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DIVISION OF THE
STATE GEOLOGICAL SURVEY
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EFFECTS OF WATER-FLOODING ON OIL PRODUCTION FROM THE McCLOSKY SAND, DENNISON TOWNSHIP, LAWRENCE COUNTY, ILLINOIS

By Alfred H. Bell and R. J. Piersol

Introduction

A preliminary statement of results of an investigation of the effects of water-flooding on oil production from the McClosky sand in Dennison Township, Lawrence County, has been issued.[1] More detailed data are herein presented.

The writers are indebted to the Associated Producers Company, Robinson, Illinois, the Big Four Oil and Gas Company, Bridgeport, Illinois, the International Oil and Gas Company, Washington, Pennsylvania, and the Ohio Oil Company, Marshall, Illinois, for supplying the data upon which this and the previous report are based. The field data have been collected by Mr. Frederick Squires, a planetable survey of the area was made by Mr. Walter Roe, and the illustrations and tables have been prepared by Mr. Perry McClure, all of the Survey staff. Water analyses are by the State Water Survey.

The location of the flood-area with respect to the Southeastern Illinois oilfield is shown in figure 1. An index map of wells and leases is shown in figure 2, and well data are listed in the Appendix.

Only those wells which penetrated the McClosky sand are included in the maps and tables in this report although many other wells in the area were drilled to shallower sands such as the Bridgeport, Buchanan, and Kirkwood.

Stratigraphy

The succession of subsurface strata in this area down as far as the McClosky sand horizon is shown in the columnar section (fig. 4). "McClosky sand" is the name applied to the very oölitic porous oil-producing part of the

[1] Bell, Alfred H., and Piersol, R. J., Effects of water-flooding on oil production from the McClosky sand in Dennison Township, Lawrence County: Illinois State Geol. Survey Information Circular No. 1, February 27, 1932.

Ste. Genevieve limestone, which formation has a total thickness of approximately 140 feet. The Ste. Genevieve is the uppermost formation of the Lower Mississippian series which consists of the "Mississippi lime" and includes the black "Chattanooga" shale at the base, and which has a total thickness of about 1400 feet. It underlies the Chester or Upper Mississippian series in which occur the Tracy, Kirkwood, and part of the Buchanan sands.

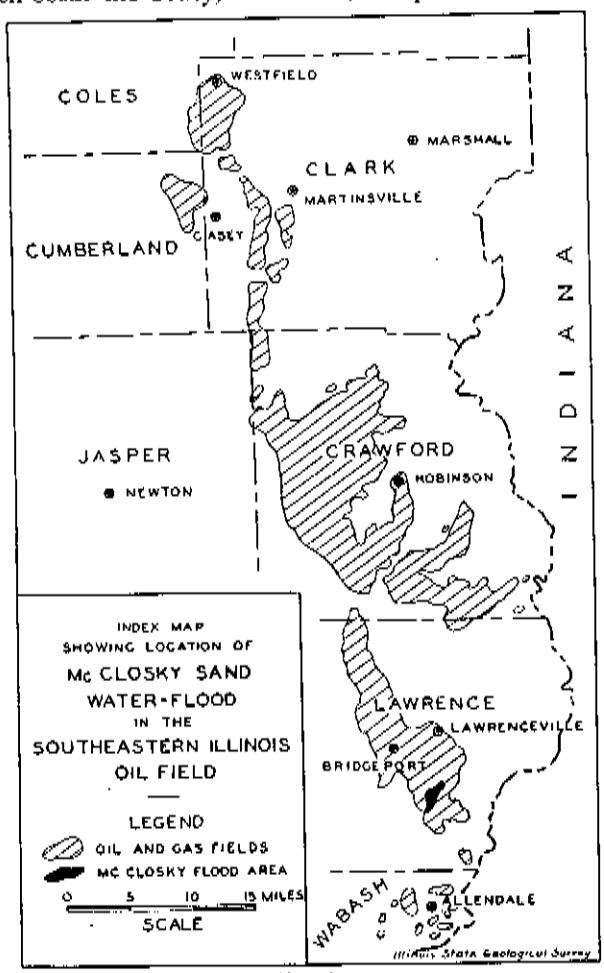


FIG. 1

The McClosky sand[2] is not a single porous stratum but comprises one to three lenses which range in thickness from less than one foot to 25 feet and which occurs anywhere through a thickness of about 80 feet of the Ste. Genevieve limestone. For instance, drill cuttings from the Associated Producers Company J. F. Snyder well No. 20, SE. ¼, NE. ¼, sec. 25, T. 3 N.,

[2] Rich, John L., Oil and Gas in the Vincennes quadrangle: Illinois State Geol. Survey Bull. 33, pp. 158-159, 1916.

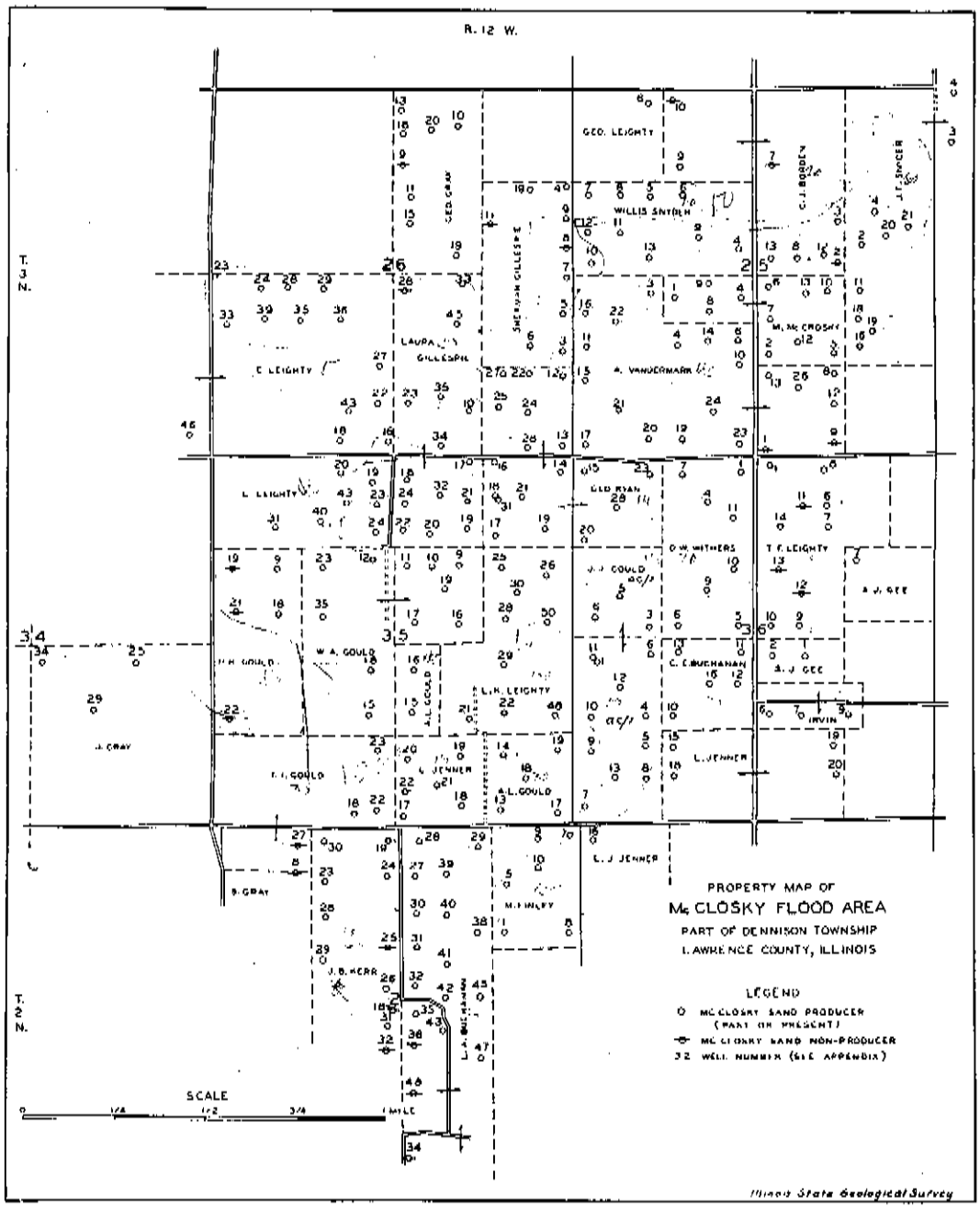

R. 12 W.
T. 3 N.
T. 2 N.
GEO. LEIGHTY
WILLIS SNYDER
C. J. BODEN
J. F. SPICER
SHERMAN GILLESPIE
LAURA GILLESPIE
C. LEIGHTY
A. VANDERMARK
M. McCROSKY
L. LEIGHTY
GEO. RYAN
D. W. WITHERS
T. F. LEIGHTY
A. J. GEE
J. J. GOULD
T. H. GOULD
W. A. GOULD
A. L. GOULD
L. H. LEIGHTY
C. E. BUCHANAN
IRVIN
L. JENNER
E. L. GOULD
E. J. JENNER
J. GRAY
S. GRAY
M. F. INLEY
J. B. KERR
L. A. BUCHANAN
SCALE
0 1/4 1/2 3/4 1 MILE
PROPERTY MAP OF
Mc CLOSKY FLOOD AREA
PART OF DENNISON TOWNSHIP
LAWRENCE COUNTY, ILLINOIS
LEGEND
McCLOSKY SAND PRODUCER (PAST OR PRESENT)
McCLOSKY SAND NON-PRODUCER
32 WELL NUMBER (SEE APPENDIX)
Illinois State Geological Survey

