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SUBSURFACE GEOLOGY and COAL RESOURCES of the PENNSYLVANIAN SYSTEM

Sangamon, Macon, Menard, and Parts of Christian and Logan Counties, Illinois

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ABSTRACT

Pennsylvanian strata of the northwest shelf area of the deep part of the Illinois Basin, which includes Sangamon, Macon, Menard, and parts of Logan and Christian Counties, were studied to determine structure, stratigraphy, and coal resources.

The general structure and stratigraphy of Pennsylvanian strata are reported, with special emphasis on the interval between the top of the Shoal Creek Limestone Member and the base of the Colchester (No. 2) Coal Member. The more important "key" members are discussed in both local and regional aspect, and structure maps based on the tops of Herrin (No. 6) Coal and Springfield (No. 5) Coal are included.

No. 6 Coal is the most important commercial coal in the southern part of the area, where No. 5 Coal is poorly developed. Conversely, in the northern part of the area, No. 5 Coal is of minable thickness and No. 6 Coal is thin. Between the areas of maximum development of the two coals is an elongate, east-west trending tract of about 450 square miles wherein both coals appear to be 3 or more feet thick.

Limited information concerning the thickness of Chapel (No. 8), Summum (No. 4), and Colchester (No. 2) Coals indicates that they are generally thin but locally may be of minable thickness. More information is required to determine their potential.

The Springfield (No. 5) Coal was mined extensively in the past, but in recent years large-scale mining has been concerned mainly with No. 6 Coal. Available information indicates that reserves of No. 6 and No. 5 Coals are considerably greater than early estimates suggested.

INTRODUCTION

The area of this report includes Sangamon, Macon, and Menard Counties, northern Christian County, and most of Logan County, located on the northwest structural shelf of the deep part of the Illinois Basin (fig. 1). The rock strata in most of the area strike in a general southwest-northeast direction and dip gently toward the southeast.

Investigation of coal reserves has been concerned mainly with Herrin (No. 6) and Springfield (No. 5) Coals, the only two that current information shows with

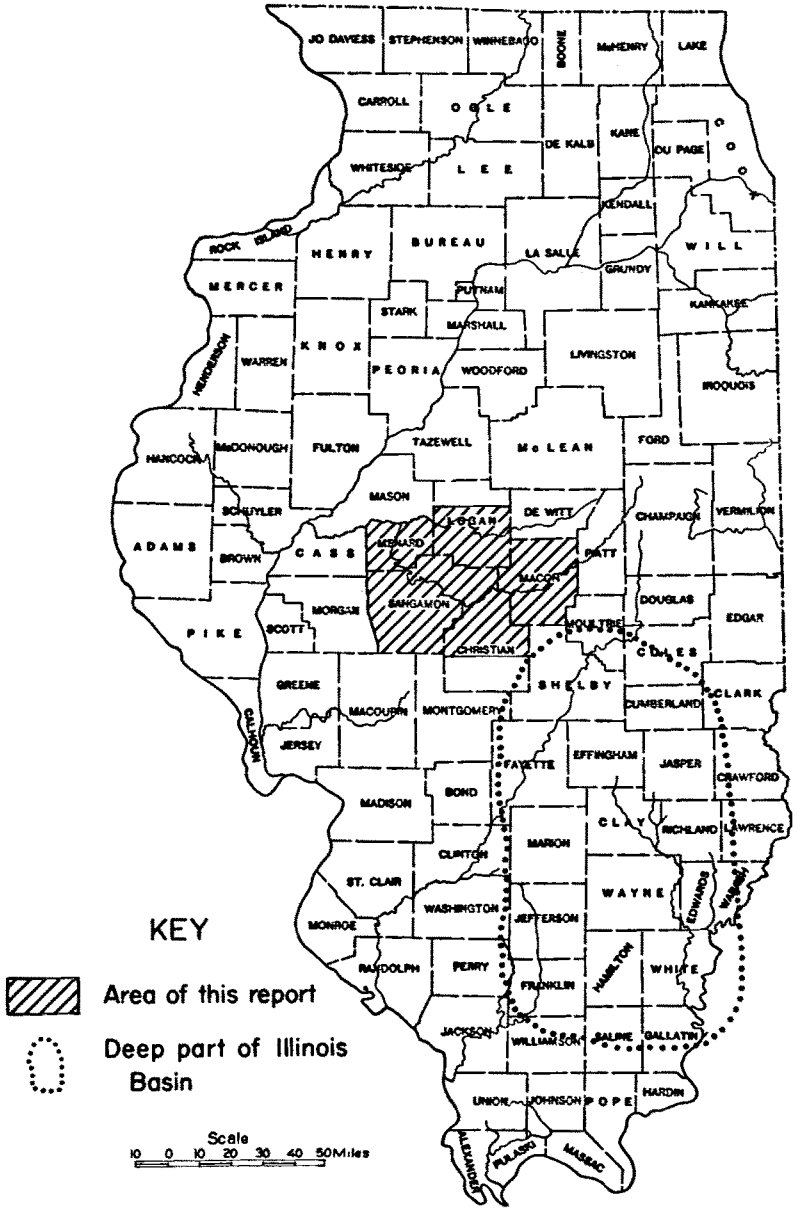


Fig. 1 - Index map showing location of the area covered in this report and its relation to the deep part of the Illinois Basin.

reasonable certainty to have minable thickness over areas large enough to be commercially important at present. Rock strata associated with the coal also have been studied because they are valuable stratigraphic markers in prospect drilling and because a knowledge of them is essential for interpreting structure and stratigraphy.

Information on thickness of coal, its depth, and its areal extent was obtained mostly from mine records, diamond drill coal tests, and electric logs of petroleum test holes. A few sample studies of churn drill coal test holes and petroleum test holes for which no electric logs were available also were used. In subsurface study, coal thickness can be determined accurately only from mine information and diamond drill cores. Electric logs are valuable for determining the depth and areal extent of coal, and their use in this study has permitted a greater degree of accuracy in mapping than was previously possible.

