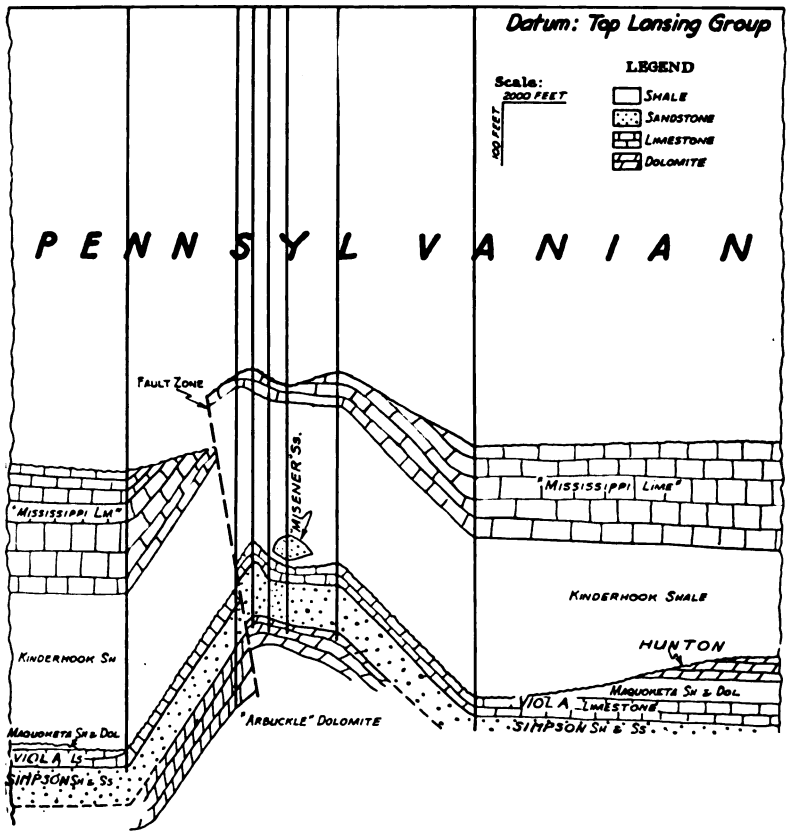

FIG. 17. Northwest-southeast cross section near center of the Voshell pool. (After Bunte and Fortier, Am. Assoc. Petroleum Geologists.) Section shows the structure and topography at the beginning of Pennsylvanian deposition.

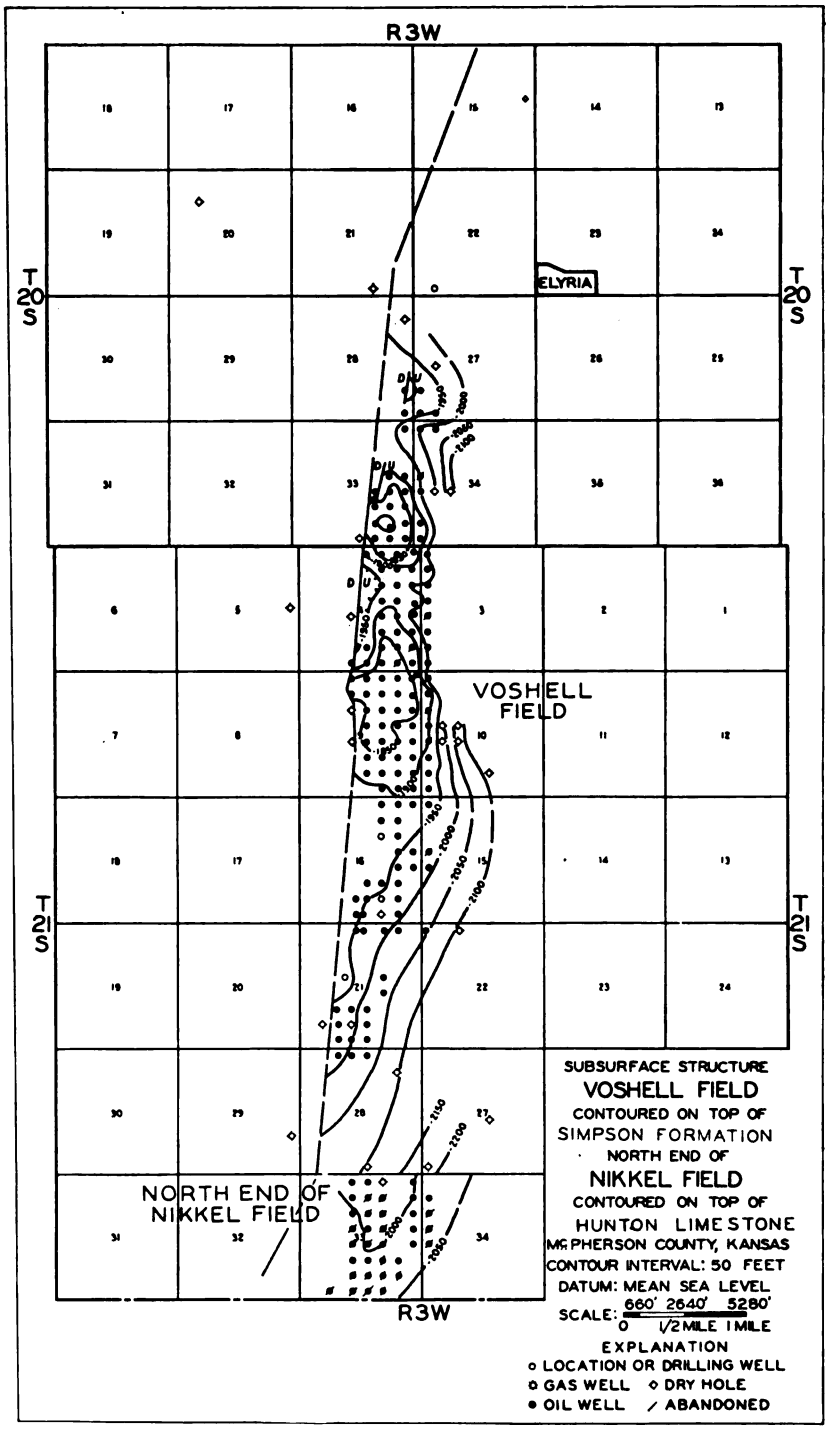

FIG. 18. Subsurface structure of the Voshell pool.
(After Bunte and Fortier, Am. Assoc. Petroleum Geologists)

new production. It had been completed as a gas well in 1933, and it was deepened in 1937 and changed to an oil well with a potential of 240 barrels. During 1941 it was again deepened, this time from 3,430 to 3,498 feet.

Roxbury pool.—The Roxbury pool was one of the most active areas in McPherson county during 1941. No less than 10 new oil wells were completed and one well was deepened. With one exception, all the new wells are in sec. 19, T. 17 S., R. 1 W. Four of the new wells have a productive capacity of approximately 2,000 barrels per day. This accounts for the drilling revival in the pool.

Voshell pool.—Although the Voshell is an old pool and has passed its zenith, two new wells were completed and several were deepened during 1941. The potential productive capacity of the three new wells is not large, and one of them is yielding some water with the oil. The Dixie No. 1 Zerger well, originally completed in 1930 at a depth of 3,425 feet, was drilled deeper in 1933. In 1940 this well was plugged back to shut off water, and in 1941 it was plugged again and was put on production at 3,043 to 3,067 feet, where it is producing a small amount of oil and much water.

Exploratory wells.—Nine wildcat wells, each situated at least 2 miles from the nearest pool and, therefore, entitled to be considered rank wildcats, were drilled in McPherson county during 1941. In the northeastern part of the county, the Westgate-Greenland Oil Company completed a dry hole in sec. 5, T. 17 S., R. 1 W. In section 12 of the same township the Rocket Drilling Company completed a test well on the Miller farm. This test found the Topeka limestone at 1,725, the Lansing limestone at 2,250 feet, and the Mississippian strata at 2,872 feet. In the next township on the west, the Westgate-Greenland Oil Company tested the SW¼ sec. 33, T. 17 S., R. 2 W., without favorable results. The Mississippian limestone was encountered at 2,998 feet. In sec. 17, T. 18 S., R. 1 W., the same operators tried to find oil on the Bukey farm, where the Topeka limestone was found at 1,670 feet, the Lansing limestone at 2,564 feet, and the Mississippian "chat" at 2,832 feet. The well was abandoned as a dry hole at 2,886 feet. In the same township the same operators tried again in section 18 on the Chinberg farm. This test also had to be abandoned as a dry hole. On the western side of the county, in sec. 31, T. 19 S., R. 5 W., the Continental Oil Company drilled to a total depth of 3,486 without finding oil. Here the Mississippian "chat" was found at 3,434 feet.

TABLE 14.—*Oil and gas pools of McPherson county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Bitikofer, 1-20-1W	80	8,360	2	"Chat"	2,885
Bornholdt, 30-20-5W	2,600	2,608,500	150	"Chat"	3,292
Canton North, 26-18-1W	80	68,468	2	"Chat"	2,803
Chinberg, 18-19-2W	700	1,308,310	5	K. C.-Lans	2,363
			25	"Chat"	3,007
Coons (gas), 13-19-1W				"Chat"	2,897
Graber, 32-21-1W	2,800	6,005,028	3	"Chat"	
			2	Misener	3,323
			130	"Hunton"	3,274
			1	Simpson	3,398
Hollow-Nikkel (see Harvey county)					
Henne, 21-17-1W	280	27,320	7	"Chat"	2,658
Johnson, 35-19-3W	1,200	2,627,865	16	"Chat"	3,032
Lindsborg, 8-17-3W	160	65,632	3	Viola	3,352
McPherson, 29-18-2W	2,000	924,735		K. C.-Lans	2,340
			29	"Chat"	2,967
				Viola	3,140
Moundridge (gas), 12-21-2W				"Chat"	3,007
Ritz-Canton, 1-21-2W	13,000	34,905,573		K. C.-Lans	2,360
			248	"Chat"	2,935
				Viola	3,412
				Simpson	3,440
Roxbury, 18-17-1W	500	511,252	37	"Chat"	2,684
Voshell, 9-21-3W	3,500	23,532,268		"Chat"	3,095
				Viola	3,301
			102	Simpson	3,322
				Arbuckle	3,394

The W. K. Royalty Company drilled a test well on the Vaught farm in sec. 1, T. 20 S., R. 1 W., without favorable showings. In sec. 22, T. 20 S., R. 3 W., the Westgate-Greenland Oil Company tested the Roberson farm without finding oil. This hole was carried beyond the Mississippian, encountering the Viola limestone at 3,514 feet, the Simpson formation at 3,552 feet, and the Arbuckle dolomite at 3,626 feet. The dry hole is situated about 1.5 miles northeast of the Voshell pool. In a test well on the Reusser farm, in sec. 26, T. 21 S., R. 2 W., the Dickey Oil Company found the Arbuckle dolomite at 3,643 feet. This dry hole is about 2 miles west of the Graber pool.

Ness County

For detailed information pertaining to the geology and early history of Ness county the reader is referred to Mineral Resources Circular 10. At the time this circular was issued the Aldrich pool had been discovered. Since then, most of the activity has centered around the area of this pool, which is still the only one in the county. In 1941 three wildcat wells were drilled in the county, but none of them were successful in uncovering new oil supplies.

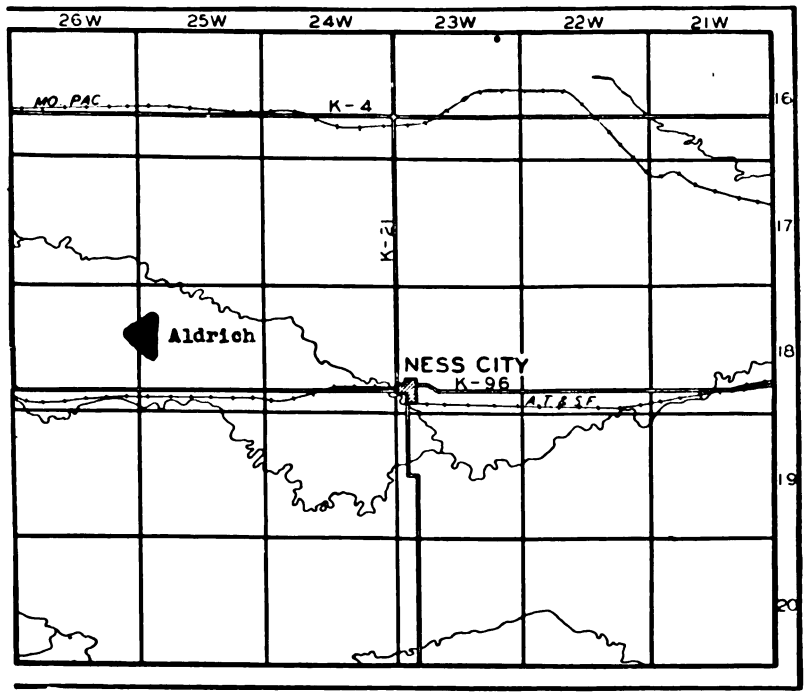

Fig. 19. Map of Ness county showing location of Aldrich pool.

TABLE 15.—*Oil pool of Ness county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Aldrich, 7-18-25W.....	2,000	355,656	13	Fort Scott.. "Mississippi lime"....	4,378 4,428

NORTON COUNTY

Norton county lies along the northern border of the state. The successful search for oil in Graham county to the south, and in Phillips county to the east has stimulated interest in this part of the state. Early wells drilled many years ago established the fact that the Central Kansas Uplift passes through Norton county, and this fact has aroused the interest of geologists and operators. The stratographic trap for oil, a new principle in oil exploration, has played its part in arousing interest in Norton county. It is no surprise, therefore, to find that the year 1941 was marked by a most determined effort on the part of a number of operators to find oil in Norton county. It will be recalled that the Van Patten pool was the first area in this county to be officially designated as an oil pool. Although this pool did not produce any commercial quantities of oil and is now temporarily abandoned, it nevertheless served to focus the spotlight on this region.

During 1941 no less than 11 test wells were completed in Norton county, and only one of these was successful in finding oil. This successful test was the Phillips Petroleum Company No. 1 Hewett well, in sec. 11, T. 4 S., R. 21 W. It was completed on July 21, 1941, with a potential rating of 272 barrels per day. The well has an elevation of 1,963 feet above sea level; the log shows the Stone Corral dolomite at 1,810 feet, the Topeka limestone at 3,194 feet, and the Lansing limestone at 3,204 feet. Good saturation was found between 3,394 and 3,401 feet, in the Kansas City-Lansing sequence. The well was drilled to test the deeper possible zones of production. The Arbuckle dolomite was penetrated at 3,655 feet, and the well ended in pre-Cambrian rock, which was encountered at 3,746 feet. Later, the well was plugged back and the casing was perforated, at two zones in the Kansas City-Lansing limestones. Oil rose in the hole to a height of 1,500 feet in 8 hours. Swabbing produced 65

barrels of oil in 19 hours. The oil has a gravity of 39 degrees A. P. I. The well was acidized and eventually was given a potential rating of 272 barrels per day. The official name of the pool that this well opened is the *Hewitt* pool.

Exploratory wells.—One of the wells that was unsuccessful in finding oil was the Barnsdall No. 1 Ramsey well in sec. 35, T. 1 S., R. 21 W. With an elevation of 2,173 feet above sea level, this test logged the Dakota sandstone at 990 feet, the Stone Corral dolomite

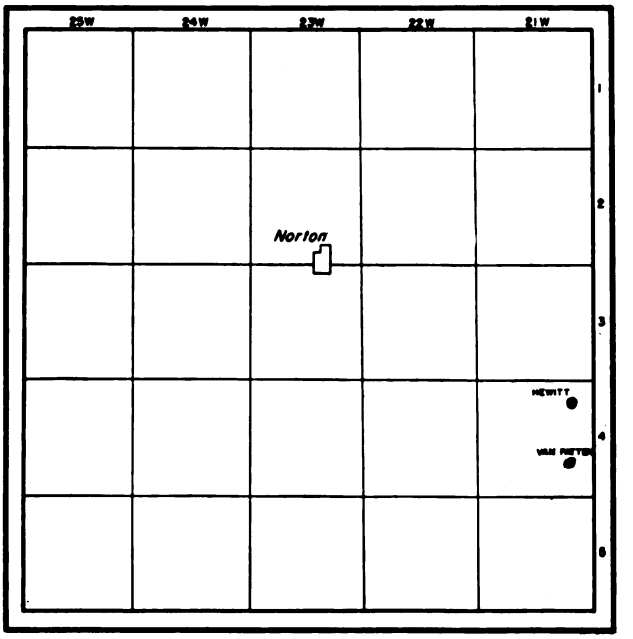

FIG. 20. Map of Norton county showing oil pools.

at 1,890 feet, and the Lansing limestone at 3,490 feet. The Arbuckle dolomite, which was expected to furnish the oil, was entered at 3,752 feet but was dry. The test was abandoned at a total depth of 3,810 feet.

Two townships farther west the Phillips Petroleum Company drilled a test well in sec. 20, T. 1 S., R. 23 W., on the Wyatt ranch. This well has an elevation of 2,361 feet and entered the top of the Dakota at 840 feet, the Stone Corral dolomite at 1,890 feet, and the Lansing at 3,220 feet. In this test, "granite wash" was found at 3,580 feet and the unaltered pre-Cambrian rock at 3,613 feet. In the township immediately south of this, Helmerick and Payne drilled

a test well on the land of the Central Trust Company in sec. 25, T. 2 S., R. 23 W. The elevation of this well is 2,300 feet above sea level, and the log shows that the top of the Dakota was entered at 865 feet, the Stone Corral dolomite at 1,885 feet and the Lansing limestone at 3,375 feet. In this part of the state the Kansas City-Lansing limestone sequence is approximately 200 feet thick. Thirty-seven feet below the base of these limestones the bit entered the Arbuckle dolomite (3,608 feet), and at 3,655 feet it entered the basal sandstone, the Lamotte. In the Arbuckle dolomite some heavy oil of noncommercial grade was found.

A test well drilled by Helmerick and Payne, in sec. 1, T. 2 S., R. 25 W., on the Lecount ranch, has an elevation of 2,480 feet above sea level. The record of this test shows the Lansing limestone at 3,390 feet, the Lamotte sandstone at 3,688 feet, weathered granite at 3,692 feet, and fresh granite at 3,723 feet. The same operators drilled a test well in sec. 7, T. 3 S., R. 23 W., on the Conway ranch. Here the Lansing limestone was found at 3,376 feet (1,028 feet below sea level), the "granite wash" at 3,623 feet, and the fresh granite at 3,635 feet.

