

1928

Pennsylvanian series

Correlation

( Use paragraph on page 6 of the Murphysboro-Herrin folio )

## Stratigraphic relations

The Pennsylvanian series progressively overlaps the rocks of the Mississippian series to the north and west. The younger rocks, accordingly, thicken south and east from the border of the basin, the increase in thickness taking place by the addition of strata to the base of the series and resulting in a gradually increasing interval between the Herrin (No.6) coal and the top of the Mississippian series. Near the border of the field the Pennsylvanian strata lie nearly horizontal, <sup>they</sup> but gradually become more clastic to the west, clay shales becoming sandy and fine sandstone becoming coarser and in places conglomeratic, the total thickness of the measures decreasing in the same direction.

OR

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Pottsville formation

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If rocks of Pottsville age are present within these quadrangles they are known only from drill records and consist principally of sandstone and sandy shale. The identification of the Pottsville is uncertain because of the general failure to report, or the general absence of, the Murphysboro (No.2) coal in the drill holes and also because of the tangential character of the basal Pennsylvanian sandstone. Because of the lateral grading of beds of fine-grained rock into sandstone and conglomerate as they approach the rising surface of the Mississippian formation, strata which are of late Carbondale age have the lithologic aspect of Pottsville strata exposed in adjacent regions to the south. In general it is believed that the basal conglomerate and sandstone of the Pennsylvanian series become older and older to the south along the margin of the coal basin and within these quadrangles, and that there is a similar increase in the age of the basal beds eastward from the edge of the basin. Hence it is probable that in the southeastern part of the Coulterville quadrangle, at least, there are strata of Pottsville age.

It has been suggested that the basal Pennsylvanian sand-

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Blatchley, R.S., Oil resources of Illinois with special reference to the area outside the southeastern field, Ill.

State Geol. Survey Bull. No. 16, p.153, 1910

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stone of the Sparta oil field is practically identical with the Buchanan or basal Pottsville sandstone of the southeastern Illinois oil field. Since the basal Pennsylvanian sandstone of the Coulterville and Baldwin quadrangles is a shore facies which becomes continually younger toward the border of the coal basin it cannot be regarded to be as a whole representative of any definite horizon. It is only toward the southeastern portion of the Coulterville quadrangle that it is possibly as old as the Buchanan sandstone of the southeastern Illinois oil field..

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Rich, John L., Oil and gas in the Vincennes quadrangle, Ill. State Geol. Survey Bull. 33, p.161, 1916

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The following table shows the thickness of the basal sandstone of the Pennsylvanian series in this region and the interval between the top of the sandstone and No. 6 (Herrin) coal

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Table                      and  
                            Depth to No. 6 (Herrin) coal, to the  
                            top and bottom of the basal Pennsylvanian sandstone,  
                            the thickness of the sandstone and the interval  
                            between Herrin coal and the top of the sandstone

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$$\begin{array}{r} 845 \\ 124 \\ \hline 721 \end{array}$$

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(257-7,500) — 2 6

Character  
strata  
above

		Coal Co - depth	Buchanan -	Shubert	Intervall	
Sparta	Old well 1 -	118-124	265-320	(55)	196	{ Sh 10' M. l. -
	Old well 2	101-107	168-368	(200)	61	{ Sh 20' M. l. -
	" 3	149-155 <sup>✓</sup>	245-362	(117)	90	{ Sh 3' M. l. -
	" 5	166-172 <sup>✓</sup>	347-427	(80)	221	{ Sh 3' M. l. -
	" 8	119-124 <sup>✓</sup>	260-380	(120)	136	{ M. l. -
	McClurkin	172-178	321-371	(50)	143	M. l. -
M	Foster	140-146 <sup>100</sup>	325-375 (46)	(50)	217	M. l. -
	McIlvrey	147-153	295-335	(40)	142	Sh 8' M. l. -
Tilden	Stevenson	160-167	400-425	(25)	233	Sh 10' M. l. -
Marissa	Marissa	88-94	<del>248-262</del> <sup>114</sup>	<del>154</del>	148	Sh 12' M. l. -
	Fulte	90-96	299-322 <sup>x</sup>	(23)	203	M. l. -
	Eck	113-119	315-325 <sup>x</sup>	(10)	196	M. l. -
	Muelker	106-112	302-350 <sup>x</sup>	(48)	196	Sh 10' M. l. -
	Kunz	58-63	No 20	(Bottom Penn. -	210	
Coutterville			545-600	(53)	228	Sh 40'
		310-317	640-855	(215)	323	10 5' M. l. -

Probably Palustrine  
Sandstone
$$\begin{array}{r} 438 \\ 360 \\ \hline 78 \end{array}$$

$$\begin{array}{r} 455 \\ 322 \\ \hline 130 \end{array}$$

$$\begin{array}{r} 435 \\ 322 \\ \hline 113 \end{array}$$

$$\begin{array}{r} 85 \\ 401 \\ 543 \\ \hline 360 \end{array}$$

A well bored at Steelville ~~penetrated~~ with a diamond drill penetrates - about 250 feet of strata much if not all of which is probably Pottsville. The outcrop of No. 6 coal lies about  $1\frac{1}{2}$  miles east of the location of the drill <sup>hole</sup>, and is about 80 feet above the top of the well. As the dip of the coal near its outcrop is to the northeast about 75 feet to the mile, the coal was probably 175 to 200 feet above top of the hole is probably structurally 175 to 200 feet below the coal. Add to this if there is added to this 60 feet of drift at bing, the first rock encountered 235 to 260 feet below No. 6 coal probably a greater ~~mass~~ interval than exists between No. 2 and No. 6 coal in this region. The character of the strata encountered, which are largely sandstones, is shown in the record which is reproduced herewith:

Record of a boring near Steelville (

SE  $\frac{1}{4}$  Sec. 16, T. 6 S., R. 5 W.

Ill. Board W. Fair Comp. 204-205

The following record of a drilling along Mary River  
in the NE.1/4, NE.1/4 sec.8, T.6 S., R.5 W., on the Rurey  
farm shows the character of the rocks at that place  
to a depth of 1289 feet. The top of the Mississippian  
series is at a depth of 280 feet, and the lower part  
of the clastic deposits overlying the Mississippian  
may be of Pottsville age.

Record of a drilling for oil on the Rurey farm  
in the NE.1/4, NE.1/4 sec.8, T.6 S., R.5 W.

OK. 9  
Strata intermediate between Murphysboro and Blair (No.5) coals

Because of the apparent variation in the succession of the Carbondale formation west toward the edge of the coal basin a generalized section of the strata between the Murphysboro and the Blair (No.5) coal cannot be prepared. East of the outcrop of the <sup>No.6 coal</sup> ~~Carbondale formation~~ the succession is more constant for large areas than it is to the west and certain beds, notably two beds of coal and an associated limestone <sup>are fairly widespread</sup>. Other strata do not display persistent or recognizable characteristics <sup>such as</sup> ~~that~~ can be identified in the various records. The two coals ~~have been previously mentioned as~~ <sup>are</sup> present in the Galum Creek test hole. They are encountered at depths of 146 feet 2 inches and 177 feet 10 inches, ~~and~~ 110 and 141 feet below No.6 coal, <sup>and</sup> 72 and 40 feet respectively above No.2 coal. A limestone 1 foot 4 inches thick lies 8 feet 3 inches above the upper coal, the intervening strata being black "slate". The definite correlation of these coals with beds found in adjacent areas is not possible, but they may correspond to thin coals found 55 and 132 feet above No.2 coal in the Murphysboro and Herrin quadrangles. A limestone is also present in the Murphysboro region above the upper coal, being separated from it by a black, finely

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laminated shale 3 to 5 feet thick.

A number of records beside that of the Galum Creek boring report two beds of coal below the Blair coal, the upper one of which is 140 feet or less below No.6 coal. Furthermore the upper coal commonly has a limestone cap-rock 30 feet or less above it. Such coals are reported in several of the churn drill records of Sparta field, in which the reported intervals between No. 6 and the upper of these beds varies from 60 to about 100 feet. The <sup>such</sup> two coal beds are also reported in coal prospect holes in the St.Clair County portion of the Coulterville quadrangle, and have already been considered as possibly being the equivalent of No.2 coal. In two of these wells the upper coal is reported to have a limestone cap-rock with black shale between the limestone and the coal.

The thickness of these two coals and the interval between them as revealed by drilling is shown in the following table

Table Thickness and interval between two coals

intermediate between Murphysboro (No.2) and Blair (No.5?) coals  
as shown by drilling

Location	Upper coal		Lower coal		Interval	
	Ft.	in.	Ft.	in.	Ft.	in.

St.Clair County

1/41/4 sec. T.S R.W.

SE NW. 27	3	6	1	6	4	10
SE.SW. 27	3	6	2	2(bony)	2	11(bony) 10
SE.SW. 27	3	6	1			
NW.SE. 21	3	6	one bed 2 feet (North of area)			
27	3	6	1	3	10	7 11
SE.SE. 36	3	6		11	2	9 about 20 feet

Randolph County

Name and  
number sec. T.S. R.W.

Sparta 1	1	5	6	2	3	35
Sparta 3	6	5	5	one bed 3 feet		
Sparta 5				2	5	12
Sparta 8	1	5	6	4	5	38
McIlroy	6	5	5	3	3	25
McClurkin 16	5	5		one bed 6 feet		

Perry County

sec. T.S. R.W.

Galum Creek	34	5	4	3	1	2	2	28	7
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possible

The westward extension of one of these intermediate

coals nearly to the boundary of the area underlain by Pennsylvanian

rocks is indicated by exposures along Plum Creek and its tributaries

and by a boring at Baldwin. In this well, which was bored by a churn

drill 3 feet and 6 inches of coal mixed with black "slate" was dis-

covered at a depth of 43 feet. Black "slate" and mother coal is

reported by the driller to lie above the coal and "slate" for 6 feet

above which a brown boulder, possibly weathered limestone, 2 1/2

feet thick. The definite identification of this coal is impossible

*It is clear, however*  
~~from the data at hand~~ except that the coal lies west of the outcrop  
of  
of No. 6 and probably the Blair coal. A test shaft located near the

center of the NE. 1/4 sec. 19 Baldwin Township (T. 4 S., R. 6 W.) is

reported to have found a thin coal, possibly the same as that

found in the Baldwin well, but the depth and thickness is not known.

A foot or less of coal found in a well in sec. 7, T. 4 S., R. 6 W., at a  
depth of 51 feet may be the same bed.

~~A coal approximately at the stratigraphic position of the  
beds described above has been worked and is exposed in at least  
one locality in the Plum Creek drainage basin in the Baldwin  
quadrangle. The coal seems to be of a lenticular character~~

## Carbondale formation

## General character

Those rocks <sup>overlying</sup> ~~underlying~~ the underclay of Murphysboro (No.2) <sup>and</sup> coal below the top of the (Herrin) No.6 coal comprise the Carbondale formation. The name is taken from the town of Carbondale, Ill., in the vicinity of which this formation is well exposed. The formation is made up of shale and sandstone with several thin layers of limestone and possibly 4 beds of coal some of which are lenticular. The shale which is commonly micaceous and sandy is of a light gray color; the sandstone in many places is friable, ~~fine~~ and micaceous, in other places, especially near the west border of the coal basin, is hard, and coarse, ~~grainy~~ and conglomeratic. Some of the limestones are dense, and hard breaking with conchoidal fracture, others are earthy, and still others very fossiliferous, and slabby. Associated with one of the limestones is a bed of reddish flint about 1 foot thick that has a widespread distribution. Some of the limestone has a peculiar brecciated or conglomeratic appearance.

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The most important coal bed of the area is the Herrin or No. 6 coal, which is found at the top of the Carbondale formation and is widespread at that horizon. The Blair coal which probably is the same as Springfield or No. 5 coal has a less definitely known distribution but may be widespread 20 <sup>possibly 75</sup> to 150 feet below Herrin coal. Murphysboro or No. 2 coal has not been definitely recognized in this area, but there are apparently several coals of lenticular character below the Blair coal, among which there may be the equivalent of the Murphysboro coal.

#### Distribution

The Carbondale formation is the surface formation west of the outcrop of Herrin or No. 6 coal, as shown on the areal geology sheet. <sup>To the boundary of the Pennsylvanian series.</sup> It is possible that some of the beds of the Pennsylvanian series west of the outcrop of Herrin coal in the southern part of the area may be of Pottsville <sup>below the Herrin coal</sup> age, as the marginal beds <sub>1</sub> become thicker in that direction. East of the outcrop of Herrin coal the Carbondale formation is known only from a few ~~clown~~ drillings, but it is probably everywhere present.

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## Lithology

The sequence of the beds composing the Carbondale formation may be seen in the following record of a diamond drill boring along Galum Creek and the Wabash Chester and Western Railroad in the NE.1/4, SE.1/4 sec.34, T.5 S.,R.4 W.

Record of a diamond drill boring on Galum Creek, Perry County, on the line of the Wabash, Chester and Western Railroad, in the NE.1/4, SE.1/4, sec. 34, T.5 S. R.4 W.

Surface altitude , 425 feet above sea level

( See Coop. Bull 11 p. 201 )

## Thickness

The Carbondale formation like the Pottsville is of varying thickness because of the overlap of the Pennsylvanian series upon the Mississippian rocks. Where observed along the western margin of the coal basin in Baldwin quadrangle it is between 50 and 75 feet thick; along Galum Creek it is possibly 220 to 244 feet thick. The <sup>usual</sup> ~~common~~ thickness of the formation east of the Duquoin anticline in Franklin and Williamson counties is about 300 feet and it is possible that a thickness as great as

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Cady, G.H. Coal resources of District VI, Ill. State Geol. Survey Bull. 15, p. 20, 1916

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this is reached in the east side of the Coulterville quadrangle.

The ~~increasing~~ <sup>ening</sup> thickness ~~westward~~ of the Carbondale formation, <sup>eastward</sup> is due in part to the addition of beds below those found farther west, but also probably to the intercalation of <sup>among</sup> beds ~~between~~ those found near the edge of the basin, <sup>this</sup> ~~which~~ will account for the ~~apparent~~ eastward increase in interval between Herrin coal and Blair or No. 5 ~~77~~ coal. <sup>Because of the variation in thickness of the Carbondale formation</sup> Accordingly, it is difficult to correlate with certainty the coals below the Herrin coal reported in the various records of oil prospects scattered over

the Coulterville quadrangle, especially as the drilling was  
made by churn drills and the records therefore probably in-  
accurate.

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Murphysboro (No.2) coal -

The Murphysboro coal, which is typically developed in the adjoining Murphysboro quadrangle where it has a thickness varying from 1 to 6 feet or more, is commonly divided into two or more benches. This coal is thought to be represented in the record of drilling at Galum Creek given above by one or more of the coals between 180 and 240 feet below No.6 coal, and accordingly <sup>or at depth of 220 to 280 feet</sup> it is believed to underlie at least the southeast portion and possibly the entire east half of the Coulterville quadrangle. In three diamond drill records of coal prospects in the St. Clair County portion of the Coulterville quadrangle the upper of two beds of coal are reported between 120 and 140 feet below No.6. The parting between the coals varies from 10 to 25 feet in the three holes. These two coals may represent the two benches of No.2 coal, but the associated <sup>strata</sup> and the interval to No.6 suggest a more probable correlation with two beds intermediate between No.2 and No.6 coals, as will be shown later. One or more of the coals encountered in the Sparta wells below the Blair coal may be the equivalent of the Murphysboro coal, but in this case also correlation with coals higher in the section seems more probable. No.2 coal is not known to outcrop in the area, all outcropping rocks of Pennsylvanian age probably being younger.

*lenticular**thought to be*

A coal at a stratigraphic position similar to that of the coals described above has been worked and is exposed

near Plum Creek in the SE. 1/4 sec. 12, T.5 S., R.7 W. The suc-

cession at the place of exposure is as follows:-

Section of the Carbondale formation measured near Plum Creek in the W.1/2 SE.1/4 sec.12, T.5 S., R.7 W.

