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GEOLOGY OF THE PINCKNEYVILLE AND JAMESTOWN AREAS, PERRY COUNTY, ILLINOIS

By Alfred H. Bell, Clayton Ball, and Louis McCabe

Introduction

Prospecting by various interested parties in the vicinities of Pinckneyville and Jamestown, Perry County, has disclosed structures which are considered to have favorable oil and gas prospects and over which leases have been taken for much of the acreage. The geological studies in southwestern Illinois which are in progress by the State Geological Survey, together with

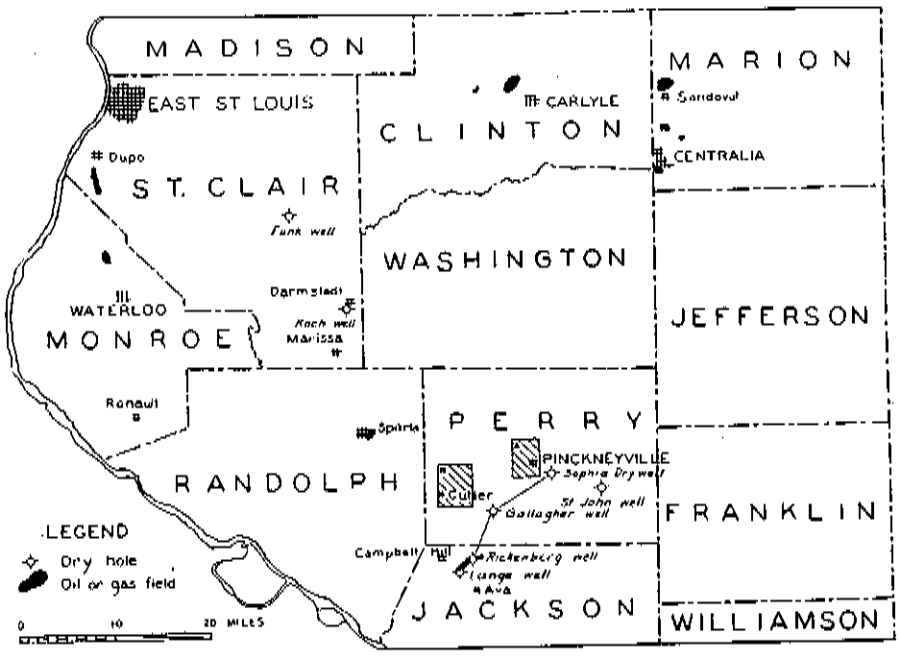

Fig. 1. Index map showing the locations of (A) the Pinckneyville and (B) the Jamestown areas mapped in figures 4 and 5, their relations to nearby oil and gas fields, and the positions of wells referred to in thetext. See also figure 3.

data generously contributed by those who have been engaged in prospecting, provide information that may assist in the proper testing and development of these areas. This information is presented herein.

The details of the structures, so far as known, are shown in figures 4 and 5 by contours that give the elevation of the top of Herrin (No. 6) coal. This coal was selected as the key horizon because it is present throughout the area and because many data concerning it are available. Well, coal test, and mine records have been supplemented by studies of rock outcrops and by descriptions of old mines as related by residents of Pinckneyville. At a few places the elevation of the horizon was calculated by adding to or substracting from the elevation of some other stratum the known interval between that stratum and the key horizon. The locations and elevations of datum points used in preparing the structure maps were determined largely by planetable survey. The accuracy and detail of the structure is obviously a function of the number of and intervals between datum points.

The collection of field data, the compilation of records, and the preparation of the structure maps, all relating to Pennsylvanian stratigraphy, were done by Messrs. Clayton Ball and Louis McCabe for the Pinckneyville and Jamestown areas, respectively, under the direction of Dr. G. H. Cady, geologist in charge of the Coal Section of the Survey. The discussions of pre-Pennsylvanian stratigraphy and structure and of oil possibilities were prepared by Dr. A. H. Bell, geologist in charge of the Petroleum Section. The planetable surveys were made by Messrs. P. S. McClure and W. B. Roe of the Petroleum Section. The report has been edited by Dr. George E. Ekblaw, geologic editor of the Survey.

Stratigraphy

Pennsylvanian System

Strata of Pennsylvanian age, mantled by glacial drift and loess, immediately underlie the areas and are exposed at some places along the streams. (Figs. 4 and 5.) The complete succession of the strata is shown in the stratigraphic column (fig. 2).

Coal No. 6, its roof shales, and its limestone caprock are the only rocks which crop out in the Pinckneyville area. The coal and caprock crop out in the bed of Beaucoup Creek just northeast of Pinckneyville and south of the Missouri-Pacific Railroad Bridge, in the center of the S. ½ SE. ¼ sec. 13, T. 5 S., R. 3 W. (fig. 4, map No. 6). The coal also crops out along the south side of the shallow ravine in the southeast part of Pinckneyville, in the center of the S. ½ SE. ¼ sec. 24, T. 5 S., R. 3 W., where it is also mined (fig. 4, map No. 11). A ledge of limestone three feet thick, immediately overlain by glacial drift and probably partly eroded before the drift was