FIG. 2

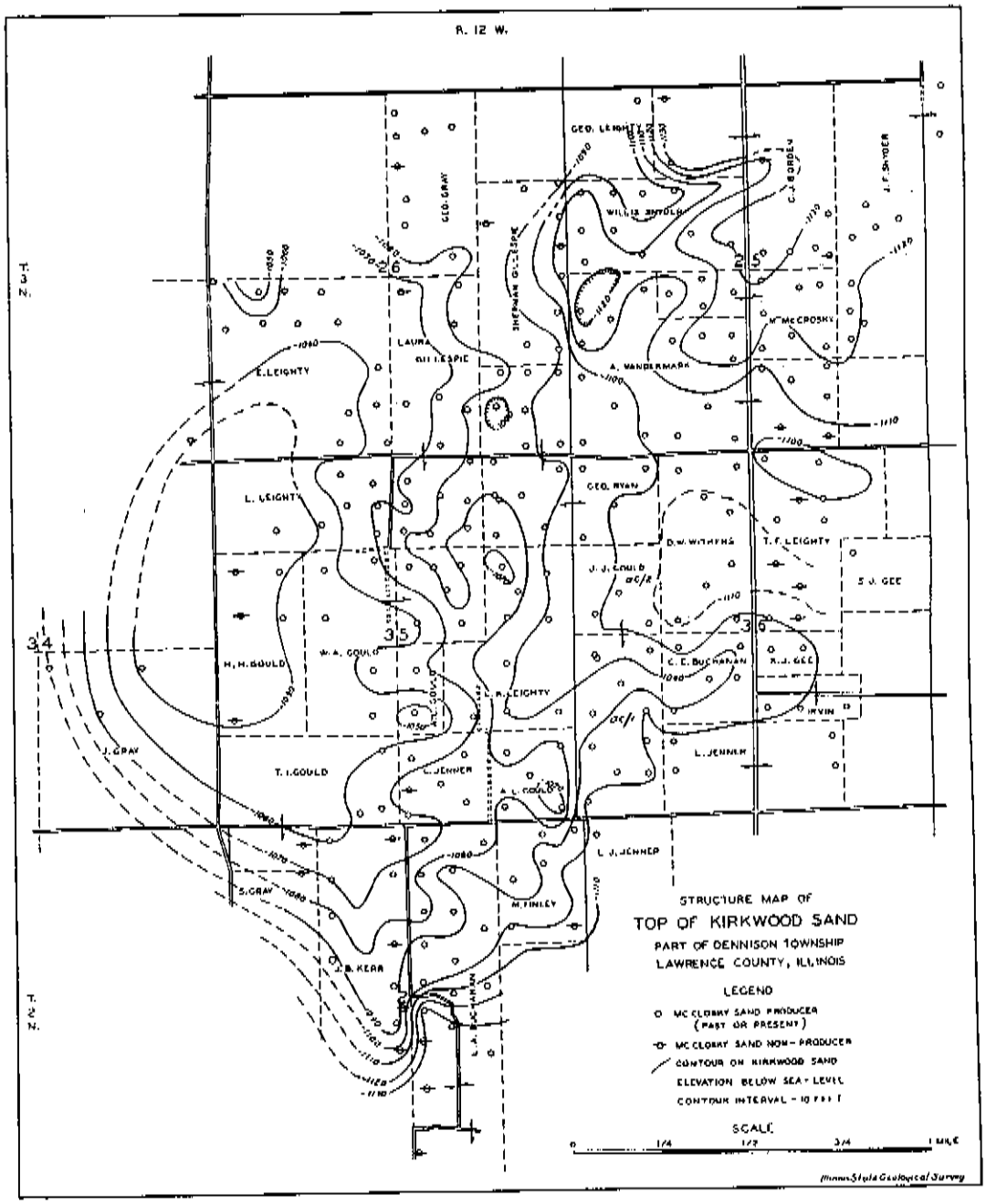

R. 12 W.
T. 5 N.
T. 4 N.
GEO. LEIGHTY
GEO. GRAY
WILLIS BOYDEN
C. J. BORDEN
J. F. SNYDER
SHERMAN GILLESPIE
LAURA GILLESPIE
E. LEIGHTY
A. VANDERMARK
Wm. McCROSKY
L. LEIGHTY
GEO. RYAN
D. W. WITHERS
T. F. LEIGHTY
J. J. GOULD
S. J. GEE
H. H. GOULD
W. A. GOULD
C. E. BUCHANAN
R. J. GEE
IRVIN
L. R. LEIGHTY
J. GRAY
T. I. GOULD
C. JENNER
L. JENNER
L. J. JENNER
S. GRAY
M. FINLEY
B. KERR
L. E. BUCHANAN
STRUCTURE MAP OF
TOP OF KIRKWOOD SAND
PART OF DENNISON TOWNSHIP
LAWRENCE COUNTY, ILLINOIS
LEGEND
MC CLOSKY SAND PRODUCER (PAST OR PRESENT)
MC CLOSKY SAND NON-PRODUCER
CONTOUR ON KIRKWOOD SAND
ELEVATION BELOW SEA-LEVEL
CONTOUR INTERVAL - 10 FEET
SCALE
0 1/4 1/2 3/4 1 MILE
Illinois State Geological Survey

FIG. 3

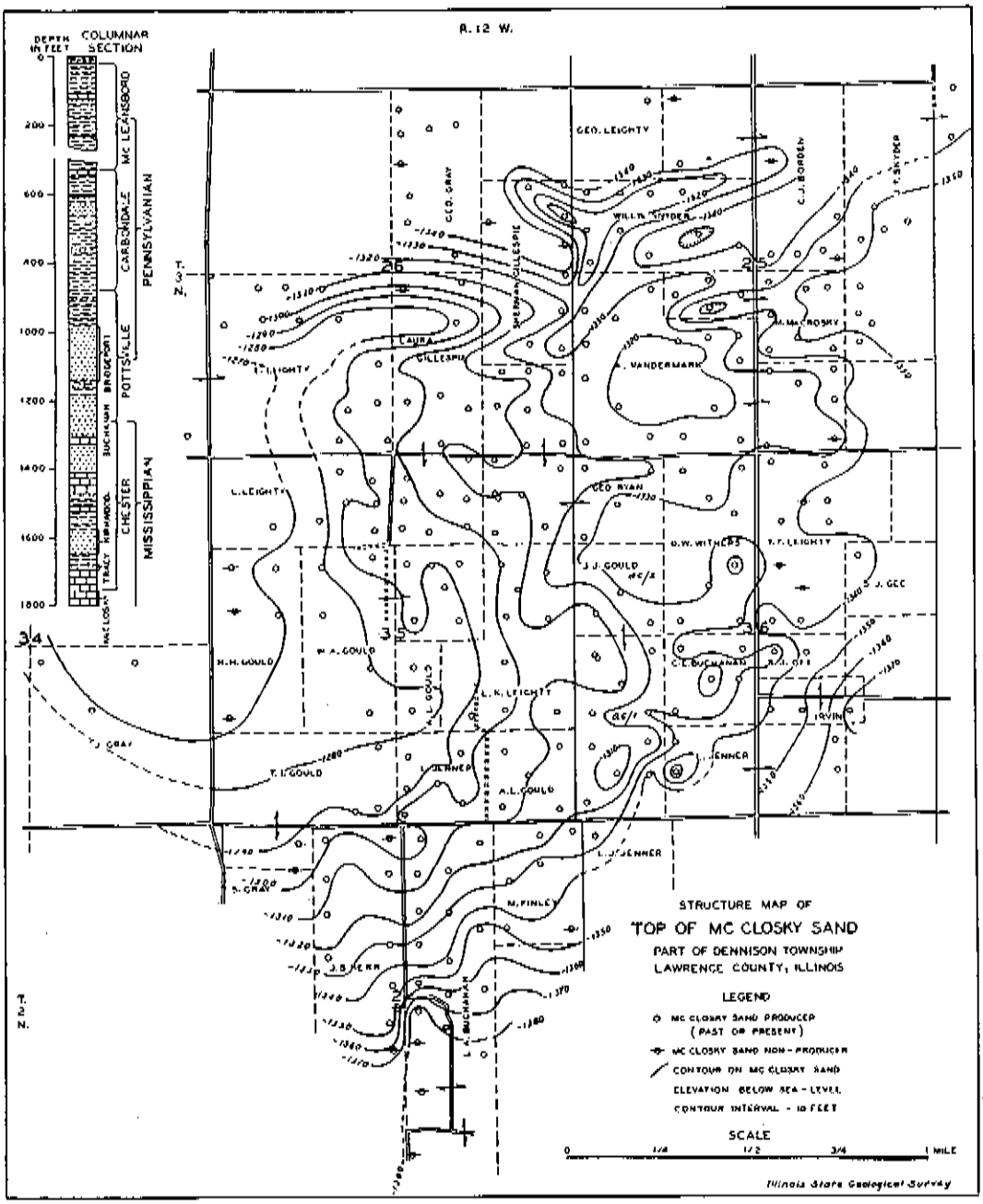

R. 12 W.
COLUMNAR SECTION
DEPTH IN FEET
PENNSYLVANIAN
MISSISSIPPIAN
MC LEANSBORO
CARBONDALE
POTTSVILLE
BUCHANAN
BRAILSFORD
CHESTER
TRACY
MC CLOSKY
STRUCTURE MAP OF
TOP OF MC CLOSKY SAND
PART OF DENNISON TOWNSHIP
LAWRENCE COUNTY, ILLINOIS
LEGEND
MC CLOSKY SAND PRODUCER (PAST OR PRESENT)
MC CLOSKY SAND NON-PRODUCER
CONTOUR ON MC CLOSKY SAND ELEVATION BELOW SEA-LEVEL
CONTOUR INTERVAL - 10 FEET
SCALE
0 1/4 1/2 3/4 1 MILE
Illinois State Geological Survey

FIG. 4

R. 12 W., in the northeast part of the flood-area, show that the McClosky sand here consists of 12 feet of white, petroliferous, oölitic, slightly sandy limestone. The cap-rock consists of the upper 18 feet of Ste. Genevieve limestone which is white to light brown and dense to crystalline.