		Feet
5	Sandstone, massive, coarse -----	10
4	Shale, siliceous, gray, partly covered	7
3	Sandstone, massive, coarse -----	10
2	Shale, black, sheety -----	4
1	Coal, reported 2 1/2 to 3 feet -----	1+

Upstream at the bridge along the south line of section 12 the lower sandstone, number 3 of the preceding section, has a thickness of at least 20 feet, the coal apparently not being present. The section at the bridge and along the road above the bridge on the east side of the valley is given below.

Section of part of the Carbondale formation in  
measured along Plum Creek in the NE.1/4, NW.1/4 sec.13, T.5 S.,

R.6 W.

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Feet

Sandstone -----	3
Shale, sandy -----	25
Sandstone, massive -----	2
Shale, sandy, with 4 inch coal near the top -----	5
Shale, black -----	1
Sandstone massive, coarse -----	<u>20</u>
Water of creek	56

The strata from the Blair coal down to the first of the intermediate Carbondale coals are known from outcrop and two sections of the ~~sections~~ of the <sup>se</sup> strata ~~present in this interval~~ have been presented. The succession is exposed along Plum Creek in secs. 7, 8 and 9, T. 5 S., R. 6 W., and in secs. 12 and 13 T. 5 S., R. 7 W. Isolated exposures are also known in secs. 1, 12, and 13, T. 6 S., R. 7 W., in secs. 8, 14, 15 and 16, T. 6 S., R. 6 W. and along the foot of the east bluff of the valley of Mary River in the SW. 1/4, sec. 4, T. 6 S., R. 5 W. The exact location of the various exposures in the different sections may be determined by inspection of the Areal Geology sheet. The outcrops along Plum Creek and its tributaries is of special interest because of their continuity across the edge of the coal basin. Outcrops elsewhere are isolated and correlation from outcrop to outcrop is not possible. For this reason it is possible that certain of the sandy shales and sandstone outcropping in the south part of the Baldwin quadrangle may be stratigraphically lower than similar beds along Plum Creek, indeed, it is possible that beds as old as Pottsville may be present but the actual position is in most places indeterminable.

The most easterly outcrop of the Blair coal in the Plum River basin is about 1 1/2 miles north of Schulline in the NW.1/4 SW.1/4 sec.9 T.5 S., R.6 W. Thence westward there is a nearly continuous outcrop along the creek to the NE. 1/4 sec. 12, T.5 S., R.7 W. Practically the same horizon is exposed throughout as the strata lie horizontal or dip 5 degrees or less down stream. The succession has been measured at various places along the creek, and the measured section given below illustrates the changes that take place in the character of the strata along this valley.

Section of part of the Carbondale formation  
exposed in the NE.1/4 sec.12, T.5 S.,

R. 7 W.

	Ft.	in.
13 Coal, No.6 -----	6	
12 Underclay*-----	1	
11 Shale -----	2	
10 Flint -----		6
9 Limestone, siliceous vesicular -----		6
8 Clay -----		10
7 Limestone -----	2	
6 Shale or clay -----		10
5 Limestone -----		8
4 Shale -----		9
3 Coal, Blair (No.5?) -----		2

3	Shale -----	4	
2	Sandstone, slabby -----	2	
1	Shale, fine grained and laminated -----	8+	
Bed of stream:		29	3

Section of part of the Carbondale formation  
along Plum Creek in the SW.1/4, NE.1/4  
sec. 8, T.5 S., R.6 W.

	Ft.	in.
Shale(beginning near base of preceding section) gray -----	6	
Limestone, flinty, black -----		6
Shale, green -----	6	
Level of stream		

Section of part of the Carbondale formation  
along Plum Creek in the <sup>SW</sup>NW.1/4, NE.1/4  
sec. 8, T.5 S., R.6 W.

(Beginning below the slabby sandstone,  
No. 2, of the first section )

	Ft.	in.
(Dip 1 to 2 degrees north )		
Shale, partly covered -----	15	
Shale, bluish with limestone concre-		
tions 8 inches or less in diameter -	4	
Limestone, brownish, fossiliferous ----		4
Shale, dark sheety, with large black		
concretions 6 to 8 feet long -----	2	
Shale, greenish gray -----	10	

Level of stream

31 4

Section of part of the Carbondale formation exposed along  
Plum Creek near the center of the N.1/2 sec. 8  
T. 5 S., R. 6 W.

	Ft.	in.
Sandstone, -slabby (No. 2 of the first of the preceding sections)	2	
Shale, sandy, gray -----	12	
Level of stream		

In the next 100 yards downstream the sandstone thickens to  
8 feet, and in the shale appear numerous concretions and sandy  
lenses. The shale is underlain by a massive sandstone of lenticular  
shape which either displaces or comes in above the limestone  
and sheeted shale of the second and third sections above.

Section of part of the Carbondale formation exposed  
along the creek in the NE.1/4 sec. 18

	Ft.	in.
Flint -----		6
Limestone, very siliceous -----	1	
Limestone, about -----	5	
Coal, Blair, and covered -----	7	
Shale gray -----	20	
Shale, gray, sandy -----	10	
Sandstone -----	5 +	
Level of stream	48	6

25

Section of part of the Carbondale formation  
along Plum Creek in the SE.1/4, NE.1/4 sec. 7

T.5 S., R.6 W.

	Ft.	in.
Flints -----	?	(few inches)
Limestone, siliceous -----	?	(few inches)
Limestone, -----	4	
Shale, sandy and sandstone -----	20	
Level of stream	—	
	24 +	

Sections of the Carbondale outcropping in section 15, T.5 S., R.7 W., have already been given to show the position of the coal that is found locally associated with one of the heavy sandstones. near the base of the Pennsylvanian series and possibly at the horizon of the black fissile shale described in two of the preceding sections.

The preceding sections and descriptions of strata illustrate the change in the lithology of strata as they approach the edge of the coal basin. The strata do not dip away from the rim of the basin but are horizontal or dip toward the rim and those beds underlying the Blair coal become increasingly siliceous toward the west. This is thought to be conclusive evidence of a progressive overlap of Carbondale strata upon the Mississippian rocks.

Blair (No.5?) coal and <sup>underclay</sup> ~~associated~~ strata

The Blair coal is so named from the small hamlet of Blair located about 5 miles south and a little east of Sparta. The coal outcrops along Little Mary River about 1 miles north of the settlement and is worked at two mines in the vicinity, one in the NW.1/4, NW.1/4 sec.35 T.5 S., R. 6 W., and the other in the SE.1/4, SW.1/4 sec. 27 T.5 S., R.6 W. The coal is also mined near Percy near the center of sec.10, T. 6 S., R. 5 W. and is present a short distance below <sup>also</sup> below the No.6 coal at Sparta. It has been mined by local banks near Schuline along some of the tributaries of Plum Creek. The Blair coal is probably generally present east of its outcrop at least in the southern half of the area underlain by Pennsylvanian strata. It is possibly continuous <sup>if so</sup> to the north boundary of the area, but is separated from No.6 coal by an interval which increases to the northward.

In the southern part of the area the Blair coal lies from 20 to 30 feet below No.6 coal and may in places be not over 10 feet below the upper coal. It attains a thickness of about 5 feet 2 inches in the mine located about 1 mile north

of Blair. At the outcrop along Little Mary Creek north of the mine the coal measures 4 feet 6 inches and this is the thickness reported in the mine at Percy. Along Plum Creek, in W.1/2 sec. 9, T. 5 S., R.6 W., the coal is only 2 inches thick but elsewhere in the Plum Creek basin it is of workable thickness.

The correlation of the Blair coal with the Harrisburg and Springfield (No.5) coal is not certain but is suspected. To avoid the possibility of erroneous identification the coal will be known in this report as the Blair coal.

Underlying the coal is 4 to 5 feet of structureless grayish clay, commonly called "fire clay". This bed of clay is well exposed along Little Mary River near the center of the SW.1/4 sec. 26, T.5 S., R.6 W. where the coal is likewise well exposed above it.

Strata between Blair coal and Hertin (No.6) coal

in the mine at Blair

The immediate roof of the Blair coal is generally

a clod about 2 inches thick. The cap rock is a heavy limestone

which overlies the clod, or lies directly upon the coal, or is

separated from the coal by a black sheety shale carrying small

concretions. The limestone is an impure argillaceous rock with

an irregular knobby surface and of a concretionary origin. It

is of variable thickness, from 3 to 20 feet, in places occupying

nearly the entire interval between the Blair coal and the No.6

coal. Along the margin of the field, in the Baldwin quad-

is reddish and brownish  
range especially, a bed of flint from 2 to 10 inches in

thickness at or near the top of this limestone, but in places

is separated from it by a bed of porous vesicular brownish siliceous

rock 1 to 2 feet in thickness. ~~The resistance to solution of the~~

~~and siliceous rock  
flint as compared with the solubility of the associated limestone~~

These two varieties of siliceous rock are relatively resistant

to solution and accordingly appear commonly as fragments along

the streams crossing their outcrop. Exposures of this flint

bed may be observed along Welge Creek in the NE. 1/4 sec. 32, T.5 S.,

R.6 W., and along the creek running through the SW. 1/4 sec. 9,

Herrin (No.6) coal and underclay

The floor clay of No.6 coal in this region is similar to that commonly found below this coal. It is a light gray clay of variable thickness up to 6 feet. In the mines along the Illinois Central Railroad between Marissa and Coulterville the clay averages 2 1/2 feet in thickness but it is commonly thicker than that in the mines near Sparta and at Percy.

The Herrin (No.6) coal is present within the area of these quadrangles and is of workable thickness probably everywhere east of its outcrop. The mean average thickness of the coal as reported for 22 mines is 5 feet 11 1/2 inches. About 15 diamond drill records of holes all of which are located within 5 miles of the outcrop of the coal show approximately the same average thickness. It is probable that the coal continues at about this thickness over the entire area except where eroded. The extremes of thickness noted in the mines lie between 5 feet 6 inches and 8 feet 6 inches. In general it seems to be true that the coal is 6 to 8 inches thicker in the north half of the area around Marissa and Coulterville than in the south half near Sparta and Percy.

This coal does not differ in appearance in any important respect from other coals in the State. It has definite bedding, three benches being recognized. The beds are each made up of laminated dull coal and thin jet-like layers of glance coal. Streaks and lenses of mother coal or "mineral charcoal" and shale, "bone, and marcasite ("Sulphur") rarely over 1/2 inch in thickness are scattered through the beds. Numerous measured sections given under Economic Geology will show the character of the bed in detail.

There are several persistent partings which either consist of thin layers of clay, marcasite, or mother coal, or are merely planes of sedimentation along which the coal splits easily. Between the bottom and middle benches is a persistent layer of shale, or shale and marcasite, thicker than the other partings, and common everywhere in the Herrin coal, known as the "blue band". This bedded impurity ranges from knife edge thickness to about 2 inches, but is commonly more than 1/2 and less than 1 1/2 inches thick. The "blue band" is commonly a fine grained laminated <sup>gray</sup> shale (see fig. ) which locally becomes impregnated with iron sulphide, carbonaceous,

and calcareous material so that it varies somewhat in color and hardness.

The different benches differ somewhat in physical character. More impurities are found in the lower bench than in other parts of the bed. It is commonly dirty due to the shale and iron sulphide present, and contains hard shaly partings ("bone"). The different in the quality of this bench as compared with the others is not always apparent, however. The thickness of the bottom bench varies from 28 inches to about 4 or 5 inches. In general the thickness increases with the increase in thickness of the whole bed, accordingly the lower bench is thicker in the northern part of the area than in the southern half.

The coal above the "blue band" is divided into two benches the middle bench separated from the upper bench by a streak of mother coal, a layer of iron pyrites or simply by a bedding plane. The middle bench is subdivided into three benches, which have received from the miners various names such as "block coal", "drift coal" and the "9-inch coal". These names in general apply from below upward in the order given. The

middle bench is known to vary in thickness from 33 to 56

inches but is commonly 42 to 47 inches thick. The upper

bench, commonly called the "blacksmith" coal by the miners

in a has a general thickness of 15 or 16 inches, but locally is known

as thin as 8 inches and elsewhere as thick as 20 inches. This

upper bench is commonly regarded as the best coal in the whole

bed, being freer from "sulphur" and other impurities.

## McLeansboro formation

### Stratigraphic position, character and thickness

The McLeansboro formation comprises all the Pennsylvanian strata from above of the Herrin (No. 6) coal. It is named from McLeansboro, Hamilton County, Illinois, where its thickness is probably greater than elsewhere in the State.

Stratigraphically it is the highest indurated formation in the two quadrangles, underlying the drift everywhere east of the outcrop of the Herrin coal. Its greatest known thickness in the quadrangles is 320 feet at Coulterville, though it is probably 25 to 50 feet thicker in the northwest part of the Coulterville quadrangle where the drift is thin.

This formation is made up of a lower series of limestones and shales and a thin and locally developed coal bed which has been worked a little in one place, and an upper series of sandstones and sandy shales, containing one, and possibly more, lenticular coal beds an inch or two thick. The limestones in the lower part of the formation outcrop here and there along the creeks and rivers in the south half of the Coulterville quadrangle especially along Mary River, Galum Creek, and Pipestone Creek

south of Cutler. There is nowhere a continuous section and apparently only the harder rocks in the section are exposed

The upper sandstones and sandy shales are exposed along the tributaries of Mud Creek north and northeast of Coulterville and in some of the higher hills in the south half of the Coulterville quadrangle. Although a large part of the Coulterville quadrangle is underlain by the McLeansboro formation exposures are not common over most of the area, especially in the central part where the covering of glacial drift and valley alluvium amounts to 25 to 60 feet.

Lithology

# Lithology

The following generalized section compiled from outcrops in the Coulterville quadrangle shows the character of the strata for 77 feet above the <sup>base of</sup> Herrin (No.6 ) coal

## Generalized section of the lower part of the McLeansboro formation and No.6 coal

		Thickness		Depth	
		Ft.	in.	Ft.	in.
22	Limestone -----	1		1	
21	Shale, gray -----	5		6	
20	Sandstone, micaceous -----	15		21	
19	Shale, sandy gray -----	10		31	
18	Shale, bluish gray with limestone concretions -----	4		36	
17	Limestone, bluish, dense, fossiliferous	5 to 8		42	
16	Shale, brownish, locally black ---	3 to 4		46	
15	Shale, carbonaceous, locally coal 3 to 4 feet -----		1	46	1
14	Shale, dark -----	4		50	1
13	Shale, concretionary -----	4		54	1
12	Limestone, dense brownish; locally 2 beds separated by 5 feet of shale	5 to 6		60	1
11	Ochre -----	10		60	11
10	Fire clay -----	8		61	7
9	Shale gray, fossiliferous, bluish toward base -----	5 to 6		67	7

8	Limestone, shaly or calcareous shale	2	67	9
7	Shale, carbonaceous -----	6 to 8	68	5
6	Shale; coal 1 to 4 inches ----- dark,	6	68	11
5	Shale, hard, calcareous, laminated, locally containing <u>septaria</u> ---	6 to 8	69	6
4	Shale, bluish -----	5	74	6
3	Limestone with <u>Gertyiana</u> <u>ventricosa</u>	3 to 10	80	6
2	Shale dark, in places sheety -----	3	83	6
1	Coal (Herrin) No. 6 -----	6	6	90

On the areal geology sheet the limestone outcrops are indicated by small triangle, the accompanying small figures referring to corresponding numbers in the preceding generalized section.

The character of the upper part of the McLeansboro section as well as that of the lower is shown in the following record of a diamond drill boring in the southeast corner of St. Clair County.

Record of drilling in the SE. cor. sec. 36  
T. 3 S., R. 6 W.

JOHN E. COVING, SECRETARY  
JOHN E. COVING, SECRETARY  
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COMMISSIONER

DEPARTMENT OF GEOLOGY

JOHN E. COVING, SECRETARY  
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COMMISSIONER

STATE GEOLOGICAL SURVEY

Record of drilling in the SE. cor. sec, 36

T.3 S.,R.6 W.