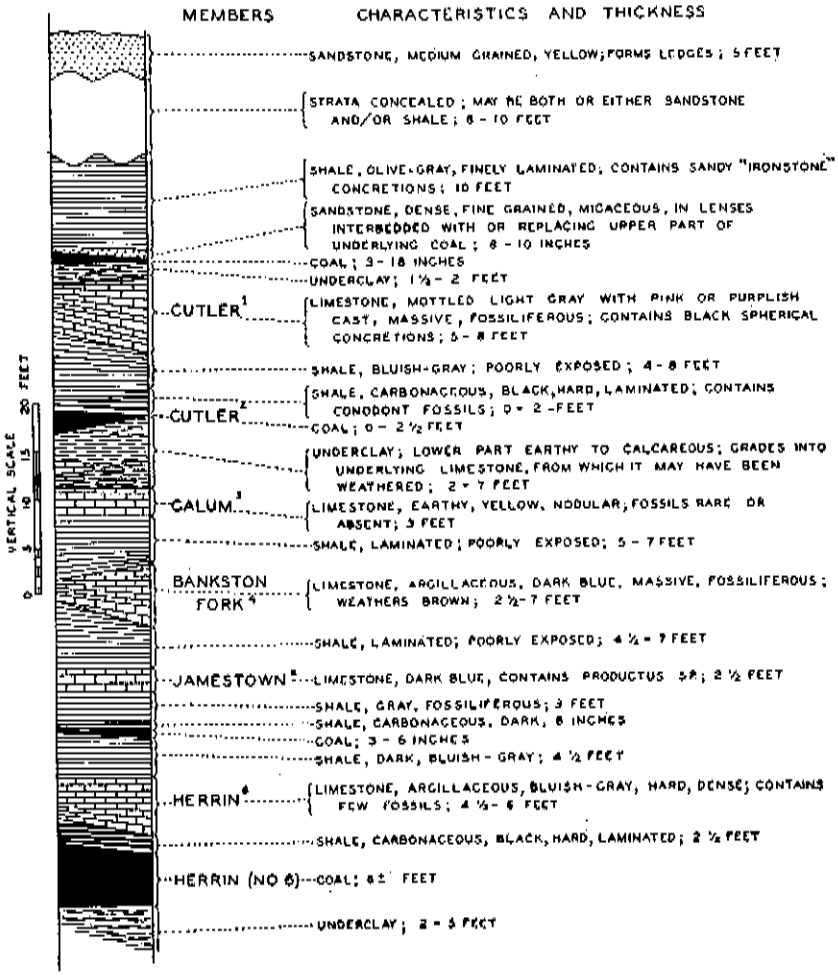

FIG. 2. Generalized stratigraphic column of Pennsylvanian strata above and including Herrin (No. 6) coal in the vicinity of Pinckneyville and Jamestown, as compiled from outcrops and records.

1. The name *Cutler* is applied to this limestone member because it is typically exposed in the vicinity of Cutler, Perry County, Illinois.
2. The name *Cutler* is applied to this coal bed because it is generally associated with the Cutler limestone.
3. The name *Galum* is applied to this limestone because it is well exposed along Galum Creek near Pinckneyville, Illinois.
4. See Cady, G. H., "Areal geology of Saline County," Trans. Ill. Acad. Sci., vol. 19, p. 261, 1927.
5. The name *Jamestown* is applied to this limestone because it is typically well exposed in the vicinity of Jamestown, Perry County, Illinois.
6. See Cady, op. cit.

deposited, crops out in the east bank of Beaucoup Creek six feet above stream-level a short distance north of the Illinois Central Railroad bridge in the center of sec. 30, T. 5 S., R. 2 W. (fig. 4, map No. 16). It closely resembles and is correlated with the nine-foot bed of limestone which occurs 25½ feet above the coal in the shaft of the North Side Coal Company in the SE. ¼ SW. ¼ sec. 13, T. 5 S., R. 3 W., (fig. 4, map No. 4), as shown below:

Log of shaft of North Side Coal Company
SE. ¼ SW. ¼ sec. 13, T. 5 S., R. 3 W.
Surface elevation, 422.0 feet

	Thickness		Depth	
	Feet	*Inches*	*Feet*	*Inches*
Surface material—soil, loess, and glacial drift (boarded)	25		25	
Limestone	11	6	36	6
Shale, gray, hard	1	3	37	9
Shale, soft, clay (boarded)	3	9	41	6
Shale, gray, hard	5	6	47	
Shale, variegated	3		50	
Limestone	9		59	
Shale, gray	6		65	
Coal (boarded)	1	6	66	6
Underclay (boarded)	1	6	68	
Shale, gray, hard	6		74	
Limestone	8		82	
Shale, black, hard, laminated ("slate")	2		84	
Coal	6		90	
Underclay	2	6	92	6

The strata that crop out in the vicinity of Jamestown (fig. 5) are stratigraphically higher than those at Pinckneyville. Strata above the Cutler limestone crop out near the center of sec. 21, T. 5 S., R. 4 W. Pennsylvanian strata below the Herrin limestone do not crop out, but are revealed by a core test which was drilled on the west bank of Galum Creek in the NE. ¼ SE. ¼ sec. 34, T. 5 S., R. 4 W., just north of the Missouri Pacific (formerly Wabash, Chester, and Western) Railroad (fig. 5, map No. 29). The test stopped in conglomeratic sandstone that is interpreted as the base of the Pennsylvanian system. The log of the test is as follows:

Log of core test drilled in the NE. ¼ SE. ¼
sec. 34, T. 5 S., R. 4 W.

	Thickness		Depth	
	Feet	*Inches*	*Feet*	*Inches*
Surficial material, soil, loess, and glacial drift	17	6	17	6
Shale, black	1	10	19	4
Limestone, dark blue	8	8	28	
Shale, black, hard, laminated, ("slate")	2	6	30	6
Coal (Herrin, No. 6)	5	10	36	4

Underclay	1	6	37	10
Limestone	1	3	39	1
Shale, white, soft	2	3	41	1
Limestone, light gray	2		43	4
Shale, sandy	7	10	51	2
Limestone, white, hard	6	7	57	9
Shale, gray, hard	2		59	9
Limestone, blue, hard		6	60	3
Coal	4	8	64	11
Underclay	11	1	76	
Limestone		9	76	9
Shale	2		78	9
Shale, sandy, and a little sandstone	40	1	118	10
Shale, sandy	12	6	131	4
Shale, blue; contains nodules of limestone	5	3	136	7
Limestone, fossiliferous	1	4	137	11
Shale, black, hard, laminated ("slate")	8	3	146	2
Coal	3	1	149	3
Shale, gray, soft ("soapstone")	1	8	150	11
Coal		2	151	1
Shale, dark, contains nodules of pyrite	2	4	153	5
Shale, gray, contains few nodules of pyrite		9	154	2
Shale, gray		10	155	
Shale, black; contains nodules of limestone	6	2	161	2
Limestone		1	161	3
Shale	13	10	175	1
Shale, black, hard, laminated ("slate")	2	9	177	10
Coal	2	2	180	
Shale, dark, gray, hard, laminated ("slate")	1	11	181	11
Shale, gray, pyritic	6	7	188	6
Limestone		7	189	1
"Rock" brown, hard		2	189	3
Shale, green		9	190	
Shale, sandy and sandstone	3		193	
Shale, in which there are 4 feet each of sandstone and limestone	15	4	208	4
Limestone, brown		3	208	7
Shale	9	8	218	3
Coal	1	6	219	9
Shale, clayey, green		6	220	3
Limestone		11	221	2
Coal	2	6	223	8
Underclay	1	7	225	3
Shale, gray		8	225	11
Limestone, sandy		8	226	7
Shale, gray, contains nodules of limestone		9	227	4
Shale, dark		5	227	9
Coal, soft, mixed with "rock"		9	228	6
Shale, brown and gray; contains nodules of limestones	7	6	236	
Shale	12	9	248	9