The Cities Service Oil Company drilled 2 test wells in T. 4 S., R. 23 W., one in section 13 and the other in section 15. Both were drilled deep enough to test all possible producing horizons and were abandoned as failures. The same company drilled a test well on the Muir ranch in sec. 34, T. 5 S., R. 21 W. Inasmuch as this test hole is situated less than 2 miles from the Ray pool in adjoining Phillips county, it may be considered as an outpost dry hole of that pool. In the next township to the west the Hall-Jordan Oil Company drilled an interesting test hole on the von Mayerhauser ranch. The well, situated in sec. 26, T. 5 S., R. 22 W., has an elevation of 2,195 feet, and the log shows that the Stone Corral dolomite was entered at 1,785 feet, the top of the Topeka limestone at 3,140 feet, the Lansing limestone at 3,355 feet, and the Sooy conglomerate at 3,625 feet. No Arbuckle was encountered and the Lamotte sandstone also seems to be absent. The bit entered pre-Cambrian rock at 3,686 feet, and the well was abandoned at 3,722 feet.

Pawnee County

In September, 1936, the one and only oil pool in Pawnee county was discovered. It was described rather fully in Mineral Resources Circular 10 and additional details were furnished subsequently in Mineral Resources Circular 13 and in Bulletins 28 and 36. These reports describe the history of development to the end of 1940. Dur-

ing 1941 a sudden revival of interest took place in the county. A great many wells were completed within the boundaries of the Pawnee Rock pool, and a number of rank wildcat wells were drilled within a radius of 30 miles from it. Of the total of 23 completions in this county, 17 were new oil wells and only 6 were dry holes.

Pawnee Rock pool.—At the close of 1940 the Pawnee Rock pool had 9 wells that drained an estimated 800 acres. During the early months of 1941 several wells having a large potential rating were drilled on the fringes of the pool. This led to a strong drilling campaign; by the end of 1941 the pool had 25 wells, 6 of which were

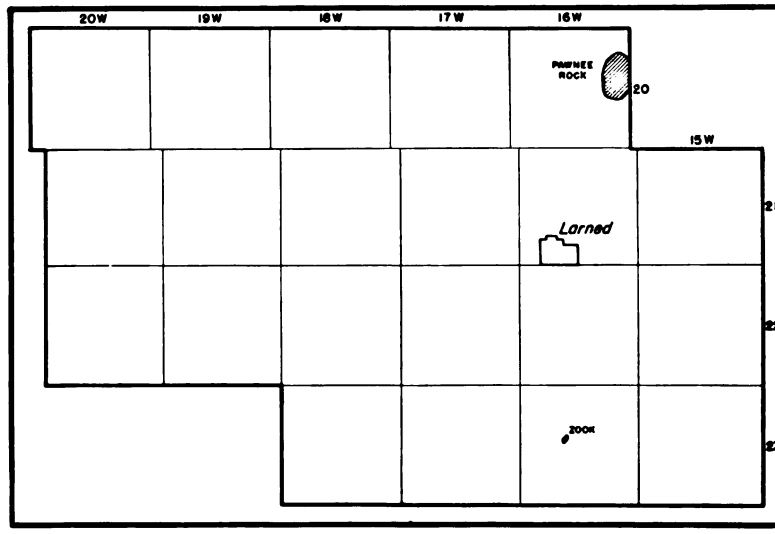

FIG. 21. Map of Pawnee county showing Pawnee Rock oil pool and Zook gas pool.

drilled in sec. 12, T. 20 S., R. 16 W. The Amerada Petroleum Corporation's No. 1 Bowyer came in for over 14,000 barrels per day. Ten new oil wells were completed in section 13, and one dry hole was drilled in the same section (F. C. Hall No. 1 Belt). In section 24 two new wells were added, and a long extension well was drilled on the Bixby farm, in the southern half of the section, by the Derby Oil Company. This pool produced almost 200,000 barrels of oil during 1941.

Exploratory wells.—The favorable results of drilling in the Pawnee Rock pool encouraged various operators to venture some distance away from the pool, in the hope of finding oil reserves. For instance, in sec. 1, T. 21 S., R. 15 W., about 7 miles southeast of the

pool, Max Cohen drilled a test hole on the English estate. With an elevation of 1,939 feet above sea level, this test found the Stone Corral dolomite at 864 feet, the Ft. Riley limestone at 1,935 feet, and the Lansing limestone at 3,330 feet. The basal conglomerate of the Pennsylvanian subsystem was encountered at 3,577 feet and was found to rest directly upon the Ordovician Viola limestone at 3,582 feet. The Simpson formation was found at 3,600 feet, and the Arbuckle dolomite, a potential oil zone, was penetrated at 3,640 feet, but proved to be dry.

In sec. 26, T. 21 S., R. 17 W., about 12 miles southwest of the Pawnee Rock pool, the Superior Oil Corporation completed a test well on the Wilson ranch. In this well the Stone Corral dolomite was encountered at 1,093, the Ft. Riley limestone at 2,170 feet, the Topeka limestone at 3,190 feet, and the Lansing limestone at 3,534 feet. The Arbuckle dolomite also proved to be dry in this locality; it was found at a depth of 3,977 feet (1,921 feet below sea level). In the next township to the west the Gulf Oil Corporation drilled a test well on the Seymour ranch in sec. 34, T. 21 S., R. 18 W. With an elevation of 2,055 feet, this test entered the Stone Corral dolomite 36 feet lower than did the Superior well (at 1,130). The Lansing limestone was encountered at 3,615 feet and the Sooy conglomerate at 4,046 feet. The Simpson formation was found at 4,084 feet and the Arbuckle dolomite at 4,108 feet. The test was abandoned at 4,183 feet, a considerable distance in the Arbuckle dolomite.

In T. 22 S., R. 15 W., two rank wildcat wells were completed. One of these, the No. 1 Wratil in section 15, was drilled by the Atlantic Refining Company. With an elevation of 1,988 feet, this test logged the Stone Corral dolomite at 930 feet, the Ft. Riley limestone at 2,050 feet, the Topeka limestone at 3,070 feet, and the Lansing limestone at 3,536 feet. Below the Pennsylvanian strata, the Viola was encountered at 3,870 feet, the Simpson formation at 3,938 feet, and the Arbuckle dolomite at 3,986 feet. After penetrating this dolomite for 23 feet the test was abandoned. In section 32 of the same township the Skelly Oil Company completed the No. 1 Yeager well as a dry hole at 4,025 feet. The elevation of this well is 2,018 feet, and the log shows that the Stone Corral dolomite was entered at 985 feet, the Lansing limestone at 3,555 feet, the Viola limestone at 3,881, and the Arbuckle dolomite at 4,000 feet.

Some 12 miles farther southwest the Stanolind Oil and Gas Company drilled a test well on the Paramore ranch in sec. 11, T. 23 S., R. 17 W. With an elevation of 2,090 feet, this test logged the Stone

Corral dolomite at 1,093 feet, the Lansing limestone at 3,700 feet, the Viola limestone at 4,212 feet, and the Arbuckle dolomite at 4,283 feet. It was abandoned in the Arbuckle at a depth of 4,343 feet.

TABLE 16.—*Oil and gas pools of Pawnee county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Pawnee Rock, 13-20-16W	2,400	311,162	25	Arbuckle	3,825
Zook (gas), 16-23-16W			1	Arbuckle	4,121

PHILLIPS COUNTY

The first oil pool in Phillips county was discovered in May, 1939. It was the Bow Creek pool in sec. 25, T. 5 S., R. 18 W. During 1940 the Cities Service Oil Company found the Ray pool in the southwestern corner of the county. This proved to be a fortunate find, and many wells were drilled. In June, 1941, the third pool was brought in when the Carter Oil Company completed its test well on the Friebus farm in sec. 36, T. 2 S., R. 19 W. The discovery well has an elevation of 2,103 feet above sea level, and the log shows the top of the Dakota sandstone at 750 feet, the Stone Corral dolomite at 1,605 feet, the Topeka limestone at 2,925 feet, and the Lansing limestone at 3,169 feet. Oil came into the hole at 3,257 to 3,260 feet; and at 3,334 to 3,349 feet a bleeding core was recovered. The Arbuckle dolomite was found at 3,535 feet and the pre-Cambrian granite was entered at 3,861 feet; the well then was plugged back. The casing was ripped at six places representing porous zones in the Kansas City-Lansing limestones between 3,254 and 3,345 feet. The well then was treated with 6,000 gallons of acid and put on production, with an assigned potential of 328 barrels per day. The new pool has been named the *Dayton* pool.

Ray pool.—During the year 1941 much drilling caused a great expansion of the Ray pool. No less than 28 new oil wells were added; most of these were completed by the Cities Service Oil Company. One well was drilled by the Barnett Oil Company and two by the Cetal Oil Company. The original well in the pool found production in the Lamotte sandstone. During 1941 some oil also

was found in the Arbuckle dolomite. The discovery well for this new producing horizon is the No. 1 Vehege well in the southwest corner of sec. 28, T. 5 S., R. 20 W. In this well the Arbuckle dolomite was found at 3,575 feet, the Lamotte ("Reagan") sandstone at 3,607 feet, and the pre-Cambrian granite at 3,635 feet. The well was plugged back to the porous zone in the Arbuckle dolomite and given a potential rating of 2,572 barrels per day. Subsequently, the No. 2 Vehege and the No. 5 Pinkerton in section 31 were completed as Arbuckle producers.

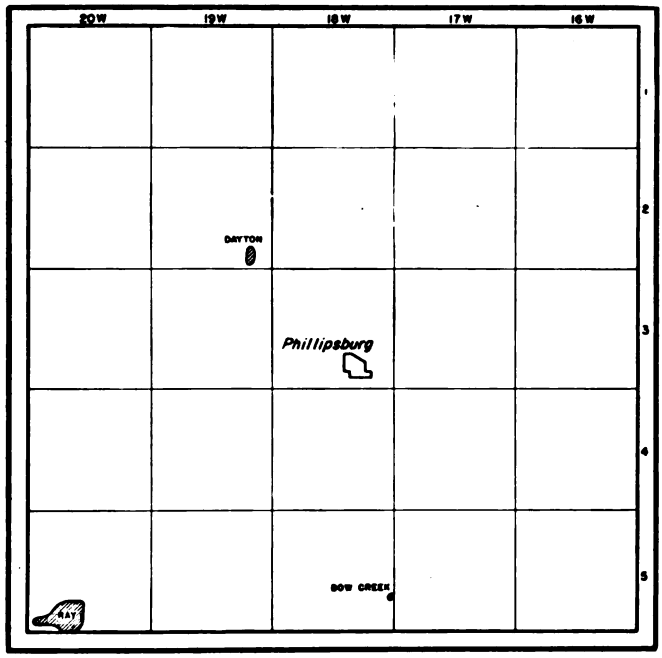

FIG. 22. Map of Phillips county showing oil pools.

Exploratory wells.—Only five wildcat wells were drilled in Phillips county during 1941. One of these found a new pool (the Dayton pool). One of the others, the Aladdin No. 1 Wiltrout well, in sec. 18, T. 5 S., R. 20 W., was so close to the Ray pool that it cannot be classed as a rank wildcat well. With an elevation of 2,059, this test found the Dakota sandstone at 640 feet, the Stone Corral dolomite at 1,600 feet, and the Lansing limestone at 3,259 feet. The Arbuckle dolomite was entered at 3,520 feet but failed to show porosity, and the test was abandoned 40 feet lower.

The Lario Oil and Gas Company drilled an interesting test, the No. 1 "B" Bard well in sec. 27, T. 3 S., R. 20 W. With an elevation of 2,220 feet, this test entered the Stone Corral dolomite at 1,845 feet, the Lansing limestone at 3,480 feet, and the Arbuckle dolomite at 3,760 feet. It was abandoned at 3,801 feet without finding oil. Another test well far removed from any pool was the Helmerick and Payne No. 1 Lloyd well, in sec. 6, T. 4 S., R. 17 W., a few miles southeast of the county seat of Phillipsburg. With an elevation of 1,854 feet, this test entered the Dakota at 650 feet, the Stone Corral dolomite at 1,640 feet, the Lansing limestone at 3,158 feet, and the Arbuckle dolomite at 3,681 feet. It is interesting to note that the Viola limestone and the Simpson formation were encountered in this well. The top of the Viola was penetrated at 3,590 feet.

Another test well far removed from any producing area was the Lario Oil and Gas Company No. 1 Lynch Estate well, in sec. 24, T. 4 S., R. 20 W. This test has an elevation of 2,018 feet above sea level, and the log shows that the top of the Stone Corral dolomite was entered at 1,543 feet, the Lansing limestone at 3,168 feet, and the Arbuckle dolomite at 3,470 feet. A sandy zone was entered at 3,812 feet and the pre-Cambrian granite at 3,841 feet. It is interesting to note that the Arbuckle dolomite is 342 feet thick in this well and, by contrast, is completely absent in parts of the Ray pool, 9 miles to the southwest, and is very thin on the fringes of the Ray pool.

TABLE 17.—*Oil pools of Phillips county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Bow Creek, 25-5-18W.....	40	17,475	1	K. C.-Lans.	3,111
Dayton, 36-2-19W.....	120	7,086	2	K. C.-Lans.	3,430
Ray, 32-5-20W.....	1,200	195,200	3 26	Arbuckle... Lamotte....	3,575 3,540

Pratt County

At the time of the present report there are two oil pools and three gas pools in Pratt county. The first of these, the Iuke pool, was discovered in 1937 by the Atlantic Refining Company. The second, the Cairo oil pool, was opened during 1939 when the Skelly drilled the first producer on the Levi Harding farm, in sec. 7, T. 28 S., R. 11 W. The gas pool of the same name was discovered in 1935 by the Skelly Oil Company, when the No. 1 Gilchrist in sec. 7, T. 28 S., R. 11 W., was completed. The Stark gas pool and the Ward gas pool are recent additions to the list and each is still in the one-well stage. For detailed information pertaining to the early history of exploration the reader is referred to Mineral Resources Circular 10. Subsequent developments are described in Circular 13 and in Bulletins 28 and 36.

Cunningham pool.—The Cunningham pool, which lies mainly in adjacent Kingman county, was greatly extended during 1941 by wells completed in Pratt county. In sec. 24, T. 27 S., R. 11 W., the Skelly Oil Company completed two new oil wells in the Kansas City-Lansing limestones. In section 25 the same company completed six new oil wells, also producing from the Kansas City-Lansing limestone. In section 35 nine additional oil wells producing from the same zone were completed by various operators. In section 36 the Skelly Oil Company completed three new oil wells, some of which also produce substantial quantities of gas.

Cairo oil pool.—Although the Cairo oil pool overlaps the area of the Cunningham oil pool, it nevertheless is listed separately because the producing horizon is the Viola limestone of Ordovician age. At the close of 1940, this pool had four wells in an area of approximately 160 acres. During 1941 the Beardmore Drilling Company completed two additional oil wells (No. 2 and No. 4 wells) in the Viola limestone on the Kemp farm, in sec. 12, T. 28 S., R. 11 W.

Cairo gas pool.—The Cairo gas pool includes the area of the Cairo oil pool and surrounding areas. At present, it drains an area not less than 20,000 acres in extent. During 1941 the Drillers Gas Company plugged back its No. 1 Gerber well, which had produced gas previously from the Viola limestone, and made an oil well in the Lansing limestone at approximately 3,750 feet. One additional gas well was completed on the Fitzsimmons farm by Sam Springer, in sec. 35, T. 27 S., R. 11 W. In the next township to the south six new gas wells were brought in, one each in sections 1, 2, 8, 9, 11, and 17.

In sec. 12, T. 28 S., R. 11 W., one new producer and one dry hole were completed.

Iuka oil pool.—The Iuka oil pool had three oil wells at the close of 1940, two of which were producing from the Simpson formation and one of which was producing from the Arbuckle dolomite. During 1941 four additional oil wells were completed in the Simpson formation. It is interesting to note that the discovery well in the Arbuckle dolomite, the No. 1 Helmke well drilled by the Skelly Oil Company during the last days of 1940, also had 15 million cubic feet of gas in the Simpson formation. One dry hole in sec. 1, T. 27 S., R. 13 W., drilled by the Tuesday Oil Company, seems to limit the pool in this direction.

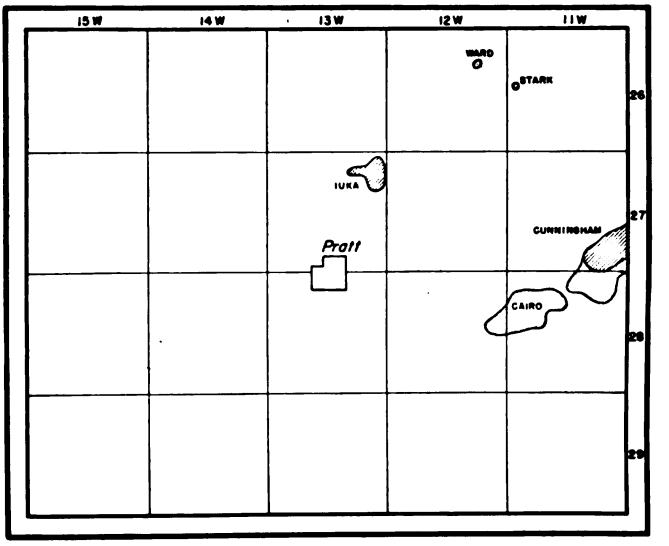

FIG. 23. Map of Pratt county showing oil and gas pools.

Exploratory wells.—Of 43 completions in Pratt county during 1941, eleven were dry holes. Among these were many rank wildcat tests. In the northern tier of townships there are four dry holes, one in T. 26 S., R. 11 W., two in T. 26 S., R. 12 W., and one in T. 26 S., R. 14 W. The test hole in sec. 18, T. 26 S., R. 11 W., was drilled by George Reeves on the Stark farm and has an elevation of 1,861 feet above sea level. The log shows that the Stone Corral dolomite lies at 640 feet, the Topeka limestone at 3,140 feet, and the Lansing limestone at 3,600 feet. In the Ordovician sequence the bit entered the Viola limestone at 4,121 feet, the Simpson formation at 4,210

feet (sandstone), and the Arbuckle dolomite at 4,290 feet. A good show of oil was found at 3,600 feet in the top of the Lansing limestone and at 4,241 to 4,245 feet in the Simpson formation. Inasmuch as these shows were not sufficiently promising, the well was plugged back to test a show of gas at 4,150 feet in the Viola limestone. At present, this test stands as a completion with a capacity of 12 million cubic feet of gas per day. The nomenclature committee has named the new gas pool the *Stark* pool.