	Thickness		Depth	
	Ft.	in.	Ft.	in.
Clay -----	22		22	
Sandstone -----	8	4	30	4
Shale, sandy, gray -----	32	8	63	
Shale, dark, Hard, brown partings	35		98	
Shale, dark gray -----	2		100	
Sandstone -----	1		101	
Shale, gray -----	11		112	
Sandstone -----	3		115	
Shale, gray -----	11		126	
Sandstone -----	1		127	
Shale, gray -----	7		134	
Limestone, hard broken -----	12		146	
Shale, black -----		8	146	8
Sandstone -----	7	4	154	
Shale dark -----	2		156	
Limestone, -----	1	6	157	6
Shale, limestone parting -----	4	6	162	
Limestone -----	1	6	163	6
Limestone, dark shaly -----	18	3	181	9
Coal, Herrin (No.6)				

The limestone at 134 feet in the preceding record is thought to be the same as the limestone No. 16 in the generalized section of outcropping rocks presented above. The limestone

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above the Herrin coal is the Gertyiana bearing limestone and the limestone at 156 feet is possibly the bed numbered No. of the generalized section.

### Roof shale and cap rock of the Herrin coal

The roof of No. 6 coal is different in different places, changing from draw slate, black sheety shale, gray shale, "white top", "clod" and limestone. Most of these beds are lenticular, but the limestone is very persistent, varying in height above the coal, so that in most places it is separated from it by one or more of the other strata enumerated. Even the limestone is known to pinch out in places. Where it is present it rarely rests directly upon the coal there generally being a very carbonaceous limy shale known as "clod" between the coal and the limestone. It is probable that "clod" and draw slate are not greatly different but the "clod" is so called when the material is found below the limestone, whereas the "draw slate" is found below the black shale.

The most common immediate roof is black shale. The lower part of the shale may be laminated and separated from the upper part by a bedding plane. This lower part falls with the or "draw slate" coal and is commonly 1 to 1 1/2 feet in thickness. The black shale including the draw slate has a general thickness of about 4 or 5 feet. It contains "boulders" or "niggerheads", concretions of a dark gray color, which are liable to fall when undermined. These are not uncommonly 2 to 3 feet in diameter.

The gray shale which locally overlies the coal underlies black shale. It is as much as 3 feet in thickness in places. The "white top" is likewise gray shale, but contains thin lenticular laminae of dark shale giving it a mottled appearance. It is also fossiliferous. At one locality north of Schulines on the Baldwin quadrangle in the SW. 1/4 sec. 9 T.5 S., R.6 E. there is an excellent exposure showing better than can be commonly seen in the mines the section above the coal where the "white top" is found. At this place the limestone is absent as a black shale (No. 5 of the generalized section of exposed rocks) with septaria 2 feet above it, which is commonly found 4 to 5 feet above the cap rock, here

descends to within 2 to 3 feet of the coal bed. Below the black shale is a carbonaceous shale containing large ironstone concretions and calcareous fossiliferous concretions 2 feet and less in diameter. These concretions mark the approximate stratigraphic position of the limestone cap rock. A stringer of coal less than an inch in thickness separates from the top of the main coal bed and runs for a distance of 15 feet from the point where it leaves the bed and attains a level 12 to 13 feet above the coal. Below the coal stringer, between it and the main coal bed is a mottled gray and black shale, which has the appearance of white top observed in the Boyd mine at Sparta. It is not known whether or not this or similar conditions obtain where ever the "white top" roof is found as observation in the mines is necessarily limited and there is little or no opportunity to know the succession above the white top.

The limestone cap rock of the Merrin coal, which next to the coal itself is the most widespread member of the Pennsylvanian series, is in this region wherever seen a dark, dirty gray, earthy limestone, carrying numerous fossils, among which may always be found the index fossils *Girtyana* <sup>i</sup> *secalica* (ventricos

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The limestone is the most easily identified and the most commonly outcropping Pennsylvanian limestone in the area. Localities where

it may be observed are indicated on the areal geology map by a small triangle accompanied by a small figure 3. The thickness of

this member is variable but in outcrop it is rarely over 3 to 4

feet. Some of the drilling records, however, report 20 feet or

more.

Strata above the cap rock of the Herrin (No.6) coal

The lower 60 feet of the measures above the cap rock of the Herrin coal are known in part from outcrop along Galum Creek and its tributaries and along Pipestone Creek and from a few isolated exposures. The section is incomplete because as a rule only the harder strata and those immediately adjacent to them are exposed. Two limestone ledges above the cap rock of No.6 coal (the "Gertyana" limestone) outcrop at various places in the southeast quarter of the Coulterville quadrangle. The lower one lies within 20 feet of the cap rock and is about 4 feet thick. In places, however, it splits into two beds each about 18 inches thick and separated by 4 to 5 feet of shale. The rock when fresh is a dense bluish gray to almost white pure <sup>dense</sup> limestone which weathers rapidly to a brownish color. This limestone is exposed along Galum Creek in secs. 28, 34 and 35 T.5 S., R.4 W. and in sec. 2 T.6 S., R.4 W., along Rock Fork in the SW. 1/4 sec. 28, T.5 S., R.4 W., along Pipestone Creek in secs. 16 and 17, T.6 S., R.4 W., and along Mary River north of the Mobile and Ohio RR. in sec. 16

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T.5 S., T.5 W. The exact location in the various sections is indicated by a symbol on the areal geology map.

The upper limestone is a grayish white subcrystalline pure limestone that remains white upon weathering. It is underlain by dark shale and locally by a bed of coal about 3 feet thick which is possibly coal No.7 of the Illinois section. This limestone lies about 20 feet above the brown limestone described in the preceding paragraph. It is well exposed near the middle of the south line of sec. 2, T.6 S., R.4 W. and near the center of the NE.1/4 sec. 3, T.6 S., R.4 W. There are also exposures along Galum Creek in the SE.1/4 sec. 21, T.5 S., R.4 W., and an isolated boulder of what is probably the same rock was found along Pipestone Creek in the SE.1/4 sec. 9, T.6 S., R.4 W., and another along the road in the SW.1/4, NE.1/4 sec. 13, T.6 S., R.5 W. At the first two of the outcrops noted above the exposures are in the bed and along the sides of small valleys and represent the two best exposures of Pennsylvanian limestone in the area. The cap rock of No.6 coal is uncovered in more places, but nowhere to such a large extent. Both of

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the upper limestones are somewhat fossiliferous, the lower one carrying many large individuals of Productus costatus and numerous Chonetes mesolobus.

The coal underlying the limestone has been worked, but not in recent years, in the NE. 1/4 sec. 3, T. 6 S., R. 4 W.,. The coal is not outcropping and not much could be learned about it. It is reported, however, to be 3 or 4 feet thick and to extend southeast as far as the limestone outcrop along the southside of sec. 2, T. 6 S., R. 4 W. The coal is not present below the limestone where it outcrops along Galum Creek in sec. 21 T. 5 S., R. 4 E., but may be represented by a thin carbonaceous shale 1 inch thick that lies 3 to 4 feet below the limestone. The coal in section 2 is separated from the limestone by black slate.

Of the intermediate beds separating the limestone little is known from outcrop and the overlying outcropping beds are in isolated areas so that their relative positions are not readily determined. The beds separating the limestones are probably largely shales and those above the limestones largely sandstones and sandy shales. The upper strata are best exposed along Mud Creek and its tributaries north and east of Coulterville. In the upper series of siliceous strata one lenticular limestone is known from out crop in the SE.1/4, NE.1/4 sec. 29, T. 3 S., R. 4 W. The limestone is bluish, crystalline and non-fossiliferous and about 2 feet thick in its thickest place. It seems to underlie a heavy bed of sandstone which outcrops along the tributaries of Mud Creek in secs. 29, 30, 31 and 32, T. <sup>3</sup>2 S., R. 4 W., and in secs 4 and 5 T. <sup>4</sup>3 S., R. 4 W. Above the limestone and below the sandstone are about 4 feet of conglomerate composed mostly of limestone fragments. Rock of similar character has been observed along the creek in the SE. corner of the SW.1/4 sec. 6, T. 4 S., R. 4 W., and fragments have been dug out of a well near the center of sec. 36 T. 3 S., R. 5 W., where they are found below about 30 feet of sandstone.

A thin coal about 2 inches thick underlying a thin limestone outcrops in the road above Mud Creek in the SW.1/4 SE.1/4 sec.32 T.3 S., R.4 W. The rock below is shale but this which grades laterally into sandstone and is approximately at the horizon of the heavy sandstone found in association with the lenticular limestone described in the preceding paragraph .

The following record of a test shaft at Swanwick shows the character of the upper part of the McLeansboro formation. Correlations are more or less doubtful as the shaft did not reach Herrin coal but it is probable that it ends within 40 or 50 feet of the coal or just above the limestone No. 17 of the generalized section. A drilling east of the Coulterville quadrangle at Winkle Craig along the Illinois Central Railroad shows about the same strata but continues down to No. 6 coal. At Winkle Craig the Herrin coal is 168 feet below a thin coal found underlying heavy sandstone in the upper part of the section. This upper sandstone at Swanwick is 120 feet thick, and is thought to be the same as the sandstone outcropping at various places along Mud Creek.

# Record of a test shaft near Swanwick, Illinois

	Thickness		Depth	
	Ft.	in.	Ft.	in.
Clay -----	12	10	12	10
Sandstone, white -----	42		54	10
Sandstone, red shaly -----	18		72	10
Shale, red, mixed with blue and black streaked sandstone 3			75	10
Sandstone, blue -----	5		80	10
Soapstone -----	4		84	10
Sandstone, blue, and soapstone 36			120	10
Limestone, hard -----		10	121	8
Coal -----		9	122	5
Conglomerate -----	1		123	5
Soapstone at -----			177	
Limestone -----	1	6	178	6
Soapstone -----				
Black slate -----		8	187	
Fire clay -----	2		189	
Soapstone -----	4		193	
Limestone, hard -----	3		196	
Fire clay -----	1		197	
Black slate -----	1		198	
Limestone -----	3		201	
Slate, soft -----	4		205	
Soapstone -----	9		214	
Slate, black -----	23		237	

The upper siliceous beds of the Mcleansboro formation are exposed to a thickness of about 50 feet along the various creeks north and northeast of Coulterville. Most of this thickness is sandstone. A massive sandstone outcropping along the tributaries of Mud Creek locally reaches a height of 25 to 30 feet in exposure. (See figure )

## Structure

### Representation of structure

(To be adapted from folios)

Methods employed

Delineation of structure contours

Reliability of structure contours

## General features

The structure of the part of the Coulterville-Baldwin quadrangles underlain by Pennsylvanian rocks is determined to the <sup>by reference</sup> altitude of the top of Herrin (No.6) coal so far as this is possible. In general, however, the structure contours do not extend beyond the outcrop of the coal, ~~a farther delineation of the structures~~ having little basis for accuracy. Accordingly the contours showing the structure of the Mississippian rocks are continued onto the area underlain by Pennsylvanian rocks where it is not possible to indicate the structure of the younger strata. This applies mainly to the Pennsylvanian area in the Baldwin quadrangle.

The structure of the Pennsylvanian rocks is determined primarily by the general ~~northeastward~~ dip that characterizes the rocks in the southwestern part of the State. The ~~dip is such that~~ Herrin coal, which outcrops at an altitude of about 470 feet  $1\frac{1}{2}$ -mile west of Sparta, ~~lies at a depth of 256 feet, or about 320 above sea level at Winkle Craig near the east edge of the quadrangle on the Illinois Central Railroad~~ lies at an altitude of between 225 and 250 feet above sea level in the northeast corner of the Coulterville quadrangle, an average dip of 14 to 15 feet per mile.

The predominant structural feature of the quadrangles is the Coulterville Sparta trough. ~~°towards°which°in°general°the strata°dip~~ The axis of the trough appears to lie closely parallel to or along the line of the Illinois Southern Railroad. The ~~bottom°of°the°trough°~~ trough slopes fairly abruptly between Sparta and Coulterville where the coal has an altitude of about 240 feet. Thence northeast to the boundary of the map there is apparently only slight decline. To the southwest the trough terminates in a sharp rise of the strata of about 50 feet within the ~~corporate~~ corporate limits of Sparta. The structure north of the axis of the trough is fairly well defined by numerous drillings, between Coulterville and Cutler, however, there is practically no data in regard to the altitude of the coal so that the structure of the southeast side of the trough except along the Illinois Central Railroad between Coulterville and Winkle Graig is practically ~~unknown~~ unknown.

On the north the trough seems to be well defined by a terrace or monocline which parallels the trough about one mile northwest of the Illinois Southern Railroad between Sparta and Coulterville. Northwest of this monocline the strata lie about

50 feet higher than they do in the part of the trough immediately adjacent, assuming a uniform dip between Sparta and Coulterville.

The coal northwest of the monocline, moreover, dips rather uniformly to the north east about 20 feet per mile as against about 25 feet per mile in the ~~trough between~~ Sparta-Coulterville trough.

In general the coal rises more rapidly ~~with~~ within a mile or two ~~above the~~ of the outcrop than elsewhere, as is indicated by the relative crowding of the contours near the outcrop. This results in a general parallelism of the line of outcrop and the nearest structure contours, and a general southeast northwest strike of the outcropping "Coal Measures" strata, ~~at least those~~ associated with No. 6 coal

Because of the unequal distribution of the drilling and the unsatisfactory character of many of the drill records, and the absence of outcrops in the east part of the Coulterville quadrangle it is impossible to give more than a generalized idea of the structure of ~~this~~ a large part of the area. ~~It is~~ However there is no indication of ~~unusual departures from~~ especially of that part lying between Coulterville and Cutler. It is possible that there are important variations in the altitude of the coal in this area

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concerning ~~which~~ ~~which~~ ~~we~~ ~~have~~ ~~no~~ ~~means~~ ~~of~~ which there is no knowledge at present. No evidence of unusual structural conditions <sup>is</sup> ~~are~~ present, however, in the few outcrops along Galum Creek.

The relation of the oil and gas accumulations at Sparta to the structural features described will be discussed in the section in Economic geology assigned to Oil and Gas.

## Geologic history

### Pennsylvanian epoch

#### Pottsville erosion and deposition

For a long period following the Chester submergence this region was a land area and during this time the surface became much dissected. This old surface now underlies the Pennsylvanian rocks and is exposed in many places in this and adjoining areas and has been reached by numerous borings. It is nowhere smooth and in places presents considerable relief, as for instance in the southeast corner of the Baldwin quadrangle, and had a general slope toward the east. The encroaching Pennsylvanian sea advanced from the east spreading coarse clastics over the Chester formation along the shore line. These sandstones and conglomerates, which were derived from siliceous Mississippian formations and from formations farther west commonly mark the base of the Pennsylvanian series, but their age is obviously less as the shore line rose higher and higher. If the sea rose to any part of this area during Pottsville time the shore line probably reached no farther west than the Coulterville quadrangle.

From time to time during Pottsville <sup>deposition</sup> ~~time~~ the sea in local areas became filled with sediment permitting the <sup>t</sup> and accumulation growth of vegetation on the low lands thus formed. The resulting coal beds are thinner and have less extent than those of later times and none are definitely known to extend into this area. Predominately the deposition was clastic, that is sandstones and sandy shales.

#### Carbondale deposition

Carbondale time opens with the sea withdrawn from much of the State and with extensive level swampy areas, similar to those which existed on a smaller scale a different times during Pottsville deposition. Upon such a surface fresh or brackish water marshes existed for a long period in which accumulated the peat which later became consolidated into the Murphysboro coal. <sup>many</sup> In places the accumulation of peat was interrupted by ~~mud~~ <sup>in</sup> deposition so that the coal large areas of the State is split into two beds. The west edge of this peat deposit at the beginning of Carbondale time possibly extended a short distance ~~in~~ to the Goulterville quadrangle

from the east but most of the area seems to have been above marsh level.