Sandstone	4	6	253	3
Shale, black, hard, laminated ("slate"), pyritic	1	7	254	10
Shale, black, fossiliferous		4	255	2
Coal	3	5	258	7
Shale, black, hard, laminated ("slate")		5	259	
Shale, sandy dark	8	7	267	7
Shale, gray; contains nodules of limestone	1	9	269	4
Shale, gray, hard	5	11	275	3
"Rock", hard		1	275	4
Shale		10	276	2
"Rock," hard		3	276	5
Shale, dark gray	6	3	282	8
Coal	1	7	284	3
Shale, dark; contains nodules of limestone	2	2	286	5
Shale, sandy, gray	6	9	293	2
Shale, hard, laminated ("slate") mixed with coal		1	293	3
Shale	5		298	3
Coal, mixed with shale, hard, laminated		4	298	7
Shale	28	9	327	4
Sandstone, white; contains thin seam of coal	1		328	4
Sandstone, coarse grained and conglomeratic ("millstone grit")	14	8	343	
Sandstone, conglomeratic	1		344	

PRE-PENNSYLVANIAN SYSTEMS

The Pennsylvanian strata are underlain by the Chester series of Upper Mississippian age, which outcrop in Monroe and Randolph counties to the west, where they consist of shale, limestone, and sandstone in approximately equal amounts. As no data concerning the Chester strata in the Pinckneyville and Jamestown areas are available, their character and thicknesses can be only inferred from a study of the logs of the nearest borings which penetrate them (figs. 1 and 3, and pp. 15-22).

Lower Mississippian and Devonian strata were penetrated in the Lange well No. 4 in sec. 15, T. 7 S., R. 4 W., six miles south of Jamestown; in the St. John well seven miles east of Pinckneyville; in the Koch well No. 1 in sec. 35, T. 2 S., R. 5 W., near Darmstadt, about twenty miles northwest of Pinckneyville; and in the Adam Funk well in sec. 14, T. 1 S., R. 6 W., about 30 miles northwest of Pinckneyville (fig. 1). The Lange well, of which the total depth is 2,530 feet, penetrated Devonian limestone for the bottom 120 feet. The St. John well, of which the total depth is 3,600 feet, probably reached the base of the Sweetland Creek (basal Mississippian) shale at 3,100 feet.

Formations down to the Kimmswick ("Trenton") limestone have been identified from samples of drill cuttings from the Adam Funk well. The Kimmswick limestone was also penetrated by the Koch well, of which the

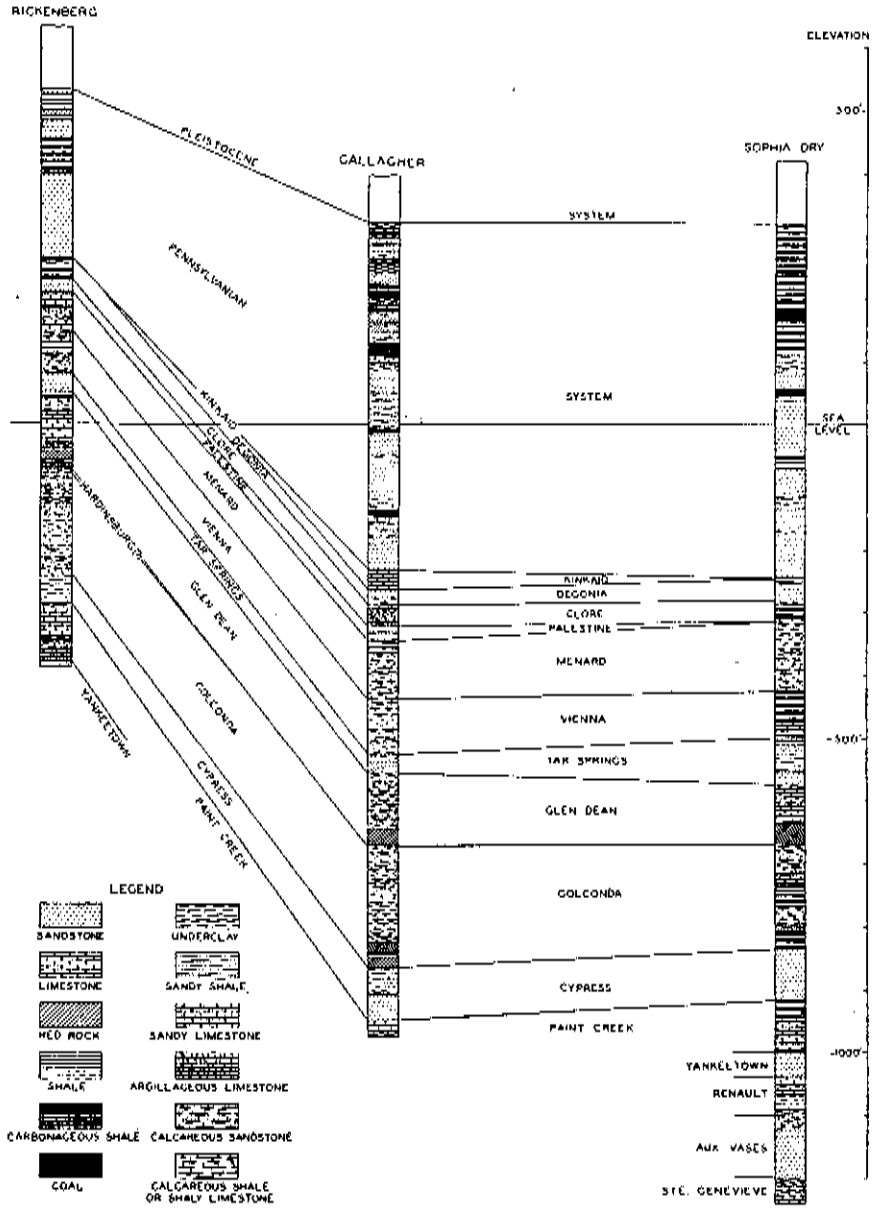

FIG. 3. Cross-section between the Ava-Campbell Hill gas field and the Pinckneyville area (fig. 1). Detailed well logs are given on pages 15-22.

driller's log accords with the log of samples of the Funk well, and both confirm the interpretation of the log of the Lange well.[1]

The following table of estimated thicknesses and depths of the geological formations may prove of some value to those who are interested in the area. Owing to the scarcity of data regarding the deeper formations and to the possibility of local and regional variation in thicknesses, the estimates may err considerably from the actual figures.

Table of classification, thicknesses, and depths of geologic strata in the Pinckneyville and Jamestown areas

	Thickness (Estimated) *Feet*	Depth to base (Estimated) *Feet*
Cenozoic group		
Recent and Pleistocene systems		
Soil, alluvium, loess, till	0-50	15
Paleozoic group		
Pennsylvanian system		
Shales, sandstones, limestones, coals, and underclays (figs. 2 and 3 and pp. 15-22)	535	550
Mississippian system		
Chester series		
Shales, limestones, and sandstones (fig. 3 and pp. 15-22)	1050	1600
Meramec, Osage, and Kinderhook series		
Mainly limestone; shale and argillaceous limestone in lower part; *Sporangites shale at base*	1250	2850
Devonian-Silurian systems		
Limestone and dolomite	500	3350
Ordovician system		
Maquoketa series		
Shale, gray	150	3500
Mohawkian series		
Kimmswick, Plattin, and Joachim formations ("Trenton") Limestone, crystalline, shaly in lower part	500	4000
St. Peter formation		
Sandstone	....	....