Ward gas pool.—A second new gas pool was discovered when the Central Petroleum Company completed its test well on the Ward farm, in sec. 11, T. 26 S., R. 12 W. The well has an elevation of 1,882 feet and found the Stone Corral dolomite at 697 feet, the Topeka limestone at 3,087, the Lansing at 3,619, and the Kinderhook shale at 4,023 feet. The Viola limestone, entered at 4,106 feet, contained good saturation between 4,129 and 4,140 feet, but drilling continued through the Simpson (4,197) and into the Arbuckle dolomite (4,276). The well was plugged back to 4,137 feet and acidized with 3,000 gallons. It responded by flowing an estimated 2½ million cubic feet per day. This well opens the *Ward* pool.

A very interesting wildcat was drilled by the Skelly Oil Company in sec. 2, T. 26 S., R. 14 W. With an elevation of 1,984 feet above sea level, this test logged the Stone Corral dolomite at 880 feet, the Topeka limestone at 3,190 feet, the Lansing limestone at 3,799 feet, and the Mississippian limestone at 4,225 feet. It found the Ordovician Viola limestone at 4,303 feet, the Simpson formation at 4,393 feet, and the Arbuckle dolomite at 4,485 feet, finishing some 30 feet lower as a dry hole.

Five miles northwest of the Cairo pool, Nadel and Gussman drilled a dry hole in sec. 5, T. 27 S., R. 11 W. The test has an elevation of 1,813 feet and found the Stone Corral dolomite at 865 feet, the Lansing limestone at 3,637 feet, the Mississippian limestone at 4,086 feet, the Viola limestone at 4,277 feet, the Simpson formation at 4,375 feet, and the Arbuckle dolomite at 4,464 feet. The well was completed at 4,510 feet as a dry hole.

Three rank wildcat wells were drilled west of the Iuka pool. One of these, the No. 1 Reschke well, drilled by the Aladdin Petroleum Company in sec. 18, T. 27 S., R. 13 W., has an elevation of 1,979 feet above sea level. It logged the Stone Corral dolomite at 860 feet, the Lansing limestone at 3,900 feet, the Mississippian limestone at 4,335 feet, the Viola limestone at 4,383 feet, the Simpson formation at 4,496 feet, and the Arbuckle dolomite at 4,572 feet. The test was

completed at 4,600 feet as a dry hole. In sec. 11, T. 27 S., R. 14 W., A. R. Jones completed a test well on the Eubanks ranch. This well has an elevation of 1,992 feet and found the Stone Corral dolomite at 925 feet, the Lansing limestone at 3,905 feet, and the Arbuckle dolomite at 4,615 feet. It was completed 100 feet lower as a dry hole.

Seven miles southwest of the Cairo pool, the Skelly Oil Company completed a test well on the Ganaway ranch in sec. 30, T. 28 S., R. 12 W. This test has an elevation of 1,905 feet, and the log shows the Stone Corral dolomite at 740 feet, the Lansing limestone at 3,860 feet, the Mississippian limestone at 4,302 feet, and the Arbuckle dolomite at 4,667 feet. A production test at 4,450 to 4,457 feet in the Viola limestone showed salt water. Six miles farther west the Falcon Seaboard Oil Company drilled a test well on the Randle farm in sec. 28, T. 28 S., R. 13 W. With an elevation of 1,941, this test entered the Stone Corral dolomite at 750 feet, the Lansing limestone at 3,919 feet, the Mississippian limestone at 4,309 feet, and the Arbuckle dolomite at 4,512 feet. It was abandoned as a dry hole at 4,660 feet.

In the lowest tier of townships in Pratt county two important test wells were drilled during 1941. One of these, the Mackall Oil Company No. 1 Thornton (sec. 14, T. 29 S., R. 13 W.), has an elevation of 1,913 feet and encountered the Stone Corral dolomite at 726 feet, the Topeka limestone at 3,345 feet, the Lansing limestone at 3,919 feet, and the Mississippian limestone at 4,442 feet. In the Ordovician rocks the log shows the top of the Viola limestone at 4,518

TABLE 18.—*Oil and gas pools of Pratt county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Cairo, 7-28-11W	160	40,118	4	Viola	4,267
Cairo (gas), 7-28-11W	20,000	38,455,000 M cu. ft.	39	Viola	4,278
Iuka, 11-27-13W	640	134,568	6 1	Simpson Arbuckle	4,292 4,354
*Stark (gas), 18-26-11W	160		1	Viola	4,121
*Ward (gas), 11-26-12W	160		1	Viola	4,107

* Discovered in 1941.

feet, the Simpson formation at 4,635 feet, and the Arbuckle dolomite at 4,735 feet. It was abandoned as a dry hole at 4,777 feet. Twelve miles southwest of this test, Pryor and Lockhart completed a test well at 4,774 feet on the Bergner farm, in sec. 35, T. 29 S., R. 14 W. This test well has an elevation of 1,959 feet and entered the top of the Stone Corral dolomite at 778 feet, the Lansing at 4,018 feet, the Viola limestone at 4,515 feet, and the Arbuckle dolomite at 4,670 feet. It was plugged back to test the Viola porosity but without favorable results.

Reno County

The first oil pool in Reno county was discovered by Hartman and Skaer in 1927 when they completed the Smith well and thus opened the Abbyville pool. Four years later the remarkable Burrton pool was discovered, which has produced over 33 million barrels of oil. The Hilger pool was found in 1934; and one year later the Lerado pool, in the southern part of the county, was discovered. The Yoder pool was found in 1935 and the Buhler pool in 1938. The early history of these pools is given in Mineral Resources Circular 10, and subsequent developments are described in Bulletins 28 and 36. Bulletin 36 includes data to the end of 1940. In succeeding paragraphs the developments of 1941 are described. During 1941, 43 test wells were completed, of which 31 were oil wells and 12 were dry holes. The Zenith pool with its phenomenal production capacity gave impetus to extensive wildcat drilling in the western part of Reno county; and, as a result, no less than five new producing areas were discovered. Four of these lie on a trend which seems to be a stratigraphic trap on the periphery of the Central Kansas Uplift. These probably will be connected in the form of a continuous line of production before many months have passed.

Burrton pool.—The limits of production in the Burrton pool were attained long ago. Therefore, drilling activity in this pool during 1941 consisted largely of working over old wells and the abandonment of some others. One new producer was drilled by the Colorado Petroleum Company on the Sabin farm, in sec. 13, T. 23 S., R. 4 W. Three wells were drilled deeper in order to provide water-disposal facilities. One of these is the Barnsdall No. 1 Sabin well in sec. 11, T. 23 S., R. 4 W. It originally was completed, in 1934, at 3,568 feet and was deepened, in 1938, to 3,775 feet and produced 100 barrels of oil and some water. In February, 1941, it was drilled to a depth of 4,517 feet and will be used as a salt water disposal well. The Sinclair Oil Company deepened its No. 6 Adam Base well from 3,593

to 4,492 feet in order to convert it for use as a salt water disposal well. The Texas Company drilled its No. 4 Sam Collins well (sec. 17, T. 24 S., R. 4 W.) from 3,376 to 4,500 feet into a formation that can store salt water.

Abbyville pool.—The Abbyville pool near the center of Reno county experienced a revival during 1941. The Skelly Oil Company completed three new oil wells and drilled one dry hole. The new wells are in sec. 24, T. 24 S., R. 8 W. The dry hole is on the Linscheid "B" lease in section 36 about one mile south of the limits of

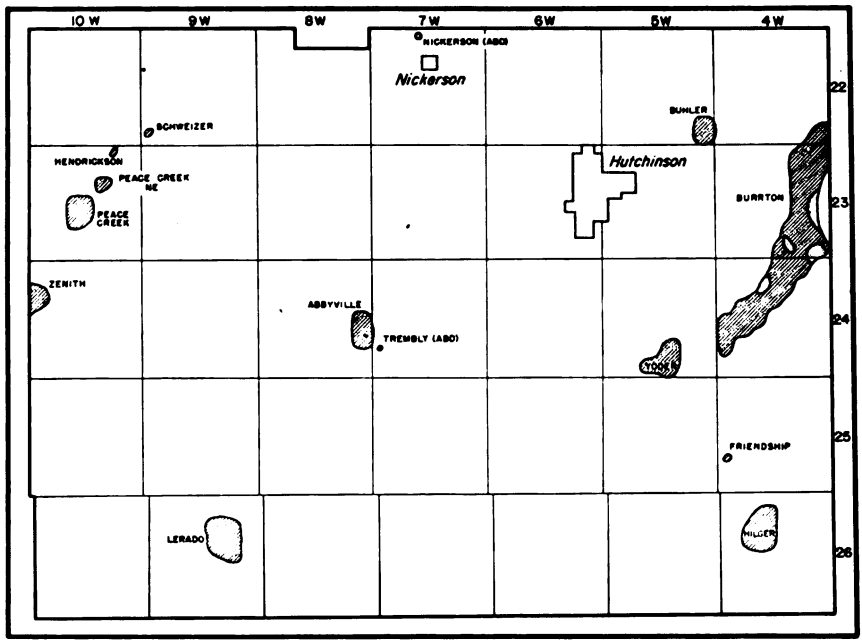

FIG. 24. Map of Reno county showing oil and gas pools.

the pool. All wells produce from the Kansas City-Lansing limestone.

New pools.—The new pools of Reno county number five. One of them is situated in the eastern part of the county and the other four are rather closely spaced in the western part of the county. The Peace Creek pool was the first to be found. It was opened by the Simpson Oil Company on the completion of the first well on the Snowbarger farm in the NE¼ sec. 21, T. 23 S., R. 10 W. This well, with an elevation of 1,781 feet, found the Ft. Riley limestone at 1,715 feet, the Topeka limestone at 2,840 feet, the Lansing limestone at 3,310 feet, and the Mississippian limestone at 3,620 feet. The

important Misener sand was entered at 3,772 feet and, below it, the Viola limestone at 3,775 feet. Oil was found in the Viola, and the well flowed 125 barrels per hour natural. After a draw-down test the well was given a rating of 7,510 barrels per day.

Needless to say, this extremely favorable showing led to the starting of other wells in the vicinity. Before the end of the year, 22 other wells had been completed in the pool. Practically all of these wells have a very large potential and are rated as maximum wells by the State Corporation Commission. Four dry holes, two in section 21 and one in each of sections 23 and 29, serve to indicate possible limits of the pool.

Peace Creek Northeast pool.—A wildcat well drilled by the Leader Oil Company on the Tonn farm, in sec. 11, T. 23 S., R. 10 W., a few miles northeast of the Peace Creek pool, also found oil in the Viola formation and opened the second pool. This well was completed on November 30, 1941. It has an elevation of 1,763 feet and found the Viola limestone at 3,755 feet. Good porosity was encountered at a depth of 3,762 feet, and 1,000 feet of oil collected in the hole. The well was drilled to a depth of 3,768 feet, and the oil rose 3,000 feet in the hole and later started to flow by heads. The gravity of the oil tested 43 degrees A. P. I. Official tests gave the well a potential capacity of 5,295 barrels per day.

Hendrickson pool.—The next pool found on the trend was the Hendrickson pool. The first well in this pool was drilled by the Central Petroleum Company on the Hendrickson farm in the NE¼ sec. 2, T. 23 S., R. 10 W. It has an elevation of 1,746 feet and found the Viola limestone at 3,680 feet. It was deepened to 3,736 feet, at which depth the Simpson dolomite was encountered. Good porosity extended from depths of 3,736 to 3,744 feet in this dolomite, and the well was acidized with 1,000 gallons, after which it swabbed a considerable amount of oil. After further treatment with 1,200 gallons of butane and 4,000 gallons of acid, the well responded with a flow of 25 barrels per hour. The official potential capacity of the well is 217 barrels per day. The Hendrickson well was completed on December 18, 1941.

Schweizer pool.—On December 22, 1941, another well on the same trend opened the Schweizer pool. This is the Hinkle Oil Company No. 1 Schweizer in the NW¼ sec. 31, T. 22 S., R. 9 W. In this well the Viola limestone was penetrated at 3,701 feet. Oil was encountered between the depths of 3,721 and 3,725 feet. After treatment

TABLE 19.—*Oil and gas pools of Reno county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Abbyville, 24-24-8W	1,200	408,628	8	K. C.-Lans	3,540
Buhler, 25-22-5W	500	364,959	1	Viola	3,890
			9	Simpson	3,897
Burrton, 23-23-4W	5,000	33,093,107	336	"Chat"	3,266
				"Hunton"	3,583
				Arbuckle	3,775
Burrton (gas), 23-23-4W	5,000	46,131,000 M cu. ft.	52	"Chat"	3,298
*Friendship, 30-25-4W	40	1,240	1	Viola	3,981
*Hendrickson, 2-23-10W	40	.....	1	Simpson	3,736
Hilger, 16-26-4W	600	2,037,559	32	Viola	4,062
*Hitz (gas), 4-24-12W	.....	.....	1	Viola	4,032
Lerado, 11-26-9W	1,800	2,348,470	1	K. C.-Lans	3,535
			32	Viola	4,128
*Peace Creek, 21-23-10W	1,000	73,216	23	Viola	3,773
*Peace Creek Northeast, 11-23-10W	120	1,347	3	Viola	3,757
*Schweizer, 31-22-9W	40	.....	1	Viola	3,720
Yoder, 34-24-5W	500	72,470	5	"Chat"	3,450
Yoder (gas), 34-24-5W	800	.....	4	"Chat"	3,402

* Discovered in 1941.

with 4,000 gallons of acid the well flowed 45 barrels per hour. The gravity of the oil is 36 degrees A. P. I.

Friendship pool.—In the eastern part of the county, a few miles northwest of the Hilger pool, the Rocket Drilling Company found oil on the Soper farm. The discovery well was drilled in the NW¼ sec. 30, T. 25 S., R. 4 W. It was completed in November, 1941. With an elevation of 1,625 feet, this test logged the Ft. Riley limestone at 1,010 feet, the Topeka limestone at 2,206 feet, the Lansing limestone at 2,812 feet, and the Mississippian limestone at 3,539 feet. The Ordovician Viola limestone was encountered at 3,981 feet, and the well was finished at 3,986 feet. Oil was found in the Viola and rose 1,500 feet in the hole. After acid treatment, the well pumped 25 barrels per hour. It was given a potential rating of 495 barrels per day. The gravity of the oil is 38 degrees A. P. I.

Rice County

With the exception of Russell and Barton counties, Rice had the most completions of any county in western Kansas. No less than 205 test holes were completed. Among them were 153 oil wells, 4 gas wells and 48 dry holes. The map (fig. 25) indicates that the pools of this county are well scattered and that there are many pools with a very small number of wells. There are a number of reasons for this condition, some structural and some topographic. The pools in which the greatest activity prevailed during 1941 are the Geneseo, Chase, Keesling, Raymond, and Wherry pools. These pools accounted for more than half of the total completions. The large Silica pool, described in the chapter on Barton county, extends into Rice county but had relatively few completions in this sector. This pool now covers over 32,000 acres. It produced 36,747,900 barrels of oil during 1941. That portion of the production supplied by the wells in Rice county amounts to 16,688,194 barrels. In the succeeding paragraphs oil and gas exploration in Rice county during 1941 are described. In order to simplify the arrangement, the pools are listed in geographical order, beginning with those in the northern tier of townships. (See fig. 25.)

Geneseo pool.—The Geneseo oil pool was discovered in May, 1934, and has continued to be prominent. During 1941 no less than 36 new oil wells were completed and only 3 dry holes. With one or two exceptions all wells were drilled by the Continental Oil Company. The greatest amount of drilling took place in the southern portion of the producing area in sees. 24 and 25, T. 18 S., R. 8 W.

The Continental Oil Company drilled one hole in section 25 to a depth of 3,869 feet so that it could be used as a salt water disposal well. There are now 191 Arbuckle dolomite wells and one Simpson well in this pool.

Rickard pool.—The Rickard pool lies 10 miles west of the Geneseo pool. In this pool three new oil wells were added during 1941. All were drilled by the Aylward Production Company jointly with the El Dorado Refining Company.

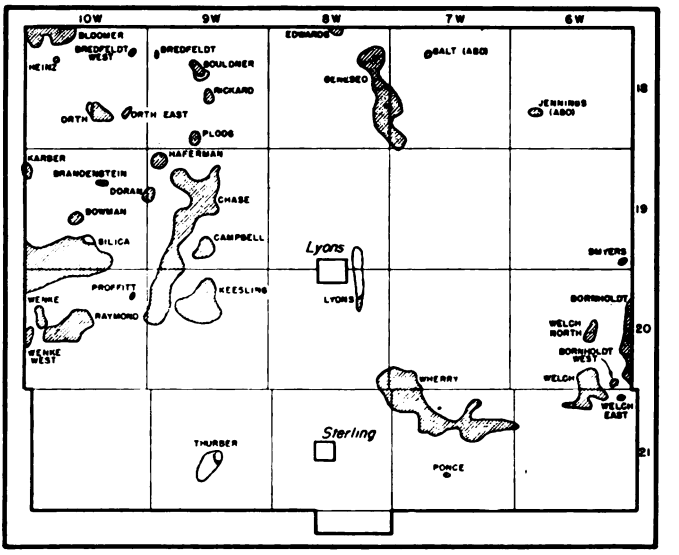

FIG. 25. Map of Rice county showing oil and gas pools. Oblique lines indicate oil pools; dots indicate gas pools.

Bloomer pool.—The Bloomer pool of Barton county extends into the northwestern corner of Rice county. It is an area of prolific wells and therefore witnessed a determined drilling campaign during 1941. In the Rice county portion of the pool four new oil wells and two dry holes were completed. Several of the new wells have a maximum potential capacity rating. One small oil well was added in the Bredfeldt West pool, which lies a few miles southeast of the Bloomer pool.

Orth pool.—The Orth pool is one of the most interesting pools in the state inasmuch as it produces oil from the pre-Cambrian quartzite. It produces gas as well as oil. During 1941, six test wells were completed. Of these, two were new oil wells, one was a

new gas well, and the others were dry holes. In several of the dry holes the Arbuckle dolomite was found to be present.