The value of sample study logs depends upon the care exercised in collecting and labeling the drill cuttings and in examining them under the microscope. Several sample studies yielded what was considered to be reasonably accurate information, but many could be used only in a general way and others were so unreliable that they were not used in the final analysis.

Previous investigations that have dealt with various parts of the area, or that have included it within a broader regional study, include those of Shaw and Savage (1913a), Savage (1915), Kay (1915), Cady (1921), Cady and others (1952). The earlier reports have been drawn upon freely in assembling data for the present study.

This report is one of a series of studies of coal reserves published by the Illinois State Geological Survey. A study of Macoupin and parts of adjacent counties north, west, and south of Macoupin County was completed by Payne (1942). Payne and Cady (1944) reported on Montgomery, most of Christian, and parts of Shelby and Fayette Counties. Both of these studies dealt with the southern part of the counties covered in the present report. DuBois (1951) discussed Shelby and Moultrie Counties, which are adjacent to the area of this study. An investigation of strippable coal reserves in the counties immediately west and southwest of those included in this report was completed by Smith (1961).

STRATIGRAPHY

The Pennsylvanian System of rocks in Illinois is divided into three stratigraphic groups: McCormick, Kewanee, and McLeansboro, named from oldest to youngest (Kosanke et al., 1960). The groups are further divided into a total of seven formations, each consisting of several members. Figure 2 is a simplified diagrammatic columnar section showing the members discussed in this study and their relationship to the Pennsylvanian System. Strata above and below the named members shown in the right hand column of figure 2 are present in parts of the area, but discussion is limited to those indicated because they include all the known commercial coals.

Earliest Pennsylvanian sediments in Illinois were laid down over a deeply eroded bedrock surface of pre-Pennsylvanian rocks. The earliest sediments (Caseyville Formation) were deposited only in the deepest part of the Illinois Basin, southeast of the area of this report. However, by or shortly after the end of deposition of the Caseyville rocks, practically the entire Illinois Basin was receiving and retaining sediments. Regional downwarping towards the deep part of the basin took place from time to time throughout Pennsylvanian sedimentation.

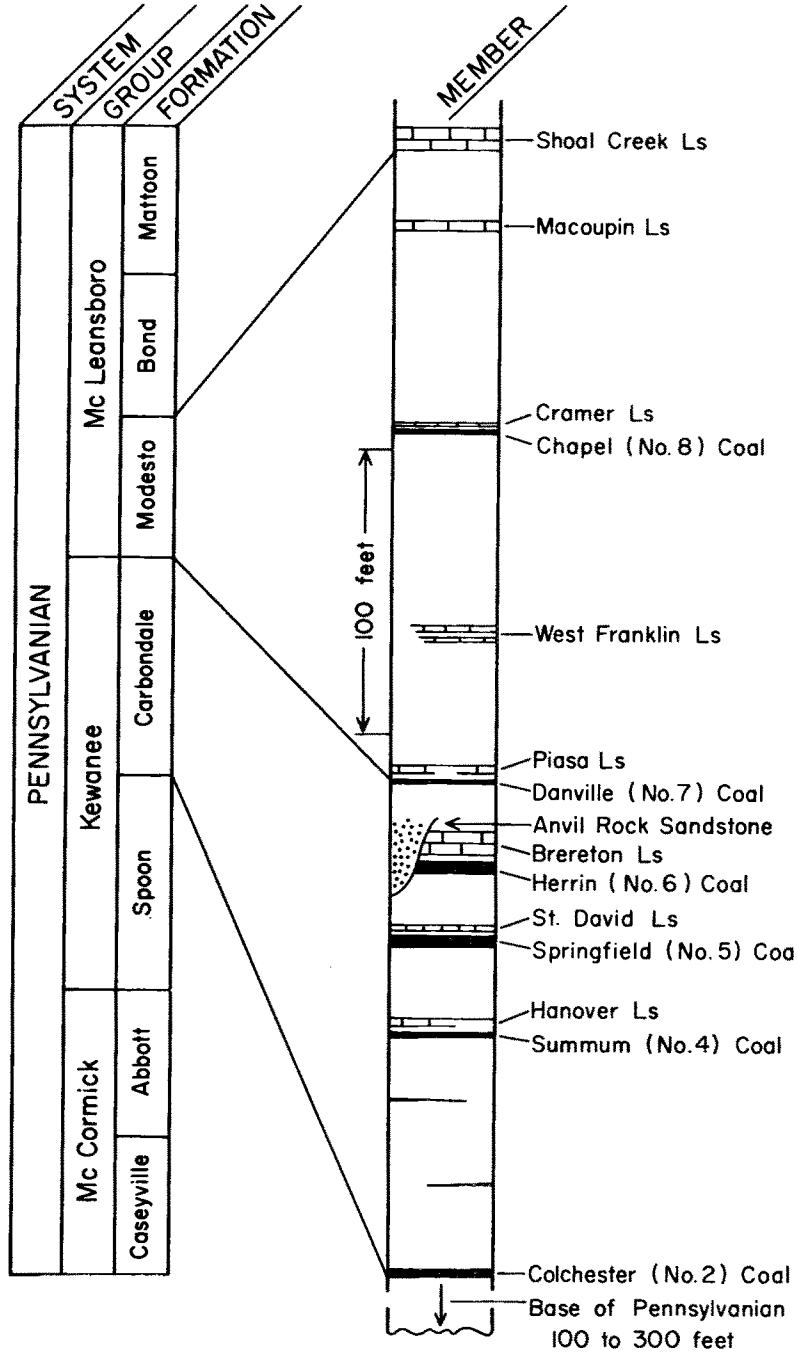


Fig. 2 - Simplified diagram of the stratigraphic section discussed, showing its relation to the Pennsylvanian System of Illinois.