[1] Root, Towner B., The oil and gas resources of the Ava-Campbell Hill area: Illinois State Geol. Survey Report of Investigations No. 16, p. 8, 1928.

TABLE 1—*Data to accompany structure map of the Pinckneyville area (fig. 4)*

Map No.	Location Sec.	Description	Surface elevation	Top of Herrin (No. 6) coal Depth	Elev.
	T. 5 S., R. 3 W.				
			Feet	*Feet*	*Feet*
1	12	Ohio Oil Company test well	429.5	72	358*
2	13	Illinois 6th-vein mine	427.8	74	354*
3	13	Langworth mine	410.9	90	321
4	13	North Side Coal Company mine	422.0	84	338*
5	13	Beck mine	420.6	55	366
6	13	Coal outcrop	394.0	...	394*
7	23	Brewerton Mine No. 45	454.4	146.5	308
8	23	Brewerton Mine No. 46	467.1	133	334
9	24	Pinckneyville High School foundation test	428.7	22	407
10	24	Brown mine	445.7	85	361
11	24	Biby Coal Company slope mine	417.8	...	418*
12	25	White Walnut mine	438.1	92	346*
13	25	Owen's (Jones') mine	425.1	38	387
	T. 5 S., R. 2 W.				
14	18	Local coal test	418.8	65	354
15	18	Local coal test	421.1	65	356
16	30	Base of limestone outcrop	388.9	25	364*

* Elevations marked with an asterisk are eminently reliable; those not so marked are less reliable.

GEOLOGIC STRUCTURES

The Pinckneyville anticline (fig. 4), of which the highest part occurs in the SE. ¼ sec. 24, T. 5 S., R. 3 W., has a north-south axis along which it plunges gently northward and abruptly southward. The east limb of the fold dips more gently than the west limb. Synclines lie on either side of the anticline and a normal fault occurs in the syncline on the west. This fault, or fault zone, was encountered in the west workings of the White Walnut mine, in the NE. ¼ sec. 26, T. 5 S., R. 3 W., where the amount of displacement is 28 feet with the downthrow side on the east. It extends a little east of north, essentially parallel to the anticlinal axis, as far as the NE. corner of the SE. ¼ sec. 14. Most of the east entries extend to but not beyond the fault. No traces of the fault are found in the Pyramid Coal Company's strip mines south of the Pinckneyville area. The dip of the fault plane is not known.

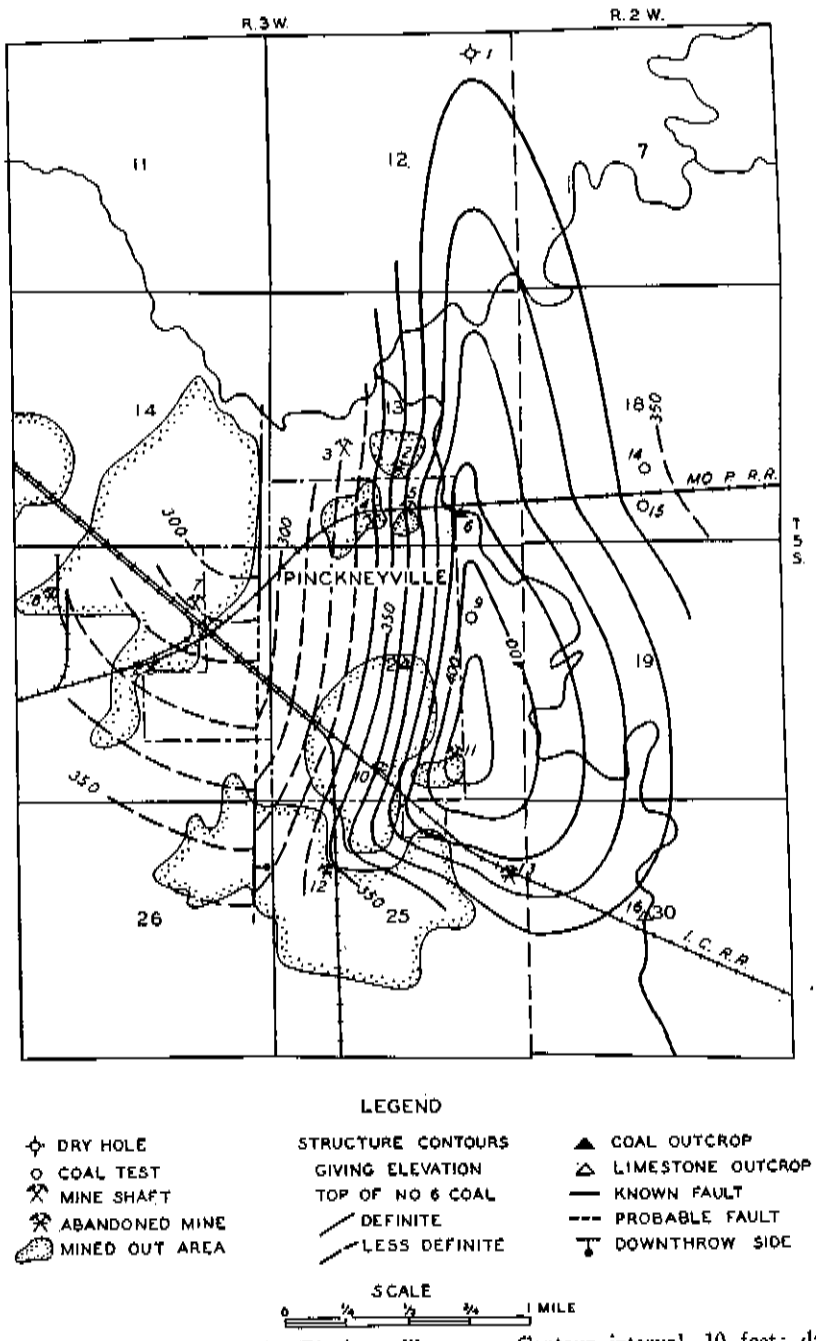

FIG. 4. Structure map of the Pinckneyville area. Contour interval, 10 feet; datum, sea-level.