Chase pool.—The original Chase pool, discovered in February, 1931, has been expanded a number of times by the addition of border pools. During 1941 it was expanded still further by extensions in various directions. It seems to be spreading out like an amoeba. The new extensions are largely in areas condemned by geologists because they are off the structure. Wells in these areas nevertheless produce large quantities of oil. Advance wells in the northwestern part of the pool have extended its limits to within less than a mile from the Hafermann pool in the northwest corner of T. 19 S., R. 9 W. The pool has been extended eastward

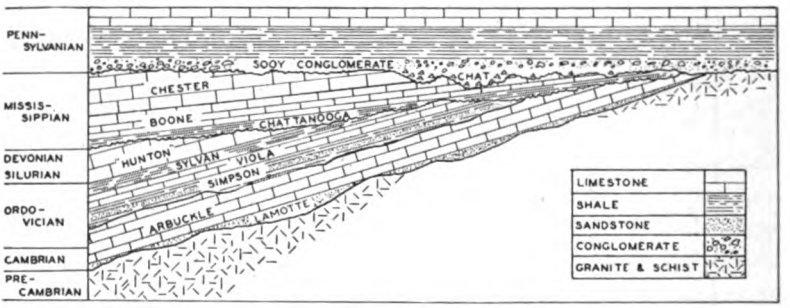

FIG. 26. Generalized cross section of pre-Pennsylvanian rocks of Central Kansas Uplift area.

into section 23 and westward into section 19. There are indications that before long it will merge with the Campbell and the Keesling pools, which border it on the east. During 1941, 25 new oil wells were added and 3 dry holes were drilled. Quite a number of the new oil wells have a maximum potential capacity rating. One of the older wells, drilled by the Magnolia Oil Petroleum Corporation as No. 5 on the Meyer lease, was reworked. Originally completed in 1935 at 3,252 feet, it was deepened in 1938 to 3,259 feet, where it produced a small amount of oil and much water. In 1941 this well was drilled deeper to 3,465 feet and converted into a salt water disposal well.

Doran pool.—The Doran pool lies a few miles west of the Chase pool in the next township to the west. Fur test wells were completed in 1941. Two of them were new oil wells and the other two were dry.

Bowman pool.—The Bowman pool lies in the middle of T. 19 S., R. 10 W. Five new oil wells were completed during 1941. Three of these produce oil from the Arbuckle dolomite, one produces oil from the Lansing limestone, and one produces oil from both zones. The Sharon No. 1 Nevius is the discovery well for the Lansing limestone production. In June, 1941, it found porosity at 3,032, 3,034, and 3,042 feet. It has a potential capacity of 530 barrels from the Lansing limestone and of 103 barrels from the Arbuckle dolomite.

Silica pool.—The Silica pool is more fully described in the chapter on Barton county. During 1941 nine new oil wells were added to the Rice county area of the pool. Despite the age of the pool, several of the new wells are maximum wells, according to the rating of the State Corporation Commission.

Keesling pool.—The Keesling pool was discovered in April, 1935, and has been rather active ever since then. The successful operations in the near-by Chase pool lead to a strong revival of interest in the Keesling pool during 1941. No less than 26 test wells were completed, of which 23 were successful in finding oil. Most of the new oil wells are situated in secs. 3, 4, 9, and 10, T. 20 S., R. 9 W. The most valuable extension lies on the south side of the pool, where three wells have been completed in sec. 21, T. 20 S., R. 9 W. Considerable intervening territory remains to be tested in that sector.

Wenke and Raymond pools.—The Wenke and Raymond pools now represent one pool. The first well in the Raymond portion was completed in July, 1929, and the first well in the Wenke portion was completed in March, 1935. During 1941 a great many test wells were drilled in this part of Rice county, and the size of the producing area therefore has been expanded considerably. Of the 37 test holes completed during 1941, six were dry and the others were oil wells. A large proportion of the new wells have been given a maximum potential rating by the State Corporation Commission.

Bornholdt pool.—The southeastern corner of Rice county has two pools of outstanding merit, the Bornholdt pool and the Wherry pool. The Bornholdt pool was discovered in 1938 in adjoining McPherson county. A fairly large part of this pool now lies in Rice county. Five oil wells were completed in the Rice county portion during 1941.

Wherry pool.—The Wherry pool covers a large area about 8 miles west of the Bornholdt pool. It produces from the Sooy conglomerate

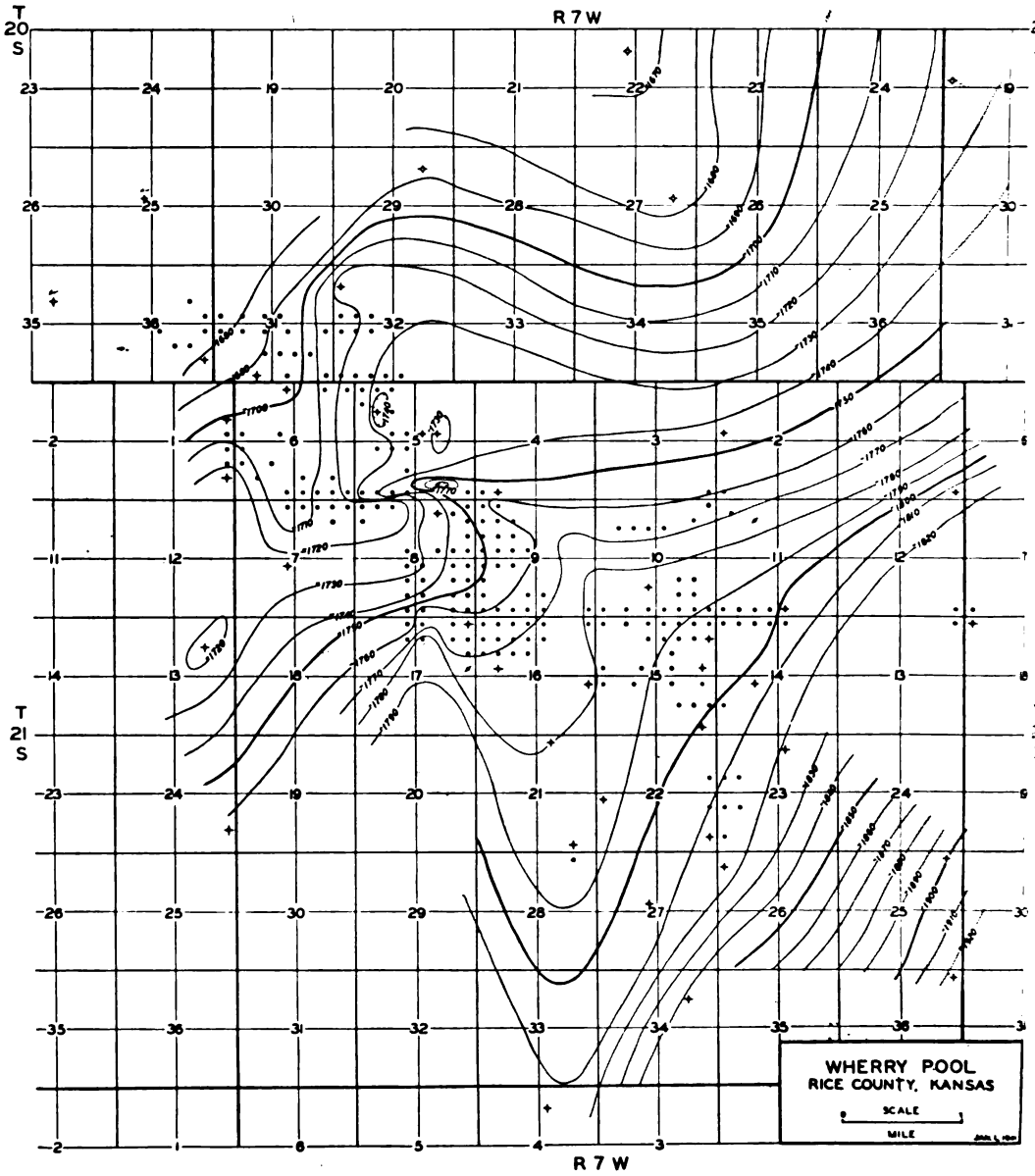

FIG. 27. Structure map of Wherry pool showing contours on top of Mississippian chert and (or) limestone. Contour interval, 10 feet. Datum plane, sea level. (After McNeil, Am. Assoc. Petroleum Geologists)

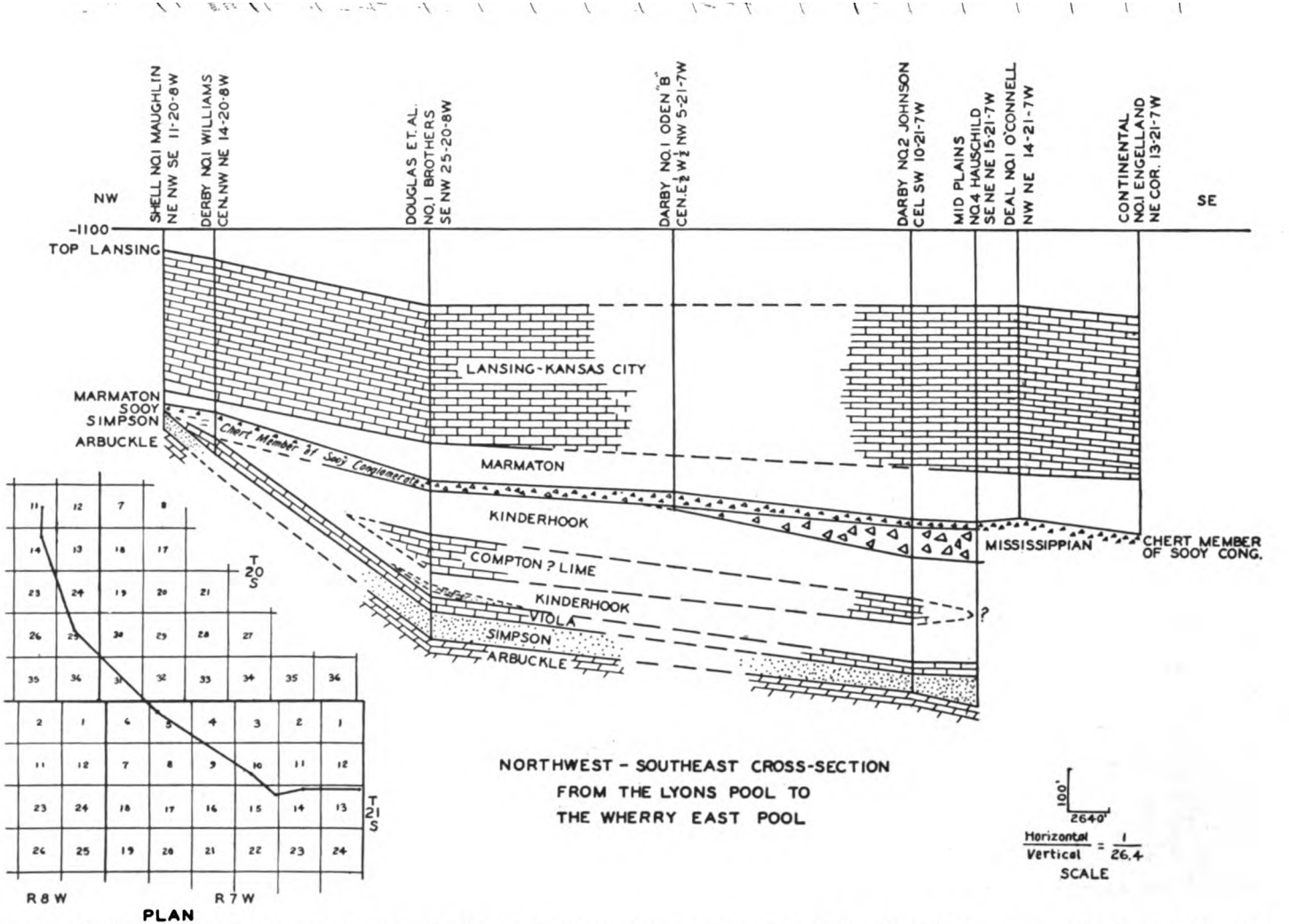

FIG. 28. Northwest-southeast cross section from the Lyons pool to the Wherry East pool. (After McNeil, Am. Assoc. Petroleum Geologists)

at a depth of approximately 3,350 feet. During 1941, 4 dry holes were drilled and 12 new oil wells were added. The new oil wells are mostly small wells; furthermore, they produce considerable quantities of water with the oil. The Garden No. 1 Oden well in sec. 5, T. 21 S., R. 7 W., originally completed in 1937, was deepened from 3,347 to 3,366 feet. The new potential is 25 barrels per day. Another reworked well is the Shell No. 1 "A" Brothers, in sec. 31, T. 20 S., R. 7 W. It was deepened from 3,323 to 3,333 feet. The new potential is 80 barrels per day.

New pools.—The two new pools added during 1941 to the already large list of Rice county pools are situated near the Wherry pool. They may in time become connecting links between the Wherry and the Bornholdt pools. In October, 1941, the Aladdin No. 1 Lackey well was completed in the SE¼ sec. 1, T. 21 S., R. 6 W. In the discovery well of the Welch East pool, the Topeka limestone was found at 2,255 feet and the Mississippian "chat" at 3,337 feet. The oil came into the hole in such volume as to cause a fill-up of 2,800 feet. Later, the well was swabbed at the rate of 10 barrels per hour.

Bornholdt West pool.—The second pool discovered in 1941 was the Bornholdt West pool. The discovery well was the Westgate-Greenland Oil Company No. 1 Harder well, in the SW¼ sec. 36, T. 20 S., R. 6 W. This well has an elevation of 1,543 feet above sea level and found the Lansing limestone at 2,850 feet and the Mississippian "chat" at 3,317 feet. Fifty-five feet lower, oil came into the hole at the rate of 18 barrels per hour, and saturation was found between 3,330 and 3,370 feet. The well was plugged back and butane used to increase the flow. A final test showed 45 barrels of oil and 20 barrels of water per day. This new producing area is separated from each of the two adjacent pools by less than one mile. The original well was completed on November 20, 1941.

Thurber gas pool.—The Thurber gas pool is situated in the southwestern part of the county. At the close of 1940 it had three producing wells which obtain gas from the Misener sandstone. During 1941 four additional wells were completed. They range in productive capacity from 4 million to 26 million cubic feet per day. To date, this pool has produced 4,960,000 thousand cubic feet of gas.

TABLE 20.—*Oil and gas pools of Rice county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Bornholdt (see McPherson county)					
*Bornholdt West, 36-20-6W			1	"Mississippi lime"	3,405
*Bowman, 21-19-10W	160	21,791	4	K. C.-Lans	3,032
			1	Arbuckle	3,273
Brandenstein, 10-19-10W	160	374,251	2	K. C.-Lans	3,014
Bredfeldt, 7-18-9W (abandoned)				Arbuckle	3,223
Bredfeldt West, 12-18-10W	80	24,325	2	Arbuckle	3,260
Campbell, 28-19-9W	800	932,150	3	K. C.-Lans	
			22	Arbuckle	3,195
Chase, 32-19-9W	5,200	22,412,741	11	K. C.-Lans	2,942
			243	Arbuckle	3,246
Doran, 13-19-10W	250	134,514	5	Arbuckle	3,291
Edwards, 3-18-8W	2,600	2,960,598	90	Arbuckle	3,278
Geneseo, 25-18-8W	5,600	7,028,200	1	Simpson	3,191
			191	Arbuckle	3,132
Gouldner, 16-18-9W	160	247,689	2	K. C.-Lans	2,884
				Arbuckle	3,227
Gouldner (gas), 16-18-9W				Lansing	2,884
Haferman, 6-19-9W	800	500,888	10	Arbuckle	3,192
Heinz, 8-18-10W	80	39,552	1	K. C.-Lans	3,000
			1	Arbuckle	3,254
Karber, 7-19-10W	120	27,430	3	Arbuckle	3,343
Keesling, 10-20-9W	1,200	3,033,161	65	Arbuckle	3,239
Lyons, 14-20-8W	40	10,237	1	Simpson	3,274
Lyons (gas), 35-19-8W	1,500	10,429,000 M cu. ft.	1	Simpson	3,290
			11	Arbuckle	3,277

TABLE 20.—Concluded

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Midway, 8-20-9W (now part of Keesling)	500	151,089	11	Arbuckle	3,244
Orth, 27-18-10W	1,000	770,962	1	Shawnee	
			1	K. C.-Lans	2,915
			11	Pre-Cambrian	3,240
Orth (gas), 27-18-10W	640		3	K. C.-Lans	2,906
Orth East, 25-18-10W				Pre-Cambrian	
Ploog, 33-18-9W	300	1,241,370	10	Arbuckle	3,252
Ponce, 28-21-7W	40	29,337	1	Sooy	3,388
Raymond, 21-20-10W	1,200	6,255,903	20	K. C.-Lans	3,130
			40	Arbuckle	3,330
Rickard, 22-18-9W	160	65,760	4	Arbuckle	3,324
Silica					
Smyres, 26-19-6W					
Stumps (now part of Bloomer)					
Thurber (gas), 22-21-9W	400	4,960,000 M cu. ft.	7	Misener	3,317
Welch, 2-21-6W	1,500	4,293,850	24	"Chat"	3,370
*Welch East, 1-21-6W	40		1	"Chat"	3,341
Welch North, 23-20-6W	160	44,961	3	"Chat"	3,334
Wenke, 7-20-10W	400	341,722	11	Arbuckle	3,360
Wenke West, 18-20-10W	80	44,566	2	Arbuckle	3,292
Wherry, 11-21-7W	7,200	7,726,461	199	Sooy	3,358
Wherry East, 12-21-7W	160	96,477	3	Sooy	3,455

* Discovered in 1941.

Rooks County

Commercial quantities of oil first were discovered in Rooks county in July, 1927, when the Vickers Petroleum Company completed a test well on the Lukman farm, in sec. 11, T. 9 S., R. 16 W. This well opened the Laton pool, which still is the leading pool of the county. One year later the Kruse pool was discovered, but it has not proved to be of any importance. In October, 1930, the Webster pool was discovered; this pool also proved to be a disappointment and soon was abandoned. The Dopita pool was discovered in 1934 and now has seven wells. The Zurich pool, opened in 1935, has produced considerable oil. In 1936, the Faubion pool and the Westhusin pool were discovered. Of these two, the Westhusin has been the more prolific. In 1937, the Nyra and the Stockton pools were discovered, but both have been abandoned without yielding much oil. Since then, interest in this county has been subdued until the year 1941. During that year the Laton pool was extended and quite a number of rank wildcat wells were drilled in order to find new supplies of oil. Two of these were successful and, as a result, two new pools were opened, the Erway and the Ray Southeast pools.

For a brief summary of the early history of exploration the reader is referred to Mineral Resources Circular 10. In this report there is a discussion of the stratigraphy and areal geology of the county. Subsequent developments were reported in Mineral Resources Circular 13 and in Bulletins 28 and 36. At the close of 1940 there were 65 producing wells in Rooks county. During 1941 no less than 48 test wells were completed. Of these, 37 found oil and 11 were dry holes.