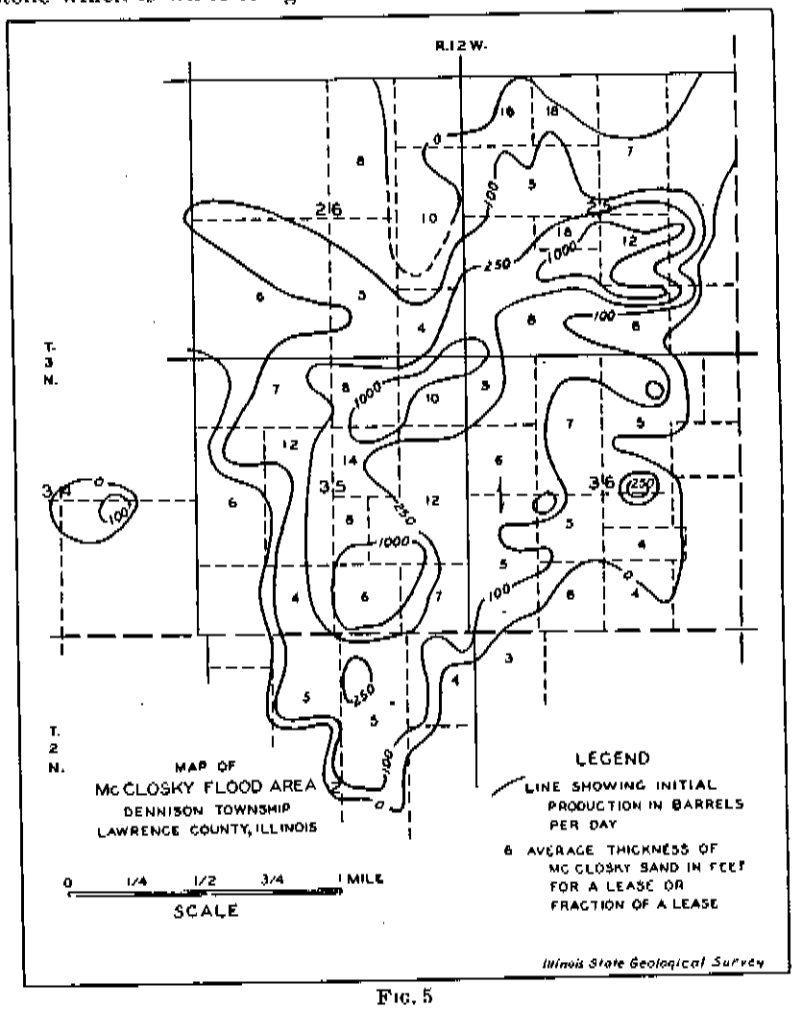


FIG. 5

STRUCTURE

Most of the elevations (Appendix) on which the structure maps (figs. 3 and 4) are based were obtained from skeleton logs in which the sands were correlated by the driller. The majority of the anomalous elevations not used in preparing the structure maps are for the McClosky sand and this is probably due to the fact that it consists of more than one lens. Owing to the variability of the McClosky sand, a structure map on the more consistent

Kirkwood sand is included for reference, although the structure of the McClosky sand is the more important for the present study.

The principal structural feature is an anticline whose axis trends a little west of north and east of south and passes through the west part of sec. 35. From the highest part of the anticline the general dip is east, southeast, and south. Although the structures on the two horizons are generally similar, they differ in detail.

Initial Productions

It may be noted that in two of the three areas of high initial production, the thickness of the McClosky sand as averaged for leases or fractions of leases (fig. 5) is above the average for the whole area which is 8.2 feet. In this connection it should also be noted that many of the wells in areas of high initial production may not have been drilled through the sand and that accordingly the total sand thickness may be greater than that recorded whereas in many of the wells of low initial production the sand was completely drilled through so that its total thickness is recorded. This accounts for the high average thickness for some of the leases near the edge of the producing area where initial productions were low.

Initial production and thickness of sand may be correlated only where the openness and other conditions of the sand are uniform. Lack of correlation between initial production and sand thickness may be due to variations in sand texture, regarding which there is little direct information, or to reservoir pressure at the time of drilling.

Flood Advance

Production records[3]

Curves of per cent production by years for many leases (A-D, figs. 6 and 7) show that following a period of decline there was a marked increase in production. Study of the dates of drilling (including wells to all sands) indicated that in most cases such increases could not be due to the drilling of new wells. Further data, given below, show that the increases were undoubtedly due to water-flooding. The benefits of the water-flood are shown by the fact that the annual production of a number of leases in the area has been increased in ratios from a minimum of 1.2:1 to a maximum of 20:1.

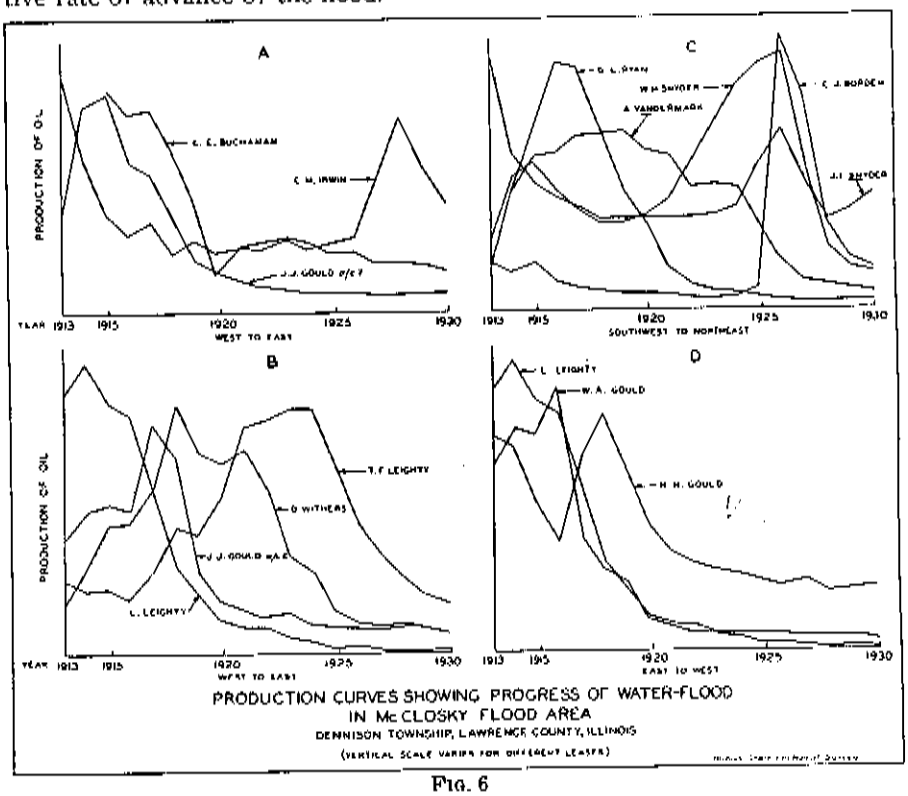
Each group of curves refers to leases located along lines that radiate from the L. K. Leighty lease in the east half of sec. 35 (fig. 7). It will be noted that there has been a sequence of time for maximum increased production in these radial directions.

Plugging-back records

A few years after the time of maximum increased production, the water-oil ratio increased rapidly, eventually making it necessary to plug back the

[3] Production records include totals for all sands.

wells to one of the higher sands. The approximate position of the flood front at successive five-year intervals (fig. 8) indicates that the flood advanced outward from a central area in the vicinity of the L. K. Leighty, L. Jenner, and A. L. Gould leases in the southeast part of sec. 35. It therefore seems clear that the increases in production were the result of oil being pushed ahead of the water-flood. The spacing of the lines indicates the relative rate of advance of the flood.



PRODUCTION CURVES SHOWING PROGRESS OF WATER-FLOOD IN McCLOSKY FLOOD AREA
DENNISON TOWNSHIP, LAWRENCE COUNTY, ILLINOIS
(VERTICAL SCALE VARIES FOR DIFFERENT LEASES)

FIG. 6

HYDROSTATIC LEVELS

Fluid levels determined in 18 wells at or near the plugging-back stage (Table 1, fig. 9) were used to determine relative pressure in various parts of the McClosky sand reservoir. It is probable that in some cases the observed levels are not true equilibrium levels because sufficient time for the fluid to rise to equilibrium had not elapsed before the measurements were made. The present tendency for flow in the McClosky sand, as indicated by the fluid-level lines, is outward from a center in the vicinity of the L. Jenner and A. L. Gould leases in the southeast part of sec. 35 and is thus consistent with the advance of the flood as shown by the production curves and plugging-back records.

Source of the Flood Water

Previous to the tapping of an oil reservoir in which the interconnected openings are larger than capillary size, the water-oil contact is at the same level in all parts of the reservoir. Adjacent unconnected reservoirs may have different oil-water contact levels. An oil reservoir may exist below one containing water and yet be connected with it if the point of junction is at the highest part of the water-bearing lens.

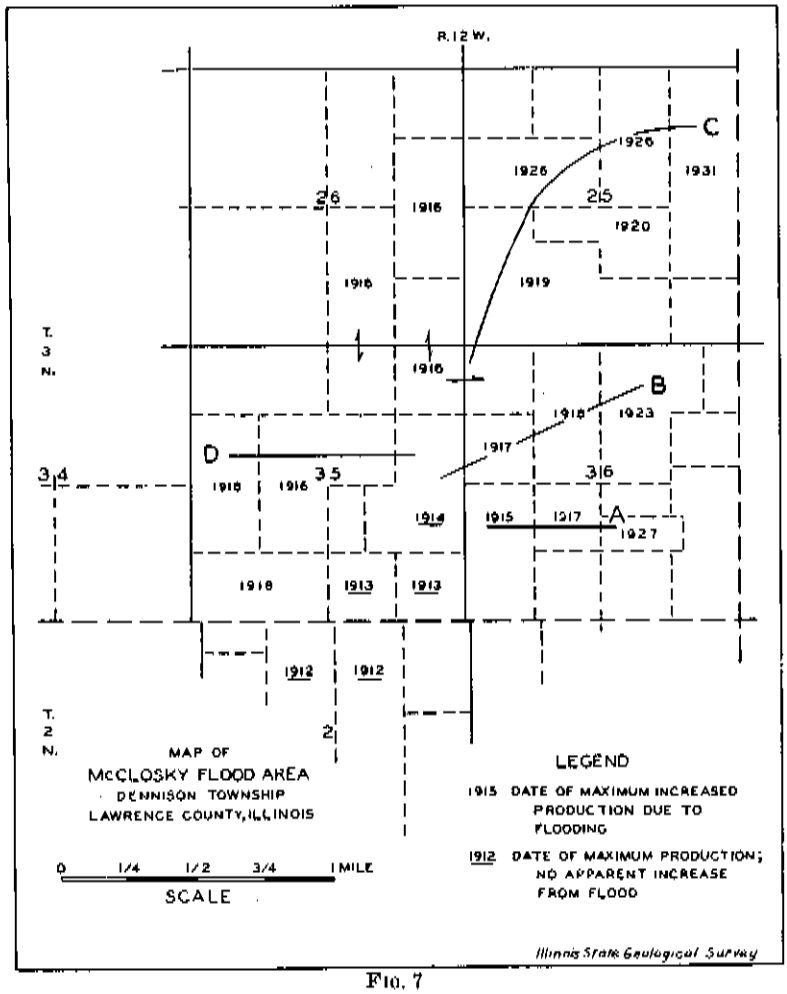


FIG. 7

The history of the McClosky water-flood shows beyond question that the main lens of the McClosky sand has connected porosity throughout the area. However, in the southwest part of the area (south of the south line of the L. K. Leighty lease, E. ½ sec. 35) there is evidence that there are three