No evidence exists that consolidated rocks younger than Pennsylvanian were ever present in the area. Following Pennsylvanian deposition, a long period of erosion ensued during which some of the higher strata were removed. Still later, additional strata were removed by ice scour and fluvial wash when Pleistocene glacial ice sheets advanced and retreated over the area. Because of the general southeastward dip of the rocks, post-Pennsylvanian erosion left the youngest strata at the bedrock surface in the southeastern part of the area and increasingly older rocks at the surface towards the west and northwest. Final retreat of Pleistocene glaciers left unconsolidated drift blanketing the entire area so that outcrops of Pennsylvanian rocks are now found only in eroded stream valleys and artificial excavations. Figure 3 is a simplified sketch of the structural and stratigraphic conditions that exist today.

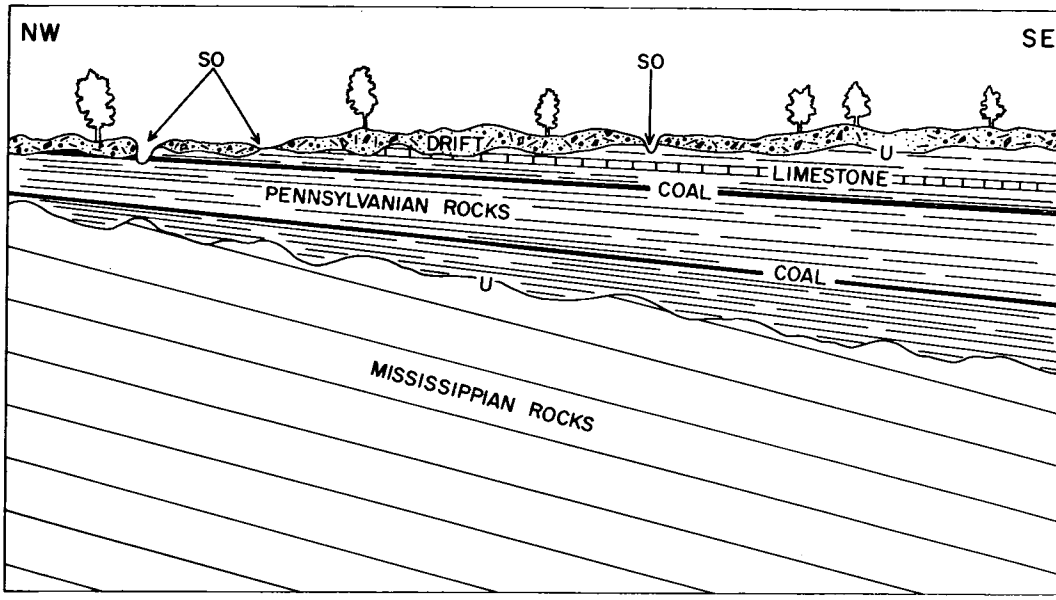


Fig. 3 - Relation of Pennsylvanian strata to underlying Mississippian rocks and overlying Pleistocene unconsolidated drift. Older Pennsylvanian strata rise to bedrock surface towards the northwest. Not drawn to scale. "U" - Erosional unconformities at bottom and top of Pennsylvanian. "SO" - Surface outcrop of Pennsylvanian rocks.

Only the more prominent members (key members) are indicated in the columnar section (fig. 2). Some of the upper key members are absent in the northwest and west, having been removed by post-Pennsylvanian erosion, but to the southeast, strata at least 200 feet above the Shoal Creek Limestone are present. The Shoal Creek Limestone directly underlies the drift in a curved line trending roughly from the southwestern to the northeastern corners of the area.

It should be noted that the vertical interval between key members is not constant throughout the entire area. As a general rule the stratigraphic section thickens and the interval between individual key members increases towards the southeast as additional strata wedge in. An especially noticeable exception to this general trend is the interval between No. 2 and No. 4 Coals. Near Divernon, south of Springfield, this interval is about 60 feet but it increases to as much as 120 feet or more towards the north and northeast as well as towards the southeast.

Westward, the interval tends to decrease. The interval between No. 5 and No. 6 Coals is another exception, ranging locally from 10 feet or less in the extreme southwestern part of the area to 60 feet towards the north and east. The normal interval appears to be about 50 feet between these coals in most of the area where No. 5 Coal is of minable thickness in Logan, Menard, and northern Sangamon Counties.

Stratigraphic key members are useful because they persist laterally over large areas and can be easily recognized in well logs. Many of them, such as Chapel (No. 8), Danville (No. 7), Summum (No. 4), and Colchester (No. 2) Coals, although not known to have significant economic importance in the counties here concerned, are none the less a valuable aid for correlating strata and in interpreting structure and stratigraphy. The higher strata are useful as horizon markers when test drilling is being done for No. 6 and No. 5 Coals. The Shoal Creek Limestone, where present, and the Piasa Limestone, readily recognizable by the variegated clay and shale associated with it, are especially useful in this respect. The position of all coals and other prominent key members should be carefully noted during exploratory drilling.

McLEANSBORO GROUP

Bond Formation

Shoal Creek Limestone Member

The Shoal Creek Limestone, named for Shoal Creek along which it crops out in Clinton County (Worthen, 1868), is present in only approximately the southeastern half of the area of this report. It attains a thickness of about 15 feet and is quarried locally along its outcrop where the glacial drift is thin. The limestone appears to be well developed throughout its area of occurrence and shows up prominently in diamond drill records, mine shaft logs, and electric logs. It lies about 275 feet above No. 6 Coal where that coal is of minable thickness south of Springfield. The interval increases to approximately 325 feet in eastern Christian County. Farther north in eastern Logan and western Macon Counties, the limestone is about 240 feet above No. 6 Coal, and the interval is only slightly more at the east edge of Macon County.

In drill cuttings, the Shoal Creek Limestone is commonly gray to white, sometimes buff, dense, fine- to medium-grained, and fossiliferous. Where it can be observed in unweathered condition in a quarry near Edinburg, southeast of Springfield, it shows the light buff coloring, is quite fossiliferous, hard, and massive. On electric logs, it is almost always recognizable by a single pronounced resistivity peak that generally is well defined at the base.