TABLE 2—*Data to accompany structure map of the Jamestown area (fig. 5)*

Map No.	Location	Description	Surface elevation	Top of Herrin (No. 6) coal	
	T. 5 S., R. 4 W. Sec.			Depth	Elev.
			Feet	*Feet*	*Feet*
1	21	Pyramid Coal Corp. test	459	68	391
2	26	Pyramid Coal Corp. test	453	*a*	...
3	26	Pyramid Coal Corp. test	437	*a*	...
4	26	Pyramid Coal Corp. test	452	*a*	...
5	27	Pyramid Coal Corp. test	455	*a*	...
6	27	Pyramid Coal Corp. test	450	*a*	...
7	27	Pyramid Coal Corp. test	453	60	393
8	27	Pyramid Coal Corp. test	430	48	382
9	27	Pyramid Coal Corp. test	447	*a*	...
10	28	Pyramid Coal Corp. test	438	38	400
11	28	Pyramid Coal Corp. test	459	*a*	...
12	28	Pyramid Coal Corp. test	464	*a*	...
13	28	Pyramid Coal Corp. test	428	*a*	...
14	28	Pyramid Coal Corp. test	438	48	390
15	28	Pyramid Coal Corp. test	456	53	403
16	28	Pyramid Coal Corp. test	445	*a*	...
17	29	Clark Bros., W. S. Irving oil test	*b* 465	..	...
18	33	Pyramid Coal Corp. test	447	48	399
19	33	Pyramid Coal Corp. test	443	43	400
20	33	Pyramid Coal Corp. test	451	51	400
21	33	Pyramid Coal Corp. test	469	63	406
22	34	Pyramid Coal Corp. test	432	52	380
23	34	Pyramid Coal Corp. test	431	40	391
24	34	Pyramid Coal Corp. test	431	21	410
25	34	Pyramid Coal Corp. test	439	31	408
26	34	Pyramid Coal Corp. test	432	37	395
27	34	Pyramid Coal Corp. test	430	26	404
28	34	Pyramid Coal Corp test	433	31	402
29	34	W. C. & W. R. R. well	431	30	401
30	34	Outcrop of Cutler coal	455 (top)	..	...
31	34	Southern Gem Coal Company No. 7 mine	489	73	416
32	35	Pyramid Coal Corp. test	452	60	392
33	35	Pyramid Coal Corp. test	*b* 450	*a*	...
34	35	Southern Gem Coal Company test	*b* 450	97	353
35	35	Southern Gem Coal Company test	*b* 450	99	351
	T. 6 S., R. 4 W.				
36	2	Pyramid Coal Corp. test	*b* 460	*a*	...
37	2	Outcrop of Cutler limestone	427 (bottom)		...
38	3	Outcrop of Cutler coal	432 (top)		...
39	4	Wilson Coal Company mine	488	105	383
40	5	Cutler Oil test	*b* 500	102	398
41	5	Southern Gem Coal Company mine No. 10	497	100	397

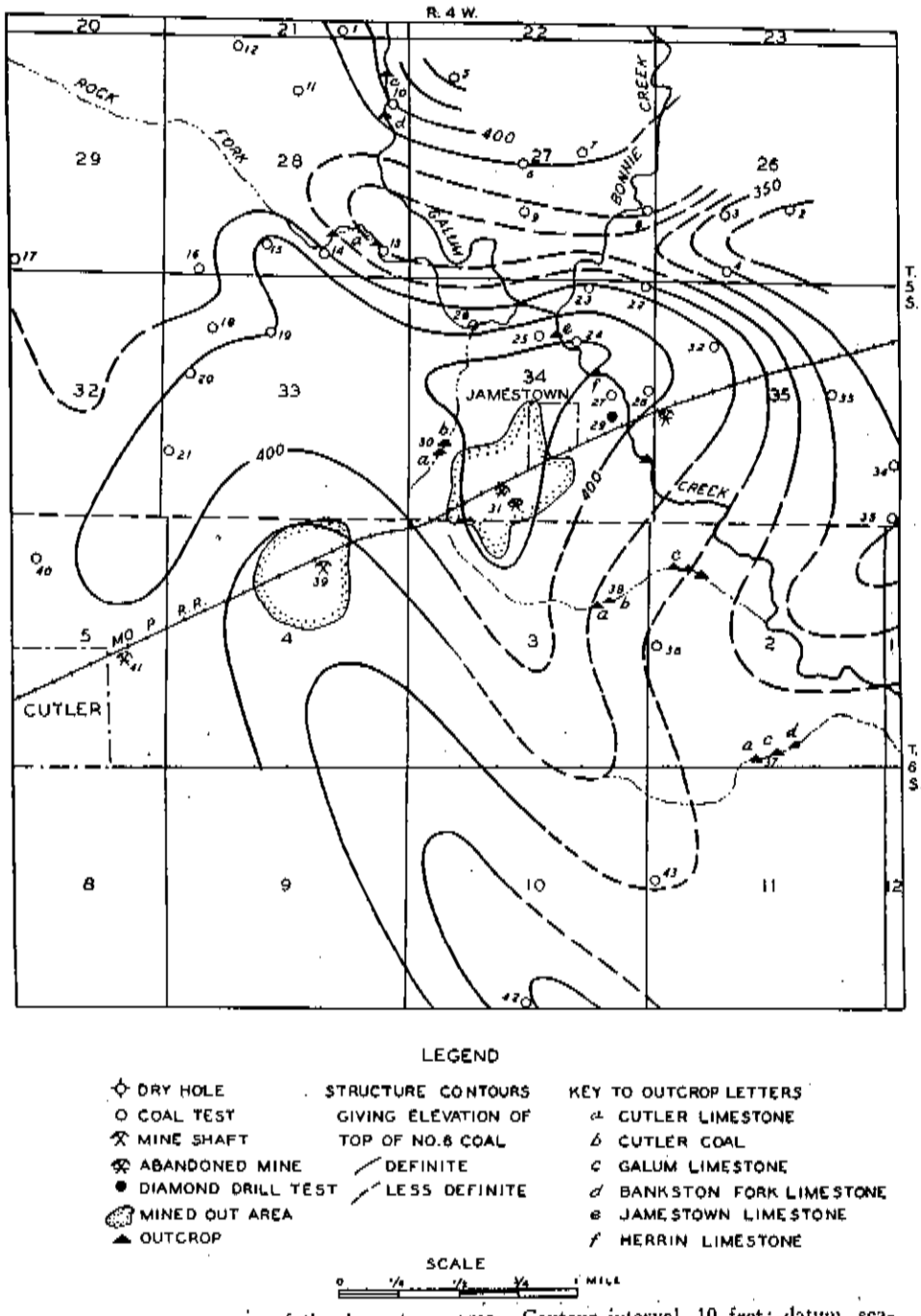

FIG. 5. Structure map of the Jamestown area. Contour interval, 10 feet; datum, sea-level.