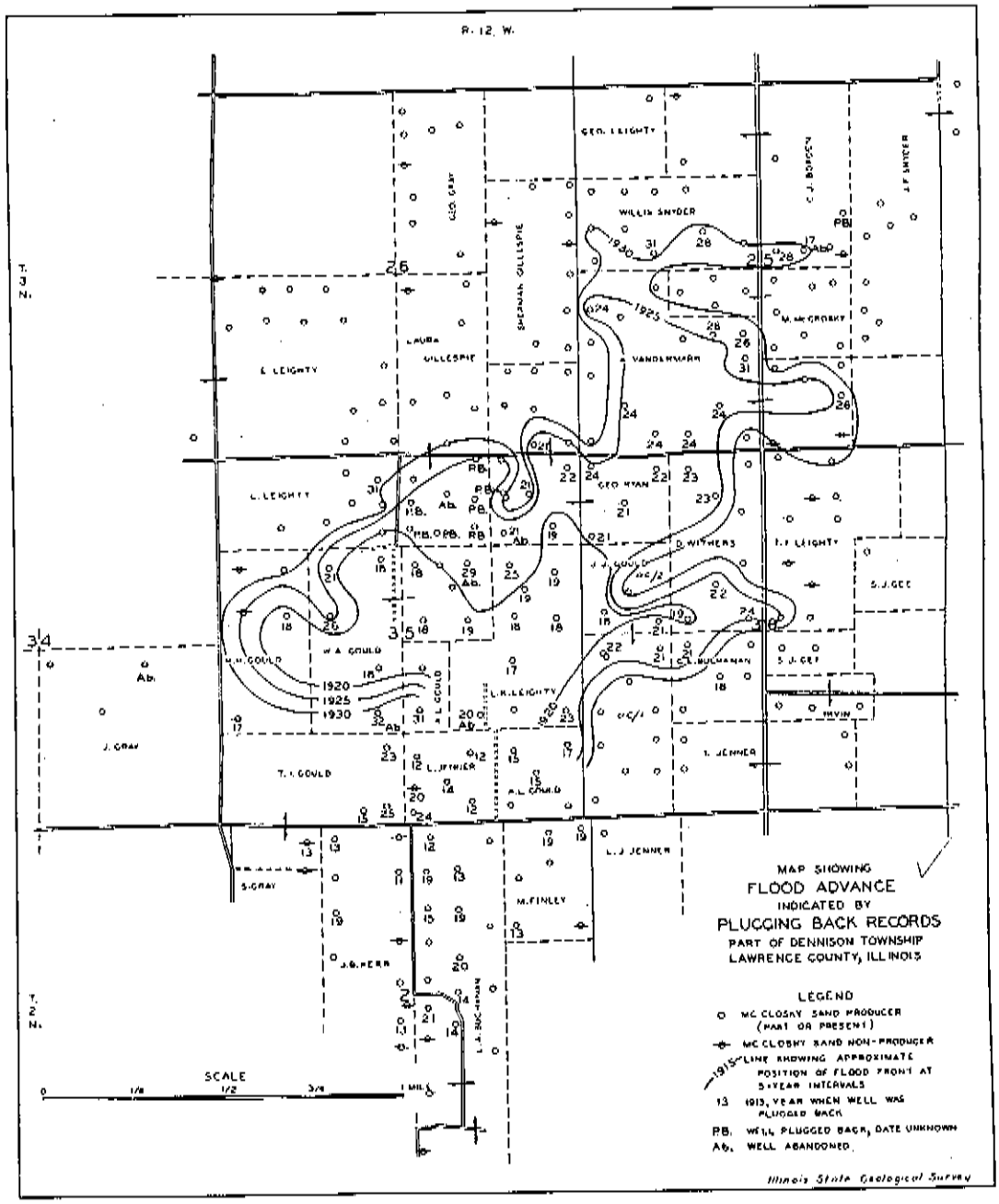
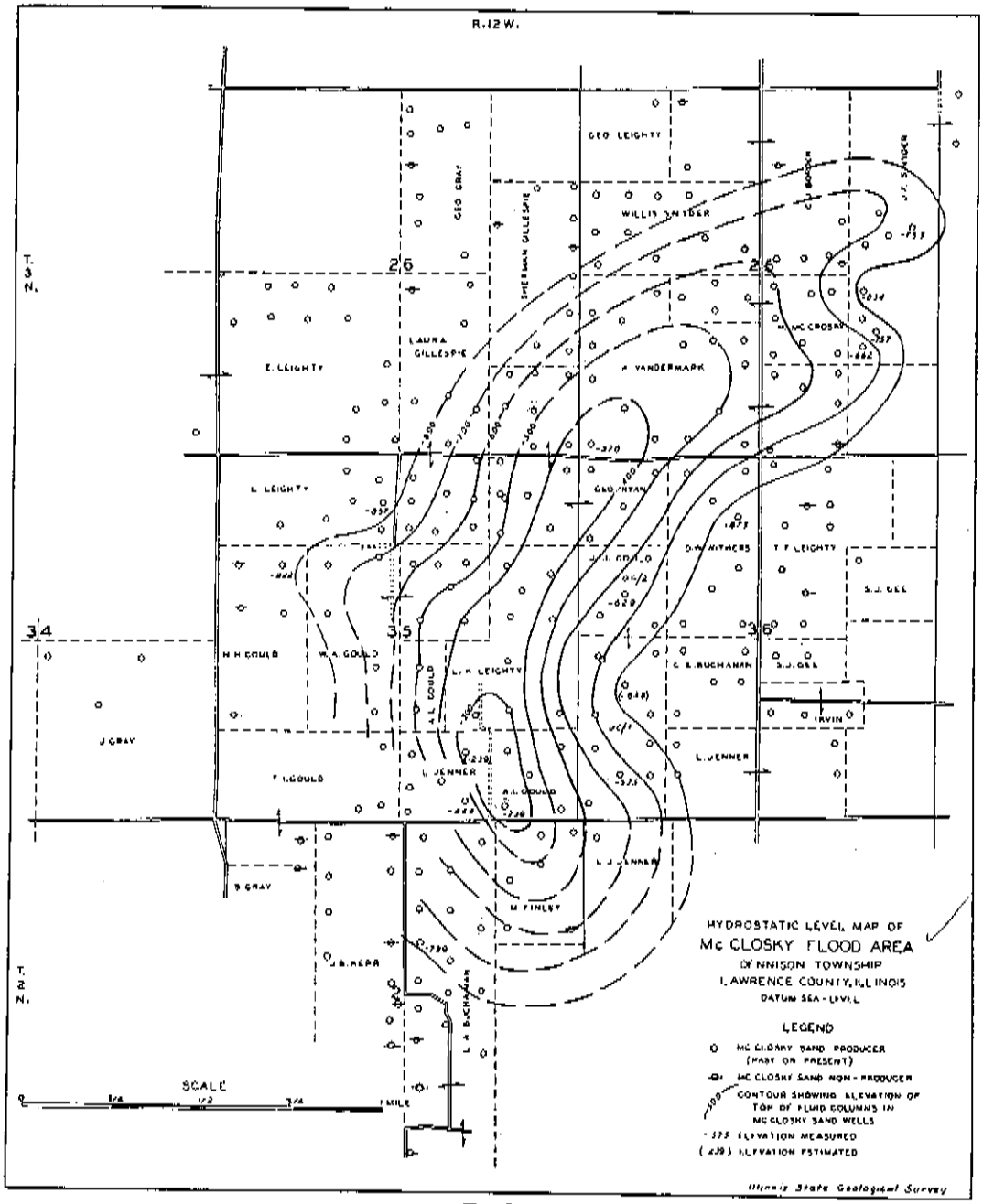

R. 12. W.
T. 3 N.
T. 2 N.
GEO. LEIGHTY
WILLIS SNYDER
C.J. BOWEN
J.F. SNYDER
M. McCROSKY
SHERMAN GILLESPIE
LAURA GILLESPIE
VANDEMARK
E. LEIGHTY
L. LEIGHTY
GEO. RYAN
WITHERS
T.F. LEIGHTY
S.J. GEE
J.J. GOULD
W.A. GOULD
M.H. GOULD
A.L. GOULD
L.H. LEIGHTY
T.I. GOULD
L. JEFFRIES
J. GRAY
S. GRAY
M. FINLEY
J.G. KERN
L.J. JENNER
S. BUCHANAN
IRVIN
1920
1925
1930
Ab.
PB.
SCALE
0 1/8 1/2 3/4 1 MILE
MAP SHOWING
FLOOD ADVANCE
INDICATED BY
PLUGGING BACK RECORDS
PART OF DENNISON TOWNSHIP
LAWRENCE COUNTY, ILLINOIS
LEGEND
MC CLOSKY SAND PRODUCER (PAST OR PRESENT)
MC CLOSKY SAND NON-PRODUCER
1915 LINE SHOWING APPROXIMATE POSITION OF FLOOD FRONT AT 5-YEAR INTERVALS
13 1913, YEAR WHEN WELL WAS PLUGGED BACK
PB. WELL PLUGGED BACK, DATE UNKNOWN
Ab. WELL ABANDONED.
Illinois State Geological Survey

FIG. 8


R.12W.
T. 3 N.
T. 2 N.
26
35
34
GEO LEIGHTY
GEO GRAY
SHERMAN GILLESPIE
WILLIS SNYDER
C.H. BURDEN
J.F. SNYDER
LAURA GILLESPIE
E. LEIGHTY
P. VANDERMARK
S. MC CROSKY
L. LEIGHTY
GEO. RYAN
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A.L. GOULD
L.H. LEIGHTY
C.E. BUCHANAN
IRVIN
J. GRAY
T.I. GOULD
L. JENNER
L.J. JENNER
B. GRAY
M. FINLEY
J.B. KEPP
L.A. BUCHANAN
SCALE
1/4
1/2
3/4
1 MILE
HYDROSTATIC LEVEL MAP OF
Mc CLOSKY FLOOD AREA
DENNISON TOWNSHIP
LAWRENCE COUNTY, ILLINOIS
DATUM SEA-LEVEL
LEGEND
MC CLOSKY SAND PRODUCER (PAST OR PRESENT)
MC CLOSKY SAND NON-PRODUCER
CONTOUR SHOWING ELEVATION OF TOP OF FLUID COLUMNS IN MC CLOSKY SAND WELLS
-525 ELEVATION MEASURED
(-538) ELEVATION ESTIMATED
Illinois State Geological Survey

FIG. 9

distinct lenses at different vertical elevations which are connected in the region north of the L. A. Buchanan well No. 31.