The Shoal Creek Limestone is the lowest member of the Bond Formation.

Modesto Formation

Chapel (No. 8) Coal Member

The Chapel (No. 8) Coal originally was numbered by Worthen (1868) from exposures in the vicinity of Springfield, and the name "Chapel" was assigned by Kosanke et al. (1960). The coal is rather widespread throughout Illinois but generally is too thin for mining. It is, however, a useful marker for correlation purposes wherever it is present. The Cramer Limestone, a thin, impure but very fossiliferous limestone, is present immediately above the coal at many places.

No. 8 Coal is absent from much of the western and northwestern parts of the area because it has been removed by preglacial and glacial erosion. East of Springfield, however, it is identifiable in almost all electric logs, and usually is recorded in drill records of core drill and churn drill coal test holes. Its stratigraphic position is from about 175 feet to more than 200 feet above Herrin (No. 6) Coal, the interval being thinner in western Sangamon County and gradually increasing eastward toward the deep part of the Illinois Basin.

Before discovery of the deeper and thicker Springfield (No. 5) Coal in the area, No. 8 was the only coal worked around Springfield. The mines were small drifts run in from outcrops along the banks of ravines and steep hill sides. Numerous traces of many of these old workings are still visible along the south bank of the Sangamon River in secs. 5 and 6, T. 16 N., R. 4 W., and others in Ts. 15 and 16 N., R. 5 W.

The thickness of the coal, where it has been measured, varies from less than one foot to as much as 30 inches. Its electric log deflection suggests that in areas farther east it probably is thin over most of the area.

Piasa Limestone Member

The Piasa Limestone, originally named by Culver (1925), is an especially valuable key member in exploratory drilling for No. 6 and No. 5 Coals because it is readily recognized by the variegated red, brown, blue, gray, green, and yellow clay associated with it. It is difficult to define accurately the upper and lower boundaries of the Piasa Limestone on electric logs because of the dampening effect exerted on the normally high resistivity anomaly of limestone by the clay and shale associated with the Piasa.

The Piasa Limestone is about 40 feet above No. 6 Coal near Divernon, where it is found in almost all diamond drill cores. It rises progressively higher in the section towards the east and southeast and is as much as 150 feet above No. 6 Coal in southern Macon County.

Stratigraphically, the Piasa Limestone is the lowest named member of the Modesto Formation, which is, in turn, the lowest formation of the McLeansboro Group.

KEWANEE GROUP

Carbondale Formation

Danville (No. 7) Coal Member

The Danville (No. 7) Coal is the uppermost member of the Carbondale Formation, the higher formation of the Kewanee Group. It receives its name from the city of Danville in Vermilion County where it is well developed and extensively mined. It is minable along the east edge of Illinois south of Vermilion County and extends eastward into western Indiana where it also has been widely mined. The coal also attains minable thickness in northern Illinois and in scattered areas in other parts of the state (Cady and others, 1952).

In the area of this report No. 7 Coal is present a few feet below the Piasa Limestone in all but the eastern part of the area where the Piasa rises in the section. The No. 7 maintains an interval varying from about 20 to 30 feet above No. 6 Coal. No. 7 Coal usually is poorly developed, at some places being so thin that recognition of its position on electric logs is difficult. It frequently is overlooked by

drillers in diamond drill cores, but careful examination will almost always reveal an underclay and commonly a thin coal.

Herrin (No. 6) Coal Member

The Herrin (No. 6) Coal is named from Herrin, Illinois, where it is well developed and extensively mined (Shaw and Savage, 1913b). It is one of the most important commercial coals of Illinois and is present in almost all of the report area.

No. 6 Coal is near the bedrock surface in the northern half of Menard County and has been observed in the bed of the Sangamon River near Petersburg during low water. It probably has been removed from approximately the northern one-third of Menard County by preglacial and glacial erosion. Farther south (T. 13 N.) where the coal is mined in Sangamon and Christian Counties, it is absent in some places, having been removed by post-depositional erosion during Pennsylvanian time. In these localities the position of the coal is occupied by long, linear Pennsylvanian sandstone- and siltstone-filled erosional channels.

No. 6 Coal is one of the two commercially important coals of the area. A thick limestone, the Brereton, usually is present above No. 6 Coal, commonly being separated from it by as much as 20 feet of dark gray or black shale.

Near Divernon, No. 6 Coal has been mined at a depth of 300 to 350 feet. It lies deeper towards the east and has been mined below 450 feet at Taylorville in Christian County. In these areas the coal is from 6 to 8 feet thick.

Northward, No. 6 Coal gradually becomes thinner and generally is thin or absent in central and northern Sangamon County and in Logan and Macon Counties. Where it formerly was mined at Mechanicsburg in Sangamon County, it was reported to be 5 to 6 feet thick, but it thinned to less than 1 foot a short distance north of the shaft bottom. When the thicker Springfield (No. 5) Coal was discovered about 35 feet lower, the shaft was deepened and mining was continued in the lower coal.

Because No. 6 Coal is thin in the north part of the area, it has not always been carefully noted and recorded in drill records. Consequently it can be mapped in only a generalized way. In localities where oil tests have been drilled, the position of No. 6 Coal can be readily identified on most electric logs, but unfortunately there are very few electric log records of drilling in the northern part of the area. The Brereton Limestone also thins northward with the No. 6 Coal.

Figure 4 shows the areas where No. 6 Coal has been mined and where available information indicates that it is thick enough for mining. More exploration must be done before the full limit of minable No. 6 Coal can be accurately delineated, but available information suggests that large reserves still remain. As No. 6 Coal thins northward, Springfield (No. 5) Coal thickens and becomes minable. The zone where the relative thickness of the two coals changes is less well defined along the western boundary of Sangamon County than it is farther east. Reliable information is scant about the region toward the west, and correlations are less accurate than those for areas of closer control.