42	10	Willis Coal & Mining Co.	456	95	361
43	11	Pyramid Coal Corp. test	*b* 460	*a*	...

a Hole did not penetrate to Herrin (No. 6) coal.
b Elevation estimated from topographic map. All other elevations determined by telescopic alidade and planetable.

The closed anticlinal structure that centers about Jamestown in sec. 34, T. 5 S., R. 4 W., is irregular in outline (fig. 5). From the highest part in sec. 34, it plunges east-by-north into sec. 35, T. 5 S., R. 4 W., south into sec. 3, T. 6 S., R. 4 W., and west into sec. 33, T. 5 S., R. 4 W., whence two subsidiary anticlinal noses plunge respectively northwest into the S. ½ sec. 28, T. 5 S., R. 4 W., and southwest into the NE. ¼ sec. 5, T. 6 S., R. 4 W. Complementary plunging synclines occur between the anticlinal noses on the east, south, and west. On the north an east-west trending syncline separates the Jamestown closure from another structural rise.

The Pinckneyville and Jamestown structures are of interest to the oil prospector only if they were formed by post-Pennsylvanian folding, in which case they reflect similar structures in older strata where possible oil sands occur. In the Ava-Campbell Hill and Sandoval areas (fig. 1), where the structures are pronounced and have definite trends, the general parallelism of the Pennsylvanian and the Chester strata indicates that the major part of the deformation was post-Pennsylvanian in age, although the fact that the Chester strata dip somewhat more steeply than the Pennsylvanian indicates that some deformation along the same axes occurred in post-Chester, pre-Pennsylvanian times. Further, in the Sparta area some pre-Pennsylvanian structures are not reflected in the Pennsylvanian strata.[2]

Comparison of the Pinckneyville anticline with these structures in which the dips of the pre-Pennsylvanian strata are known to be greater than those of the Pennsylvanian, indicates that it too is probably of this type. The Pinckneyville anticline is represented by about 60 feet of closure on Herrin No. 6 coal, as compared with about 30 feet in the Sandoval dome. It trends north-south parallel to the pronounced Duquoin fold which lies some eight miles to the east. In view of these facts, the Pinckneyville anticline appears to have been produced by forces similar to those which produced the Duquoin and Sandoval structures, and therefore it may affect the deeper strata, possibly becoming more pronounced with depth.

The evidence with regard to the Jamestown anticline is less conclusive. The syncline which lies on the north has a distinct east-west trend but the anticline itself has no definite trend. The structure apparently belongs to that class which has been described as "amoeboid,"[3] regarding whose origin geol-

[2] Moulton, Gail F., Oil and gas possibilities near Sparta: Illinois State Geol. Survey Illinois Petroleum No. 1, April 17, 1926.

[3] Twenhofel, W. H., Significance of some of the surface structures of central and western Kansas: American Association of Petroleum Geologists, vol. 9, p. 1063, 1925.

ogists are not agreed. If the dips of the strata are due to original deposition or to settling of the sediments over an irregular surface, they can not be considered as indication of structure in deeper strata. However, if the Jamestown anticline does continue into the pre-Pennsylvanian strata, the closure is probably sufficient to create an effective oil trap in any oil sands which may be present.

Possible Producing Formations

CHESTER SERIES

The producing formations in the oil and gas pools nearest the Pinckneyville and Jamestown areas are of Chester (Upper Mississippian) age, and therefore the Chester strata are regarded as having the best prospects for production in the Pinckneyville and Jamestown areas. The producing formations in the Ava-Campbell Hill gas field[4] are the Cypress and Tar Springs sandstones, and in the Sparta field the oil-bearing sand is probably either the Cypress or the Yankeetown formation. Shows of oil from a sandstone tentatively correlated as the Cypress have been found in several wells in sec. 33, T. 5 S., R. 2 W. In the most recent of these, drilled in the fall of 1930 by the Duquoin Oil Company on the John Harris farm in the NE. corner SE. ¼ NW. ¼ of the section, a show of oil was found at a depth of 1,334 feet, but abundant salt water immediately below the oil made it necessary to abandon the well.

PRE-CHESTER STRATA

A number of pre-Chester formations which are considered to be possible producing horizons in southwestern Illinois[5] are present but unproductive to date in Perry County. The only evidence of oil in pre-Chester strata was a very light show from the Devonian in the Lange well No. 4, located on the crest of the Ava-Campbell Hill anticline which is much larger than the Pinckneyville and Jamestown structures. No shows of oil were reported from the St. John well, although it was favorably located on structure and also penetrated Devonian strata. For these reasons prospects of oil and gas from the Lower Mississippian and Devonian strata in the Pinckneyville and Jamestown areas are not bright.

The Kimmswick limestone has not been tested nearer than the Koch well on the Darmstadt anticline. The formation is regarded as a possible producer in the region, but it is believed that under present economic conditions the likelihood of finding production is not sufficient to justify drilling to

[4] Root, Towner B., The oil and gas resources of the Ava-Campbell Hill area: Illinois State Geol. Survey Report of Investigations No. 16, 1928.
[5] Bell, Alfred H., The Darmstadt anticline and related structures, St. Clair County, Illinois State Geol. Survey Illinois Petroleum No. 18, pp. 5-7, Nov. 2, 1929.

the depth necessary to test the Kimmswick in the Pinckneyville and Jamestown areas.

RECOMMENDATIONS

In view of their proximity to areas in which Chester sands are productive, the numerous shows of oil and gas from Chester strata in the general region, and the probability that the structure shown by the coal also affects the underlying strata, especially in the Pinckneyville area, it is believed that the Pinckneyville and Jamestown anticlines merit testing for oil and gas to the base of the Chester series. Test wells should be located on the crests of the structures as shown by the contour maps, which in the Pinckneyville area would be near the NW. corner of the SE. ¼ SE. ¼ sec. 24, T. 5 S., R. 3 W., and in the Jamestown area would be near the NE. corner of the SE. ¼ SW. ¼ sec. 34, T. 5 S., R. 4 W.

WELL LOGS

(1) *Log*[1] *of Mid-Egypt Gas and Oil Company Well No. 16, Rickenberg farm, Well No. 3, SE. ¼ NE. ¼ sec. 11, T. 7 S., R. 4 W.*

Elevation, 633.02 feet

	Thickness *Feet*	Depth *Feet*
Pleistocene System		
Clay	10	10
Sand	90	100
Pennsylvanian System		
Shale, gray, soft ("clay")	5	105
Shale, gray, soft ("clay") and sandstone, fine grained, white	5	110
Shale, gray, soft ("clay")	15	125
Shale, gray, soft ("clay") and sandstone	10	135
Sandstone, coarse grained, gray	10	145
Shale, gray, soft ("clay")	5	150
Sandstone, coarse grained, becoming finer in lower 10 feet, gray	30	180
Shale, gray	50	230
Shale, gray, and sandstone, coarse grained, gray	5	235
Sandstone, fine to coarse grained, white to brown	135	370
Mississippian System		
Chester series		
Clore formation		
Shale, gray	2	372
Shale and sandstone	13	385
Shale, gray	20	405

[1] Compiled from samples studied and correlated by Dr. Stuart Weller, adapted to driller's log.