With the advance of Carbondale time the sea continued to encroach further and further on the Mississippian land surface, its shore line commonly being marked by a sand and pebble deposit. Now and then away from the shore mud flats, possibly islands existed, upon which marsh conditions flourished. For the most part however, conditions in the early part of the Carbondale deposition resembled those of the Pottsville in this region and sands and sandy muds were the principal sediments, with an area

Two periods when great thicknesses of peat accumulated over a large part of the area mark the latter part of the Carbondale time. In the first of these the peat which formed the Blair coal was formed and in the latter, which marks the close of Carbondale time, the Herrin coal. The overwhelming of the marsh in which the peat forming the Herrin coal was accumulating in the early part of its growth possibly by a flood of muddy water resulted in

the deposition of a thin layer of mud upon the peat at the position of the "blue band". In each of the coal beds the general existence of partings at certain positions indicate that there were interruptions in the accumulation of the peat from time to time over wide areas.

During the later part of Carbondale epoch there was a greater amount of limestone deposited than previously during Pennsylvanian time in this region.

#### McLeansboro deposition

Conditions similar to those that existed during Carbondale time continued throughout the McLeansboro epoch. In the early part of the epoch the character of sediment changed considerably possibly because the sea was very shallow. Thin limestones, dark fissile shales, fire clay like clays and thin coal seams all point to a closeness of the sea bottom to the surface of the water over large areas. After a long period when shallow water conditions prevailed the relief of the adjacent lands and the depth of the sea both seem to have increased resulting in the deposition of a thick series of siliceous beds, sands and sandy muds.

Small parts of the sea floor at times became shallow enough to permit short periods of vegetal accumulation and lime-

stone reefs were locally developed, but these were exception-

al. So much of the McLeansboro record as remains indicates the persistence of conditions suitable for the accumulation of sandy clastics up to the time of the deposition of the youngest McLeansboro strata underlying the area. The present record of the Pennsylvanian epoch is incomplete as probably a considerable thickness of the "Coal Measures" has been removed from this part of the State.

## Post Carboniferous deformation

Deposition in this region was closed by widespread movements which resulted in the uplift of the Appalachian mountains on the east and the Ouchita mountains and the Ozark dome on the west, the further uplift of the La Salle anticline in eastern Illinois and the permanent withdrawal of the sea. The strata of the Baldwin and Coulterville quadrangles were not greatly modified by these movements. There was a general tilting to the northeast causing the strata to decline in that direction between 200 and 300 feet. At the same time there was probably some wrinkling of the strata causing such irregularities in the general dip as are found near Sparta, at Blair and along Galum Creek.

Since Carboniferous time the land has stood so high above the level of the sea that no marine record of the events has been made and the history is comparatively obscure.

## Economic geology

The most important mineral resource of the Baldwin and Coulterville quadrangles aside from the soil and water is coal. Most of the Coulterville quadrangle and parts of the Baldwin quadrangle is underlaid by at least one bed of workable coal and the southern part of the Coulterville quadrangle by two or three such beds. Limestone for building and for fertilizer underlies large areas in the Baldwin quadrangle and gas and a little oil have been obtained from the rocks in the vicinity of Sparta. Other resources of the area consist of

## Coal

The quadrangles lie in the southwestern part of the eastern interior coal basin (see fig. ) Coal is found at several horizons in the Carbondale and McLeansboro formations but the Herrin (No.6) coal is of much greater value than any other. The coal production of the mines of the area in 1916 was the tons.

### Coals below the Herrin (No.6) coal

1918-7 The only coal of known commercial importance lying below the Herrin coal is a 4 to 5-foot bed lying 20 to 30 feet below the upper coal, and possibly equivalent to the <sup>or Springfield</sup> Harrisburg (No.5) coal. This coal is known as the Blair coal in this region, being mined at two shafts a short distance north of Blair. It is also mined near Percy. The coal has already been described under Stratigraphy.

The area underlain by the Blair coal has not been determined by drilling. The bed is less uniform in thickness and less persistent in distribution than the upper bed, <sup>and</sup> ~~The coal~~ apparently underlies a large area running from near Sparta and Schulines toward Percy. The limits of its eastward extension is not known. To the north, diamond

drilling between Marissa and Coulterville failed to discover and coal within 100 feet below the Herrin coal, but it is possible that the interval between the two coals increases northward to that amount. There has been insufficient drilling to prove whether or not this is the case. That the Blair coal is locally wanting in the section is indicated by its absence at its proper horizon in places along Plum Creek in the Baldwin quadrangle.

The accompanying graphic section represents ~~measurements~~ measurements of the coal in one of the mines near Blair and at two exposures, one near Blair and one north of Schulines

The Blair coal has a thickness of about 4 $\frac{1}{2}$  feet at Percy and about 5 feet at Blair. The coal at Blair is divided into three benches,- a layer of top coal about 14 inches thick which is considered somewhat better than other portions of the bed, an intermediate layer of soft coal 6 inches thick and the lower coal which makes up the remainder of the bed. The roof of the coal at Blair is "clod" reported to average about 2 feet in thickness. The "clod" which is a soft gray shale, separates the coal from the limestone cap-rock. The cap rock is a solid limestone 10 to 20 feet thick and in places apparently occupying nearly the entire space between the Blair coal and coal No.2. At Percy black shale is reported locally to separate the coal and limestone which is 15 feet thick in the shaft. The coal at Blair is very regular with no "horse-backs" or clay slips such as are commonly found in the Springfield (No.5) coal.

> insert  
mine #9  
rec'd

The chemical character of the Blair coal is shown in the accompanying analyses made under the direction of Prof. S.W. Parr in laboratory of the University of Illinois from samples collected at the face in the Stanway mine north of Blair.

Insert  
preceding page

In mine No.9 Willis Coal and Mining Company at Percy

the Blair coal varies from  $3\frac{1}{2}$  to  $4\frac{1}{2}$  feet averaging 4 feet 2 inches. The coal does not lie in benches but is uniform throughout. There are no "horsebacks" or no concretions or "niggerheads" in the roof shale so that the characteristics accompaniments of No.5 coal are lacking. The bed contains a few scattered pyrite lenses not commonly more than 1 inch thick and 4 to 6 inches across. These are not sufficiently numerous to seriously damage the coal. The roof is a black shale 10 to 30 inches thick which in places is sheety, and which is hard to hold. The limestone cap-rock is firm and hard and 15 to 20 feet thick. It makes an excellent permanent roof after the shale has fallen in. A thin slabby limestone layer 1 to 2 inches thick underlies the coal and shoots up with it. Below is a thin clay parting and then limestone said to be 2 to 5 feet thick, although it has not been penetrated in the mine.

# Analyses of samples of the Blair coal

Laboratory number		Mois- ture	Vola- tile matter	Fixed car- bon	Ash	Sul- phur	B.t.u.
8836	As received	12.21	35.22	41.61	10.96	4.47	11037
	Air dried	4.03	38.50	45.49	11.98	4.89	12065
	Moisture free		40.12	47.40	12.48	5.10	12572
8835	As received	13.90	35.33	41.33	9.44	4.84	11015
	Air dried	4.02	39.38	46.07	10.53	5.40	12279
	Moisture free		41.03	48.00	10.97	5.63	12793

If these two samples are approximately representative of the average quality of the Blair coal its heating value is intermediate among the coals of Illinois. The coal sampled has a slightly higher heating value than the Herrin coal in the southwestern portion of the State, which has a B.t.u. value determined by averaging the analyses of 76 samples from 25 mines of 10847

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Ill. Coop. Mining Investigations Bull.11, p.41., 1915

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but a lower heating value than the Herrin coal of Franklin and Williamson counties which averages 11825 B.t.u. for 58 samples from 16 mines. Its heating value is more than 1000 B.t.u. lower

than the average B.t.u. value of No. 5 coal in Saline County as determined from analyses of 27 samples from 7 mines.

The Blair coal is high in moisture and ash content as compared with other Illinois coals but it is probably not greatly different in this respect from the No.6 coal in this region. From the analyses it appears that the Blair coal is very similar to the No.6 coal in southwestern Illinois, which is its natural competitor, but that it is inferior to the Murphysboro No.2 coal of Jackson County the No.6 coal of Franklin and Williamson counties and the No.5 coal of Saline County

# Herrin (No.6) coal

Herrin coal appears to be generally present in these quadrangles east of its outcrop and to be of uniform character and thickness. Only a small part of the Baldwin quadrangle is underlain by this bed, and it is absent in about one-half of the southwest quarter of the Coulterville quadrangle in an area lying south of Sparta and west of Percy. Where present the coal is generally of workable, <sup>thickness,</sup> thin coal being reported in only one of the several diamond drill holes in the area.

The physical character of the coal, including its thickness, its floor, its roof, and its subdivisions are described in detail under the heading "Stratigraphy". The following detailed descriptions of the coal and adjacent strata in <sup>three representative mines</sup> ~~several~~ of the mines in the area will furnish in addition some information concerning the mining conditions encountered. The detailed measurements of the coal bed and adjacent strata that will be presented have been collected during the past several years by members of the U.S. Geological and State Geological surveys and of the Illinois Cooperative Mining Investigations. Sections are included from mines now abandoned and several of the sections are reproduced

graphically in fig.

Description of mining conditions in Crystal mine  
of the Madison Coal Corporation at Tilden, Illinois

Herrin coal in this mine varies from 5 1/2 to 6 1/2 feet in thickness, averaging 6 feet. The coal lies in distinct benches separated by clay or pyrite partings several of which are fairly persistent. Pyrite is present in several fairly continuous plates or sheets rarely more than 1/4 inch thick. One of these lies about 5 inches above the "blue band" another below the top bench of coal and a third, less persistent about 10 inches lower. The amount of impurity present does not seriously affect the quality of the coal.

The roof over about one-half the mine is limestone, the cap-rock lying directly upon the coal, the lower ~~into~~ 3 inches in places being rather shelly and forming a slow draw slate. In other places the cap-rock appears to be solid down to the coal. About one-fourth of the mine has a black sheety shale roof which reaches a thickness of 3 to 4 feet. It is noteworthy that the coal is 3 to 4 inches thicker beneath the shale than it is elsewhere in the mine. Very locally the black

shale contains "white top" which appears to be nothing more than certain layers of the black shale which upon exposure become coated with a whitish or bluish film. It is said to be impossible to hold this "white top" but no especial difference was observed between the black shale and the "white top" in this respect. At places in the mine either a lens of impure argillaceous earthy limestone wedges in between the coal and the cap-rock or the cap-rock itself becomes earthy and impure. Such roof is very difficult to hold and will cave to heights 10 to 12 feet above the coal. This massive earthy rock is the chief source of difficulty in this and adjacent mines. However, the very favorable mining conditions under the solid limestone cap-rock which is commonly present probably more than off-set the difficulties occasioned by the weak rock roof.

The floor clay has no unusual characteristics.

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Description of mining conditions in the mine  
of the Moffat Coal Co., Sparta, Illinois

The coal in this mine has an average thickness of 6 feet, varying from ~~5 feet 5 inches~~ to 6 1/2 feet. The bed is divided into several benches by thin layers of clay or pyrite. Of these the blue band and the "steel" band are the most ~~persisent~~. The blue band lies at its usual position about 9 to 12 inches above the floor. The "steel band" is a thin layer of ~~pyrite~~ pyrite and clay below the top coal about 1 foot below the top of the bed. It is commonly 1/4 to 1/2 inch thick. Another fairly persistent layer of pyrite occurs 4 to 6 inches above the blue band. The impurities in the coal are not in sufficient amount to seriously damage the quality.

"white top"

The roof rock is either black sheety shale or limestone, the latter rarely being more than 4 feet above the coal. The black shale is the usual laminated carbonaceous shale of the region. Generally a "clod" or soft clay lies between the limestone and the coal, or the limestone and the black shale. This is a very carbonaceous calcareous clay which ~~slakes~~ slakes on contact with the air, but is hard when fresh. It resembles draw "slate"

to some extent, and varies up to about 1 foot in thickness, averaging about 4 inches. When The black shale and "clod" fall in more commonly along entries running north and south than along those running east and west. This is generally characteristic of southern Illinois mines.

The limestone cap-rock is said to be about 35 feet thick, the lower bench being about 6 feet in thickness. This is a dark gray limestone mottled with spots of lighter color in which the amount of lime is probably greater. In places the limestone lies directly upon the coal with no parting between. The limestone is crossed by cracks or "slips" which weakens it so that parts of it occasionally fall out.

The "white top" is a dark gray shale not so well laminated as the black shale, and contains a few small brachiopods. It generally occurs as a lens lying between the coal and the black shale or limestone, and is rather hard to hold especially along entries driven north or south.

The coal <sup>is reported to</sup> commonly varies in thickness and quality with the character of the roof ~~according to the management~~. It is generally 2 to 3 inches ~~lower~~ thinner under the black shale

than under the "white top" and about 6 inches thinner under the limestone than under the black shale. The coal under the limestone is reported to be less pure than under the other two varieties of rock.

The floor clay is dark gray in color, and contains some sand, and also calcareous boulders. The floor heaves badly especially in places where the limestone roof rock is weak.

#### Description of mining conditions in mine No. 6

Willis Coal & Mining Co., at Percy, Illinois

The coal in this mine has an very uniform thickness of about 6 feet 3 inches. The division into benches characteristic of the coal farther northwest is not so evident here, except that the top, middle, and bottom benches are readily recognizable. The blue band is as persistent as usual. Between and about 15 inches from the top of the bed the top and middle benches there is commonly a pyrite parting 1/8 to 1/4 inch in thickness. A second pyrite parting is fairly persistent about 15 inches farther down. The other partings commonly present in the coal at Sparta and Coulterville

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are not recognized.

The roof rock is either <sup>"white top"</sup> ~~clad~~ or black sheety shale, with limestone in places within 1 inch of the top of the coal. The "clod" ~~is~~ rather loose clay shale which lacks coherence and generally falls when exposed. The black shale is of the usual character, a dark gray to black carbonaceous sheety shale. The "white top" is gray soapstone with very little tenacity and supporting power. This material apparently lies in lenses in slight hollows in the coal and beneath the black shale. The black shale is believed to continue over it in all places where it was observed. Commonly along the margin of the lense of white top there are "slips" which continue down into the coal, so that the latter may be off-set as much as a foot. The "white- top" is also usually crossed by nearly vertical fracture ~~lines~~ planes or "slips" so that it is very hard to hold. ~~A much larger percent of the mine~~ Only a small part of the mine has white top roof, in general roof conditions are very satisfactory.

The floor clay is about 4 feet thick and is underlain by limestone.

Herrin  
There follow several ~~measured~~ sections of the coal  
as measured in mines in Coulterville quadrangle. Graphic re-  
production of some of these sections is presented in fig.