The oil-water contact is believed to have been originally below —1400 feet because the L. A. Buchanan No. 35 well, drilled in 1913, produced oil for eight years from the McClosky sand at an elevation of —1389 feet and in 1924 the L. A. Buchanan No. 47 well produced oil from the McClosky sand at —1397 feet.

TABLE 1.—*Measured fluid levels*
(Datum, sea-level)

Company	Lease and well No.		Height of fluid column	Elevation McClosky sand	Elevation top of fluid
Associated Producers Company	J. F. Snyder	11	525	—1359	—834
	J. F. Snyder	16	685	—1347	—662
	J. F. Snyder	19	600	—1357	—757
	J. F. Snyder	21	600	—1355	—755
Ohio Oil Company	L. A. Buchanan	31	533	—1332	—799
	A. L. Gould	13	1068	—1307	—239
	H. H. Gould	9	455	—1277	—822
	J. J. Gould	5	700	—1329	—629
	J. J. Gould	13	730	—1305	—575
	J. J. Gould	12	[a]470	—1308	—838
	L. Jenner	18	855	—1299	—444
	L. Jenner	19	[a]1060	—1299	—239
	L. Leighty	[b, c] 33	650	—1260	—610
	L. Leighty	[d] 17	432	—1289	—857
	L. K. Leighty	[b] 22	345	—1296	—951
	G. Ryan	[b] 31	182	—1306	—1124
	D. Withers	11	[a]460	—1335	—875
	Vandermark	17	956	—1326	—370

[a] Estimated.
[b] Data not used in hydrostatic level map (fig. 9).
[c] Located near L. Leighty No. 31.
[d] Located near Leighty No. 23.

The first well drilled in the southwestern area was the M. Finley No. 1, drilled in 1908, in which the elevation of the oil-sand is —1311 feet or approximately 100 feet above the water sand in the wells in the extreme southern part of the J. B. Kerr and L. A. Buchanan leases. This well was flooded out by water in 1913. In the meantime the J. B. Kerr No. 24 well, drilled into the McClosky sand at an elevation of —1306 feet in 1911, showed water immediately. Drillings in 1913 and 1914 showed that water extended in a channel-like belt throughout the length of the J. B. Kerr lease,

its advance being due to the release of pressure through wells drilled from 1908 to 1913. J. B. Kerr No. 31 well appears to be in a water-bearing lens deeper than the surrounding oil-producing McClosky sand such as found in L. A. Buchanan Nos. 35 and 47 wells. Also there appears to be an interconnected lens which includes the sand encountered in L. A. Buchanan wells Nos. 36, 39, and 42 and Maggie Finley well No. 1 at an elevation of about —1300 feet. L. A. Buchanan well No. 42 seems to be in a lens at a higher level than wells Nos. 32 to the west, 35 to the south, and 45 to the east in which the sands are respectively at elevations of —1356, —1389, and —1332 feet.

Indications are that the water drove the oil ahead in the J. B. Kerr lease previous to the drilling of wells Nos. 32, 31, 29, 28, 25, 24, and 30 and L. A. Buchanan wells Nos. 28 and 39. Unfortunately these wells were not drilled in time to be benefitted by the water-flood but the L. Jenner wells Nos. 17, 18, 19, and 20 were drilled in advance of the flood and showed initial daily productions of 1400 to 1600 barrels.

The "channel" through which the water enters the area appears to be a lens of porous sand bounded on the east and west by tight sand and having an elevation different from that of the oil-producing sand in the south part of the J. B. Kerr and L. A. Buchanan leases. These lenses seem to merge in a region north of the L. A. Buchanan No. 31 well and therefore form an apparent source of flood spreading outward from a central area approximately covered by the L. Jenner and L. K. Leighty leases.

In the results of water analyses (Table 2) attention is called particularly to the relative amounts of total dissolved solids, which generally increase with the depth of the aquifer.[4] Weighted averages of parts per million of total solids for waters from the Bridgeport, Buchanan, Kirkwood, and Tracy sands, named in descending order of depth, are respectively 16,000, 17,000 35,000 and 53,000. A weighted average for five analyses of McClosky sand water outside of the flooded area is 50,000 whereas for five analyses of McClosky sand water from the flood-area it is 70,000 parts per million, or nearly 50 per cent higher. These figures indicate that the flood water came not from a horizon higher than the McClosky sand but either from a deeper part of the McClosky sand or from some lower water horizon, possibly in the Ste. Genevieve or a lower formation.

These observations explain why it is possible to have a well, such as H. H. Gould No. 18 at McClosky sand elevation of —1268 feet, plugged back on account of water in 1918 whereas the L. A. Buchanan No. 38 well at McClosky sand elevation of —1356 feet is pumping oil at the present time.

[4] Moulton, Gail F., Further contributions to the geology of the Allendale oil field, with a revised structure map: Illinois State Geol. Survey Report of Investigations No. 7, p. 18, 1925.

TABLE 2.—*Analyses of water from oil sands in Lawrence County, Illinois*[a]

(Constituents in parts per million)

Lease and well	Location Sec.	T.-N.	R.-W.	Na	Ca	Mg	SO_4	Cl	CO_3	HCO_3	Total Solids
Bridgeport sand											
L. Gillespie	4	26	3	12	8797	144.4	165.1	0	11854	0	4063	23240
Lewis	12	20	4	12	4057	87.2	77.3	208.4	5902	0	920	11993
Meagher	8	5	2	11	7037	570.3	87.8	2523	10297	0	198	20940
M. Wood	17	20	4	12	5595	77.1	10.9	1644	7086	0	798	14600
M. Wood	21	20	4	12	5595	108.5	28.4	920	7425	0	673	14236
M. Wood	23?	20	4	12	5791	114.8	37.1	1509	7205	0	659	15079
Buchanan sand											
De Beouf	2	18	2	11	9164	556	198.3	3142	13180	0	366	26694
W. E. Finley	13	17	3	12	5990	111.5	98.3	1751	7972	0	622	16400
W. E. Finley	37	17	3	12	5492	39.1	0	627.1	7415	0	1249	14312
L. Gillespie	30	26	3	12	6294	257.2	125.3	1001	9398	0	781	16840
Jett	4	14	2	12	10386	700.2	228.9	2797	15742	84	140	30382
Kirkwood sand											
———		14	3	12	7475	118.6	103.1	0	12000	0	678	20136
Barnett	11	7	2	11	14483	1112	406.6	1634	24480	0	224	46060
W. E. Finley	43	18	3	12	18783	1414	460.8	0	32684	0	132	58260
Kirkwood	11	14	3	12	7761	58.6	90.4	123.4	11915	0	666	22400
Stallings	3	30	4	12	8141	75.8	71.6	0	12427	0	730	21030

TABLE 2.—*Analyses of water from oil sands in Lawrence County, Illinois* [1]—Concluded

Constituents in parts per million

Lease and well	Location Sec.	T.-N.	R.-W.	Na	Ca	Mg	SO_4	Cl	CO_3	HCO_3	Total Solids
Tracy sand											
Meagher	6	5	2	11	17747	1069	481.2	24.7	30888	0	276	53260
McClosky sand (Outside of flood-area)											
Conover	1	23	5	12	20125	1969	1191	2776	35960	0	229	65900
Meagher	4	5	2	11	20191	1640	864.8	530.2	36156	0	425	63980
Rogers	13	14	3	12	14193	774.9	463.4	459.9	24308	21.6	34	42440
Stallings	26	30	4	12	8521	395.9	237.6	1804	12864	0	651	24791
Tanquary	2	28	4	12	6306	200.1	0.4	148.9	9592	0	966	16980
McClosky sand (Flood-area, Dennison Township, Lawrence County)											
L. Gillespie	16	35	3	12	21314	2310	1472	3003	38916	0	854	70620
J. J. Gould	13	36	3	12	23072	2216	1426	2507	41423	129.6	454	72518
L. K. Leighty	22	35	3	12	22148	2745	1394	3334	40005	0	1076	70223
J. F. Snyder	21	25	3	12	22802	1793	1866	405.8	43225	24	392	71252
A. Vandermark	17	25	3	12	21612	2609	1374	3172	39004	0	1034	68354

[1] Analyses by Illinois State Water Survey, Urbana, Illinois.

APPENDIX

Data on wells drilled into McClosky sand,
Part of Dennison Township, Lawrence County, Illinois

Co.[a]	Lease, well No.	Date dr.	Location	Curb elev.	Kirkwood Depth	Kirkwood Elev.	McClosky Depth	McClosky Elev.	McClosky Th.	TD.	IP bbls.	PB.[c]	Remarks
O	C. J. Borden 9		25 NE NW	490	1622	—1132	1828	—1338	23	1852	200		
O	C. J. Borden 10		25 NE NW	502	1640	—1138	1828	—1326	12	2016	0—		Dry
O	C. J. Borden 7	'09	25 NW NE	477	1597	—1120	1802	—1325	33	1835	0—		Dry; water 1833
O	C. J. Borden 3	'09	25 SW NE	456.1	1579	—1123	1792	—1336	13	1805		PB	
O	C. J. Borden 8		25 SW NE	463			1797	—1334	8	1805	550		Abd. 1917
O	C. J. Borden 2		25 SW NE	456.6			1978	—1342	2	1800	168		
O	C. J. Borden 12		25 SW NE	459.0			1803	—1344	2	1805+			Pumping St. time
O	C. J. Borden 13		25 SW NE	465.0			1810	—1345	5	1815+		'28	
R	C. E. Buchanan 10	'11	36 NE SW	444.8	1535	—1090	1772	—1327	2	1789	150		
R	C. E. Buchanan 11	'11	36 NE SW	444.4	1535	—1091	1781	—1337	5	1786	50		Pumping 1 hr.
R	C. E. Buchanan 12	'11	36 NE SW	444.4	1535	—1091	1774	—1330	8	1796	51		
R	C. E. Buchanan 13	'11	36 NE SW	447.3	1552	—1105	1784	—1337	6	1795	350	'21	Abd.
R	C. E. Buchanan 16	'17	36 NE SW	444.5			1760	—1315	5			'18	Oil and Water
O	L. A. Buchanan 27	'11	2 NW NE	508.9	1590	—1081	1814	—1305	1	1815	570	'19	
O	L. A. Buchanan 28	'12	2 NW NE	499.8	1567	—1067	1798	—1298	10	1808	100	'12	
O	L. A. Buchanan 29	'12	2 NW NE	516.7	1593	—1076	1832	—1315	5	1840	100		
O	L. A. Buchanan 30	'12	2 NW NE	515.7	1594	—1078	1833	—1317	7	1840	360		
O	L. A. Buchanan 39	'13	2 NW NE	524.9	1621	—1096	1844	—1319	4	1848	50	'13	
O	L. A. Buchanan 40	'14	2 NW NE	507.3	1593	—1086	1837	—1330	3	1840	250	'19	
O	L. A. Buchanan 38	'13	2 NW NE	498.9	1593	—1094	1855	—1356	2	1857	200		Pumping
O	L. A. Buchanan 36[b]	'13	2 NW SE	486.3			1795	—1309	10		None	'13	Drilled 1913, Water (abd.)
O	L. A. Buchanan 31	'12	2 SW NE	517.5	1613	—1095	1850	—1332	7	1858	200		Pumping 12 hr.
O	L. A. Buchanan 32	'12	2 SW NE	515.1	1614	—1099	1871	—1356	5	1880	200		