Palestine formation		
Sandstone, fine to coarse grained, gray, brown, in upper 5 feet	20	425
Menard formation		
Limestone, gray, mixed with sand	5	430
Limestone, gray, crystalline	15	445
Shale, gray, calcareous, sandy	5	450
Limestone, argillaceous, gray, hard	10	460
Shale, calcareous, gray, and limestone	10	470
Limestone, dark gray, crystalline	15	485
Vienna formation		
Shale, calcareous, gray	20	505
Shale, gray	20	525
Shale, calcareous, gray	15	540
Shale, gray, and limestone	10	550
Shale, calcareous, gray	5	555
Tar Springs formation		
Sandstone, fine grained, gray	30	585
Glen Dean formation		
Shale, calcareous except at top, gray	30	615
Limestone, light gray, crystalline	25	640
Limestone, light gray, crystalline, and shale, calcareous, gray	10	650
Limestone, light to dark gray, subcrystalline	10	660
Limestone, argillaceous, gray	10	670
Limestone, light to dark gray, crystalline	5	675
Shale, gray and red	15	690
Shale, sandy, gray	5	695
Shale, gray and red, and limestone, crystalline	10	705
Hardinsburg (?) formation		
Limestone, gray, hard; shale, calcareous, gray; sandstone, fine grained, gray	5	710
Golconda formation		
Limestone, gray, crystalline and oolitic; shale, gray, some red at bottom	15	725
Limestone, gray, oolitic; shale, gray	30	755
Shale, calcareous, gray; some limestone	5	760
Limestone, light gray, oolitic; some shale	8	768
Shale, calcareous, gray; some limestone	22	790
Shale, calcareous, gray	55	845
Limestone, gray, oolitic and crystalline; some shale, gray; sandstone, fine grained, gray	6	851
Shale, calcareous, gray	20	871
Cypress formation		
Sandstone, fine grained, gray; shale, dark; contains salt water	47	918
Paint Creek formation		
Shale, dark; some limestone	7	925
Limestone, gray, partly oolitic	45	970

Limestone, gray, oolitic and crystalline; shale, gray; sandstone	5	975
Limestone, gray, crystalline; shale, gray	15	990
Limestone, crystalline; sandstone, gray	20	1010
Yankeetown formation		
Sandstone, gray, fine grained; contains salt water	10	1020

(2) *Log*[2] *of Midvalley Oil Company well, L. Gallagher farm, Well No. 1 NW. ¼ SW. ¼ sec. 17, T. 6 S., R. 3 W.*

Elevation, 394.29 feet

	Thickness *Feet*	Depth *Feet*
Pleistocene system		
Soil, claycy, loessial, yellow	6	6
Subsoil, clayey, sandy, loessial, yellow and brown	9	15
Loam, yellowish, (loessial)	9	24
Sand, pebbly, clayey (till?)	8	32
Silt, clayey, pebbly (till?)	8	40
Sand, pebbly	18	58
Clay, pebbly (till)	9	67
Sand	7	74
Pennsylvanian system		
Shale, calcareous, gray	10	84
Limestone, black	3	87
Shale, black, hard, laminated; coal in lower part	5	92
Underclay; sandstone; shale, hard, black, laminated, and limestone (probably caved)	6	98
Sandstone, gray; yellow limestone, black shale, and mineral charcoal (probably caved)	7	105
Shale, sandy, micaceous, light to dark gray, and sandstone, white, yellow, and gray	22	127
Shale, calcareous, bituminous, black, hard, waxy, laminated, fossiliferous; limestone, dark gray, coarsely crystalline, fossiliferous, in upper half; "clod," coal, and underclay in lower half	16	143
Coal (possibly caved) and underclay	10	153
Sandstone, micaceous; white to gray, some underclay at top	19	172
Shale, clayey to sandy, gray; sandstone, gray; some limestone	6	178
Shale, sandy, gray; limestone; shale, black	6	184
Shale, black and gray; coal; underclay	6	190
Underclay, gray; limestone, black shale, and coal (possibly caved)	12	202
Shale, sandy, gray to grecnish-gray	4	206
Shale, gray; limestone; coal	6	212
Shale, gray; shale, black; coal; limestone	6	218

[2] Compiled from samples studied by J. A. Udden and restudied by R. S. Blatchley; correlated by L. E. Workman.

Sandstone, gray; shale, gray; black shale and coal (possibly caved)	6	224
Sandstone, carbonaceous, gray; shale, dark to black (possibly caved)	6	230
Sandstone, gray; shale, black (probably caved); "rock," red, brown, and yellow	6	236
Limestone, yellowish-gray; "rock," red; shale, sandy, gray; sandstone	6	242
Sandstone, fine grained, dark gray, soft	6	248
Shale, sandy, gray	18	266
Shale, light gray to dark	6	272
Coal and underclay	6	278
Shale, black, contains coal laminae; some limestone at bottom	12	290
Limestone, gray	5	295
Shale, sandy, micaceous, gray	11	306
Sandstone, micaceous, gray to white, laminated, and shale, gray	12	318
Sandstone, white	16	334
Sandstone, gray and red; limestone and black shale (possibly caved)	6	340
Sandstone, micaceous; fine to coarse grained, white, shaly at top	56	396
Sandstone, white and gray; shale, some calcareous in lower part	8	404
Shale, light, dark gray, and brown; sandstone, fine grained	3	407
Sandstone, micaceous, fine to coarse grained, white to gray	33	440
Sandstone, grains coarse and rounded; shale, dark	10	450
Sandstone, micaceous, fine to coarse grained, white, gray at top and bottom, calcareous at base	78	528
Shale, dark gray to black; some sandstone (possibly caved)	7	535
Shale, dark; sandstone, white; limestone	11	546
Shale, gray; sandstone, gray and red	6	552
Shale, gray; sandstone, micaceous, white	6	558
Sandstone, coarse grained, white	6	564
Sandstone, micaceous, white and gray; shale, dark and red	10	574
Sandstone, brown, yellow, white, pink, and purple	11	585
Sandstone, fine grained, white	40	625
Mississippian system		
Chester series		
Kinkaid formation		
Limestone, light to dark gray; sandstone (possibly caved in part)	30	655
Degonia formation		
Sandstone, fine grained; a very little limestone	25	680
Clore formation		
Limestone, argillaceous, dark; shale, dark, some red	35	715
Palestine formation		
Sandstone, micaceous, dark gray; shale, dark to black	23	738