## Section in the mine of the Johnson Coal Co., near Marissa

	Ft.	in	Ft.	in
Slate -----	8		8	
Coal -----	1	4	9	4
Mother coal 1/8 th inche ot 1/2 inch ----		1/4	9	4 1/4
Coal -----	1	2	10	6 1/4
Mother coal 1/8 thin to 1/4 inch -----		1/4	11	6 1/2
Coal -----	1	2	11	8 1/2
Sulphur 1/4 incho to 1/2 inch -----		1/2	11	9
Coal -----	1	6	13	3
Blue band -----		1	13	4
Coal -----	1	6	14	10
Black jack ( 0 to 1 inch ) -----		1	14	11
Coal -----		9	15	8
Fire clay -----	+			

# Section in the mine of the Borders Coal Co., near Marissa

In the straight south air course about 1700 feet

from the shaft

Total

	Ft.	in	Ft.	in
Roof shale -----				
Coal -----	1	4	1	4
Sulphur -----		$\frac{1}{4}$	1	$4 \frac{1}{4}$
Coal -----	1	$7 \frac{1}{2}$	2	$11 \frac{3}{4}$
Sulphur -----		$1 \frac{1}{8}$	2	$11 \frac{7}{8}$
Coal -----	1	$10 \frac{1}{2}$	4	$10 \frac{3}{8}$
<del>Sulphur</del> -----		$1 \frac{1}{8}$	4	$10 \frac{1}{2}$
Coal -----		3	5	$1 \frac{1}{2}$
Blue band -----		1	5	$2 \frac{1}{2}$
Coal -----	1	8	6	$10 \frac{1}{2}$

## Section in mine No.6 of the Willis Coal and Mining Co.,

near Percy

Room 16 off the 1st south of the  
main east entry

	Ft.	in	Ft.	in
Black shale -----	2		2	
Coal -----	1	2 $\frac{1}{2}$	3	2 $\frac{1}{2}$
Sulphur and coal -----		3/8	3	2 7/8
Coal -----	1		2	2 7/8
Clay and shale -----		$\frac{1}{2}$	4	3 3/8
Coal -----		6	4	9 3/8
Mother coal -----		1/8	4	9 $\frac{1}{2}$
Coal -----		7	5	4 $\frac{1}{2}$
Sulphur -----		1/8	5	4 5/8
Coal -----		5 $\frac{1}{2}$	5	10 1/8
Mothr coal -----		1/8	5	10 $\frac{1}{4}$
Sulphur -----		1/8	5	10 3/8
Coal -----		11 $\frac{1}{2}$	6	9 7/8
Parting -----		1/8	6	10
Coal -----		4	7	2
Blue band -----		1	7	3
Coal -----	1	4 $\frac{1}{2}$	8	7 $\frac{1}{2}$
Fire clay -----	2		10	7 $\frac{1}{2}$

Section 3 - Entry face, 8th west off main south entry  
2000 feet from the shaft

	Ft.	in.	Ft.	in.
Coal bright -----	1	$\frac{1}{2}$	1	$\frac{1}{2}$
Sulphur streak -----		$\frac{3}{8}$	1	$\frac{7}{8}$
Coal bright -----	11		1	11 $\frac{7}{8}$
Mother coal -----		$\frac{3}{4}$	2	$\frac{5}{8}$
Coal bright -----	4	$\frac{1}{2}$	2	5 $\frac{1}{8}$
Sulphur streak -----		$\frac{1}{4}$	2	5 $\frac{3}{8}$
Coal, bright -----	2	2	4	7 $\frac{3}{8}$
Sulphur streak -----		$\frac{3}{4}$	4	7 $\frac{5}{8}$
Coal, bright -----		4	4	11 $\frac{5}{8}$
Blue band -----		$\frac{3}{4}$	5	0 $\frac{3}{8}$
Coal, bright -----	2	$\frac{1}{2}$	5	2 $\frac{7}{8}$
Blue band -----		$\frac{1}{2}$	5	3 $\frac{3}{8}$
Coal bright -----	5		5	8 $\frac{3}{8}$

# Sections in the mine of the Moffat Coal Co., near Sparta

## Section 1 - Room 4 off the 3rd south entry off the 4th west off the south entry

	Ft.	in	Ft.	in.
"White top" shale -----				
Shale carbonaceous -----				
Coal, top -----	1	2	1	2
Coal, middle bench with carbon- aceous shale and mother coal bands and a little sulphur -----	3	9	4	11
Blue band -----		1	5	
Coal, bottom bench -----		10	5	10

## Section 2 - Entry face off the 4th east off main south entry, 2900 feet from shaft

Slate -----				
Coal, bright -----	1	3	1	3
Sulphur -----		3/8	1	3 3/8
Coal, bright -----	1	11 1/2	3	2 7/8
Mother coal -----		1	3	3 7/8
Coal, bright -----	1	4	4	7 7/8
Sulphur streak -----		3/8	4	8 1/4
Coal, bright -----		4	5	0 1/4
Blue band -----		5/4	5	1
Coal, bright -----		11	6	
Fire clay -----				

Section in the mine of the Boyd Coal and Coke Co.  
near Sparta

Main north 600 feet from the main west entry

	Ft.	in.	Ft.	in.
Coal with trace of sulphur		5 5/8		5 5/8
Dirt band -----		1/4		5 7/8
Coal -----	6	6		11 7/8
Sulphur -----		1/8	1	
Coal -----		1/2	1	1/2
Bone and sulphur -----		3/8	1	7/8
Coal -----		10 6/8	1	11 5/8
Binder -----		3/8	2	
Coal -----	1	9 3/4	3	9 3/4
Blue band -----		1 1/4	3	11
Coal -----		11 5/8	4	10 5/8

Section in the Crystal mine of the Dessemer Washed  
Coal Co., near Tilden

Face of the 16th west entry, room 16, 6th west  
off main south

	Ft.	in	Ft.	in.
Soapstone ("white top") ----				
Slate -----		3		3
Coal -----	1	5	1	8
Sulphur -----		1/16	1	8 1/16
Coal -----	2	2 1/8	3	10 9/16
Dirt -----		3/8	3	10 15/16
Coal -----		1	3	11 15/16
Sulphur -----		1/16	4	
Coal -----	1	4	5	4
Blue band -----		7/8	5	4 7/8
Coal -----	1	1	6	5 7/8

## Section in the mine of the Johnson Allen Coal Co.

Room 1 off the 3rd east entry off the

main southentry

	Thickness		Depth	
	Ft.	in.	Ft.	in.
Shale -----				
Coal -----		8 $\frac{1}{4}$	8 $\frac{1}{4}$	8 $\frac{1}{4}$
Sulphur -----		3/16	8	7/16
Coal -----	1	4 $\frac{1}{8}$	2	0 15/16
Parting, dirt -----		$\frac{1}{4}$	2	1 3/16
Coal -----	1	1	3	2 3/16
Coal, bony -----		$\frac{3}{4}$	3	2 15/16
Coal -----	1	1	4	3 15/16
Sulphur -----		$\frac{1}{8}$	4	4 7/16
Coal -----		8	5	7/16
Blue band -----		1 $\frac{1}{4}$	5	1 11/16
Coal -----		8	5	9 11/16
Clay, soft				

Section in mine of the St. Louis-Coulterville Coal Co.,

Second east entry on north entry, 550 feet from shaft

	Thickness		Depth	
	Ft.	in.	Ft.	in.
Limestone -----	+			
Slate, black ----- 1 in to 4 feet --	4		4	
Coal -----		11	4	11
Sulphur ----- $1/8$ in to $1/2$ inch -		$1/8$	4	$11\frac{1}{8}$
Coal -----	4	6	9	$5\frac{1}{2}$
Blueband ----- $1/2$ inch to 2 inches		2	9	$7\frac{1}{2}$
Coal -----	1	6	11	$1\frac{1}{2}$
Fireclay ----- - 3 to 6 feet -----	6		17	$1\frac{1}{2}$

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The chemical character of Herrin (No.6) coal in this area is shown by the accompanying analyses. made under the direction of Prof. S.W.Parr in the laboratory of the University of Illinois from samples collected at the face in 2 mines in Randolph County and Perry Counties

Copy analyses of samples  
from Moffat Coal Co Randolph(0908)  
and Eden Coal Co Randolph(0908a)

~~The coal in this area~~ The coal in this area is very similar to the average character of the <sup>Herrin</sup> coal in southwestern Illinois from ~~Madison County~~ Macoupin County on the northwest to ~~the~~ Pinckneyville in central Perry County on the east. The coal has a lower heating value than Herrin coal in the Franklin and Williamson counties field, ~~where the~~ or the Harrisburg Coal of Saline County, or the Muprhysboro coal of Jackson County. It has about the same rank as the ~~No.5 coal of the~~ Harrisburg (No.5) coal of the Springfield and Peoria regions, and is of slightly better quality than the La Salle coal of the Longwall District and the coal of the Rock Island region.

The ash, moisture, and sulphur contents have about the same relative relation to the same values for other coals in the State as does the heating value.

#### Coals above Merrin coal

A coal which is probably No. 7 of the Illinois section is said to have been worked a little a one time southeast of Cutler in the NE. 1/4 sec. 3, T. 6 S., R. 4 W. The coal is reported to be about 3 feet thick, but it could not be seen. No exposure of coal of workable thickness corresponding to this bed has been discovered, and drill records do not in any case report coal of commercial thickness above Merrin coal in this area.

Oil and gas  
*Development + decline*

The strata underlying the Baldwin and Coulterville quadrangles have been penetrated in a number of places to depths of 800 to 1200 feet in prospecting for oil and gas. No important supplies of oil have yet been found, but a number of gas wells in the vicinity of Sparta furnished gas for several years beginning in June 1888. Producing wells continued to be drilled in until at least as late as January 1894, 22 wells having been drilled by August of that year. Drilling ceased shortly after 1894, and

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Report of Illinois Board of World's Fair Commissioners 1893 p.  
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the production of gas which in 1889 amounted to 120 million cu.ft. gradually dwindled until it became practically negligible sometime before 1906.

A second period of development began in 1906 when small quantities of oil were found in several wells north east of Sparta. Sixteen wells were drilled up to the latter part of 1908. Of these

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Blatchley, R.S. Oil resources of Illinois, Ill. State Geol. Survey, Bull. No. 16, p. 147, 1910

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only six yielded oil, and only two gave commercial quantities. By 1914 these wells had been entirely abandoned. During 1916 two additional wells were drilled in which oil is said to have been found but not in paying quantities.

Other drilling in the area but outside of the Sparta field took place for the most part between 1906 and 1910 while the Sparta field was being explored. There were possibly a half-dozen holes put down south and southeast of Sparta at this time. Between 1910 and 1912 five holes were drilled east of Marissa in an area where the structure was interpreted as anticlinal on the basis of a single profile along the line of the Illinois Central Railroad.

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Blatchley, R.S., Oil and gas resources of Illinois: Ill. State Geol. Survey, Bull. 16, pp. 110 and 168, 1910

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Some of the holes near Marissa gave off a little gas but the yield of none of the wells in the quadrangles except those in the Sparta field was of commercial quantity.

#### Oil bearing strata

The oil and gas sands of the Baldwin Coulterville quadrangles are apparently within the Ruma or Paint Creek formations, the same beds being productive at Carlyle and Centralia. The most

reliable record available for the area is that of the Kiskaddon well drilled on the Bremen anticline a short distance south of the Coulterville quadrangle in sec.23 T.6 S.,R.6 W. Drill cuttings

from this well were examined by Dr.Stuart Weller and correlations

determined therefrom. Using this record, <sup>as a basis for comparison</sup> it is possible with fair

satisfaction to correlate <sup>the larger masses of</sup> strata described in the records of other

1 wells in the area. It is rarely possible, however, <sup>because of the unsatisfactory character of the drilling records</sup> to correlate

oil or gas bearing sands, which are commonly thin, possibly lentic-

ular and seem in places to be limestone and in other places sand-

<sup>As a result</sup> stone, ~~Because of impossibility of making exact correlations of~~

~~smaller divisions of strata~~ structural relationships ~~are not~~ cannot be determined with the accuracy that is desirable.

~~definitely determinable the general relationships, however, the and uncertainty exists as to~~

~~for the area as a whole and in the more carefully drilled and~~

~~Sparta and Mariassa fields can be roughly approximated~~

<sup>However</sup> ~~it is believed~~ 1 The interpretations advanced are as accurate as

can be hoped for under the circumstances, and concern mainly the

conditions in the better drilled fields at Sparta and Marissa.

Oil and gas sands  
at Sparta

The oil and gas sands in the Sparta area are found between 820 and 925 feet below the surface. In only one well was oil or gas found below a depth of 900 feet and in only one other was the gas sand at a depth less than 850 feet. The identification of the gas sand in this well is open to to doubt as the sand was dry. The interval between No.6 coal and the oil and gas sands varies from 695 to 790 feet but seems to increase fairly consistently toward the northeast. The following table shows the variation in this interval assuming in one case that the first coal encountered is No.6 coal and in the second case that the first thick coal is No.6 coal.

Insert table

Table            Interval between oil and gas sands and  
                 No.6 coal in Sparta field.

Table Interval between the gas sand  
*at Sparta*  
and No.6 coal in the ~~Sparta~~ region

Name and number of well	Upper coal to gas sand	Upper or lower sand	First thick coal to gas sand	Depth to Gas Sand		
	Feet		Feet			
Sparta 1	726	upper	x 726	845		370 475
Sparta 2	762	upper	x 715	822		368 474
Sparta 3	735*	? lower	730	885		362 523
Sparta 5	765*	lower	728	894	430	464
Sparta 8	722	upper	x 692	845	380	465
McClurkin (Sec 7)	719	upper?	<del>665</del> 705	843		
Foster 1	744*	lower	744	890	375	415
McIlroy 1	711	upper?	711	864	(897 oil)	529
McMillan, A.B.	697	upper?	697	823		
McMillan T.	717	upper?	717	855		
Wilson	704	"	704	800	890	
Clendenin	704	"	704	825		
Preston	790*	lower	690	870		
Lyons 1	714	upper	714	880		
Lyons 2	724	upper	724	875		
McIlroy (1916)	777*	lower	733	890	(903 oil)	
Collins	752	lower?	752	890		
McClurkin (Depot)	745*	lower?	<del>745</del> 725 695	869	371	498

(765)

As pointed out by Blatchley the upper limestone of

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Ill.State Geol.Survey Bull 16 p.153 1910

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the Chester group is of special importance in determining the structure and stratigraphy of the field. This limestone it is believed belongs to the Clore formation and is recorded very consistently in most of the logs and lies below the massive Pottsville sandstone. It is ge generally found between 370 and 400 feet below the surface but in one record is noted at a depth of only 340 feet, <sup>(McIlroy 1)</sup> and in another well (McIlroy 1916) is either absent or ~~recorded~~ recorded as shale. In a few records there is a little shale between between the limestone and Pottsville sandstone which probably belongs with the Clore. The depth to the Mississippian rocks (the base of the sandstone) in the various holes and the interval to No.6 coal is shown in the following table

Table                      Depth to the top of the Mississippian  
series and the interval to No.6 coal

Name and number of well	Depth to to of Mississippian <i>to Gas Sand</i>	Interval to upper coal (No.6 ?)	Interval to first thick coal (No.6 ?)
Sparta 1	370      475	246	246
Sparta 2	368      474	305 ←	261
Sparta 3	362      523	251	207
Sparta 5	430      464	258	201
Sparta 8	380      465	256	233
McClurkin (Depot)	371      498	247	195
Foster 1	375      515	229	229
McIlroy 1	335      529	183	183

In spection of the foregoing tables and of the graphic reproduction of the records shown in fig. ~~I believe clearly~~ indicate that there are at least two productive horizons. One of these lies above the main red rock or PaintCreek formation and the other below it. The first gas wells were apparently received ~~the~~ their supply from the upper gas productive horizon above the red beds from a sandy limestone overlying a black shale in the Ruma formation. The oil wells to the northeast, however, although sunk to about the same vertical depth were at a lower surface altitude and consequently penetrated the red beds of the Paintcreek formation and found oil in one or two sands in this formation or in the ~~the Ruma formation~~

## Structure in the Sparta field

An interpretation of the structure of the Sparta field assuming a continuous "oil and gas" sand is probably not correct and such an interpretation will differ considerably from that determined from the position of the Herrin (No.6) coal. However, even the use of Herrin coal as a basis for the structure map is not altogether satisfactory because of the impossibility of definite correlation of the coal in the records.

Drillers state that there are four coals present in the Sparta region, Herrin (No.6) coal, Blair coal, about 20 feet below No.6, a coal about 40 feet lower and one at a depth of about 240 feet or 125 to 150 feet below No.6. This opinion is apparently based upon the record of Sparta gas well No.8, which

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Report of Illinois Board of World's Fair Commissioners  
1893, p.186

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according to Nickles is the most reliable of the five available records of the first set of wells. None of the other records of wells drilled at that time or since agree with this distribution of the coals so that the actual succession is doubtful. The special source of difficulty in correlation is a thin coal

9)

which is apparently present in some of the holes 40 to 50 feet above Herrin coal. The existence of such a coal is known from outcrop in an area east of Percy in secs.2,3, and 11 Southwestern Township (T.6 S.,R.4 W.) This coal has not been noted in outcrop near Sparta, but is reported to have been encountered in sinking the shaft of the abandoned mine at Eden in the NE.1/4 sec.8, Sparta Township (T.5 S.,R.5 W.) The interval between the two coals in this shaft is 34 ft.8 in. Inspection of the drill records of the Sparta field indicates that the upper coal was penetrated in some of the holes, in others had probably been eroded, the drift resting upon rocks lying below the horizon of the thin coal. In a few records it is apparently is reported as between 5 and 6 feet thick and hence regarded as No.6. Examination of the graphic sections shown in Plate will show some of these relationships.