O	L. A. Buchanan 35	'13	2 SW NE	501.2	1632	—1131	1890	—1389	5	1896	225	'21	Abd.
O	L. A. Buchanan 41	'14	2 SW NE	502.9	1599	—1096	1845	—1342	5	1867	125	'20	Abd.
O	L. A. Buchanan 42 [b]	'14	2 SW NE	506.6	1619	—1112	1808	—1301	2	1810	115	'14	Abd.
O	L. A. Buchanan 43	'14	2 SW NE	496.2	1632	—1136	1874	—1378	2	1877	115	'14	Water (abd.)
O	L. A. Buchanan 45	'14	2 SW NE	500?			1832	—1332	13	1847?			Water at 1847 (abd.)
O	L. A. Buchanan 47	'24	2 SW NE	492.0			1889	—1397	6		25		No water; little oil
O	L. A. Buchanan 34	'13	2 SW SE	447.0	1622	—1175	1832	—1385	3	2019	0	'13	Water drilled 1913
O	L. A. Buchanan 48	'30	2 SW SE	476.3			No McC.						
							"sand"			2000	0		Dry
O	M. Finley 5	'09	2 NE NE	504.8	1590	—1085	1834	—1329	4	1838	125		Pumping 4 hr.
O	M. Finley 7	'12	2 NE NE	478.4	1574	—1096	1803	—1325	2	1805	175	'19	
O	M. Finley 9	'12	2 NE NE	489.2			1802?	—1313			30	'19	
O	M. Finley 10	'17	2 NE NE	490.4			1825	—1335	4		75		Pumping 1 hr.
O	M. Finley 1	'08	2 SE NE	495.9			1807	—1311			150	'13	
O	M. Finley 8		2 SE NE	477.6	1582	—1104	1822	—1344	5	1827	0—		Dry
L	S. J. Gee 1		36 NW SE	433	1539	—1096	1789	—1346	17	1806	35		
L	S. J. Gee 2		36 NW SE	440	1537	—1097	1767	—1327	28	1795			
L	S. J. Gee 7		36 SW NE	479	1588	—1109	1814	—1335	10	1824			
B	L. Gillespie 28	'13	26 NW SE	492.6	1557	—1064	No McC.						
							"Sand"			1829			Abd.
B	L. Gillespie 33	'14	26 NW SE	519.7	1603	—1083	1827	—1307	8	1850			
B	L. Gillespie 34	'14	26 SW SE	476.9	1550	—1073	1785	—1308	5	1795			
B	L. Gillespie 45	'19	26 NW SE	522.9	1604	—1081	1805	—1282	5	1850			
B	L. Gillespie 10	'10	26 SW SE	497.6	1579	—1081	1803	—1305	3	1864	150		
B	L. Gillespie 23	'12	26 SW SE	481.9	1551	—1069	1774	—1292		1811	Light		
B	L. Gillespie 35	'14	26 SW SE	494.6	1566	—1071	1802	—1307		1822			
B	L. Gillespie 16	'11	35 NW NE	467.2	1541	—1074	1763	—1296		1818			
B	L. Gillespie 17	'11	35 NW NE	484.1	1565	—1081	1798	—1314				PB	Abd.
B	L. Gillespie 19	'12	35 NW NE	462.6	1541	—1078	1765	—1302	5			PB	

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[b] Data not used in preparing structure maps.

[c] PB—Plugged back.

APPENDIX—Continued

Data on wells drilled into McClosky sand,
Part of Dennison Township, Lawrence County, Illinois

Co.[a]	Lease, well No.	Date dr.	Location	Curb elev.	Kirkwood Depth	Kirkwood Elev.	McClosky Depth	McClosky Elev.	McClosky Th.	TD.	IP bbls.	PB.[c]	Remarks
B	L. Gillespie 20	'12	35 NW NE	460.8			1757	—1296	8		3200	PB	Abd.
B	L. Gillespie 21	'12	35 NW NE	472.7	1571	—1098	1776	—1303	9		1200	PB	Abd.
B	L. Gillespie 22	'12	35 NW NE	470.1	1549	—1079	1765	—1295	9	1800	Light	PB	Abd.
B	L. Gillespie 24[b]	'12	35 NW NE	466.9	1535	—1068	1777	—1310				PB	Abd.
B	S. Gillespie 4	'10	26 SE NE	510.6	1598	—1087	1852	—1341		1855	50		
B	S. Gillespie 8	'13	26 SE NE	511.3			1855	—1344					Abd.
B	S. Gillespie 9	'14	26 SE NE	517.6			1826	—1308	9		Show		
B	S. Gillespie 19	'25	26 SE NE	516.1			1841	—1325	9				
B	S. Gillespie 3	'10	26 NE SE	507	1595	—1088	1841	—1334	28	1920	120		
B	S. Gillespie 5	'10	26 NE SE	494	1590	—1096	1812	—1318	2	1855	150		
B	S. Gillespie 6	'12	26 NE SE	520.7			1843	—1322	7				
B	S. Gillespie 7	'13	26 NE SE	510.5			1850	—1339	10	1860			
B	S. Gillespie 11	'19	26 NE SE	500.0			1848	—1348	6		0		Dry
O	A. L. Gould 15	'12	35 NW SE	490.3	1531	—1041	1759	—1269	7	1766	1560	'31	Abd.
O	A. L. Gould 16	'13	35 NW SE	481.4	1545	—1064	1770	—1289	10	1807	225	'19	
O	A. L. Gould 13	'12	35 SE SE	508.5	1593	—1084	1816	—1307	2	1818	360		Pumping St. time
O	A. L. Gould 14	'12	35 SE SE	496.0	1580	—1084	1799	—1303	4	1803	1560	'15	
O	A. L. Gould 17	'12	35 SE SE	486.0	1554	—1068	1803	—1317	4	1807	100		Pumping 2 hr.
O	A. L. Gould 18	'13	35 SE SE	505.6	1580	—1074	1815	—1309	10	1832	200		
O	A. L. Gould 19	'14	35 SE SE	490.3	1570	—1080	1802	—1312	16	1818	125		
O	H. H. Gould 9	'12	35 SW NW	497.8	1547	—1049	1775	—1277	5	1839	125		
O	H. H. Gould 18	'16	35 SW NW	498.8	1550	—1051	1767	—1268	8	1828	15	'18	Abd.
O	H. H. Gould 19		35 SW NW	512.4	1557	—1045	No McC. "sand"			1834	0—		Dry

O	H. H. Gould 21 [b]	'17	35 SW NW	516.5	1564	—1047	No McC. "sand"			1838		PB	
O	H. H. Gould 22	'17	35 NW SW	498.6	1548	—1049	1760	—1269	6	1775	None	'17	Drilled into water 1917
O	J. J. Gould ac 2—3	'11	36 SW NW	450.6	1558	—1107	1776	—1325	4	1826	200	'21	
O	J. J. Gould ac 2—5	'16	36 SW NW	453.1			1782	—1329	8		220		
O	J. J. Gould ac 2—6	'16	36 SW NW	453.5			1763	—1309	5		125	'18	
O	J. J. Gould ac 1—1	'16	36 NW SW	454.3			1759	—1305			225		
O	J. J. Gould ac 1—4	'11	36 NW SW	446.4	1546	—1100	1776	—1330	4	1793	100		Pumping 5 hr.
O	J. J. Gould ac 1—6	'11	36 NW SW	448.8	1545	—1096	1772	—1323	4	1777	220	'21	Abd.
O	J. J. Gould ac 1—10	'14	36 NW SW	458.4	1542	—1084	1775	—1317	3	1780	185		Pumping 1½ hr.
O	J. J. Gould ac 1—11 [b]	'16	36 NW SW	455.8			1790	—1334	6		100	'22	
O	J. J. Gould ac 1—12	'17	36 NW SW	452.0			1760	—1308	5		25		(Drillers est.)
													Pumping 12 hr.
O	J. J. Gould ac 1—5	'11	36 SW SW	448.6	1550	—1101	1762	—1313	7	1806	225		Pumping 3 hr.
O	J. J. Gould ac 1—7	'13	36 SW SW	479.0	1580	—1101	1797	—1318	3	1815	100		Pumping 1½ hr.
O	J. J. Gould ac 1—8	'13	36 SW SW	456.8	1555	—1098	1798	—1341	2	1838	85		Pumping 6 hr.
O	J. J. Gould ac 1—9	'13	36 SW SW	465.3	1558	—1093	1778	—1313	10	1831	205		Pumping 1½ hr.
O	J. J. Gould ac 1—13	'17	36 SW SW	464.6			1770	—1305	10		50		Pumping 7 hr.
O	T. I. Gould 18	'13	35 SE SW	515.4	1579	—1064	1805	—1290			225	'15	
O	T. I. Gould 22	'12	35 SE SW	505.5	1570	—1064	1792	—1286	5	1797	175	'25	
O	T. I. Gould 23	'12	35 SE SW	495.1	1555	—1060	1777	—1282	2	1779	600	'23	
O	T. I. Gould 27	'13	2 NW NW	517.6			1809	—1291			0	'13	Water
O	W. A. Gould 12	'12	35 SE NW	490.6	1560	—1069	1788	—1297	8	1800	250	'18	
O	W. A. Gould 23	'13	35 SE NW	483.3	1541	—1058	1762	—1279	20	1782	200	'21	
O	W. A. Gould 35 [b]	'16	35 SE NW	486.8	1540	—1053	1837	—1350?	6	1857	60	'26	
O	W. A. Gould 15	'12	35 NE SW	490.3	1545	—1055	1767	—1277	16	1783	300		Abd. 1932
O	W. A. Gould 18	'12	35 NE SW	489.4	1559	—1070	1768	—1279	11	1779	425	'18	
O	W. A. Gould 9	'12	35 SW NE	460.4	1540	—1080	1754	—1294	4	1758	1200		

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[b] Data not used in preparing structure maps.