Sandstone Channels. – Occasional sandstone-filled channels have been encountered in mines working No. 6 Coal in T. 13 N., Rs. 2 and 3 W. These channels, sometimes referred to as "cutouts," developed in Pennsylvanian time when stream erosion removed the coal and the subsequent channels were filled by sandstone and siltstone, which we call the Anvil Rock Sandstone. Known channels in the area are narrow and sinuous, with a maximum width of about a quarter of a mile. They have been traced for distances of 7 or 8 miles.

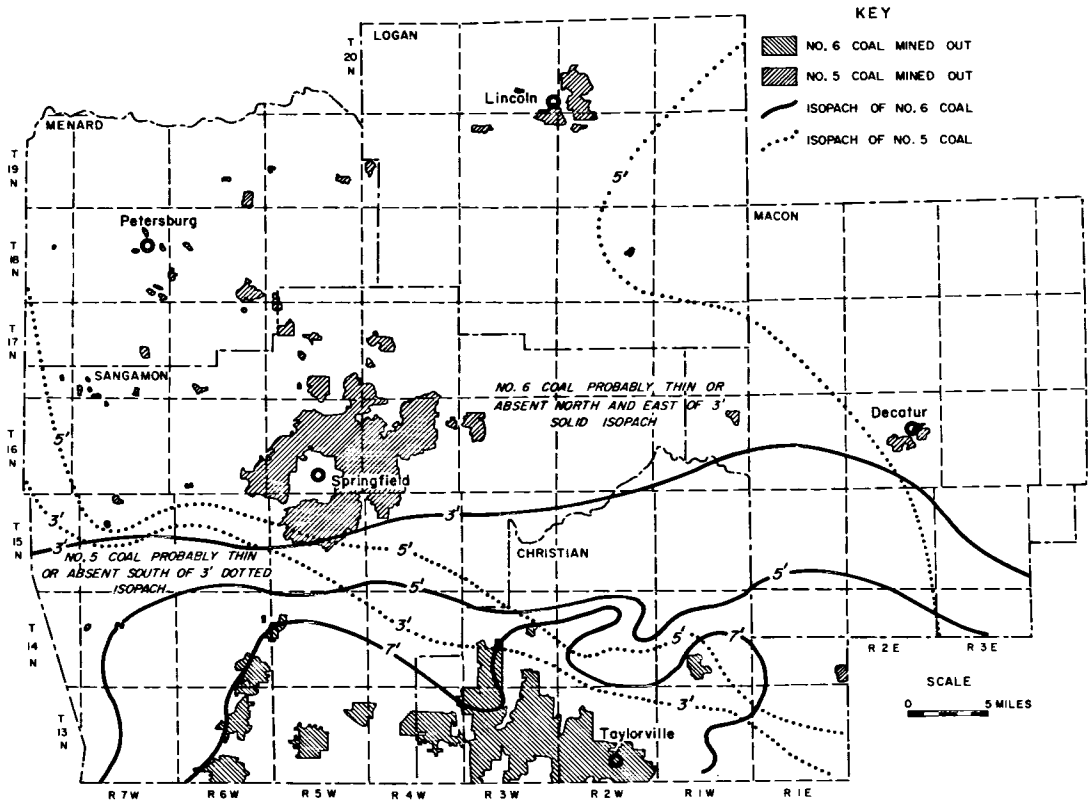


Fig. 4 - Map showing thickness of Herrin (No. 6) and Springfield (No. 5) Coals in report region.

A major channel several miles wide has been mapped in part of Christian County south of T. 13 N. (Payne and Cady, 1944; Potter and Simon, 1961), and the local channels encountered in the area of this report are thought to be tributary to the larger channel. However, none has been traced to an actual junction with the major channel.

Only a few drill records show the Anvil Rock Sandstone at or immediately above the position of No. 6 Coal in Sangamon and Christian Counties. One of these occurrences was in sec. 15, T. 14 N., R. 4 W., Sangamon County, and two were in Christian County, one each in secs. 13 and 34, T. 15 N., R. 1 W. Several other occurrences were suggested in drill records, but the nature of the records was such that no definite conclusion could be reached. Occurrences of the Anvil Rock Sandstone in drill records strongly point to the existence of channels, but the size and direction of trend cannot be determined from isolated locations. All channels and drill holes that definitely show sandstone at the position of No. 6 Coal have been plotted on plate 1.

The stratigraphic position of the Anvil Rock Sandstone is higher than that of No. 6 Coal, but where it fills eroded channels its base may be below No. 6 Coal (fig. 2). Hopkins (1958) has shown that in Illinois the Anvil Rock Sandstone may be present in both channel and sheet phases but that on the shelf area it is present in channels only. In the channel phase the sandstone occupies previously eroded channels, but in the sheet phase the sandstone, with little or no erosion of the underlying strata, appears to have blanketed relatively flat-lying areas between and adjacent to channels.

Channels at many places are cut deeply enough to remove part or all of the No. 6 Coal, sometimes extending downward considerably below the coal. Where they are present a short distance above the coal they may be troublesome to mining because they can serve as aquifers for underground water that may enter the mine. They also cause roof problems at places where they cut down into the normal roof strata.

Because the Anvil Rock Sandstone is in its channel phase in the report area, in exploratory drilling for No. 6 Coal it is important to begin coring far enough above the coal to note whether the sandstone is present. Its presence above the coal may mean that the coal is cut out near by.

Springfield (No. 5) Coal Member

The Springfield (No. 5) Coal, named from exposures in mines near Springfield (Worthen, 1883), is another of the more important coals of Illinois and, like No. 6 Coal, also is of major importance in the Sangamon County area. In southern Illinois it is called the Harrisburg (No. 5) Coal from the city of Harrisburg in Saline County. It is of workable thickness in large areas of southern Illinois east of the DuQuoin Monocline, but seems to be only sporadically present west of the monocline.