Dopita pool.—The Dopita pool has its center at the intersection of four townships near the center of the county. During 1941 only 2 additional oil wells were completed. One is the No. 2 Dopita, drilled by K. A. Nill, in sec. 31, T. 8 S., R. 17 W. This well has a potential productive capacity of 600 barrels per day. The other well was drilled by the Sharon Drilling Company on the Maddy farm, in sec. 36, T. 8 S., R. 18 W.

Laton pool.—The Laton pool, in T. 9 S., R. 16 W., drew the spotlight during 1941. No less than 35 test wells were drilled in and around this pool. Of this total, 32 were new oil wells and only 4 were dry holes. In sec. 2, T. 9 S., R. 16 W., the Beardmore-Broadview Oil Company drilled nine producers and two dry holes. In section 3 four additional oil wells were completed. Most of these have

a potential capacity of 500 barrels per day. Nine new wells were added in section 10. Several of these received a rating of 2,000 barrels per day or more. In section 11 three new oil wells were completed. One new oil well was completed in section 13 and three new wells in section 15.

Westhusin pool.—In the Westhusin pool 6 miles west of the Laton pool, three test wells were completed. One of these, the Coöperative No. 1 McClay well, in sec. 12, T. 9 S., R. 17 W., represents a new

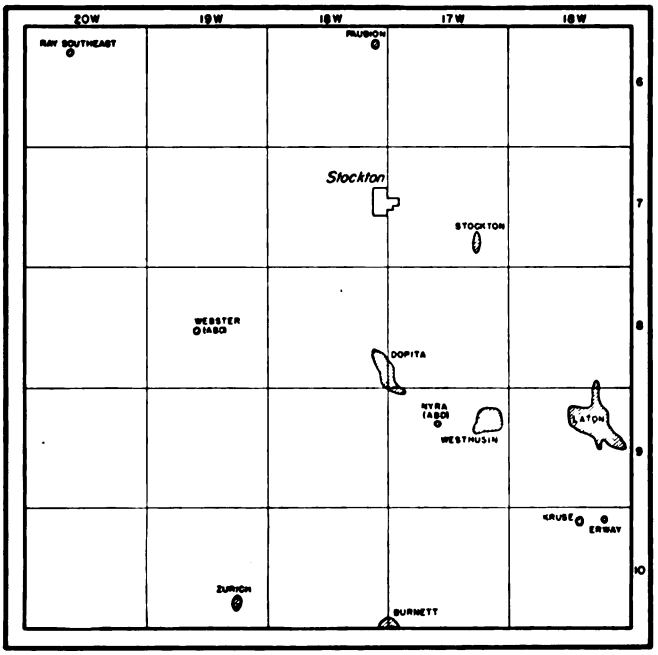

FIG. 29. Map of Rooks county showing oil pools.

producer. It has a potential capacity of 215 barrels per day. One well, the Plains Oil and Gas Company No. 2 Westhusin, was deepened from 3,258 to 3,325 feet by Helmerick and Payne. At the new depth it has a potential capacity of 630 barrels, which is much better than the original rating at the shallower depth. One dry hole was drilled in section 14 by Earl Wakefield on the Westhusin ranch.

Erway pool.—Two new producing areas were discovered in Rooks county during 1941. One of these is the Erway pool, in sec. 2, T. 10 S., R. 16 W. The discovery well was drilled by the Cities Service Oil Company on the Erway ranch, in the SE¼ sec. 2. It has an

elevation of 1,959 feet above sea level and was drilled to the Arbuckle dolomite, the top of which was encountered at 3,485 feet. Inasmuch as no oil was found in the Arbuckle, the well was plugged back to test good shows in the Kansas City-Lansing limestones. Although some oil was found there, it was not present in sufficient quantity to make a commercial well. The well was then plugged back to test porosity in the Topeka limestone. After the casing was perforated, the hole filled up 2,400 feet with oil; 3,000 gallons of acid were injected into the limestone and the well swabbed 125 barrels. When finally completed, the well received a rating as a minimum well in the Topeka limestone.

Ray Southeast pool.—The second new pool in Rooks county is the Ray Southeast pool in sec. 9, T. 6 S., R. 20 W. The discovery well was drilled by the Derby Oil Company on the Steele ranch, in the center of the N½ NW¼ sec. 9. Although the Ray pool of Phillips county lies only a little more than a mile northwest of this pool, it nevertheless was considered proper to designate this as a new producing area. In the test well the Lansing limestone was found at 3,359 feet. Inasmuch as no good shows were found within this possible producing zone, the test was drilled deeper and eventually found the Lamotte sandstone at 3,613 feet. Two feet deeper a good show of oil was found, although the porosity was not very great. "Granite wash" was penetrated at a depth of 3,636 feet, and at 3,639 feet drilling was stopped. When a test was made of the show in the Lamotte sand, the well swabbed about seven barrels per hour. The oil has a gravity of 31 degrees A. P. I. The State Corporation Commission gives the well a potential capacity rating of 65 barrels per day.

Exploratory wells.—The Central Petroleum Company drilled a very interesting wildcat well in sec. 32, T. 6 S., R. 19 W., on the Liebenau farm. With an elevation of 1,992 feet, this test found the Stone Corral dolomite at 1,580 feet, the Ft. Riley limestone at 2,180 feet, the Topeka limestone at 3,030 feet, and the Lansing limestone at 3,302 feet. The Ordovician Arbuckle dolomite was reached at 3,537 feet and was dry.

Another valuable geologic record was obtained when Hartman and Blair completed the No. 1 Veverka in sec. 28, T. 8 S., R. 19 W. In this test, which has an elevation of 2,018, the Ft. Riley limestone was logged at 2,150 feet, the Lansing limestone at 3,193 feet, and the Arbuckle dolomite at 3,458 feet. It was abandoned as a dry hole at 3,586 feet.

A third important wildcat well was the Kerlyn Oil Company No. 1 Francis test, in sec. 31, T. 9 S., R. 17 W. In this well the Dakota sandstone came in at 610 feet, the Stone Corral dolomite at 1,385 feet, the Ft. Riley limestone at 2,125 feet, the Topeka limestone at 3,018 feet, and the Lansing at 3,320 feet. At greater depths the bit entered the Simpson formation at 3,538, the Simpson dolomite at 3,556, and the Arbuckle dolomite at 3,584 feet. The test was abandoned at 3,630 feet as a dry hole.

TABLE 21.—*Oil pools of Rooks county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Dopita, 31-8-17W	160	157,270	3	K. C.-Lans.	3,212
			4	Arbuckle	3,409
*Erway, 2-10-16W	40	2,717	1	K. C.-Lans.	3,136
Faubion, 12-6-18W	80	42,200	2	K. C.-Lans.	3,128
Kruse, 3-10-16W	40	10,900	1	K. C.-Lans.	3,115
Laton, 11-9-16W	1,000	1,093,996	71	K. C.-Lans.	3,228
*Ray Southeast, 9-6-20W	40		1	Lamotte	3,600
Stockton, 26-7-17W (abandoned)				K. C.-Lans.	3,118
Webster, 21-8-19W	40	50,247	1	Arbuckle	3,434
Westhusin, 11-9-17W	400	394,563	12	K. C.-Lans.	3,231
Zurich, 26-10-19W	200	118,049	2	K. C.-Lans.	3,340

* Discovered in 1941.

RUSH COUNTY

The areal geology and the subsurface stratigraphy of Rush county are described rather fully in Mineral Resources Circular 10 published by the State Geological Survey. The history of early oil exploration was outlined in the same report. Later developments were discussed in Bulletins 28 and 36. By the end of 1940 this county had two oil pools and one gas pool. During 1941, 10 test wells were drilled in the county, 7 of which are new oil wells and 3 of which are dry holes.

Otis pool.—The Otis area produces both oil and gas, but for purposes of statistical exactness the oil and gas data are treated separately. By the close of 1940 the Otis oil pool had 17 wells, all of which produce from the Lamotte sandstone of Cambrian age. During 1941, seven new oil wells were added, several of which have a productive capacity in excess of 1,000 barrels per day. Two of these were drilled in sec. 23, T. 28 S., R. 16 W., two in section 25,

and the remaining two in section 36. In the Barton county extension of this pool no wells were drilled during 1941.

Otis gas pool.—The Otis gas pool lies mostly in Rush county, but extends a short distance into adjoining Barton county. During 1941 no new wells were added in the Rush county portion, but three new gas wells were completed in the Barton county portion. The record shows one well in each of secs. 8, 27, and 25, T. 18 S., R. 15 W. The productivity of these new wells ranges from 1½ to 23 million cubic feet per day. The new wells have a pressure of ap-

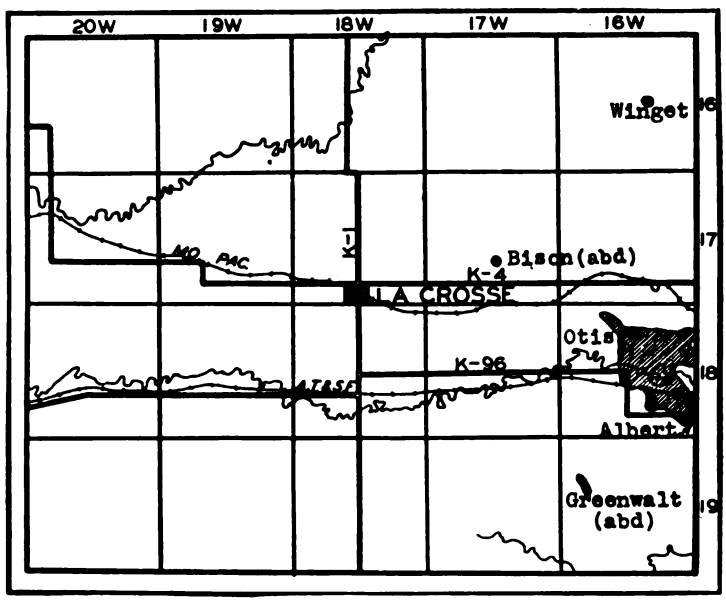

FIG. 30. Map of Rush county showing oil and gas pools.

proximately 650 pounds. At the close of 1941 the pool had only 59 wells, indicating that some of the older producers have been abandoned. Most of the older wells have a pressure of approximately 575 pounds. Allowable production is based on the formula of three-fourths allocated to acreage times pressure and one-fourth to open flow capacity. During December, 1941, pipe line runs were as follows:

Central Gas Utilities	107,565 M cu. ft.
Kansas-Nebraska Natural Gas	83,088 M cu. ft.
Kansas Power and Light Company	67,207 M cu. ft.
Northern Natural Gas Company	708,791 M cu. ft.
Producers Gas Company	271,800 M cu. ft.

The original pressure in the Otis gas pool (casinghead shut-in pressure) was 1,064 pounds. When the weight of the static gas column is computed as 114 pounds, the initial bottom-hole pressure is 1,178 pounds per square inch. By May 1, 1941, the removal of

GENERALIZED COLUMNAR SECTION FOR RUSH CO.

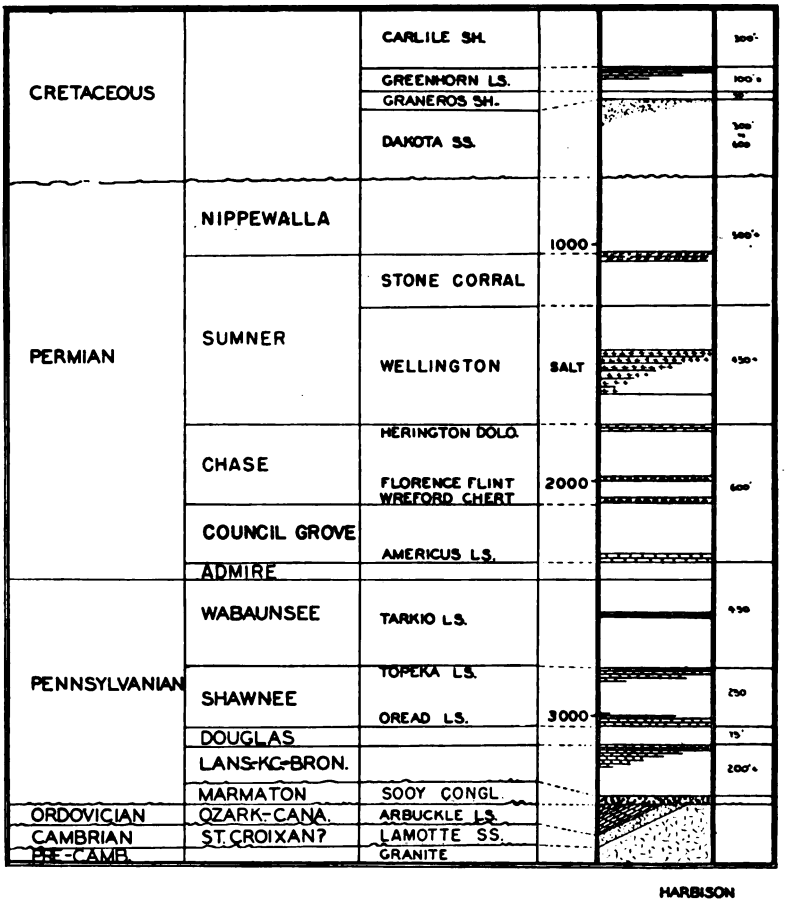

FIG. 31. Generalized columnar section of rocks in Rush county.

99,200 million cubic feet of gas had caused the pressure to drop to 660 pounds. The State Corporation Commission estimated that 108,700 million cubic feet of gas were still on reserve in the reservoir, of which 94,000 million cubic feet could be expected to be recovered assuming an abandonment pressure of 50 pounds per square inch (at the well head).

Available well logs indicate that the gas-producing zone in the Lamotte sandstone is 30 feet thick. Cores from the No. 1 "A" Schroeder well show a porosity of 18.8 percent. A core taken from the No. 1 Woodward well shows only 10 percent porosity. The average porosity probably is close to 12.5 percent.

Data on past production indicate that the gas-oil ratio has been approximately 20,900 cubic feet per barrel of oil. With a maximum ratio, for combination wells, of 3,000 cubic feet of gas per barrel of oil, as fixed by the State Corporation Commission at the end of 1937, it seems probable that about 17,900 cubic feet of gas have been wasted in the production of each barrel of oil. This figure suggests a grand total of 24,800 million cubic feet of gas probably wasted. In view of this situation, the State Corporation Commission ruled, on April 26, 1941, that no more gas should be vented to the atmosphere or otherwise wasted and drew up a detailed program for future production of the combination oil and gas wells in the Otis pool.

Wildcat wells.—During 1941 three wildcat test holes were completed in Rush county. One of these was drilled for water to a depth of only 450 feet. The second one was drilled just west of the Otis gas pool in sec. 8, T. 18 S., R. 16 W. The third well was drilled about 4 miles south of the abandoned Greenwalt pool in the southeastern township of the county. It is the Magnolia Petroleum Company No. 1 Conard well in sec. 33, T. 19 S., R. 17 W. This test has an elevation of 2,167 feet above sea level, and the log shows that it found the Stone Corral dolomite at 1,230 feet, the Lansing limestone at 3,593 feet, the Marmaton shales at 3,895 feet, and the Arbuckle dolomite at 3,950 feet. Inasmuch as it failed to find commercial production, it was abandoned at a total depth of 4,018 feet.

TABLE 22.—*Oil and gas pools of Rush county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Otis, 10-18-16W	800	1,555,397	22	Lamotte	3,527
Otis (gas), 11-18-16W	15,000	63,124,000 M cu. ft.	59	Lamotte	3,507
Winget, 15-16-16W	80	47,429	3 1	K. C.-Lans. Arbuckle	3,243 3,537

Russell County

Russell county held the spotlight of interest during 1941. In the numerous pools of this county and in other parts of its area no less than 338 test wells were completed during that year. As a result of this determined drilling campaign, 277 new oil wells were added to the already large number in the county. The 61 dry holes are situated mostly within one mile of producing wells. A number of outpost tests or wildcats were completed as oil wells. Four of these succeeded in opening new oil pools. The Hall-Gurney producing area, which now covers 19,000 acres, scored the largest number of new producing wells. Next in importance was the large Trapp area, which extends into adjoining Barton county. These two pools accounted for more than 10 million of the total of 84 million barrels of oil for the state of Kansas during 1941. In the following paragraphs the pools of Russell county are described in geographic order because they are so numerous.

Fairport pool.—The oldest pool in the county is the Fairport pool, discovered in 1923 when the nearest production in the state was over 100 miles away. This pool has been drilled rather completely, although in recent years some important additions to its area have been made by drilling at the southwestern end, in Ellis county. Four new wells were completed in the Russell county portion of the pool. A number of old wells were abandoned and several were reworked. The northernmost well in the pool, the Liggett No. 1 Chrisler in sec. 9, T. 11 S., R. 15 W., was deepened the second time. It was completed originally in 1928 for 40 barrels at 3,105 feet. In 1935 it was deepened to 3,280 feet, where it made a potential of 100 barrels after acid treatment. In 1941 it was deepened an additional 105 feet and made a new potential of 20 barrels. The Stanolind Oil Company deepened its No. 2 Bronson well in sec. 20, T. 11 S., R. 15 W., from 3,106 feet to 3,339 feet, at which depth it was capable of making 44 barrels of oil with 40 barrels of water per day. The Sinclair Oil Company reworked its No. 2 Brungart well in sec. 31, T. 12 S., R. 15 W. When drilled deeper, from 3,098 to 3,260 feet, this well made a new potential of 10 barrels of oil with 18 barrels of water.

Atherton and Russell pools.—Near the town of Russell are two pools in which some drilling was done during 1941. One new oil well was completed in the Russell pool. In the Atherton pool two additional oil wells were completed. One well, the No. 2 Jellison (McBride) in sec. 19, T. 13 S., R. 14 W., was deepened from 2,957 to

3,204 feet. The new potential production is 94 barrels per day. One dry hole was drilled in section 29 southeast of the pool limits.

Gorham pool.—In the next township on the west lies the large Gorham pool in which there are five different producing zones. Ten new oil wells were completed in this pool during 1941. One of these extended the limits approximately three-quarters of a mile to the northeast (Derby No. 1 Dillner well in sec. 35, T. 13 S., R. 15 W.).