[c] PB—Plugged back.

APPENDIX—Continued

Data on wells drilled into McClosky sand,
Part of Dennison Township, Lawrence County, Illinois

Co.[a]	Lease, well No.	Date dr.	Location	Curb elev.	Kirkwood Depth	Kirkwood Elev.	McClosky Depth	McClosky Elev.	McClosky Th.	TD.	IP bbls.	PB.[c]	Remarks
O	W. A. Gould 10	'12	35 SW NE	469.8	1550	—1080	1760	—1290	20	1780	2400		Abd. 1929
O	W. A. Gould 11	'12	35 SW NE	480.5	1554	—1073	1773	—1292	9	1802	250	'18	
O	W. A. Gould 16	'12	35 SW NE	468.8	1548	—1079	1755	—1286	15	1775	250	'19	
O	W. A. Gould 17	'12	35 SW NE	470.3	1528	—1058	1762	—1292	16	1778	300	'18	
O	W. A. Gould 19	'12	35 SW NE	464.2	1547	—1083	1754	—1290	21	1775	150		
O	Geo. Gray 9	'11	26 NW NE	455.8	1545	—1089	1744	—1288	56	1800	0—		Dry
O	Geo. Gray 10	'12	26 NW NE	460.1	1535	—1075	1797	—1337	8	1868	15		
O	Geo. Gray 13	'13	26 NW NE	435.5	1535	—1099	1750	—1315	8	1785	10		Abd.
O	Geo. Gray 16		26 NW NE	440.5	1528	—1037	1775	—1334	15	1866	30		
O	Geo. Gray 20	'14	26 NW NE	449.5	1536	—1086	1785	—1335	7	1925	100		
O	Geo. Gray 11	'13	26 SW NE	468.5			1788	—1319	8		40		Abd.
O	Geo. Gray 15	'15	26 SW NE	474.8	1581	—1106	1833	—1358	5	1847	30		
O	Geo. Gray 19	'14	26 SW NE	495.6	1569	—1073	1827	—1331	5	1857	50		
O	J. Gray 25	'17	34 NW SE	525.8	1575	—1049	1794	—1268	2	1811	140		Abd.
O	J. Gray 29	'18	34 NW SE	536.1	1607	—1071	1807	—1271	2	1826	33		Pumping 12 hr.
O	J. Gray 34[b]	'19	34 NW SE	520.0	1610	—1090	1771	—1251	5	1851	50		
O	S. Gray 8		2 NW NW	508.7			1802	—1293	1		0		Water
O	Irvin 6	'11	36 NW SE	440.3	1537	—1097	1780	—1340	5	1791	50		Abd.
O	Irvin 7	'11	36 NW SE	439.3	1540	—1101	1783	—1344	4	1796	75		
O	Irvin 9	'27	36 NE SE	437.8			1810	—1372	6		Light		
O	L. Jenner 17	12	35 SW SE	497.8			1800	—1302	5		1600	'24	
O	L. Jenner 18	'12	35 SW SE	502.6			1802	—1299	3		1400		Pumping St. time
O	L. Jenner 19	'12	35 SW SE	483.1			1782	—1299	5		1500		Pumping
O	L. Jenner 20	'12	35 SW SE	475.2			1760	—1285	12		1400	PB	

O	L. Jenner 21	'12	35 SW SE	487.5			1789	—1301	6			'14	
O	L. Jenner 22	'20	35 SW SE	484.5			1770	—1286				'20	Drilled into water 1920
O	L. Jenner 16		1 NW NW	477.7			1804	—1326	3		46		
O	L. Jenner 15		36 SE SW	449.0			1779	—1330	13				
O	L. Jenner 18		36 SE SW	453.4			1772	—1319	3		70		
O	L. Jenner 19		36 SW SE	437.3			1800	—1363	2		90		
O	L. Jenner 20		36 SW SE	436.7			1800	—1363	5		35		
O	J. B. Kerr 19		2 NE NW				No McC. "sand"			1800	19?		
O	J. B. Kerr 23	'11	2 NE NW	508.5			1817	—1309			75		
O	J. B. Kerr 24	'11	2 NE NW	517.3	1595	—1078	1823	—1306	5	1828	150	'11	
O	J. B. Kerr 28	'13	2 NE NW	495.2	1577	—1082	1807	—1312		1807	280	'13	
O	J. B. Kerr 30	'13	2 NE NW	519.9	1580	—1060	1818	—1298		1830	90	'13	
O	J. B. Kerr 18	'13	2 NE NW							1940	0		Water
O	J. B. Kerr 25	'12	2 SE NW	516.6			No McC. "sand"				0	'12	Water
O	J. B. Kerr 26	'13	2 SE NW				1853		7	1860	75		Abd. 1918
O	J. B. Kerr 29	'13	2 SE NW				1832		5	1826	75	'13	
O	J. B. Kerr 31[b]	'13	2 SE NW	498.2	1585	—1087	1943	—1445		1950	150	'13	
O	J. B. Kerr 32	'13	2 NE SW				No McC. "sand"						
O	E. Leighty ac 1—27[b]	'13	26 NE SW	491.4	1552	—1061	1810	—1319	5	1875	120		
O	E. Leighty ac 1—28	'13	26 NE SW	511.0	1574	—1063	1818	—1307	7	1852	150		
O	E. Leighty ac 1—29	'13	26 NE SW	499.6	1567	—1067	1810	—1310	5	1910	125		
O	E. Leighty ac 1—35	'13	26 NE SW	513.3	1576	—1063	1811	—1298	14	1855	220		
O	E. Leighty ac 1—36	'13	26 NE SW	492.3	1558	—1066	1758	—1266	6	1851	175		
O	E. Leighty ac 1—23	'13	26 NW SW	461.5	1532	—1070	1752	—1290	9	1843	160		
O	E. Leighty ac 1—24	'13	26 NW SW	505.5	1553	—1047	1765	—1259	6	1852	125		

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[b] Data not used in preparing structure maps.

[c] PB—Plugged back.

APPENDIX—Continued

Data on wells drilled into McClosky sand,
Part of Dennison Township, Lawrence County, Illinois

Co.[a]	Lease, well No.	Date dr.	Location	Curb elev.	Kirkwood Depth	Kirkwood Elev.	McClosky Depth	McClosky Elev.	McClosky Th.	TD.	IP bbls.	PB.[c]	Remarks
O	E. Leighty ac 1—33	'13	26 NW SW	484.2	1557	—1073	1755	—1271	7.	1776	40		
O	E. Leighty ac 1—39	'13	26 NW SW	511.1			1812	—1301	3		75		
O	E. Leighty ac 1—16	'11	26 SE SW	470.4	1535	—1065	1766	—1296	4	1780	190		
O	E. Leighty ac 1—18	'11	26 SE SW	487.8	1543	—1055	1755	—1287	5	1785	120		
O	E. Leighty ac 1—22[b]	'13	26 SE SW	474.6	1540	—1065	1730	—1255	5	1903	30		
O	E. Leighty ac 1—43	'14	26 SE SW	484.3			1782	—1298	3		25		
O	E. Leighty ac 1—46	'17	27 SE SE	530.0			1847	—1317	5		50		
L	Geo. Leighty 6		25 NW NW	510.	1614	—1104	1844	—1334	18	1866	9		Abd. 1926
O	L. Leighty 31	'13	35 NW NW	492.6	1537	—1044	1753	—1260	2	1864	100		
O	L. Leighty 19	'11	35 NE NW	475.2	1534	—1059	1766	—1291	6	1772	600	'31	
O	L. Leighty 20	'11	35 NE NW	490.5	1563	—1072	1776	—1285	6	1800	200		
O	L. Leighty 23	'12	35 NE NW	474.5	1547	—1072	1764	—1289	8	1791	125		
O	L. Leighty 24	'12	35 NE NW	483.5	1554	—1070	1780	—1296	10	1792	150	'20	
O	L. Leighty 40	'13	35 NE NW	498.8	1550	—1051	1776	—1277	11	1787	125		
O	L. Leighty 43	'13	35 NE NW	490.4	1552	—1062	1780	—1290	10	1861	125		
O	L. K. Leighty 25	'12	35 SE NE	457.4	1526	—1069	1757	—1300	13	1770	100	'25	
O	L. K. Leighty 26	'12	35 SE NE	456.8	1547	—1090	1777	—1320	8	1785	240	'19	
O	L. K. Leighty 28	'12	35 SE NE	459.4	1539	—1080	1765	—1306	5	1775	240	'18	
O	L. K. Leighty 30	'12	35 SE NE	458.3	1531	—1073	1763	—1305	11	1774	150	'19	
O	L. K. Leighty 50	'16	35 SE NE	455.6			1767	—1311	11		80	'18	Abd.
O	L. K. Leighty 10	'09	35 NE SE	464.1			No record				235	'17	
O	L. K. Leighty 22	'12	35 NE SE	476.3	1566	—1090	1772	—1296	13	1785	1800		Pumping 14 hr.
O	L. K. Leighty 29	'12	35 NE SE	469.2	1556	—1087	1763	—1294	29	1792	200	'17	
O	L. K. Leighty 48	'14	35 NE SE	475.1	1563	—1088	1798	—1323	11	1839	175	'23	Abd.