No. 5 Coal has been mined more extensively around Springfield than in any other part of the report area, but it also has been worked at other towns in Sangamon County and at various localities in Menard, Logan, and Macon Counties, including Petersburg, Lincoln, Mt. Pulaski, Decatur, and Niantic. Its depth ranges from less than 100 feet at Petersburg to about 200 feet near Middletown in eastern Menard County, and from 260 to 380 feet around Lincoln. At Springfield it is about 200 to 250 feet deep, depending upon surface topography, but becomes gradually more shallow to the west. Greater or lesser depth, of course, may be encountered at these localities because depth at any one place is related to surface elevation. The coal has an average thickness of 5 to 6 feet in Sangamon and Menard Counties, becoming thinner to the south and east. A general outline of the areal extent, mined-out areas, and average thickness of the coal is shown in figure 4. As mentioned, paucity of reliable subsurface information makes it difficult to outline the zone near the west margin of Sangamon County where No. 5 Coal becomes too thin for mining and No. 6 Coal becomes well developed. Plate 2 is a contour structure map based on the top of No. 5 Coal.

A thin limestone (St. David), about 1 foot thick, generally is present a few feet above the coal and is separated from it by a black shale containing hard, calcareous, and pyritic concretions that have been reported in sizes varying from 1 inch to as much as 4 feet in diameter. Where the St. David Limestone is absent, its position may be occupied by a gray shale, sometimes fossiliferous at its base.

Horsebacks. - A conspicuous feature associated with Springfield (No. 5) Coal in Sangamon County and adjacent counties is the presence of clay seams, called "horsebacks" by the miners. These are irregular, steeply dipping to nearly vertical, clay-filled fissures that range from less than an inch to as much as several feet thick and extend into and sometimes through the coal. Fragments of roof shale and coal and sometimes limestone from the overlying rock may be present in the clay filling.

Horsebacks in Springfield (No. 5) Coal in Sangamon County were studied in considerable detail and reported on by Savage (1915) who observed that they extended downward into the coal,as shown by the presence of roof material in the clay,

by the occasional presence of coal fragments carried down below the bottom of the coal strata, and by the absence of coal fragments in the clay filling above the top of the coal He noted that the coal appeared to have yielded laterally to the pressure of the intruded clay mass, as the width of the clay veins was greater in the coal than in the overlying shale. Some fissures were divided into several branches, some of which died out within the coal whereas others extended through the coal and into the underclay. Savage also noted that no true faults with relative displacement of the coal on opposing sides of horsebacks were observed.

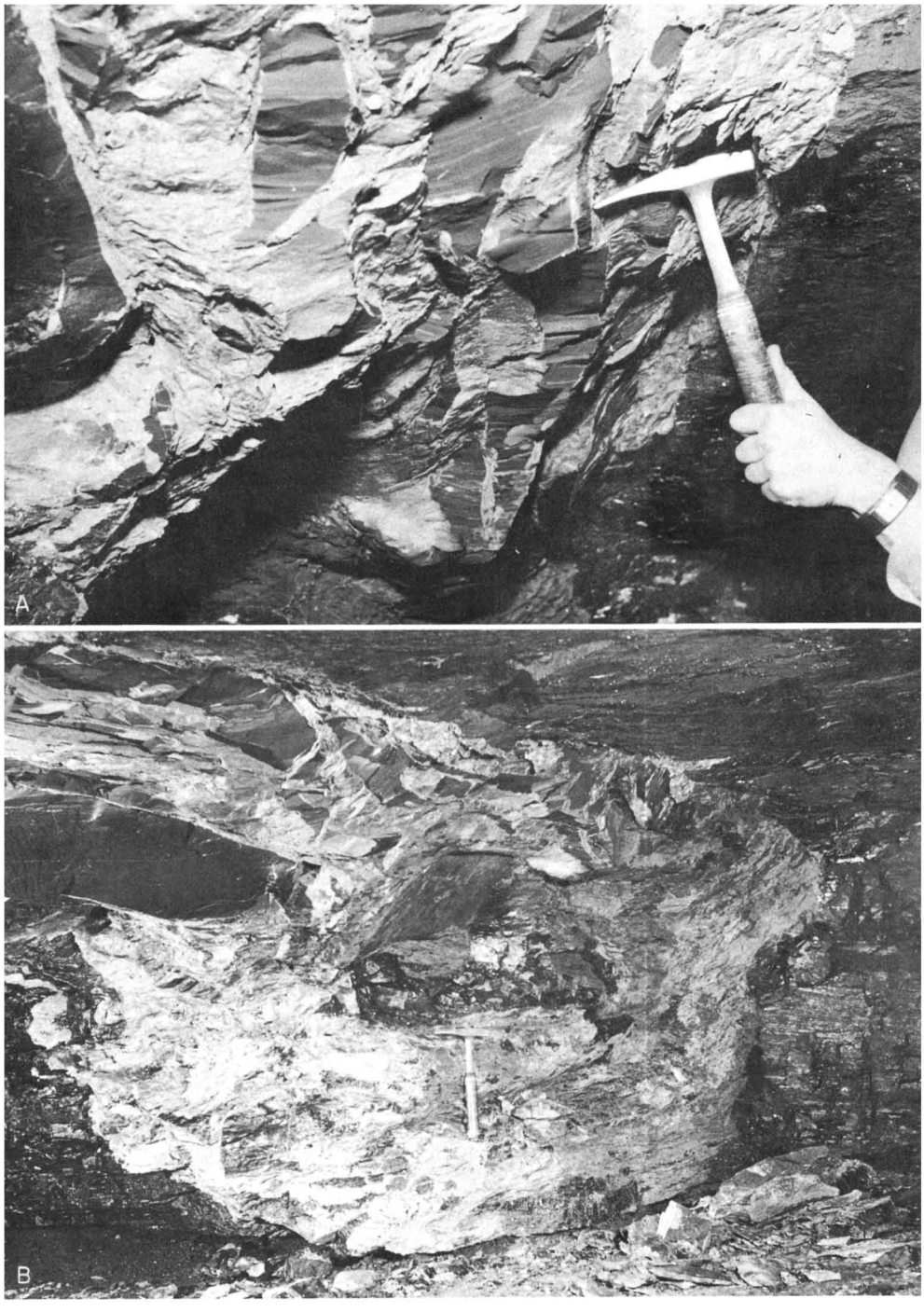
Savage believed that the clay seams resulted from the fracturing of the coal after it had been compressed and consolidated to almost its present state, and that the clay filling came from gray shale overlying the thin limestone caprock. He attributed the squeezing to inequalities of stress in the roof of the coal under its load of overlying rocks. The limestone caprock yielded to the stress by fracturing, and the soft shale immediately above it was then forced downward through the fractured limestone and into the coal.