In view of the uncertainty in regard to the correlation of the coals it is practically impossible to draw a structure map based upon the altitude of No.6 coal that is not open to serious criticism. It should be pointed out, however, that one or two good diamond drill ~~holes reaching to No.6 coal from the~~ holes put down in the NE.1/4 sec. 6 Sparta Township (T.5 S.,R.5 W.) would probably

clear up much of the uncertainty in regard to the structure of the field and permit a definition interpretation of conditions.

Willis Coal and Mining Co., through the courtesy of their Superintendent Mr. Jeremiah has recently furnished the Survey with levels showing the ~~steep~~ in their mine No. 7 at Sparta ( NW. 1/4 sec. 8 T. 5 S., R. 5 W.) This data is incorporated in the accompanying map (fig. ) It indicates that the coal in this part of the Sparta ~~district~~ field dips irregularly toward the ~~center~~ <sup>the middle of the north line of</sup> of sec. 5 and rises irregularly toward the southwest and also toward the west. ~~The dips vary from about 35 to 45 feet per miles in the area being mined.~~

Two coals either or neither or which may be Herrin coal were penetrated in the ~~Preseton~~ <sup>Preston</sup> well (NW. 1/4 NW. 1/4 sec. 5) one a foot thick at a depth of about 80 feet and another 5 feet thick at a depth of 180 feet. The altitude of the upper coal is 394 feet and of the lower 294. It will be noted that the altitude of the coal at the end of the north entry mine No. 7 is 333 feet. It seems probable that the drilled <sup>of the Preston well</sup> passed through No. 6 coal without noting it in the record. and that it lies between the two coals mentioned. Likewise in the Collins' well (SE 1/4 NE. 1/4 sec. 5) ~~coal is~~ the No. 6 coal is reported to have been penetrated at an altitude of 380

feet, or ~~228 feet~~ 128 feet from the surface. The altitude of the coal at the end of the ~~entry~~ mine entry of No.7 mine ending in ~~the~~ near the center of sec.5 is about 320 feet and the coal is dipping rather sharply to the east. That the Herrin coal is 60 feet higher at the Collins well than at the end of this entry seems improbable so that here ~~also~~ the upper thin coal 40 to 50 feet above No.6 has been confused with the No.6. If this is the case the altitude of No.6 is probably ~~about~~ not more than 330 feet. ~~above~~

~~Taken by themselves the record of the McClurkin well and of~~  
the Sparta gas well <sup>(S)</sup> No.3 seem to indicate that No.6 coal lies at an altitude of about 410 feet, which is

The structure of the Herrin (No.6) coal in the Sparta field as shown in fig. is based upon what seems to be the most natural interpretation of the structure so that the slopes of the coal is fairly uniform throughout. ~~The coal appears to have the form of~~ the structural form seems to be that of a trough the open end of which extends northeast toward Coulterville. The trough terminates as the coal rises <sup>with fairly even slope</sup> rather ~~evenly~~ <sup>uniformly</sup> to the outcrop. <sup>of the coal synclinal and therefore</sup> The structure is not suggestive of such as would suggest such as would under usual conditions be considered favorable for oil or gas accumulation. <sup>The cause</sup> The ~~reason~~ for accumulation at

in  
of gas ~~at~~ this particaular ~~seems to be~~ area seems to involve either  
the character of the ~~oil~~ gas bearing stratum which apparently was  
of varying ~~possibility~~ porosity ~~in~~ even in the producing area, ~~and also~~  
or the ~~height~~ <sup>level</sup> of the salt water. or ~~beether~~ both these factors. It

~~does~~ The salt water apparently <sup>underlies</sup> ~~underlay~~ the gas bearing stratum  
<sup>of the Tennesse formation</sup>  
1 so that it is possible that gas and a little oil accumulated

above the ~~waters~~ salt water which did not completely fill the  
productive beds in the Coulterville trough. On the other hand  
the oil and gas may be of very lowal origin distilled from the  
black shale near which it is reported to be found and entrapped  
in ~~pre~~ ~~pepees~~ occasional porous layers or lenses. The unfortunate  
inaccuracy of the drilling records in the Sparta region and of the  
information concerning the position of the water in the wells  
permits only <sup>o</sup>speculative interpretation of conditions. The

~~fact; however; that the field is practically completely tested~~

The interest in the field, however, is largely historical as the  
~~separate~~ ~~strata~~ ~~have~~ ~~testing of~~ the holes which have been  
drilled have probably thoroughly tested the strata, and it is  
very doubtful whether additional drilling would be proiftable.

part of the  
The only area where drilling has not attempted so far as is know  
is in the north half sec. 1 T.5 S., R.6 W., and the NW.1/4 sec.6

in the adjacent township. Unproductive gas wells border the edge of this undrilled area. so that probability of oil is so that it does not on the south.

#### Oil and gas sands at Marissas and Coulterville

The drilling at Marissa entered what appears to be the Ruma-Paint Creek-Renault succession at depths of 660 to 690 feet. No.6 coal in the area drilled lies at a depth of about an altitude of 325 to 350 feet the coal being found in the wells at about 100 feet. The succession of the A little gas was found in the strata of the Chester group at Marissa but not in paying quantities. The Mississippian "Big Lime" at Marissa as shown by the record of the Kunze well in the SW 1/4 SW 1/4 sec.21 Marissa Township (T.3 S., R.6 W) northwest of Marissa and beyond the edge of the Baldwin quadrangle lies at a depth of between 800 and 900 feet probably at 905 feet.

The well on the Stevenson farm 1 1/2 mile southwest of Tilden (Sec 7 T.4 S., R.5 W.) entered the Ruma formation at about 800 feet or 670 feet below No.6 coal the massive limestone of the lower Mississippian (the "Big lime" of drillers) was reached

100

at a depth of 1020 or possibly 1092 feet. This well was not productive.

The well at Coulterville penetrated to a depth of 1120 feet and found Pennsylvanian strata apparently to a depth of 850 feet. The record shows about 250 feet of sandstone between 550 and 850 feet and it is not improbable that some of the Chester limestones of the Chester group were erroneously reported as sandstone. ~~The red bed~~ Several beds of red shale are reported to have been penetrated in this well at about the same <sup>distance</sup> ~~interval~~ below ~~N. 70°~~ Herrin coal ~~as~~ that they were at Sparta, so that it is probable that the structure of the Mississippian and Pennsylvanian rocks is not very different at least within the ~~Coulter~~ Coulterville quadrangle.

#### Bremen anticline

The Bremen anticline involves Chester strata but is not known to

The Bremen anticline lies in secs 22 and 23 Bremen Township (T. 6 S., R. 6 W.) the axis bearing N. 70° E.

According to Weller the rocks involved in the anticline are of the Chester group and the base of the Pennsylvanian series. This deformation lies from 1/2 mile to 1 mile south of the Coulterville quadrangle and so far as could be discovered does not extend onto this area. No features of the structure near Percy indicate unusual deformation.

## Water supply

As in much of southern Illinois the water supply ~~for~~  
~~domestic purposes~~ comes either from cisterns, shallow wells or  
 ponds. Drinking water is commonly obtained from cisterns. Sparta  
 has recently constructed a large reservoir about 1 mile south of  
 town, and <sup>supplying water</sup> reservoirs for railroad use ~~are also~~ are located at  
~~Sparta~~ Sparta and Coulterville. Except Sparta none of the towns  
 have city water service.

### ~~Deep wells supplying potable water~~

Farm wells more than 50 feet in depth are the  
 exception. ~~These~~ and are more common in the ~~northwest~~ northeast  
 quarter of the Coulterville quadrangle than in other parts of the  
 area. Very few ~~wells~~ farm wells are more than 100 feet deep.

Most of the wells more than 25 feet deep are in rock,  
 ending in sandstone more commonly than in any other material.  
 The heavy sandstone outcropping along Mud Creek northeast of  
 Coulterville is apparently somewhat water bearing back from the  
 streams.

Deep wells that penetrate several hundred feet of strata  
 are scattered over the quadrangles. The Sparta ice plant has used

water from one of the abandoned gas wells the supply apparently coming from the ~~the~~ ~~of basal Pottsville~~ Palestine sandstone at a depth of 360 to 466 feet.

This seems to be a fairly persistent fresh water sandstone in ~~this~~ the Sparta region, ~~several of the records~~ fresh water with artesian head being reported in the Foster, McClurkin, McIlroy, Preston and in some of the old gas wells.

A deep well drilled for water ~~at Marissa the~~ by Meek Milling Co at Marissa ~~obtains salt water~~ found brackish water in a sandstone, probably Pottsville, at 248 to 262 feet. Salt water and a show of ~~oil~~ oil was found ~~at~~ in a sandstone between 608 and 631 feet.

In the southern part of Coulterville quadrangle there is a heavy sandstone about 300 feet thick apparently the base of the Pennsylvanian series and about "200 feet below No.6 coal that carries fresh water. ~~This yields~~ Wells ~~in this~~ reaching this sandstone are found at Percy and Steelville and also at Willisville a short distance south of the Coulterville quadrangle. The yield in some of these wells is as much as 280 gallons per minute.

~~It is probable that the Pottsville sandstone in the Percy region and the Chester sandstone in the Sparta region carrying fresh water~~

List of rock and coal outcrops,  
data and information on coal mines,  
oil and gas wells, in the City of Sparta,  
and vicinity.....

Compiled by { J. E. Hood,  
W. B. Goddard,  
Sparta, Illinois.

*For M. M. Leighton, Chief-  
State Geological Department.*

## SPARTA.

In the summer of 1888, and for several years thereafter, some twenty gas wells were drilled within the city limits of Sparta, Randolph County, Illinois, twelve of which were good producing gas wells; one or two put on a steam gage showed 400 lbs. pressure; the best producing wells were located near the junction of the Missouri-Illinois R.R. tracks and South Market St., then owned by M. McClurken and W.R. Borders; Well No. 1, drilled on Lot 6 Block 10 A.M. Neill's addition at corner of Broadway and Walnut Sts. now owned by W.F. Clendenin; two wells drilled in the Presbyterian Church yard, one of which showed considerable oil, and others showed some oil; all about the same depth, 880 ft. The first well was brought in in June 1888 and sufficient gas was produced to furnish the city with gas for lighting, heating, and manufacturing purposes for eight or nine years.

One well owned by the Eagle Milling Co. still furnishes gas for lighting purposes in their mill, out of a two inch pipe, and the well has not been cleaned out since it was drilled, about 1890. The Sparta Plow Works well also showed gas up to a few years ago when the accumulation of oil and mud stopped the flow of gas.

In 1907, J.J. Hoblitzell & Son, of Meyersdale, Pa., the firm which opened up the Casey and Westfield pools in Illinois several years previous, came to Sparta, and Mr. Hoblitzell had a chemical analysis or test made of the oil found in the Presbyterian Church yard well, and from this test they decided to drill for oil in Sparta territory. Their first well was drilled on the John C. Foster farm in Sec. 31, 4-5, near the NE corner of Sparta city limits; and oil was found at 890 ft., 12 ft. sand, total depth 948; well was shot and reported that shot ruined the well; reported a 5 bbl. well after shot which Hoblitzell claimed was too heavy a shot; Hoblitzells then drilled No. 2 Foster on the hilltop about 500 ft. east of No. 1 which was along the creek; No. 2. come in a 100 bbl. well the first 24 hours (as told to me by the Hoblitzells, confidentially); other drillers and operators in the field told me they estimated it at from 60 to 100 bbls.; Foster No. 3 was drilled near the orchard about 700 ft. north of No. 2 and was a dry well. Hoblitzells then drilled a well on the John Lyons farm in the SE 1/4 of SE 1/4 Sec. 30-4-5, which was dry, but a good depth of sand. They then drilled on the Thomas Patterson farm in NW-NW Sec. 25-4-6, and got a dry well. Hoblitzells also drilled two holes on the R.J. Craig farm in SW-SW Sec. 32-4-5, No. 1 being a 900 ft. test, and a small show of oil and shot and tubed; No. 2 drilled 1070 ft., the last 100 ft. being in lime and not through lime then when abandoned; it was a crooked hole, the tools being lost and drilled around them. Hoblitzells also drilled on the James France ten acres in SE-NE Sec. 6-5-5, good show sand; small well, probably 5 bbl.s. Mr. Hoblitzell told me the Sparta sand was the best sand he had seen outside of Pennsylvania. Soon after drilling the Craig well, Mr. J.J. Hoblitzell died, and the family did not care to continue the oil business and they sold their Sparta interests and leases to the Sparta-St. Louis Oil Co. (Weigelt-Taggart and others) who continued to pump the wells. In the meantime other wells had been drilled on the Josiah McIlroy farm (66 acres) in NE-NE Sec. 6-5-5; by the Sparta-St. Louis Oil Co.; No. 1. was a small well; broken sand, hard, streaked. No. 2. encountered a good sand 15 ft. thick, showed up nice, seemed to hurt it when shot; No. 3 broken sand, about 1/2 bbl., shot and tubed; No. 4 encountered good sand 14 ft. thick, 12 ft. pay, made 125 bbls. and over first 24 hours; No. 5, west of No. 4, dry hole. Several tankcars of oil was shipped from the Foster and McIlroy wells, 16 in number, I am told.

## District

- (9.) In 1922 W.O. Harrison drilled another small well, about 5 bbls., on the J. McIlroy farm for successors to Sparta-St. Louis Oil Co.
- (9.) In 1923, W.O. Harrison drilled another small well, about 5 bbls., on the J.C. Foster farm, in NE corner, for local company.
- (9.) On Wm. Preston farm, 17 acre tract, in SE-SE Sec. 6, 5-5, Sullivan-Schrier drilled well-small show oil-puff gas-depth about 900 ft.; No. 2 west of No. 1 dry.
- (9.) In about 1917 or 1918, Walsh-Duncan drilled on Wm. Preston farm a 1350 ft. well; small show oil, at usual depth; drilled deeper into salt water at 1350; (in NW-SW, Sec. 5-5-5, near barn.)
- (9.) A.B. McMillan well (Zahniser) near line SE-NW, and NE-SE Sec. 7, 5-5, 40 ft. oil and gas sand, little gas, right under it a little break and then a little sand with little oil; shot; quit at 1002 ft., no water, considered about 2 bbls.
- (9.) Wm. Schlimme well, drilled near center of Sec. 20-5-5, oil sand at 872 ft. (5 ft.) break- 5 ft. gas sand; water; finished at 903 ft.; W.O. Harrison reports from memory; 872 ft. struck oil sand, 5 ft; 20 ft. slate, puff gas, salt water; finished at 903 ft.
- (10) Fred'k. Schuette well, drilled near center of Sec. 35, 5-5, 5 ft. dry gas sand quite a ways below water sand just above lime; supposed drilled about 900 to 1000 ft.
- (9.) Wm. Clendenin well, SE-NE, Sec. 14, 5-6, good brown sand, at about 900 ft., show of oil.
- (9.) H.W. Grenslet well, SW-SW, Sec. 18, 5-5, first vein coal thin, second vein 6 ft. at about 200 ft., dry well; do not know depth.
- (9.) Mathew McClurken well, gas, drilled in year 1906 or 1907, by W.O. Harrison and John Sullivan, a good show of gas was found at 880 ft. depth, in the woods near his home in SE-SW, Sec. 6-5-5.
- (9) Depths of coal in McIlroy-Foster wells.  
McIlroy, Sec. 6-5-5, 122-126 (4 ft.); 159-165 (6 ft.); 182-186 (4 ft.); and 247-252 (5 ft.)  
Foster-No. 1 (Hoblitzell) Coal No. 6 found at 140-146 (6 ft.) Coal No. 4 at 200-205 (5 ft.)  
Foster (local company) well Coal 138-144 (6 ft.) 174-181 (7 ft.) 195-197 (2 ft.) 245-251 (6 ft.) this well being about 1/4 mile NE of Hoblitzell No. 1.  
Oil sand depths-McIlroy-St. L. Sparta Oil Co. 893-909.  
Foster (local company) well, drilled in 1923, oil sand, 925-935.  
Foster-Hoblitzell No. 1, drilled in 1907, oil sand, 890-902; all these wells about same depth coal, and oil sand, and had a good rock roof over the coal, except the thin vein of 2 ft. (third vein) on Foster, and the third vein of 4 ft. on McIlroy.  
E.H. McGuire well, E-1/2 SE 1/4, Sec. 26-4-6, good sand, small show oil,
- (1.) In Sec. 28 (near the middle of section) 4-5, Buffalo N.Y. interests are drilling a well; coal encountered 125-131 (6 ft.), 175 thin vein; 245-252 (7 ft.) reported; well still drilling, at 954, the last 60 ft. being lime formations.
- (12.) J.W. Wright well, NW-NW, Sec. 35, 5-6, small show oil, at about 900 ft., good sand, 25 ft. thick.
- (3.) Despain well, now W.A. McHatton, near center of Sec. 32-4-6, thin vein of coal about 60 ft., 28 or 29 inches vein at about 160 ft., oil sand, smell oil. at about 600 ft., drilled to 960 ft.; driller's called it "Mississippi" lime, big lime, grey; 2 days going only a few feet.
- (No. 8)-Central- Two wells drilled on J.F. Hammel farm, N-1/2 SW 1/4, Sec. 11-5-7, reported struck oil sand, small show oil, thin sand, smell oil, 600 ft.
- (No. 12)-Blair- D.M. Hawthorne well, Sec. 11-953 struck oil sand, 12 ft., then strong flow salt water at bottom of sand; said to be small oil well; no coal encountered.