Menard formation		
Shale, red, brown, black, greenish, and bluish	19	757
Limestone, oolitic, fossiliferous, and shale, dark gray, black, and red	13	770
Shale, dark bluish-gray and red; some limestone	12	782
Limestone, gray, fossiliferous, oolitic; shale, light to dark gray	10	792
Shale, red and black; limestone; sandstone, fine-grained, greenish	6	798
Limestone, white to gray, fossiliferous; shale, dark gray to black	34	832
Vienna formation		
Shale, dark gray, bluish-gray, and greenish-gray to black, fossiliferous; some limestone, fossiliferous, except at 874 to 890 feet; sandstone, fine-grained, at 880 to 886	86	918
Tar Springs formation		
Sandstone, fine-grained, and shale, dark to black, hard	12	930
Sandstone, fine-grained, gray to white	18	948
Glen Dean formation		
Shale, dark bluish-gray to greenish black; some limestone	17	965
Limestone, gray, fossiliferous, oolitic, shale, dark gray to black	72	1037
Shale, calcareous, red and green	28	1065
Golconda formation		
Shale, dark gray to black; limestone, light to dark gray	15	1080
Limestone, light gray, oolitic; shale, dark gray to black	20	1100
Shale, calcareous, dark gray to black, fossiliferous	27	1127
Limestone, gray, fossiliferous; shale, dark gray	7	1134
Shale, calcareous, carboniferous, dark gray, fossiliferous; some limestone	18	1152
Limestone, shaly, gray, fossiliferous, oolitic; shale, gray	11	1163
Shale, calcareous, dark gray, fossiliferous	35	1198
Limestone, shaly, light gray, and shale, black	20	1218
Shale, red	15	1233
Shale, black, and limestone	9	1242
Shale, red; some limestone	15	1257
Cypress formation		
Sandstone and red shale	43	1300
Sandstone, fine-grained, brown; contains salt water	40	1340
Paint Creek formation		
Limestone; sandstone, fine-grained, brown (probably caved)	10	1350
Limestone, dark brown	10	1360
Limestone, dark reddish-brown, and shale, red	10	1370

(3) *Log*[3] *of Midvalley Oil Company well, Sophia Dry farm, Well No. 1, SW. ¼ sec. 29, T. 5 S., R. 2 W.*

Elevation, 421 feet

	Thickness *Feet*	Depth *Feet*
Pleistocene system		
"Mud," yellow	10	10
"Mud," yellow, and gravel	20	30
Gravel	5	35
Till, dark gray, and gravel	15	50
"Mud," dark, and gravel	10	60
"Mud," dark gray	20	80
Sand and gravel	20	100
Pennsylvanian system		
Shale, white to dark	75	175
Shale, bituminous, black	5	180
Shale, white to gray	65	245
Shale, black	10	255
Shale, white to dark	50	305
Shale, sandy, micaceous, light to dark gray	30	335
Sandstone, coarse-grained, dark gray	30	365
Shale, dark	10	375
Shale, sandy, dark, hard	10	385
Sandstone, micaceous, mostly very fine-grained and white except at base	85	470
Shale, white	20	490
Sandstone, coarse-grained, white	45	535
Shale, sandy, light gray	15	550
Sandstone, fine- to very coarse grained, gray, hard	40	590
Shale, sandy, white	5	595
Sandstone, fine-grained, light gray to pinkish-white	30	625
Sandstone, conglomeratic, coarse-grained, brown	40	665
Mississippian system		
Chester series		
Degonia formation		
Shale, gray	10	675
Sandstone, mostly fine-grained, gray, pinkish-white, and brown at base	25	700
Clore formation		
Limestone and shale	5	705
Shale, dark gray	25	730
Limestone and shale	5	735
Menard formation		
Shale, calcareous, dark and greenish	55	790
Limestone and shale	55	845

[3] Compiled from samples studied by R. S. Blatchley; correlated by L. E. Workman.

Vienna formation		
Shale, gray	45	890
Shale, dark to black, hard	5	895
Limestone	10	905
Shale, dark to black, hard	15	920
Tar Springs formation		
Sandstone, hard	5	925
Shale, dark, hard	5	930
Sandstone, hard	15	945
Shale, black, and sandstone	30	975
Sandstone, fine-grained, white	20	995
Glen Dean formation		
Shale, black; limestone, white	5	1000
Limestone, fine-grained, brown to gray; some shale at 1010 to 1025 feet	45	1045
Shale, black	5	1050
Limestone	5	1055
Shale, black and red	35	1090
Golconda formation		
Limestone, brown; shale, red	20	1110
Limestone and shale, gray and black, hard, laminated	15	1125
Limestone, gray	5	1130
Shale, dark	10	1140
Limestone	10	1150
"Rock," red, and limestone	10	1160
Shale, black, hard, laminated	5	1165
Shale, gray	25	1190
Shale, gray to red, and limestone	25	1215
Sandstone, hard; shale, red (possibly caved)	5	1220
Sandstone, fine-grained, white	5	1225
Shale, red	10	1235
Shale	20	1255
Cypress formation		
Sandstone, fine-grained, white, gray, dark, orange, and light brown	80	1335
Paint Creek formation		
Shale, dark, hard, laminated	30	1365
Limestone, white, crystalline	40	1405
Shale, red and gray	5	1410
Limestone, white	10	1420
Yankeetown formation		
Sandstone, fine-grained, white, gray and brown	35	1455
Renault formation		
Limestone, gray	15	1470
Sandstone, calcareous, gray, hard	10	1480
Limestone, fine-grained, brown	5	1485
Sandstone, highly calcareous, fine-grained, brown	25	1510
Shale, calcareous	10	1520

Aux Vases formation		
Shale, sandy, fine-grained	20	1540
Sandstone, very fine-grained, light-colored	80	1620
Meramec series		
Ste. Genevieve formation		
Shale, sandy, calcareous	5	1625
Limestone, and shale	5	1630
Sandstone, calcareous, shaly	5	1635
Limestone, shaly, white	15	1650
Limestone, white, hard, oolitic	10	1660

Water and casing record

85-95	feet	Fresh water
105	feet	Set 12½-inch casing
360-415	feet	Fresh water sufficient only for drilling
415-470	feet	Hole full of fresh water
560	feet	Set 12½-inch casing
610-625	feet	Hole full of fresh water; casing pulled and hole reamed to 625 feet
661	feet	Set 8¼-inch casing
680-700	feet	Hole full of salt water
950-1000	feet	More salt water; hole reamed to set 8¼-inch casing at 1000 feet