Cady (1942) described clay-filled cracks that extended more or less vertically into coal in Perry, Fulton, and Grundy Counties. He observed that the cracks ranged from no more than a "knife edge" in width to, uncommonly, as much as a foot, and that they were sometimes only about five to ten feet apart. In some places the material filling the cracks was very sandy. He believed that the features represented cracks formed in the coal before its burial and while it was yet unconsolidated, but after accumulation of organic debris had ceased. Cady believed that the cracks were filled with fine silt that was either washed or blown in, and that the coal was subsequently compressed by weight of overlying sediments that caused the clay material to spread laterally, probably widening the cracks and forcing the clay into adjacent strata along the partings. He observed some evidence that the clay filling had been forced upward into the overlying black shale, but that most of the fissures did not extend through the shale.

More recently Wanless (1957) described horsebacks in the Springfield (No. 5) Coal in Fulton County where he noted that they ranged from 6 inches to 3 feet wide and extended in many directions. He noted that the clay filling was lighter gray and more sandy than the underclay or any of the strata immediately above the coal and roof shale, and that at some places the coal tended to bend upward toward the edges of the veins as if the clay had been injected from below. Some horsebacks were reported by Wanless to cut through the black roof shale but others died out in the coal above the underclay.

Figure 5 shows a diagrammatic sketch of a typical horseback as depicted by Savage (1915) and plate 4 shows photographs of two horsebacks in the Lakeside Coal Company mine in Tazewell County. They are typical of those found in Sangamon, Menard, and Macon Counties. In these counties horsebacks are limited to No. 5 Coal and have been reported in almost all mines. Horsebacks in coals other than No. 5 Coal have been reported from other parts of Illinois, but in no other locality in the state are they known to be as abundant as in the Springfield and Peoria region.

Because horsebacks are almost certain to be encountered in all parts of the report area where No. 5 Coal is mined, they must be reckoned with when problems related to mining are considered. There appears to be no way of determining the frequency of occurrence of horsebacks by drilling because chances of drilling through one is exceedingly small, even in areas where they are abundant.



A - Horseback in roof and coal, Lakeside Coal Company mine near Pekin, Illinois.

B - Horseback in the same mine. Coal has been undercut preparatory to shooting.

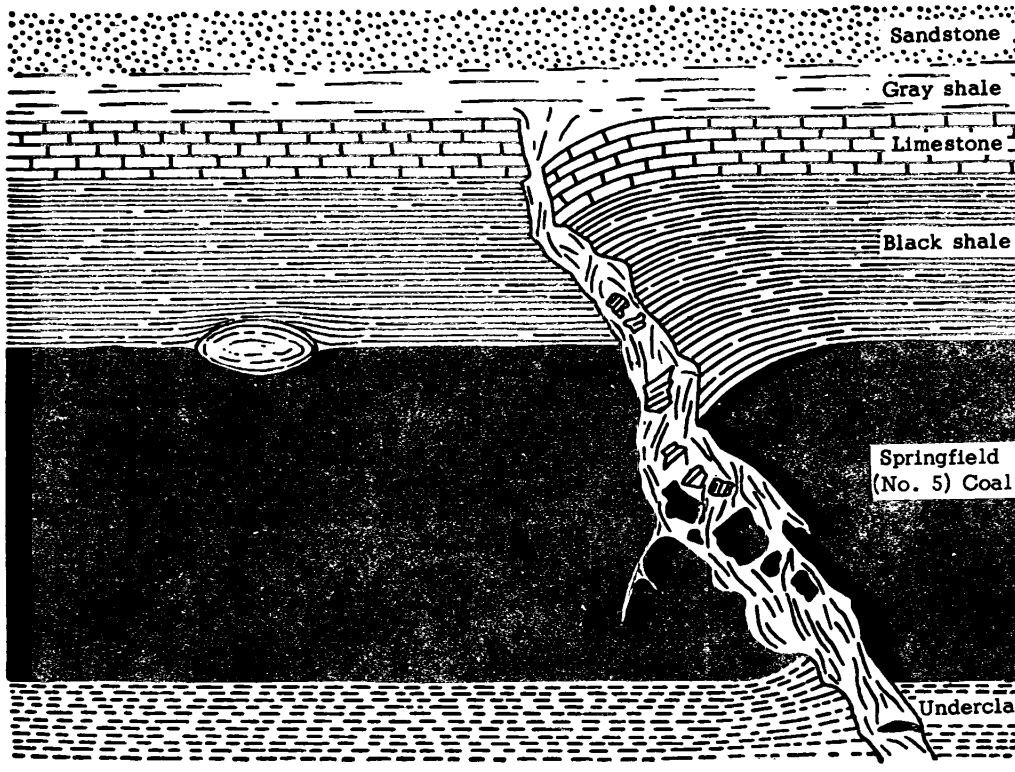


Fig. 5 - Diagrammatic sketch of a typical horseback (after Savage, 1915).

Summum (No. 4) Coal Member

The Summum (No. 4) Coal, named from Summum in Fulton County (Wanless, 1931), is useful for correlation purposes because of its lateral persistence over the area. It varies in thickness and has a maximum of probably little more than 3 feet. Many records show only a black slaty shale on underclay at the No. 4 Coal position. Where encountered in drilling, No. 4 Coal usually is described as a thin coal lying beneath a thin limestone, the Hanover. The limestone is not always reported in drill records, however, and may be present only sporadically.