(Logs of the Wm. Winkelman well in Sec. 23-6-6; the D.M. Hawthorne well in Sec. 11-6-6; the Hoblitzell No. 1, Foster, in Sec. 31-4-5; the Hotze-Harrison (local company) Foster; the Buffalo (Hyset-Busch) on M. Dickey farm in Sec. 28-4-5; the Sparta-St. Louis (McIlroy) in Sec. 6-5-5; and other wells, were sent to your department by W.B. Goddard some time ago.

The Moffat Coal Co. and Willis Coal Co. have made numerous coal tests (drill holes) in the vicinity of their mines.

Moffat Coal Co. mine located in SE-NW, Sec. 8-5-5, and tests made south and southwest.

Willis Coal Co. mine located NE-NW, Sec. 8-5-5, and tests made mostly north and NW of mine, some south.

Illinois Fuel Coal Co. mine No. 4, NE-NW-Sec. 16-5-5, coal rises north from shaft into E-1/2 SW 1/4 Sec. 9, half mile from shaft.

Illinois Fuel Co. own old abandoned mine (Randolph Coal & Coke Co.) Sec. 21-5-5, NE-NE, at shaft 20 ft. to coal; farther up hill 60 ft. to coal; coal outcrops in the creek east.

Sec. 16-5-5, NE 1/4; coal outcrops in the creek on G. Bannister lands.

Sec. 21-5-5, SE-NE, on E. Rosborough lands, T.A. Brown drift coal mine.

Sec. 35-4-6, E 1/2 NE 1/4, John T. Wilson farm, a core test drilled for coal; coal found at 80 ft., 60 to 65 inches thick, good rock roof,

Wieckhorst and Ziegenhein farm, 3/4 miles E of Wilson test coal found 142 ft. and deeper, NW-NE Sec. 36-4-6.

Sec. 35-4-6, SW-NE, Wood farm, 1/4 mile W. of J.T. Wilson farm, the coal outcrops in the creek; years ago old mine operated.

Sec. 25, 4-6, NE-NE (E.B. McGuire farm) rock outcrops; sandstone.

Reported small coal outcrop; also rock outcrop; near the surface; on E.B. Finley farm in NE-NE-Sec. 27-4-6.

Coal core tests made by Willis Coal Co. on W.M. Beattie 40 acres, NW-NE Sec. 26-4-6, and on Wm. Brenning farm in E 1/2 SW 1/4 Sec. 23-4-6,

Sec. 33-4-5, On T.B. Stephenson farm, near Beattie creek, sandstone outcrop.

(1.) COULTERVILLE. Coal mines at Coulterville 300 ft. to coal.

Deep well drilled near Union station at Coulterville, log in Coal Resources VII (Bulletin 11)

Rock outcrops on farms, W.J. Lemon, Wm. Liehweg, and F. Gibson in Sec. 1-5-5 and D.I. Outten (NE-SW) Sec. 2-5-5.

Sec. 28-4-5, (SE-SE) rock outcrop in creek, G.A. Smith farm.

(2.) TILDEN. Tilden Mines- West Mine- Crystal Mine. Coal boring test 1/2 mile N of Tilden, coal encountered at 150 ft., reported.

(3.) BALDWIN. Reported coal outcrops on A. Muench farm, NE-NE Sec. 21-4-7, 1-1/2 miles W. of Baldwin, on road west, then turn south, coal outcrops near surface. Sec. 4-4-6, rock outcrop, E-1/2, A. Smiley farm, near county line. On James Redpath farm in Sec. 19-4-6 (SW-NE) drilled for coal years ago, 18 in. coal found at about 100 ft., and 30 in. coal found at about 120 ft.; drilled 182 ft. all together and hole plugged; churn drill part of way and part shaft; lime over coal; south of house and R.R. tracks.

Rock outcrops (lime) on John Schmoll farm SE cor. Sec. 21-4-7; Mrs. E. Becker along creek (SW-SE); Cox's Ford, S.W. Cor. Sec. 21-4-7; Sec. 16-4-7, Mrs. E. Becker farm, south M. & O R.R. water tank in creek, also northeast of tank in creek, rock outcrops. In E 1/2 Sec. 6-5-7, along river, lime outcrops (Borders) dipping west. In SW-SW Sec. 2-5-7, W.A. Glore, on road across creek, lime outcrop.

(9) SPARTA- The Wilson Coal Mine in Sec. 1-5-6, is 116 ft. to coal; in old shaft it is 96 ft., 2500 ft. apart; in a cave in near creek in part of the old workings one can walk into the mine, 10 ft. to coal from surface. Old rock quarry on W.R. Borders lands, S 1/2 SE 1/4, Sec. 2-5-6. The Boyle Coal Mine shaft in NW 1/4 Sec. 1-5-6, is 102 ft. to coal. The McKelvey-Lemon Mine shaft in SW 1/4 Sec. 36-4-6, is 142 ft. to coal; good rock roof; coal and rock dip to east; in airshaft sandstone is 8 ft. thick while at the mine it is but 18 inches thick; 250 ft. distant; 900 ft. farther west outcrop shaly rock, sandstone or weathered shale. On A.M. Barker farm, in NW 1/4 Sec. 2-5-6, small coal mine, shaft 50 ft. to coal. Sec. 35-4-6, NE-NW, there is a drift mine, Edgar place, now owned by Phillip Smith, 16 ft. to coal, 10 ft. entry; dip to SE; coal and rock. Sec. 9-5-6, S 1/2 and NE 1/4 Sec. 9-5-6, on Henry L. Rozier farm, coal and rock outcrops, north and south of road, and in creek. Sec. 35-4-6, SE-NW, along creek, coal outcrops, Wood place, no rock over coal; old mine years ago. Sec. 24-5-6, NW-NW, reported coal outcrops in creek, east of Union Church. Sec. 15-5-6, SE-SE (W.A. Wiley farm) rock outcrops in creek, north of road, and in N 1/2 of SE 1/2 Sec. 22 along creek, old sandstone quarry. Sec. 22-5-6, NE-SE, old coal mine (Roberts) 18 ft. to coal; along creek coal outcrops (W.E. McDill farm). Sec. 18-5-6, NW-SW, near line between H.W. Grenslet and Wm. Armour farms, lime outcrop, old quarry. Also outcrops SE-SE Sec. 13-5-6, Pettigrew & Zang, and NE-NE Sec. 13 on Geo. Chambers, rock outcrops. Sec. 18-5-5, SW-SW, H.W. Grenslet reports that in oil well drilled on his farm about 1908 a small vein coal, first vein, but at 200 ft. good vein 6 ft.

(8) CENTRAL Sec. 32-SW-NE-(5-6) Geo. Kranz, rock outcrop in creek near road. Sec. 29-5-6, SW-SE (Jno. Eggemeyer, where road crosses creek, rock outcrop. Sec. 22-5-6, NE-SE, (W.E. McDill) coal outcrops; also old coal mine along creek. Sec. 15-5-6, SE-SE, W.A. Wiley, outcrop rock in creek, N. of road, also NE-NE Sec. 22 along creek, old rock quarry, sandstone. Sec. 16, 5-6, Mine No. 3, Illinois Fuel Co., abandoned, on M-I- R.R., depth to coal 40 ft., DECIDED DIP OF COAL TO SE. Sec. 17-5-6, SW-SW, old coal mine, J.T. Weir, coal about 40 ft., slanting roof, Weir claims churn drill was used to drill to a depth of 142 ft. where another vein of coal was found. Sec. 18-5-6, NE-SE, J.G. Beattie, coal mine, 30 ft. to coal; (Mr. Hood reports Mr. Culver found fusellina lime in pile of debris removed from this mine.) Sec. 7-5-6, NW-NW, Peter Shape, coal outcrops, reported six feet depth. Sec. 8-5-6, SE-SW, reported coal outcrops, Hy. Falkenhein farm, in creek. Sec. 18-5-6, (near center of section) on Andrew Young 40, coal outcrops. Sec. 9-5-6, SW-SW, NW 1/4, Old Dan Gerlach Mine in creek, Wm. Wolf lands. Sec. 12-5-7, SE-SW, & Sec. 13-5-7, NE-NW, extensive sandstone outcrops, on Ben Bleem and Wm. Blind lands. Sec. 12, 5-6, SE 1/4, Herman Diefenbach, reported coal outcrop. Sec. 36-5-6, Chas. Briethaupt, along creek, reported coal outcrops also rock outcrops in SE-SW. Sec. 35, 5-7, SE-SE, along creek on Steve Ederer farm, lime outcrops; also on creek extending into Sec. 2-6-7, NE-NE, lime outcrops. Sec. 26-5-7 (SE-SW) Geo. E. Walter, along creek, and Sec. 35-5-7, NE-NW, Louisa Nitsche, rock outcrops, lime, bluff. Sec. 26-5-7, NW-NW, reported coal outcrops, on Anna Roth farm, and SE-SE Sec. 22. Sec. 30-5-6, near center of section, reported coal outcrop, Will J. Bert. Sec. 11-5-7, N 1/2 SW 1/4, J.F. Hammel farm, oil well drilled about 1908, reported struck oil sand, small show oil, thin sand, at 600 ft. Sec. 11-5-7, NE-NE, along road and in creek lime outcrop, also NW-NW Sec. 12, and SE-SE Sec. 2, lime outcrop (Bambauer) Sec. 2-5-6, SW-SW (W.A. Glore, in creek, along road, lime outcrop.

CENTRAL continued.

Despain well, now W.A. McHatton, near center of section 32-4-6, thin vein of coal at about 60 ft., 28 or 29 inches vein of coal at about 160 ft.; oil sand and smell of oil; at about 600 ft.; drilled to 960 ft. depth; big lime; grey; driller's thought they were in the "Mississippi" lime; two days going a few feet.

Sec. 33-4-6, S 1/2 NE 1/4, Alva Hargis, sandstone rock outcrop.

Sec. 34, 4-6, near center of section, on Robt. L. Merz farm, old coal mine, abandoned, 90 ft. to coal, reported 66 inches thick by Perry Fellers, former owner.

Sec. 27-4-6, NE-NE, Ed. Finley, reported coal and rock outcrops in creek, near surface, 1/4 mile E. of Plum Creek bridge.

6. RUMA. In NW 1/4 Sec.2-5-8, on Louis Leifer farm, old quarry.
17. CHESTER. Chester lime outcrops at Southern Illinois Penitentiary at Menard.
7. EVANSVILLE. Sec.33-5-7(NE-NW) Jane Bowman, rock outcrops; Sec.27-5-7, near center of section, in creek, rock outcrop, L. Nietzsche. In SW 1/4 Sec.7 and W 1/2 Sec.8-5-7, on N. Schulines farm, along Plum Creek, lime outcrops.  
In NE-NW Sec.9-5-7, Ben Wahl farm, rock outcrops (lime) in creek, along road, dipping slightly SW.  
Sec.10-5-7, (SE-SW) J. Rucknagel, rock outcrops on road.  
Sec.10-5-7, (SW corner and NW corner Sec.15, near cemetery, rock outcrops.
14. ELLISGROVE. SE-SE (SE corner Sec.5-6-7, on Spurgeon and H. Rickenberg farms near cemetery, limestone outcrops- cave nearby.  
In SE 1/4 Sec.8-6-7, along creek, Dan Ningler, farm, lime outcrop.  
In SW Corner Sec.16, along creek, and road, on E. Thureau farm, lime outcrops.  
In E part of Sec.3-6-7, on Dr. W. R. MacKenzie farm and J. C. Knott farm, and W 1/2 of Sec.2, along creek, lime outcrops.  
Sec.28-5-7, SE-SW, Bowman 40 acres, lime.  
Sec.26-5-7, SE-SW, Walter- and Nitsche farms- on creek, -lime outcrops.  
In NE 1/4 Sec.15-6-7, on Mrs. M. Zersche farm, lime outcrops along creek.
- (13) PALESTINE- Sec.35-5-7, (S 1/2 SW 1/4) and Sec.2-6-7, (NE 1/4) on Steve Ederer lands, limestone outcrop (supposedly Upp. Miss.)  
Sec.36-6-7, on Marshall and Zang farms, NE 1/4, rock outcrops near road and in creek.
- (11) STEELEVILLE- Sec.29-6-5, SE-SW, along creek, (Rockcastle) huge boulders, chasms, caverns in rock. Outcrops in Sec.33-6-5, near center of section.
- (12) BLAIR- Sec.11-6-6, NE-SE, D. M. Hawthorne, oil well drilled in 1922- depth 965, 12 ft. oil sand, small show oil, 953-965, then strong flow salt water; no coal encountered.  
Henry G. Uchtmann drilled core test for coal on his farm 202 ft., thin vein coal found, (state has log) in SW 1/4 Sec.3-6-6.  
Sec.10, 6-6, NE-SW- and SW-SE, E. Hornberger, west of creek, lime exposed.  
Sec.8-6-6, SW-NE, where road crosses creek, rock outcrops.  
Sec.10, 6-6, SW-NW, in creek, D. Uchtmann, rock outcrops.  
Sec.3-6-6, on H. G. Uchtmann lands, rock outcrops in creek, NW-SW.  
Sec.33, 6-6, in south half, in creek, on Eggemeyer lands, rock outcrops.  
Sec.35, 6-6, NW-NW, John W. Wright farm, oil well drilled about 1908, small show oil, at about 900 ft., good sand, 25 ft. thick.  
In south half of Sec.26-5-6, coal outcrops in creek on the farms of J. G. Fullerton and Harry Clark, exposure on Fullerton near bridge on E. side road and S. side creek.  
Sec.31, -5-6, S 1/2 SE 1/4, G. O. Diskey, reported coal outcrop near surface.  
Jones Coal Mine in NW-NW, Sec.35, depth to coal reported 30 ft.  
Mine on E. E. McDill farm, SE corner Sec.27-5-6, 20 ft. to coal, good rock roof virtually rock from surface to coal (Clara Hawthorne McDill farm.)  
J. W. Bixby mine in S part SE-SW, Sec.27-5-6.  
Sec.27-5-6, NE-SE, rock outcrop in creek J. W. Wright farm- also McNulty farm.
- In Jackson County, about three miles due south of Shiloh Hill (Randolph County, near where the road crosses Piney Branch, boulders, chasms, caverns, in the rocks, and stunted pine trees growing (called "The Pines.")
- (10) PERCY- Sec.35-5-5, on Fred'k. Schiette farm, near center of section, oil well drilled about 1908, about 900 ft. 3 ft. oil sand, dry, (smell of oil.)