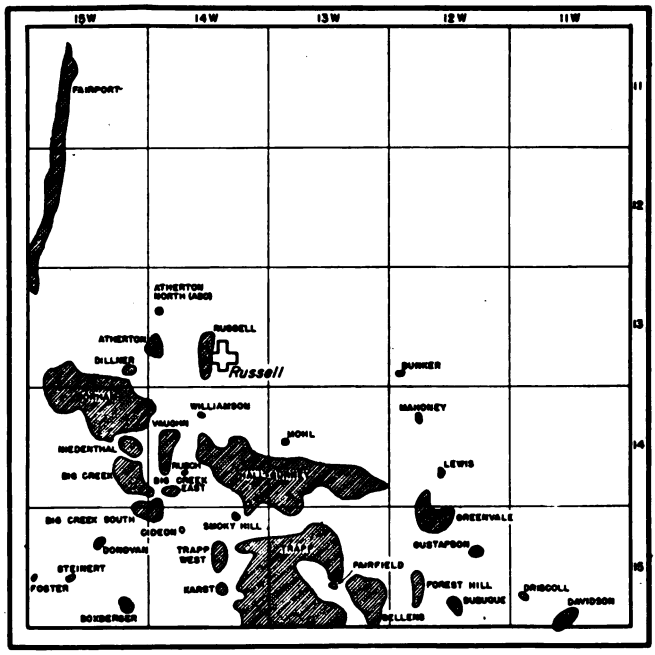

FIG. 32. Map of Russell county showing oil pools.

Three old wells were reworked. The Darby Petroleum Company deepened its No. 3 "C" Dumler well in sec. 11, T. 14 S., R. 15 W., from 3,096 to 3,305 feet and established a new potential of 174 barrels. The Transwestern Oil Company deepened its No. 11 Polcyn well in section 11 from 3,059 feet to 3,260 feet. The Gorham pool has produced, to date, over 19 million barrels of oil.

Mahoney and Lewis pools.—In T. 14 S., R. 12 W. there are two relatively small pools that received some attention during 1941. One new oil well was drilled in the Mahoney pool in sec. 17, T. 14 S., R. 12 W. In the Lewis pool, Jones and Shelburne deepened their No. 1 Lewis well. It originally was completed at 2,329 feet, where

it produced from the Wabaunsee formation. In 1941 it was deepened to 3,191 feet, where a new potential of 10 barrels of oil and 35 barrels of water was established. One dry hole was drilled in the pool. In the Greenvale pool, which lies partly in the same township, two new oil wells and one dry hole were completed.

Hall-Gurney pool.—The Hall-Gurney pool is now the largest pool that lies wholly within the county. There was feverish drilling activity in this producing area during 1941. As a result, no less than 117 test wells were completed, of which less than 10 were dry holes. This pool has seven different producing horizons, including the pre-Cambrian granite. It now covers more than 19,000 acres and the limits have not yet been found. There are strong indications that it may soon merge with the already large Trapp pool farther south. To the northwest it may merge with the Vaughn pool and eventually with the Gorham pool. To the southeast there seemingly is no barrier between it and the rapidly expanding Greenvale area. It may be expected that the Hall-Gurney area will see much additional activity during the coming year.

Vaughn and Big Creek pools.—The Vaughn pool lies 1.5 miles west of the Hall-Gurney pool, and the Big Creek pools are situated to the southwest. Two new wells and one dry hole were completed in the Vaughn pool during 1941. Four of the older wells were drilled deeper.

Big Creek pool.—In the Big Creek pool much drilling took place during 1941. No less than 22 test wells were completed during the year. Of these, 21 were successful in finding new oil supplies. A number of the new wells were rated as maximum wells, and this encouraged further drilling. The Big Creek East pool, which lies a short distance east of the south end of the main pool, received two additions so that it now has eight wells. In that portion of the Big Creek pool that formerly was called Big Creek South, seven new oil wells were completed.

Davidson pool.—The Davidson pool is situated in the southeastern township of the county. During 1941, five test wells were completed, of which three were new oil wells.

Greenvale pool.—The Greenvale pool is in the northwestern part of T. 15 S., R. 12 W. It was one of the most actively prospected areas in the county. Its limits therefore were expanded in several directions during 1941. Of 26 completions, no less than 23 were new oil wells. Some of these came in with a very high productive

capacity. The pool now extends into the next township to the north and eventually may merge with the much larger Hall-Gurney area farther northwest.

Dubuque pool.—The Dubuque pool, 5 miles south of the Greenvale pool, did not fare well during 1941. Of 8 test wells completed there during 1941, no less than 6 were dry holes. Each of the 2 producing wells is rated at 120 barrels of oil per day.

Trapp pool.—The Trapp pool is now the second largest pool in the state of Kansas. With an area of nearly 29,000 acres, it outranks the El Dorado pool and is second only to the Silica pool. Since it was discovered, it has produced over 25,000,000 barrels of oil. Although there are five producing zones in the pool, only two are very important. They are the Lansing limestone, which now yields oil in 108 wells, and the Arbuckle dolomite, which yields oil in 677 wells. During 1941, 75 test wells were completed in the Russell county portion of the Trapp pool. Of this number, 69 were new oil wells and only 6 were dry holes. One well, the Stanolind No. 6 Roessner well in sec. 9, T. 15 S., R. 13 W., was reworked. The original depth of this well was 3,325 feet, and it produced 600 barrels from the Arbuckle dolomite. During 1941 it was plugged back so as to produce from the Lansing limestone between the depths of 3,056 and 3,080 feet.

Trapp West pool.—A considerable area still is classified as being separated from the main pool and is designated the Trapp West pool. This pool was the scene of much activity during 1941; nine new oil wells and two dry holes were drilled. One new well, in sec. 22, T. 15 S., R. 14 W., extended the limits of the pool half a mile, and at that point the Trapp West pool is three quarters of a mile from the outpost wells of the main pool. Two dry holes were drilled in the Sellens pool, which lies about a mile east of the Trapp pool. The Eichman pool, which heretofore has been classified separately, was joined to the Trapp pool when the Leader Oil Company completed its No. 3 Berry well, in sec. 33, T. 15 S., R. 13 W., on December 27, 1941.

Donovan and Boxberger pools.—In the southwestern corner of Russell county there are four small producing areas. During 1941 drilling in the Donovan pool added two oil wells and one dry hole. In the Boxberger pool the Central Petroleum Company deepened its No. 1 "B" Boxberger well from 3,151 to 3,223 feet. The new potential is 192 barrels of oil and 10 barrels of water.

New pools.—During 1941 four new pools were discovered in Russell county. The first of these was the Rusch pool, which lies between the Hall-Gurney and the Big Creek East pools and eventually may serve as the connecting link between them. The discovery well was drilled by the Westgate-Greenland Oil Company on the Rusch farm, in the NE¼ sec. 29, T. 14 S., R. 14 W. With an elevation of 1,814 feet, this well reached the Lansing limestone at 3,955 feet and the Arbuckle dolomite at 3,218 feet. Three zones of saturation were found in the Kansas City-Lansing sequence of limestones, the best one at 3,056 to 3,062 feet. Oil rose in the hole 1,600 feet within half an hour and 2,500 feet within one hour. The well received a potential rating of 3,000 barrels per day. The good showing of this well caused other tests to be started near by, with the result that five other oil wells and two dry holes were completed before the end of the year. The discovery well was completed on June 3, 1941.

Forest Hill pool.—The second pool was found in July when the Central Petroleum Company completed its No. 1 Steinle well in the NE¼ sec. 29, T. 15 S., R. 12 W. This well is 2 miles northwest of the Dubuque pool, the nearest producing area. With an elevation of 1,790 feet, this well logged the Lansing limestone at 3,046 feet and the Arbuckle dolomite at 3,318 feet. Oil rose 1,800 feet in the hole from a porous zone in the Arbuckle dolomite. The well received a potential rating of 1,100 barrels per day. Three other wells and two dry holes were completed in this pool before the end of the year.

Gustason pool.—The third pool, the Gustason pool, was found on the 31st of July, the day following the discovery of the Forest Hill pool. The discovery well was completed on the Gustason farm in the NW¼ sec. 14, T. 15 S., R. 12 W., by the Central Petroleum Company. Oil was found in the Arbuckle dolomite at 3,244 feet. A second well in this pool was successfully completed by the Stanolind Oil Company on the Kastrup farm.

Mohl pool.—The fourth pool was discovered in September when the El Dorado Refining Company completed its No. 1 Mohl well in the SE¼ sec. 18, T. 14 S., R. 13 W. This well is one mile north of the nearest well in the Hall-Gurney pool. It obtains production from the Lamotte sandstone at a depth of 3,253 feet.

TABLE 23.—*Oil pools of Russell county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Atherton, 30-13-14W	1,800	1,098,064	8	K. C.-Lans.	3,008
			26	Arbuckle	3,284
Atherton North, 18-13-14W (abandoned)				Arbuckle	3,130
Big Creek, 36-14-15W	2,000	1,899,283	10	K. C.-Lans.	2,908
			40	Gorham	3,152
			16	Arbuckle	3,171
Big Creek East, 31-14-14W	200	203,047	5	K. C.-Lans.	
			3	Arbuckle	3,149
Big Creek South					
Boxberger, 36-15-15W	160	138,470	3	K. C.-Lans.	3,147
Bunker Hill, 31-13-12W	160	70,262	4	K. C.-Lans.	2,965
Davidson Northeast, 34-15-11W (now part of Davidson)	80	10,042	2	Gorham	3,309
Davidson, 33, 34-15-11W (see Barton county)					
Dillner, 35-13-15W	40	45,952	1	Arbuckle	3,300
Donovan, 10-15-15W	120	50,226	3	K. C.-Lans.	3,193
Driscoll, 30-15-11W	80	15,450	1	Sooy	3,323
			1	Arbuckle	3,255
Dubuque, 34-15-12W	200	179,877	1	K. C.-Lans.	
			4	Arbuckle	3,275
Eichman, 34-15-13W (now part of Trapp)	800	648,965	9	Arbuckle	3,316
Fairfield, 22-15-13W	40	8,181	1	Arbuckle	3,352
Fairfield North, 16-15-13W (now part of Trapp)	400	173,818	2	K. C.-Lans.	3,112
			8	Arbuckle	3,332
Fairport, 8-12-15W	3,600	15,015,974	147	K. C.-Lans.	2,950
				Gorham	3,211
*Forest Hill, 29-15-12W	160	8,296	4	Arbuckle	3,320

* Discovered in 1941.

TABLE 23.—Continued

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Foster, 19-15-15W (abandoned)				K. C.-Lans	3,114
Gideon, 8-15-14W	40	40,500	1	Sooy	3,266
Gorham, 5-14-15W	7,500	19,460,548	1	Tarkio	2,525
			10	Topeka	2,765
			140	K. C.-Lans	3,027
			2	Arbuckle	3,289
			156	Lamotte	3,299
Greenvale, 4-15-12W	1,600	376,600	19	K. C.-Lans	3,040
			22	Arbuckle	3,267
*Greenvale Northwest, 32-14-12W			2	Arbuckle	3,171
*Gustason, 14-15-12W	80	2,334	2	Arbuckle	3,244
Hall-Gurney, 30-14-13W	19,000	9,516,698	2	Wabaunsee	
			3	Topeka	2,675
			396	K. C.-Lans	2,985
			24	Gorham	3,165
			8	Arbuckle	3,451
			12	Lamotte	3,129
			3	Pre-Cambrian	3,156
Karst, 27-15-14W	160	198,250	3	Arbuckle	3,315
Lewis, 28-14-12W	40	7,150	1	Wabaunsee	2,317
Mahoney, 8-14-12W	120	24,400	3	K. C.-Lans	2,977
*Mohl, 18-14-13W	40		1	Lamotte	3,253
Niedenthal, 23-14-15W	600	880,748	2	K. C.-Lans	
			7	Arbuckle	3,246
Russell, 22-13-14W	1,200	4,810,746	3	K. C.-Lans	3,195
			47	Arbuckle	3,280

* Discovered in 1941.

TABLE 23.—Concluded

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
*Rusch, 29-14-14W	240	30,663	2	K. C.-Lans	3,071
			4	Arbuckle	3,216
Sellens, 26-15-13W	1,200	2,578,623	1	Shawnee	
			8	K. C.-Lans	3,088
			17	Arbuckle	3,352
Smoky Hill, 2-15-14W					
Steinert, 21-15-15W	40	39,092	1	K. C.-Lans	3,060
Trapp, 23-15-14W	28,600	25,461,806	1	Dodge	
			1	Topeka	2,889
			108	K. C.-Lans	3,062
			1	Sooy	
			677	Arbuckle	3,252
Trapp West, 15-15-14W	500	95,213	12	Arbuckle	3,249
Vaughn, 17-14-14W	1,000	1,007,871	24	K. C.-Lans	3,004
			1	Gorham	3,282
			4	Arbuckle	
Williamson, 9-14-14W	160	52,823	2	Tarkio	2,522

* Discovered in 1941.

Scott County

The only oil pool discovered to date in Scott county is the Shallow Water pool in the southern part of the county. It was discovered by the Atlantic Refining Company when the first well on the Vaniman farm was completed in December, 1934. The history of this pool to the end of 1937 is given in Mineral Resources Circular 10, published by the State Geological Survey. Subsequent developments

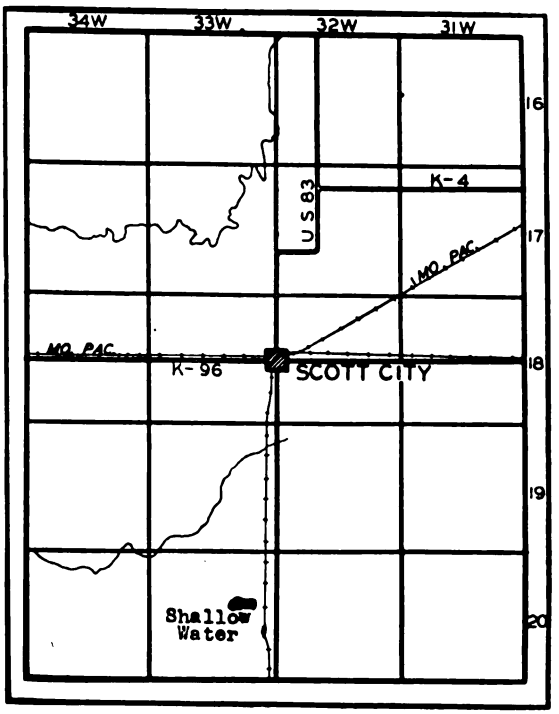

Fig. 33. Map of Scott county showing oil pools.

are discussed in Bulletins 28 and 36. The rock strata and their structure are described in the first-mentioned report. At the end of 1940 the Shallow Water pool had nine wells, all of which were producing from the porous zone at the top of the Mississippian limestone. During 1941 two new test wells were drilled in the area of the pool, but both of these proved to be dry holes. In the No. 1 Rosine Smith well, the top of the Mississippian limestone was found at 4,609 feet, and the test was abandoned at 4,800 feet. This well is in sec. 34, T. 19 S., R. 33 W. Another test, drilled on the Roark farm in sec. 10, T. 20 S., R. 33 W., found the Topeka limestone at 3,555 feet,

the Lansing limestone at 3,920 feet, and the top of the Mississippian limestone at 4,615 feet. This test was completed at 4,890 feet and then plugged back to test the porosity at 4,648 feet and above. No worth-while quantities of oil were found and the well was abandoned as a dry hole. The Atlantic Refining Company deepened one of the early wells, the No. 3 Dague in sec. 14, T. 20 S., R. 33 W. This well originally was completed in 1937 with a potential capacity of 143 barrels. In 1938 it was drilled deeper and made into a salt water disposal well at a total depth of 4,911 feet. During 1941 it was deepened still further to 5,620 feet for salt water disposal purposes.

TABLE 24.—*Oil pool of Scott county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Shallow Water, 15-20-33W	600	1,039,612	9	"Mississippi lime"	4,670

SEDGWICK COUNTY

The first oil in Sedgwick county was found in August, 1928, when the Valley Center pool came into production. This pool has proved to be the best in the county even though a number of other pools were discovered prior to the end of 1941. It has accounted for over 20 million barrels of oil since its discovery, which represents a per acre recovery in excess of 15,000 barrels. The Goodrich pool, discovered in December, 1928, also proved to be a good producing area although development has been slow and the limits of the pool still are unknown. Another pool of large productivity is the Greenwich pool, discovered in April, 1929. This pool has produced over nine million barrels of oil and is nearing exhaustion. The Eastborough pool, which lies a mile east of the City of Wichita, was found in August, 1929. It produces oil from the Mississippian "chat" and the Viola limestone. The Robbins pool, six miles south of the city of Wichita, was found in April, 1929. Thus, within one year the four major producing areas of the county were discovered, and since then no area of comparable productivity has been found.

Drilling activity in Sedgwick county was on a much reduced basis during 1941. One small producer was added in the Goodrich pool, where the Continental completed its No. 6 Goodrich well in sec. 16,

T. 25 S., R. 1 E. The well is capable of producing 173 barrels of oil, but is also making 35 barrels of water. In the same pool the Prunty Producing Company drilled a deep water-disposal well on the Casey farm in sec. 16, T. 25 S., R. 1 E. The total depth of this well is 4,199 feet. The same company completed a small producer on the Wright farm in the SE¼ sec. 12, T. 26 S., R. 1 W., in the Valley Center pool. This well is capable of producing 140 barrels of oil per day, but it is also yielding 850 barrels of water.

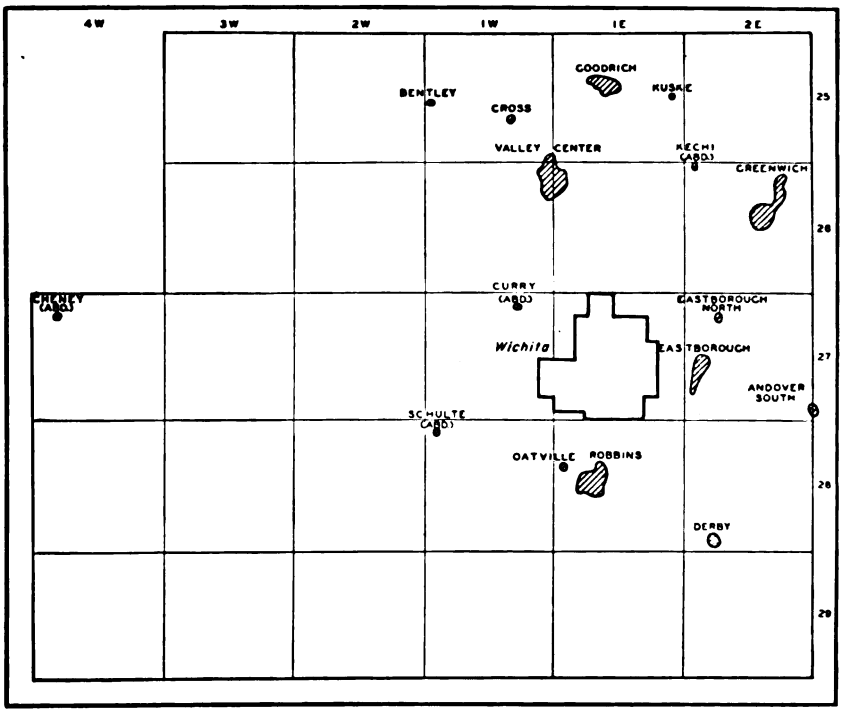

FIG. 34. Map of Sedgwick county showing oil and gas pools.