O	L. K. Leighty 21	'12	35 NW SE	490.7	1555	—1064	1784	—1293	4	1788	1560		Abd. 1920
O	T. F. Leighty 1		36 NW NE	507.7			1846	—1338	2				Pumping St. time
O	T. F. Leighty 6[b]	'10	36 NW NE	492	1592	—1100	1797	—1305		1835	715		
O	T. F. Leighty 7	'10	36 NW NE	484	1586	—1102	1827	—1343	6	1833	100		Pumping 1 hr.
O	T. F. Leighty 8	'10	36 NW NE	494	1587	—1093	1827	—1333	3		110		
O	T. F. Leighty 11	'16	36 NW NE	488.2			1828	—1340	4		0		Dry
O	T. F. Leighty 14	'17	36 NW NE	478.7			1815	—1336	4		20		Pumping 4 hr.
O	T. F. Leighty 9	'11	36 SW NE	446	1550	—1104	1782	—1336	5	1787	450		Pumping St. time
O	T. F. Leighty 10	'11	36 SW NE	445	1545	—1100	1797	—1352	8	1820	50	'25	
O	T. F. Leighty 12	'17	36 SW NE	454.5			No record				0		Dry
O	T. F. Leighty 13	'17	36 SW NE	458.4			No record				0		Dry
I	M. McCrosky 2	'09	25 NW SE	499	1616	—1117	1842	—1343			150		
I	M. McCrosky 5	'09	25 NW SE	478	1625	—1147	1820	—1342	11	1831	300		
I	M. McCrosky 6		25 NW SE	472	1602	—1130	1804	—1332	11	1815	1290		
I	M. McCrosky 7		25 NW SE	483	1605	—1122	1820	—1337	15	1835	1500		
I	M. McCrosky 10		25 NW SE	465.9			1820	—1354					
I	M. McCrosky 12		25 NW SE	484.3			1833	—1349					
I	M. McCrosky 13		25 NW SE	469.3			1821	—1352					
I	M. McCrosky 1[b]	'09	25 NE SW	471	1612	—1141	1842	—1371					
I	M. McCrosky 4		25 NE SW	480	1607	—1127	1824	—1344	13	1837	1700		
I	M. McCrosky 8		25 NE SW	481	1600	—1119	1832	—1351	28	1860	100		
I	M. McCrosky 9		25 NE SW	485	1597	—1112	1810	—1325	12	1822	300		
O	Geo. Ryan ac 3—12	'10	26 SE SE	504	1595	—1091	1827	—1323	8	1860	300		
O	Geo. Ryan ac 3—13	'11	26 SE SE	494	1592	—1098	1802	—1308	4	1806	1200	'25	
O	Geo. Ryan ac 3—22	'12	26 SE SE	515.1	1597	—1082	1828	—1313	4	1848	100		
O	Geo. Ryan ac 3—24	'13	26 SE SE	515.4	1603	—1088	1832	—1317	4	1836	110		Pumping St. time
O	Geo. Ryan ac 3—25	'13	26 SE SE	512.6	1607	—1094	No McC. "sand"			1998			
O	Geo. Ryan ac 3—27	'14	26 SE SE	521.5	1597	—1075	1835	—1313	2	1851	75		

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[b] Data not used in preparing structure maps.

[c] PB—Plugged back.

APPENDIX—Continued

Data on wells drilled into McClosky sand,
Part of Dennison Township, Lawrence County, Illinois

Co.[a]	Lease, well No.	Date dr.	Location	Curb elev.	Kirkwood Depth	Kirkwood Elev.	McClosky Depth	McClosky Elev.	McClosky Th.	TD.	IP bbls.	PB.[c]	Remarks
O	Geo. Ryan ac 3—28	'14	26 SE SE	509.2	1594	—1085	1820	—1311	3	1841	120	'21	
O	Geo. Ryan ac 3—14	'11	35 NE NE	489	1572	—1083	1805	—1316	5	1810	1440	'22	
O	Geo. Ryan ac 3—16	'11	35 NE NE	500.1	1580	—1080	1806	—1306	6	1813	600	'25	
O	Geo. Ryan ac 3—17	'12	35 NE NE	459.8	1534	—1074	1766	—1306	5	1771	1200		Abd. 1921
O	Geo. Ryan ac 3—18	'12	35 NE NE	480.3	1560	—1080	1794	—1314	12	1806	1800	PB	Abd.
O	Geo. Ryan ac 3—19	'12	35 NE NE	476.1	1565	—1089	1793	—1317	172	1825	700	'19	
O	Geo. Ryan ac 3—21	'13	35 NE NE	488.4	1572	—1084	1798	—1310	4	1812	110		
O	Geo. Ryan ac 3—31	'18	35 NE NE	478.6			1785	—1306	20		30		
O	Geo. Ryan ac 3—15	'11	36 NW NW	472	1568	—1096	1788	—1316	5	1793	1650	'24	
O	Geo. Ryan ac 3—20	'12	36 NW NW	467.4	1560	—1093	1792	—1325	4	1814	260	'21	
O	Geo. Ryan ac 3—23	'13	36 NW NW	487.9	1582	—1094	1808	—1320	4	1858	127	'22	
O	Geo. Ryan ac 3—26	'21	36 NW NW	465.4	1566	—1101	1800	—1335	6	1835	300	'21	
O	J. F. Snyder 3		30 NW NW	462.9			1800	—1337	5				
O	J. F. Snyder 4		30 NW NW	472.5			1831	—1358	2				
A	J. F. Snyder 2		25 SE NE	455.7	1584	—1128	1804	—1348					Abd.
A	J. F. Snyder 4		25 SE NE	451.9	1577	—1125	1802	—1350					
A	J. F. Snyder 20		25 SE NE	453.7			1805	—1351					
A	J. F. Snyder 21		25 SE NE	448.8			1804	—1355					
A	J. F. Snyder 11		25 NE SE	458.7	1580	—1121	1818	—1359			1000		
A	J. F. Snyder 16		25 NE SE	472.5			1820	—1347					
A	J. F. Snyder 18		25 NE SE	463.0			1819	—1356					
A	J. F. Snyder 19		25 NE SE	463.2			1820	—1357					
O	W. Snyder 4	'10	25 SE NW	468.7	1600	—1131	1809	—1340	7	1875	80	'30	
O	W. Snyder 6	'10	25 SE NW	510	1606	—1096	1827	—1317	6	1833	200		

O	W. Snyder 9	'11	25 SE NW	470	1595	—1127	1823	—1353	5	1829	225	'28	
O	W. Snyder 5 [b]	'09	25 SW NW	481	1646	—1165	1772	—1291	13	1795	70		
O	W. Snyder 7	'10	25 SW NW	495	1622	—1127	1834	—1339	10	2000	20		
O	W. Snyder 8	'10	25 SW NW	502	1605	—1103	1832	—1330	1	1855	175		
O	W. Snyder 10	'13	25 SW NW	507.3	1625	—1118	1817	—1310	2	1908	50		
O	W. Snyder 11	'14	25 SW NW	506.5	1615	—1108	1835	—1328	3	1861	100		
O	W. Snyder 12	'14	25 SW NW	515.2	1631	—1116	1834	—1319	3	1848	70	'30	
O	W. Snyder 13	'14	25 SW NW	494.5	1605	—1110	1842	—1347	1	1850	100	'31	
O	A. Vandermark 3		25 NW SW	502.8	1612	—1109	1830	—1327	10	1850			
O	A. Vandermark 11		25 NW SW	512	1623	—1111	1841	—1329	7	1850	850		Pumping 18 hr.
O	A. Vandermark 16	'10	25 NW SW	495	1620	—1125	1826	—1331	3	1833	100	'24	
O	A. Vandermark 15	'10	25 SW SW	496	1592	—1096	1823	—1327	5	1828	720		Pumping St. time
O	A. Vandermark 17	'11	25 SW SW	474	1569	—1095	1800	—1326	6	1806	1500		Pumping St. time
O	A. Vandermark 20	'13	25 SW SW	498.2	1600	—1102	1823	—1325	10	1843	125	'24	
O	A. Vandermark 21	'13	25 SW SW	500.0	1589	—1089	1818	—1318	10	1850	190	'24	
O	A. Vandermark 19	'13	25 SE SW	511.2	1614	—1103	1835	—1324	8	1856	165	'24	
O	A. Vandermark 23	'14	25 SE SW	526.9	1635	—1108	1853	—1326	3	1865	110		Pumping St. time
O	A. Vandermark 24	'16	25 SE SW	531.5			1846	—1314	8	1854	80	'24	
O	A. Vandermark 4	'10	25 NE SW	518.9	1638	—1119	1839	—1320	16	1855	2450		
O	A. Vandermark 6	'10	25 NE SW	503.3	1630	—1127	Not known				2500	'26	
O	A. Vandermark 10	'10	25 NE SW	505	1630	—1125	1843	—1338	9	1855	750	'31	
O	A. Vandermark 14	'10	25 NE SW	515	1640	—1125	1841	—1326	14	1855	1050	'26	
O	A. Vandermark 1		25 SW SE	510.9	1611	—1100	No McC recorded				0		Dry
O	A. Vandermark 8	'09	25 SW SE	489	1607	—1118	1823	—1334	6	1829	1200		Pumping St. time
O	A. Vandermark 9	'10	25 SW SE	500	1605	—1105	1828	—1328	12	2101	0		Dry
O	A. Vandermark 12	'10	25 SW SE	495	1612	—1117	1832	—1337	9	1860	40	'26	
O	A. Vandermark 13	'10	25 SW SE	509	1617	—1108	1839	—1330	6	1845	1860		
O	A. Vandermark 26	'25	25 SW SE	498.9			1822	—1323	11			'25	

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[b] Data not used in preparing structure maps.

[c] PB—Plugged back.

APPENDIX—Concluded

Data on wells drilled into McClosky sand, Part of Dennison Township, Lawrence County, Illinois

Co.[a]	Lease, well No.	Date dr.	Location	Curb elev.	Kirkwood Depth	Kirkwood Elev.	McClosky Depth	McClosky Elev.	McClosky Th.	TD.	IP bbls.	PB.[c]	Remarks
O	A. Vandermark 22		25 NW SW	512.4	1624	—1112	1838	—1326	6	1854	125		
O	D. W. Withers 1		36 NE NW	509.1	1617	—1108	1842	—1333	5	1860	105		Pumping 6 hr.
O	D. W. Withers 7	'13	36 NE NW	490.7	1600	—1109	1814	—1323	3	1832	175	'23	
O	D. W. Withers 8	'16	36 NE NW	482.6			1806	—1323	7		25	'23	
O	D. W. Withers 11	'17	36 NE NW	476.7			1812	—1335	4		60		Pumping St. time
O	D. W. Withers 5	'11	36 SE NW	448.5	1547	—1098	1778	—1329	8	1797	75	'24	
O	D. W. Withers 6	'11	36 SE NW	448.0	1563	—1115	1775	—1327	6	1803	175	'19	
O	D. W. Withers 9	'16	36 SE NW	453.5			1784	—1330	10		40	'22	
O	D. W. Withers 10	'17	36 SE NW	462.3			1780	—1318	10		40		Pumping 1 hr.

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[b] Data not used in preparing structure maps.

[c] PB—Plugged back.

(78920—1000)