No. 13 - Palestine Sec. 17-6-6. Remainder in No. 16, Bremen

District Sec. 23-6-6, H. Heitman, SW-SW, heavy sandstone, shale, riffle marked, shore line.

13 Sec. 17-6-6. In NE-SE in creek on Hy. Kloth, lime; exposure lime near Frank Schuenhoff orchard; granite boulders.

Sec. 16-6-6, NE-SW; David Sternberg; lime rock with shale underneath.

(Culver- Upp. Miss.- & Penn. bedded)

Lime exposure at junction two streams (Hy. Massberg farm) SW-SW, Sec. 15, indications of a fault in creek just north of bridge on B. W. Hapke farm. East side bridge shale and lime in open, following ravine to SE., Sec. 16.

12 Sec. 10-6-6, NE-SW & SE-SW, west of creek, particles crushed lime exposed.

Sec. 22-6-6, Ravine E. of Grammel's house-exposures N. side of road.

Sec. 21-Ravine, NW house, exp. rocks, sandy shale, hard fine sandstone 1 ft. Exposure NE flank sandstone 15 in. thick, shale, sandstone thickens down ravine (riffle marks) and continues dipping NW downstream; sandstone about 4 ft. thick, (riffles marked strongly)

Between sections 21-16 & ~~22~~ 15, exposure blue shale in drain, on N flank, & farther E. blue shale outcrops; sandstone farther east.

N. W. Grammel house brown sandstone in deep ravine.

N. E. cove heads up south, exposure sandstone overlying lime farther down the slope, also exposed shale on S. flank of creek.

Sec. 26-6-6 (SW) Houston Oil Co., drilled well - dry, 1000 ft. test,

4 Sec. 30, 6-5, SW-SW shows faulted condition, tilted 50', breaks, broken & twisted; NW-NW strong exposure hard sandstone.

Sec. 22-6-6, Hogreve house on NW Corner of NW-SW; SW dip N. of road on W. bank of creek N of F. Hogreve house; exposure sandstone.

Sec. 24-6-6, S. W. corner on either side ravine, exposed "shore line" same underlying sandstone and shales, In NW-SW exp. shale in drain.

Sec. 23-near SW-NW on W. side Sec. 23, is a 25 ft. exposure almost vertical, which shows soil 10 ft., thin sandstone 5 ft., dark shale 6 inches; and in SE-NW farther up creek blue sticky shale at water edge, sandy sandstone 5 ft., sandy shale 15 ft., dip to S.

Kiskaddon well in Sec. 23, Wm. Winkleman farm, (log attached to this list.)

Sec. 23- Exposure in bed branch due E. of Heitman house, evidence old shore line-thin sandstone, dip to NW; in narrow ravine same vicinity exp. rock.

Sec. 25- Exp. sandstone-quarry; 1/4 mi. SE of center SE-SE; on C. F. Ernstein

Sec. 26-in NE-NW crosses creek, shales, sandstone, and limes, twisted; farther on another exposure near NW corner NW-NE rocks upturned & tilted ends, dip SW (sandstone, shale & lime)

On W. side creek exp. shale at water edge-upturned blue slate almost vertical crossing creek bed on line between Sections 23 & 26, about 1/2 mile S. of Kiskaddon well.

Sec. 27- On E side section exposure in a branch about 1/3 mile N. slightly NW of Bremen Church; and near Schroder house in center SW-NE exp. rock in slight drain. In S 1/2 section steep narrow ravines, little Mary's River, bottoms; SW-SW hard sandstone shore line exposed.

Sec. 28- In a ravine SW of L. Lindner house sandstone exposed.

In a ravine in Sections 27 and 28 sides almost vertical-20 to 30 ft. high; 1/4 mile E. local upheaval ble shales and steep vertical drop on E. side creek; farther upstream exposed ledge lime was found; 10 ft. thick-2 ft. thickness shales-on S line SE 1/4 Sec. 27-towards head of ravine near line between sections 27-34.

Sec. 34- Exposure lime; NE branch; farther up branch another exposure lime; over a bed of shales; farther up hill exp. rock; near a narrow rail. bridge crossing ravine where blue shales are exposed with a sandstone over-the above being in E 1/2 of NE 1/4 Sec. 24. At head of a deep ravine in S 1/2 Sec. 34 exp. 4 ft. black slate, over of 4 ft. sandstone.

Sec. 34-NE-NE exposure in drain on Werre lands. Sandstone 5 ft., slate 10 ft. thick.

Sec. 33- A SE branch from main ravine thru Sec. 34 near NW 1/4 thereof, to NW 1/4 of Sec. 33, lime exposure, steep sides, sandstone over lime; farther down drain exp. sandstone 5 ft. thick, over dark blue shales with 2-1/2 ft. thickness between lime and sandstone. Also farther down this same ravine another exposure of 4 ft. black shale dipping under sandstone which is

~~distinct~~  
which is about 5 ft. thick beneath a 10 ft. drop or step in the bed of creek and extends to junction with deep ravine which penetrates Sec. 27.

Sec. 26- N. Bremen church exposure brown sandstone, heavy; in ditch about 25 ft. west is another exp. rock.

Sec. 35- Near SE corner of NW -NW exp. lime (blue) On S line NE-NW, lime. West of road exposure, sandstone, following the flank W. to road.

Sec. 36-SW-NW- exposure lime over blue shale.

Sec. 11-7-6, on Martin Eber's farm, upheaval sandstone and big boulders.

Sec. 22-SW-NE 1/4 NE Schnoeker house, on Heitman farm, exposure in deep ravine; sandstone; farther down ravine another outcrop; and farther down another; a drop-off in structure in same creek (riffle marks) in massive rock 6 ft. thick, underneath is sandstone; On Heitman land below dividing line between Heitman and Hogrefe.

Sec. 27- S of SW corner NW-NW S. Grammel house in main creek exposure "shore line", also exposure close limestone in same creek bottoms.

11 Sec. 19- ~~6-5~~, W. 1/2 NW-SW, in woods, ~~#####~~ exposure rock (*Boedeker*)

Sec. 26- 6-6, center W line NW-NE, exposure rock in creek bed in woods, to west, sandstone & blue shales, covered by about 4 ft. sandstone; also at junction of branch with main creek.

Exposure in ravine near Winkelman line,

Sec. 34-6-6, W side 1/2 of NE, in drain, sand rock exposed, also shale exposed in branch NE Bremen blacksmith shop; another exposure in branch short distance west.; and another farther west in woods.

Near SW corner Sec. 35 & SW corner 34 & SE corner 34 sandstone exposed in drain.

13 Sec. 29-6-6, W 1/2 NE 1/4, exposure crosses road S. John Surman house, (riffle marks) well defined in thin sandstone; other exposures downstream. On road E. near old schoolhouse, ~~#####~~ another exposure sandstone with gray shale bed; and still farther downstream heavy massive sandstone exposed on Fleming place (SE 29 and NE 32)

13 In N 1/2 Sec. 29-up spring branch N of road from bridge, exposure "riffle marks" in heavy sandstone of old shore line; beneath it thin sandstone, and also other exposure sandstone about 18 inches thick (this ravine heads up below barn J.H. Niehaus, in SE-SW Sec. 29)

Sec. 36- Exposure in SW-NW- West of Sickmeyer house, 6 ft. hard sandstone & 6 ft. blue slate; farther down creek a 50 ft. exposure in E ~~#####~~ bank of shale. At a crusher down the creek, lime; farther down creek a drop-off exposed 4 ft. lime over 5 ft. blue slate.

Sec. 26-6-6; in NE-SE-SE exposure "riffle marked" shore line basic rock 6 ft. thick over blue black shale. Another exposure in bed branch at another drop-off in structure having heavy hard sandstone with black shale underneath.

Sec. 21-6-6, NW Corner SW-NE, west side woods 20 ft. S Buckhorn line and NW of Williams Cave. North of this is an exposure in bed of branch.

A short distance up drain exposure limestone (highly fossilized)

West of center of NE-NE, north of above, sandstone exposed thoroughly "riffle marked" as a shore line. Exposure along this creek, waved, shale bedded in twisted lime and sandstone. Another exposure E. road, twisted. Just above bridge W. of road to NW sandy shale & sandstone.

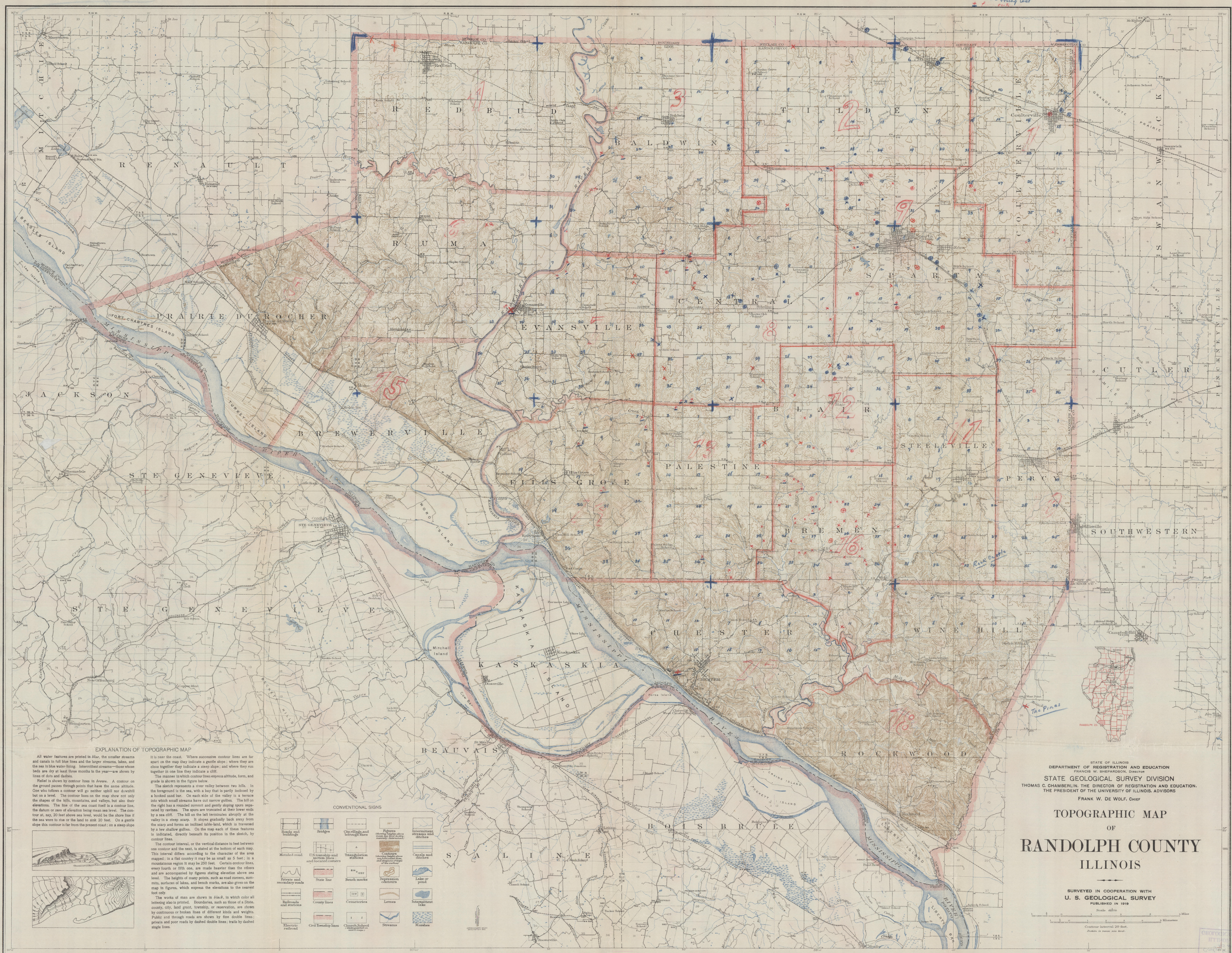
Sec. 15-6-6, (Sternberg) NW corner SE-NW; below bridge in Sec. 16, exposed in bed creek, hard sandstone with blue slate underneath; and farther E. in the Buckhorn ravine the same conditions exist (this exposure being in NE-SE Sec. 16) Farther down stream another exposure on N and S side of creek showed 5 ft. heavy sandstone over 4 ft. of shale; and farther down the creek another exposure of lime.

Sec. ~~24~~ 6-6, N side NE of section, N of Henry Hillerman house, creek bottoms; a number of sink holes occur in area south of creek; lime near surface. Exp. hard red sandstone E. of Hillerman ~~#####~~ barn-with shore line basic rock in open. *504, 51-6-6 + 504, 6, 7-6.*

Sec. 15-6-6, Hy. Maasberg lands, SE 1/4, on creek, near center of section, coal outcrops; also slate and rock.

Sec. 22-6-6, Henry, Hogrefe, NE. of house, near SE corner NE-NW, in woods, heavy

Handwritten notes in red ink at the top right corner of the map.



EXPLANATION OF TOPOGRAPHIC MAP

All water features are printed in blue, the smaller streams and canals in full blue lines and the larger streams, lakes, and the sea in blue water-tint. Intermittent streams—those whose beds are dry at least three months in the year—are shown by lines of dots and dashes.

Relief is shown by contour lines in brown. A contour on the ground passes through points that have the same altitude. One who follows a contour will go neither uphill nor downhill but on a level. The contour lines on the map show not only the shapes of the hills, mountains, and valleys, but also their elevations. The line of the sea coast itself is a contour line, the datum or zero of elevation being mean sea level. The contour at, say, 20 feet above sea level, would be the shore line if the sea were to rise or the land to sink 20 feet. On a gentle slope this contour is far from the present coast; on a steep slope it is near the coast. Where successive contour lines are far apart on the map they indicate a gentle slope; where they are close together they indicate a steep slope; and where they run together in one line they indicate a cliff.

The manner in which contour lines express altitude, form, and grade is shown in the figure below. The sketch represents a river valley between two hills. In the foreground is the sea, with a bay that is partly inclosed by a hooked sand bar. On each side of the valley is a terrace into which small streams have cut narrow gullies. The hill on the right has a rounded summit and gently sloping spurs separated by ravines. The spurs are truncated at their lower ends by a sea cliff. The hill on the left terminates abruptly at the valley in a steep scarp. It slopes gradually back away from the scarp and forms an inclined table-land, which is traversed by a few shallow gullies. On the map each of these features is indicated, directly beneath its position in the sketch, by contour lines.

The contour interval, or the vertical distance in feet between one contour and the next, is stated at the bottom of each map. This interval differs according to the character of the area mapped: in a flat country it may be as small as 5 feet; in a mountainous region it may be 250 feet. Certain contour lines, every fourth or fifth one, are made heavier than the others and are accompanied by figures stating elevation above sea level. The heights of many points, such as road corners, summits, surfaces of lakes, and bench marks, are also given on the map in figures, which express the elevations in the nearest foot only.

The works of man are shown in black, in which color all lettering also is printed. Boundaries, such as those of a State, county, city, land grant, township, or reservation, are shown by continuous or broken lines of different kinds and weights. Public rail through roads are shown by fine double lines; private and poor roads by dashed double lines; trails by dashed single lines.

CONVENTIONAL SIGNS

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DEPARTMENT OF STATE OF ILLINOIS AND EDUCATION  
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THE PRESIDENT OF THE UNIVERSITY OF ILLINOIS, ADVISORS  
FRANK W. DE WOLF, CHIEF

TOPOGRAPHIC MAP  
OF  
RANDOLPH COUNTY  
ILLINOIS

SURVEYED IN COOPERATION WITH  
U. S. GEOLOGICAL SURVEY  
PUBLISHED IN 1916

Scale: 1 inch = 1 mile  
Contours interval 20 feet  
Areas in acres are shaded

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Frank W. De Wolf, Chief

RANDOLPH COUNTY ILLINOIS  
(with H.M.H.)

MINERAL RECORDS  
COAL, OIL, LIME  
ILLINOIS STATE  
GEOLOGICAL SURVEY

(Scale - 1 inch 1 mile.)  
Lime Outcrop

Oilwell  
Rock Outcrop

Coal Mine  
Coal Test  
Coal Outcrop