Exploratory wells.—Four wildcat wells were drilled in Sedgwick county in an effort to find new production. One of these tests is the Fees No. 1 Hall Estate in sec. 30, T. 27 S., R. 4 W., at the extreme western edge of the county. With an elevation of 1,436 feet above sea level, this well logged the Lansing limestone at 3,895 feet, the Mississippian limestone at 3,721 feet, the Viola limestone at 4,104 feet, and the Simpson formation at 4,121 feet. It was abandoned at 4,133 feet as a dry hole.

Another rank wildcat well was drilled 12 miles southwest of the

abandoned Schulte pool. This test, drilled by the Olson Oil Company on the Macreadie farm, is in the NE¼ sec. 15, T. 29 S., R. 2 W. It has an elevation of 1,299 feet above sea level and found the Topeka limestone at 1,937 feet, the Lansing limestone at 2,929 feet, and the Mississippian limestone at 3,547 feet. It was drilled to 3,576 feet and then plugged back to test an oil showing at 3,572 feet. It was abandoned as a dry hole.

In the eastern ranges of the county five dry holes were completed during 1941. One of these was the Murfin No. 1 Gsell well in sec. 33, T. 26 S., R. 2 E. Situated almost midway between the Greenwich and the North Eastborough pools, it seems to be on a good structural trend. The Misener sandstone was found at 3,239 feet, the Mississippian "chat" at 2,921 feet, and the Mississippian limestone two feet lower at 2,923 feet. The basal Mississippian Misener sandstone, which sometimes contains oil in this county, was found at 3,239 feet. At greater depths the test logged the Viola limestone at 3,240 feet, the Simpson formation at 3,272 feet, and the Arbuckle dolomite at 3,360 feet.

TABLE 25.—*Oil and gas pools of Sedgwick county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Cross, 29-25-1W	160	73,000	2	K. C.-Lans.	2,690
Eastborough, 19-29-2E	1,000	8,058,700	45	"Chat"	2,956
				Viola	3,238
Eastborough North, 8-27-2E	80	4,400	1	Viola	3,258
Goodrich, 16-25-1E	640	2,910,600	.....	K. C.-Lans.	2,614
			35	"Chat"	3,010
				Misener	3,334
Greenwich, 14-26-2E	700	9,307,160	.....	"Chat"	2,885
			42	Viola	3,321
				Simpson	3,350
Kuske, 24-25-1E	40	139,690	1	Sooy	3,489
Oatville, 18-28-1E	80	11,590	1	Simpson	3,489
Robbins, 20-28-1E	420	2,959,547	52	"Mississippi lime"	3,090
Valley Center, 1-26-1W	1,500	20,226,359	66	Misener	3,368
				Viola	3,366

Stafford County

The first oil pool in Stafford county was found when the Midwest Exploration Company opened the Richardson pool in 1930. This pool has produced over 4 million barrels of oil and has served as an impetus to further prospecting. Three years later the Gates pool in the northern part of the county was discovered. It has not proved to be as prolific as the Richardson pool. In 1935 the St. John pool was found, and in 1936 three other pools were opened, the Jordan, Kipp, and Snider. None of these proved to be sensational. In 1937, the Drach, Sittner, and Zenith pools were discovered. The Zenith pool has proved to be a remarkable pool and no doubt accounts for the very ambitious wildcatting activity carried on by operators during 1941. More rank wildcat wells were drilled in Stafford county than in any other county of the state. No less than 17 wildcat wells, far removed from any producing area, were completed during the year. Only three succeeded in finding new supplies of oil. Thus, the mortality has been high. Furthermore, drilling in and around present pools has resulted in an unusually high toll of dry holes. The pools that were most active during 1941

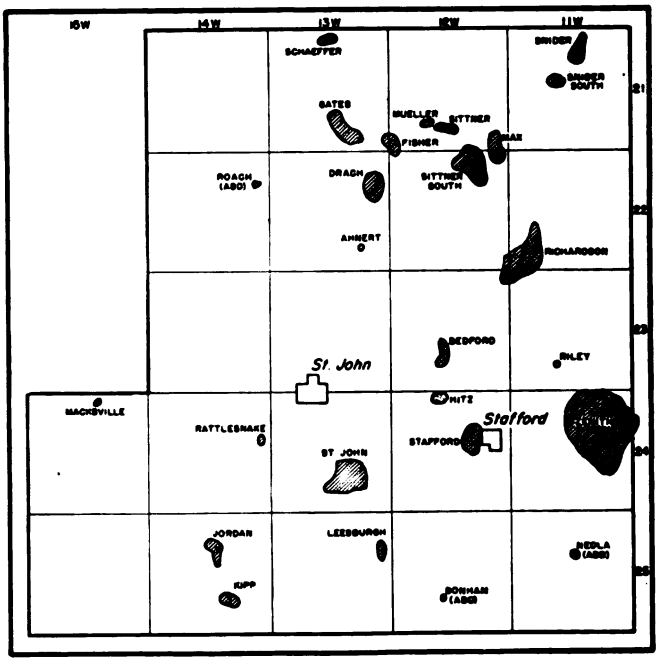

Fig. 35. Map of Stafford county showing oil and gas pools.

are the Zenith and Stafford pools. In all others only a limited number of tests were completed.

In the northeastern part of the county one dry hole was completed in the Snider South pool. In the Max pool three new oil wells and two dry holes were completed. The Fischer pool, situated 6 miles west of the Max pool, added one dry hole. In the Sittner pool, which lies between the two, one additional oil well was drilled. In the Sittner South pool, situated in the next township south of the Sittner pool, three dry holes were completed during 1941. The Drach pool, which lies in T. 22 S., R. 13 W., was more fortunate, inasmuch as three new oil wells were brought in to bring the total number to 12. The Roach pool, a new discovery of 1940, was abandoned in April, 1941.

Farther south and in the eastern part of the county one dry hole was drilled in the Riley pool. In the Bedford pool, which lies 7 miles to the west and in T. 23 S., R. 12 W., considerable drilling took place. Of a total of 12 test holes completed only one was a dry hole. The very large production of some of the new wells caused quite a flurry of drilling activity, and no doubt this will continue during 1942. The Bedford pool obtains production from the Arbuckle dolomite at a depth of approximately 3,850 feet.

Stafford pool.—Another pool in which there were a considerable number of completions was the Stafford pool, 5 miles south of St. John, the county seat. Here 16 test holes were completed during 1941 and only one of these proved to be dry. Among the 15 producers are quite a few rated as maximum wells. In the St. John pool, 7 miles farther west, six test holes were completed. Three of these were producers and three were dry.

Jordan and Kipp pools.—These two pools in the southwestern part of the county have been somewhat neglected, but during 1941 a renewed interest in them was manifested. Two wells with a high potential rating and one dry hole were completed in the Jordan pool. In the Kipp pool three tests were drilled and all proved to be producing wells.

Zenith pool.—The Zenith pool is the outstanding pool of Stafford county. The geological conditions in this area recently have been described by Imbt in the book entitled *Stratigraphic Type Oil Fields* (pp. 139-165), published by the American Association of Petroleum Geologists. The Pennsylvanian basal conglomerate (Sooy) rests on the eroded and truncated edges of older beds in such a manner that a great thickness of older beds is involved. The youngest of these

is the Kinderhook red shale, which thickens to the south across the area of the pool. Below it there are two sandstone bodies separated by the Misener limestone. The upper sandstone commonly is less than 10 feet thick and is not important as an oil-producing zone. The lower one is more extensive and in places reaches a maximum thickness of 30 feet. It is a very prolific oil zone. The Misener

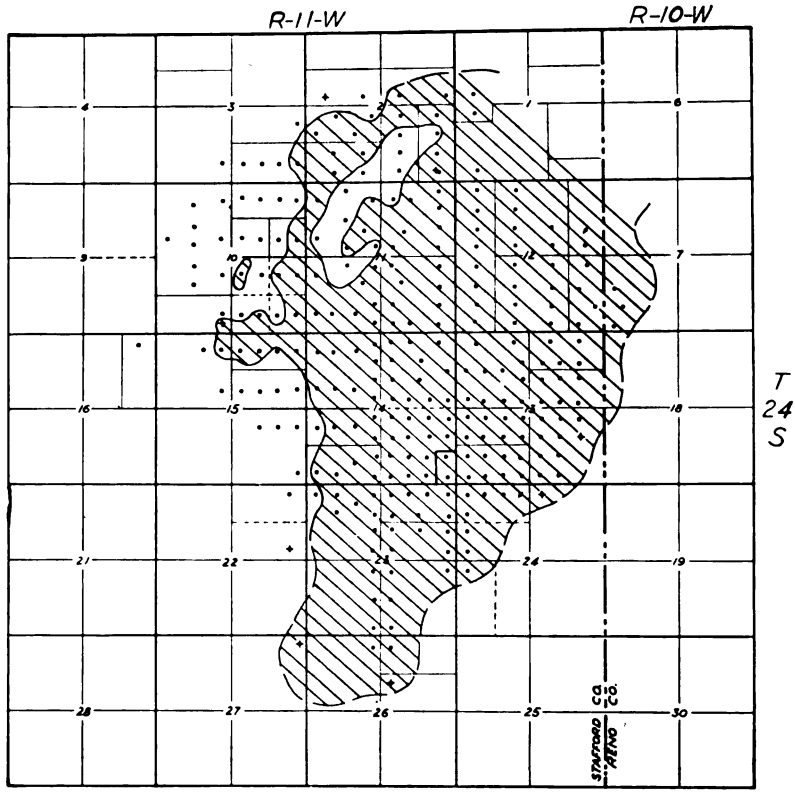

FIG. 36. Map showing distribution of the lower Misener sand in the Zenith pool. (After W. C. Imbt, Am. Assoc. Petroleum Geologists)

limestone, which separates the two sandstones, also is a very important producing zone. It varies from a few feet to 35 feet in thickness. In some wells the limestone of the Misener formation rests directly on older Ordovician limestone, the lower sandstone being absent. The Mississippian Misener formation evidently has an erosional unconformity beneath it, for it rests at different places on rocks of Maquoketa or Viola age. The Maquoketa formation

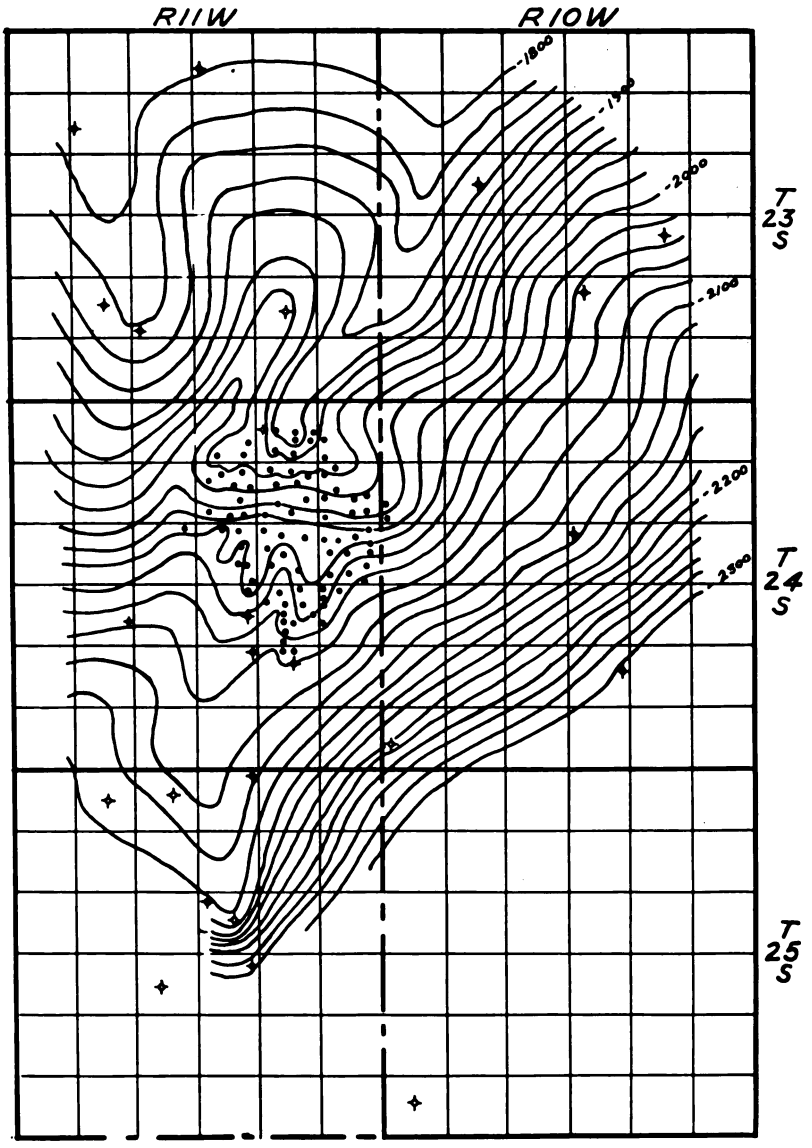

FIG. 37. Subsurface structure map on top of the Viola limestone in the Zenith pool and adjacent areas. (After W. C. Imbt, Am. Assoc. Petroleum Geologists)

is composed of shale, dolomitic limestone, and some dolomite. The dolomite is very porous and is an excellent oil reservoir. The Maquoketa is extremely limited in distribution and apparently is an erosional outlier. The maximum thickness is 35 feet.

The Viola limestone, which lies beneath the Maquoketa, also is a very important oil horizon. The upper part of the formation is coarsely crystalline, white and pink limestone and is referred to as the Fernvale member. It is 20 feet thick. The middle Viola consists of 80 feet of cherty, dolomitic limestone. The lower Viola consists of 15 feet of coarsely crystalline, mottled limestone. The Simpson formation below the Viola is 70 feet thick and rests upon the Arbuckle dolomite, which has a thickness of about 600 feet.

During 1941 no less than 88 test holes in the Zenith pool were completed. Only four of these failed to find oil in commercial quantities. Quite a number of the recently completed wells are located in the adjoining part of Reno county, and the pool still is expanding in that direction. During 1941 many wells were deepened from the lower Misener sandstone to the more prolific Viola limestone below. Fifteen wells were so deepened in sec. 11, T. 24 S., R. 11 W., one in section 12, four in section 13, and one in section 14.

New pools.—Three new oil pools and one temporary gas pool were discovered by wildcat prospecting in Stafford county during 1941. Two of these were discovered on the same day, the 24th of March. One is the Macksville pool in T. 24 S., R. 15 W. The discovery well was the Stanolind No. 1 Nagel in the SW¼ sec. 3, T. 24 S., R. 15 W. With an elevation of 2,020 feet, this well found the Lansing limestone at 3,653 feet, the Viola limestone at 3,966 feet, the Simpson formation at 4,064 feet, and the Arbuckle at 4,103 feet. A good show of oil between 3,830 and 3,836 feet was tested, and the well flowed 44 barrels per hour. The No. 2 Nagel well was given a rating of 39,652 barrels. This resulted in further drilling of offset wells, three of which were dry.

Schaeffer pool.—The other pool discovered in March was the Schaeffer pool opened by the Atlantic Refining Company on the Schaeffer farm in the SW¼ sec. 3, T. 21 S., R. 13 W. The discovery well produced oil from the Arbuckle limestone at 3,536 to 3,540 feet. A second well, drilled by the Bodine Drilling Company on the Willcut farm, in the SE¼ sec. 4, produced oil from the Kansas City-Lansing limestone between 3,395 and 3,405 feet. By the end of the year four additional oil wells and two dry holes had been completed.

TABLE 26.—*Oil and gas pools of Stafford county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
*Ahnert, 26-22-13W	40	5,917	1	Arbuckle	3,748
Bedford, 21-23-12W	640	181,929	17	Arbuckle	3,859
Drach, 12-22-13W	900	307,178	12	Arbuckle	3,693
Fischer, 31-21-12W	120	111,914	3	Arbuckle	3,641
Gates, 27-21-13W	640	688,918	11	Arbuckle	3,679
*Hitz (gas), 4-24-12W	40	.....	1	Maquoketa	3,800
Jordan, 15-25-14W	260	260,377	7	K. C.-Lans	3,722
Kipp, 27-25-14W	220	145,000	7	K. C.-Lans	3,827
Leesburgh, 12-25-13W	360	287,382	9	Arbuckle	4,153
*Macksville, 3-24-15W	80	15,406	2	K. C.-Lans	3,811
Max, 35-21-12W	200	123,433	1	K. C.-Lans	3,356
			8	Arbuckle	3,570
Mueller, 29-21-12	80	97,870	2	Arbuckle	3,594
Rattlesnake, 13-24-14W	40	30,148	1	K. C.-Lans	3,608
Richardson, 36-22-12W	1,200	4,399,066	60	Arbuckle	3,537
Riley, 28-23-11W	40	11,961	1	K. C.-Lans	3,323
Roach, 12-22-14W (abandoned)	.....	.....	.....	Arbuckle	3,749
St. John, 23-24-13W	1,200	955,868	14	K. C.-Lans	3,588
			10	Arbuckle	4,075
*Shaeffer, 3-12-13W	250	49,540	5	K. C.-Lans	3,404
			1	Arbuckle	3,546
Sittner, 33-21-12W	600	180,822	2	K. C.-Lans	3,278
			4	Arbuckle	3,600

* Discovered in 1941.

TABLE 26.—Concluded

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Sittner South, 3-22-12W	500	360,475	18	Arbuckle	3,501
Snider, 3-21-11W	320	198,270	4	K. C.-Lans	3,111
			2	Simpson	3,362
			2	Arbuckle	3,324
Snider South, 16-21-11W	360	131,149	8	Simpson	.....
				Arbuckle	3,402
Stafford, 15-24-12W	600	206,250	18	Viola	3,845
			1	Arbuckle	3,945
Zenith, 23-24-11W	5,000	6,761,726	301	Misener	3,804
				Viola	3,860

Ahnert pool.—The third pool discovered in Stafford county during the year was the Ahnert pool. The first well was the Stanolind Oil and Gas Company No. 1 Ahnert well in the SE¼ sec. 26, T. 22 S., R. 13 W. With an elevation of 1,886 feet above sea level, this well found the Lansing limestone at 3,395 feet, the Viola limestone at 3,655 feet, the Simpson formation at 3,690 feet, and the Arbuckle dolomite at 3,745 feet. Oil was encountered at 3,753 feet and the well swabbed 4 barrels per hour of 28 degree gravity oil. It was drilled deeper without increasing the flow. When completed, the well was rated at 1,440 barrels of oil with 60 barrels of water per day. The Stanolind Oil Company drilled one offset test, which was a dry hole.

Hitz gas pool.—The Nelson Drilling Company completed a test well in the NW¼ sec. 4, T. 24 S., R. 12 W., which for a time was listed as a new gas pool. The well found the Viola limestone at 3,850 feet and the Arbuckle dolomite at 3,999 feet. Gas came into the hole at 3,800 to 3,815 feet. After acid treatment, the well flowed 6 million cubic feet of gas and had a rock pressure of 1,255 pounds per square inch. Early in 1942 this well was plugged and the pool was abandoned. The gas probably came from the Maquoketa dolomite, which produces in the Zenith pool.

Stevens County

Stevens county is important because it is part of the Hugoton gas field, one of the largest reserve areas of gas in the world. Although the first well in the field was drilled during 1922 in neighboring Seward county, the richest part of the gas pool seems to center about the town of Hugoton, after which the field was named. By the close of 1940 a total of 209 gas wells had been completed in Stevens county. During 1941, eight more gas wells were added.

One of the new wells was drilled on the Smith ranch in sec. 25, T. 31 S., R. 39 W., by the Stevens County Oil and Gas Company. It is capable of producing 24 million cubic feet of gas per day. A second well in the same township was drilled by the same company on the Palmer ranch in section 34. In the next tier of townships to the south the Northern Natural Gas Company drilled a successful well on the Boles ranch in sec. 26, T. 32 S., R. 35 W. The same company drilled a very large producer on the Lightcap ranch in sec. 36, T. 32 S., R. 37 W. This well is capable of producing over 33 million cubic feet a day. The remaining four wells were drilled by

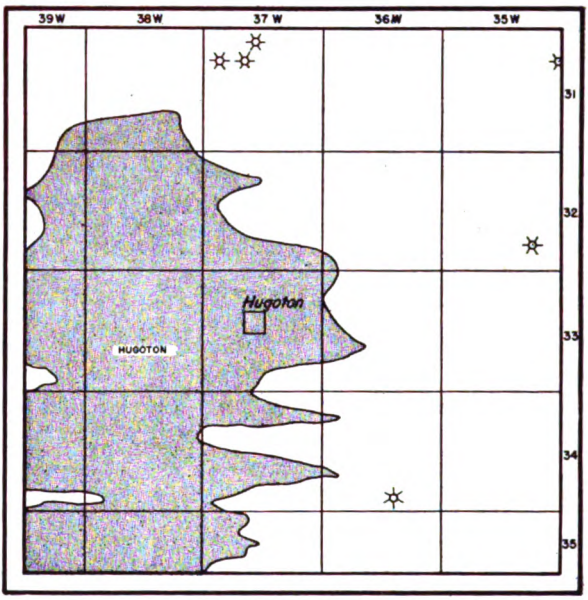

FIG. 38. Map of Stevens county showing proved gas-producing area and probable extensions as indicated by outlying wells.

the Northern Natural Gas Company. One is situated in sec. 1, T. 33 S., R. 37 W., on the Madden ranch and another in the adjoining section 2, also on the Madden ranch. A producer, in sec. 1, T. 33 S., R. 37 W., on the Swisher ranch, is rated at 24 million cubic feet per day. In the same section but on the Curry ranch, a well was drilled to a depth of 2,844 feet and has nearly as large a production.

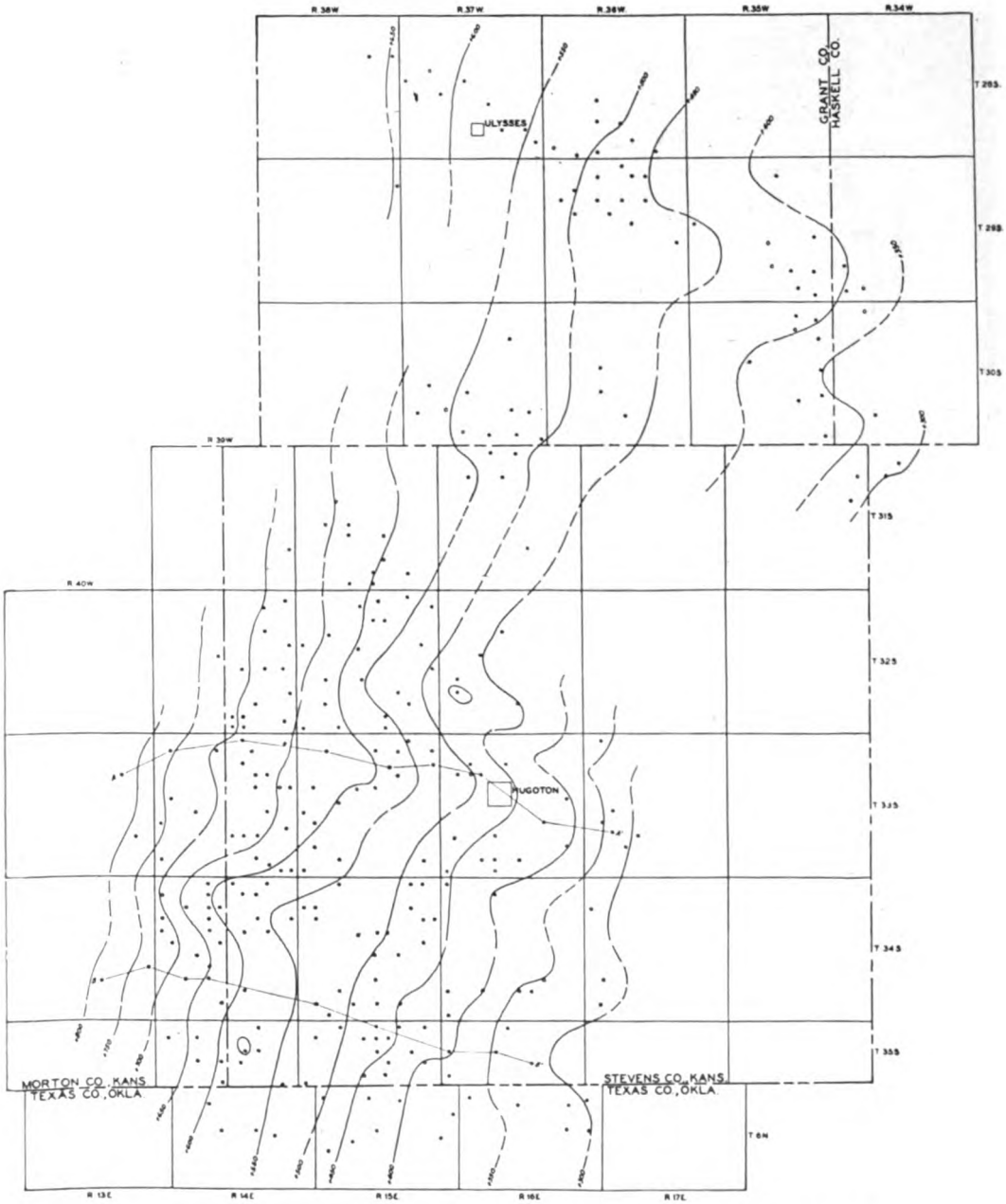

FIG. 39. Subsurface structure map of Hugoton gas field showing attitude of top of Chase group. Contour interval, 50 feet. Elevations are in feet above sea level. December, 1940. (After Garlough and Taylor, Am. Assoc. Petroleum Geologists)

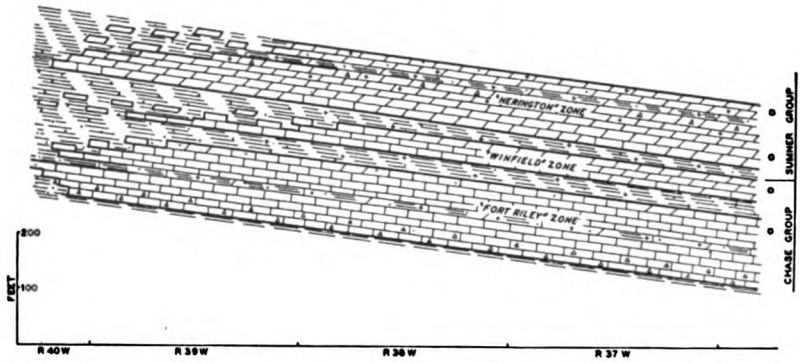

FIG. 40. Idealized cross section of gas-producing rocks in Hugoton pool illustrating westward increase of clastic sediments. (After Garlough and Taylor, Am. Assoc. Petroleum Geologists)

SUMNER COUNTY

Despite active development of oil and gas reserves in Cowley county, adjacent to and east of Sumner county, active drilling did not begin in Sumner county until 1914. In June of 1915 the first gas field was discovered when the Empire Oil Company completed its first gas well in the North Vernon pool. In October, 1924, the Continental Oil Company discovered the Padgett pool, which produces both oil and gas. The Rainbow Bend pool, five miles northeast of the Padgett pool, was found in April, 1926. In the same year the Rutter pool was opened. The remarkable Oxford pool was discovered during 1927. In this pool the Stalnaker sand, which lies just above the Lansing limestone, proved to contain prodigious quantities of oil. A renewed period of exploitation in this pool began when the Barnsdall Oil Company deepened one of its wells to the Arbuckle dolomite at 2,889 feet. The large production from this zone of several later wells brought about an excited drilling boom, the height of which was marked by the completion of the Amerada Petroleum Company's No. 1 "A" Gassoway well. This well had a potential rating of 37,466 barrels per day, which is the largest ever to be reported in the state according to the then-current methods of measuring oil flow. The fact that this pool lies on the crest of the buried Nemaha granite ridge accounts for the large per acre yield of the pool.

The Churchill pool, 3 miles northeast of the Oxford pool, also lies on the crest of the granite ridge, and it also had phenomenal production. The prolific Wellington pool was found in December, 1929.

It lies in the center of the county and some distance west of the granite ridge.

During 1941, only 6 test wells were completed in the county. Of these, three were dry holes and three were relatively small producers. Of the three new oil wells, one was drilled in the Latta pool in the

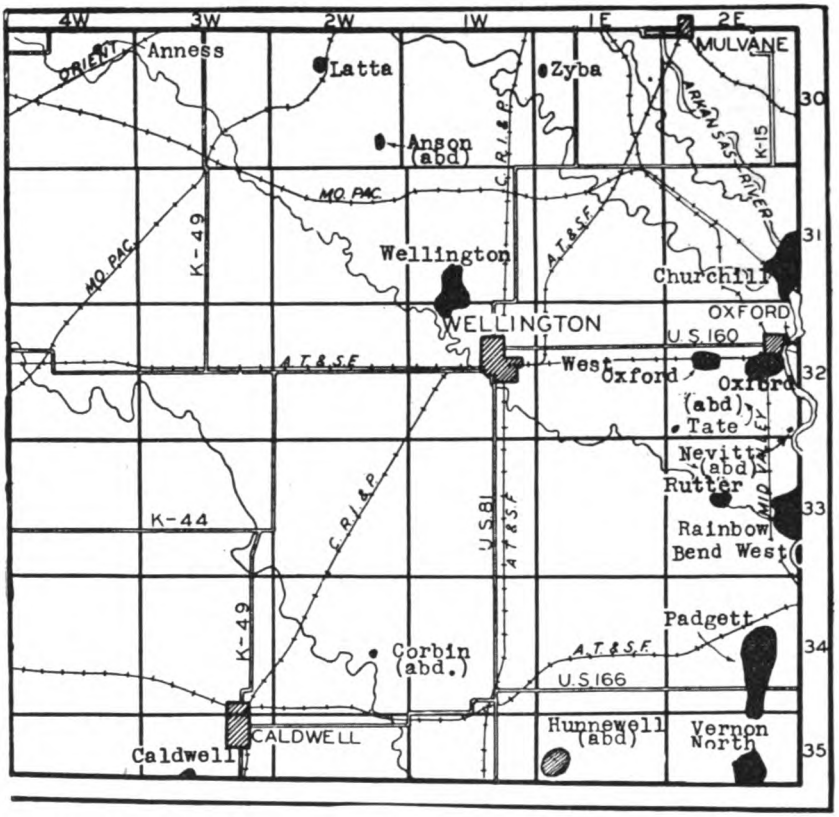

FIG. 41. Map of Sumner county showing oil and gas pools. Oil pools shown by solid black, gas pools by oblique lines.

northern part of the county, one in the Wellington pool, and the third was drilled in the North Vernon area on the Kemp farm, in sec. 8, T. 35 S., R. 2 E. It found oil and gas shows in the Mississippian "chat" below 3,357 feet and free oil in the same formation between depths of 3,388 and 3,393 feet. The test was drilled deeper and found the Wilcox sand of the Simpson formation at 3,573 feet. Later, it was plugged back to the producing zone in the "chat" at 3,416 feet, where it has a potential rating of 30 barrels per day.

TABLE 27.—*Oil and gas pools of Sumner county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Anness, 2-30-4E	40	44,298	1	Simpson	4,394
Caldwell, 17-35-3W	160	1,338,950	4	Simpson	4,765
Churchill, 25-31-2E	1,000	18,475,957	62	Stalnaker	1,820
Latta, 9-30-2W	300	182,232	15	K. C.-Lans	3,042
				K. C.-Lans	3,200
Oxford, 23-32-2E	800	14,489,875	13	Stalnaker	2,020
			6	Layton	.....
			21	Arbuckle	2,890
Oxford West, 17-32-2E	160	499,374	3	Arbuckle	.....
Padgett, 23-34-2E	1,800	1,929,338	20	"Mississippi lime"	3,474
Rainbow Bend West, 24-33-2E	160	400,000	2	Burbank	.....
				Arbuckle	.....
Rutter, 21-33-2E	40	57,841	2	"Mississippi lime"	3,315
Vernon North, 15-35-2E	200	250,996	5	"Mississippi lime"	3,443
Wellington, 33-31-1W	1,200	4,814,702	98	"Chat"	3,655
Wellington (gas), 33-31-1W	1,200	.....	97	"Chat"	3,655
Zyba, 7-30-1E	80	17,954	2	Simpson	3,866

Zyba pool.—The Zyba pool was discovered in November, 1937, by the McKnabb Oil Company, when the No. 1 Blair well found oil in the Wilcox sandstone at 3,866 feet. Some geologists believe that this sandstone is the Misener sand. In 1941 the Leader Oil Company drilled a second producer in the Zyba pool, which found oil between 3,847 and 3,850 feet. It is in the northeast corner of sec. 7, T. 30 S., R. 1 E. Before the official production test was made, oil rose 3,200 feet in the hole. The oil has gravity of 50 degrees A. P. I.

Exploratory wells.—One of the unsuccessful test holes completed in Sumner county was the Central Petroleum Company No. 1 Stewart well, in sec. 22, T. 31 S., R. 3 W. This well logged the Ft. Riley limestone at 890 feet, the Topeka limestone at 2,290 feet, and the Bronson limestone at 3,966 feet. It found the Ordovician Wilcox sandstone at 4,390 feet and the Arbuckle dolomite at 4,504 feet. The test was abandoned at 4,536 feet.

Trego County

The first oil pool in Trego county was discovered in May, 1929. It is the Rega pool in sec. 20, T. 13 S., R. 21 W. This pool soon was abandoned without producing any appreciable quantity of oil. In August, 1934, the second pool was discovered in the northern part of the county. It is the Wakeeney pool in sec. 14, T. 11 S., R. 23 W. This pool produces from the Lansing limestone and, to the close of 1941, had produced 427,495 barrels of oil. The Gugler pool was found in 1936 in the eastern part of the county, not far from the Rega area. After that, no new pools were discovered in the county until September, 1941, when the Ogallah pool was opened. The discovery well of the Ogallah pool is the Aylward Producing Company No. 1 Schaeffer well, in the NE¼ sec. 10, T. 12 S., R. 21 W. This location is 4 miles north of the Gugler pool. The well has an elevation of 2,339 feet above sea level; and the log shows the tops of the Stone Corral dolomite at 1,765 feet, the Ft. Riley limestone at 2,540 feet, the Neva limestone at 2,870 feet, and the Topeka limestone at 3,384 feet. The important marker bed, the Lansing limestone, was entered at 3,626 feet and the Sooy conglomerate, at the base of the Pennsylvanian subsystem, at 3,960 feet. Only 26 feet lower, the bit entered the Arbuckle dolomite, and drilling was continued to 4,003 feet, the total depth. An oil-saturated zone was found in the Arbuckle dolomite between 4,000 and 4,003 feet. Oil of 35 degree gravity filled the hole to 600 feet. The well then was

plugged back to the Lansing limestone, at which zone salt water came into the hole. Later, the casing was perforated between the depths of 3,626 and 3,628 feet and acid was injected. The well then produced 30 barrels of oil and 75 barrels of water per day.

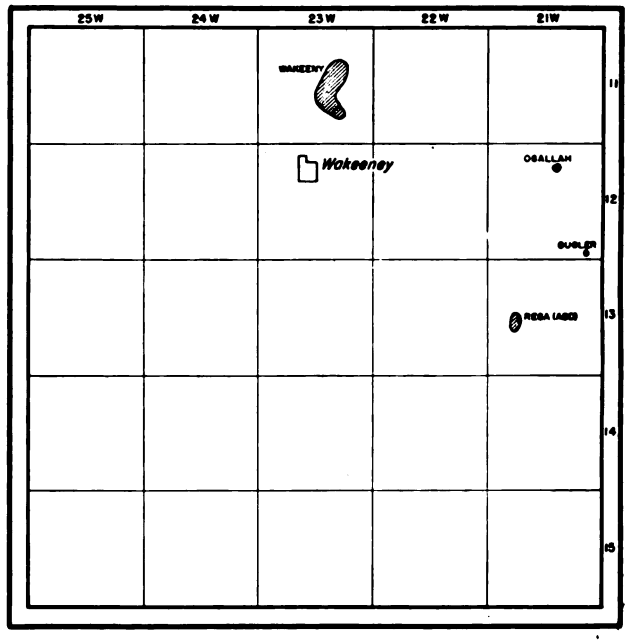

FIG. 42. Map of Trego county showing oil pools.

TABLE 28.—*Oil pools of Trego county*

POOL AND LOCATION	Area, acres	Cumulative production to end of 1941, bbls.	Number of wells	Producing zone	Depth in feet
Gugler, 36-12-21 W.....	40	20,278	1	Arbuckle.....	3,830
Ogallah, 10-12-21 W....	40	None	1	Arbuckle.....	3,992
Wakeeney, 14-11-23 W..	640	427,495	7	K. C.-Lans...	3,619

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