The position of No. 4 Coal is practically always recognizable on electric logs by a small resistivity peak and a rather prominent reverse deflection of the third curve, the opposing deflections being quite noticeable (pl. 3). Sometimes the resistivity peak is doubled and this is thought to represent both the coal and the overlying Hanover Limestone, the limestone being considered as not present where a single resistivity peak occurs. A few cases where core logs and electric logs occur in close enough proximity for comparison bear out this reasoning.

No. 4 Coal is present locally in thickness sufficient for shallow mining in counties to the southwest, west, and northwest of Sangamon and Menard Counties. Information on thickness of lower coals is limited, but it is possible that future drilling may show No. 4 Coal to be minable at least locally in the area of this report.

It lies from 30 to at least 60 feet below the Springfield (No. 5) Coal, the greater interval being in the southeastern part of the area. In extreme western Sangamon County it rises so close to the base of No. 5 Coal that its position

cannot be positively identified on electric logs, and it frequently is not noted or is reported as a black shale in core records.

Colchester (No. 2) Coal Member

The Colchester (No. 2) Coal is the lowest named member of the Carbondale Formation. It originally was identified as the No. 2 Coal in outcrops in Fulton County (Worthen, 1868) and subsequently correlated with a coal at Colchester, McDonough County, from which place it derives its name. The coal probably is present throughout the entire report area and usually is recognizable in drill holes deep enough to penetrate it.

It is a remarkably persistent coal throughout all of Illinois and extends into western Indiana, where it is called Coal IIIa, and into western Kentucky where it is known as the Schultztown Coal (Wanless, 1939). No. 2 Coal crops out in counties to the west and northwest of the area discussed here and has been mined there for many years. It is recognized as an important strippable coal reserve in wide areas of these counties where it is sufficiently close to the surface. It also has been mined extensively underground, and currently is being mined by stripping along its outcrop area in counties bordering the northern edge of the Illinois Coal Basin. Unlike many Illinois coals, it thins rather than thickens southward and generally does not have widespread minable thickness along its southern and southeastern limits in the state.

Because No. 2 Coal does not crop out in the counties discussed here and is not often sampled in drill cores, little is known of its physical character in the area. To the west and northwest it is described as being commonly without partings, having a few thin pyrite bands near the top in some localities and near the middle in others. Thin calcite normally covers the cleavage faces.

A few core records indicate that the coal is more than 2 feet thick in some parts of the Sangamon County area, but it appears to be generally thinner, and in many places is less than 1 foot thick. Its stratigraphic position can be determined quite accurately wherever electric log information is available, provided there is some diamond-drill core information for proper control.

In the vicinity of Divernon, the Colchester (No. 2) Coal is about 60 feet below the Summum (No. 4) Coal. This interval increases northward and eastward to as much as 120 feet, and there are indications of one or possibly two additional coals in the interval. Information on the thickness of these two coals is meager, but at least one of them appears to attain local thickness of about 3 feet.

There is no reliable information on possible minable coals below No. 2 Coal in this area. Such coals are known to occur in other parts of the state, but their possible presence in the area of this study could be determined only by exploratory drilling.

STRUCTURE

As mentioned earlier, the area under consideration lies on the northwest shelf area of the deeper part of the Illinois Basin, with the strata being structurally highest in the northwest and lowest in the southeast.

Cady (1921) showed the general structure by means of a contour structure map of the Springfield (No. 5) Coal. His map included the area covered in this report, along with adjacent counties to the west, northwest, and north. Structure maps of Springfield (No. 5) and Herrin (No. 6) Coals have been prepared in conjunction with this report (pls. 1 and 2). The over-all structural pattern is the same

as that shown by Cady even though much more control was used than was available when the earlier map was constructed. The additional information has permitted the showing of more detail and local variations of the general structure, especially in the southern and southeastern parts of the area.

The general structural trend is arcuate with strike roughly northeast-southwest and southeastward dip in the western part of the area, and becomes roughly east-west with southward dip in the northern part (pls. 1 and 2). In the eastern part of the area the strike is northwest-southeast with southwestward dip. The regional structural trend is interrupted by numerous irregularities in the form of structural noses, terraces, anticlines, and synclines. These show up more numerously in the areas of close control, but there is little doubt that such minor flexures also are abundantly present in the areas of sparse drill-hole information. In general the degree of dip is very gentle.

Numerous small, closed structures, low domes and shallow depressions, are present in roughly parallel rows trending southwestward to northeastward, and appear to occur where the regional dip of strata decreases. In the over-all plan these features have the aspect of structural terraces and irregular surfaces resulting from differential compaction.

The over-all structural pattern is the result of periodic downwarping toward the southeast during and probably after Pennsylvanian time. Many of the local structural features can be attributed to differential compaction of sediments, draping of Pennsylvanian rocks over an uneven post-Mississippian erosional surface, and uneven distribution of Pennsylvanian sediments over local surface irregularities.

Occasional references to minor faults with displacements of a few inches to a few feet have been noted in mine records, but there appears to be no faulting of a scale sufficiently large to seriously affect mining of either No. 6 or No. 5 Coals.

COAL PRODUCTION AND RESERVES

Coal has been mined in Sangamon and Menard Counties since at least 1860. The earliest mining near Springfield was in Chapel (No. 8) Coal,which was taken from small drifts worked from outcrops along ravines and steep banks at a number of places northeast and southwest of Springfield. The coal was said to be of good quality but was too thin for mining on a large scale. Mining in Menard County was generally along the No. 5 Coal outcrop.

Soon after the discovery of the thicker No. 5 Coal in Sangamon County, several shafts were put down and the coal industry rapidly assumed a position of first importance in the area. The earliest mine to operate in No. 5 Coal near Springfield was at Howlett (now Riverton) and probably was sunk about 1870. Mining of No. 5 Coal was begun in 1870 at Lincoln in Logan County and in 1882 at Decatur in Macon County.

Mining of No. 6 Coal in Christian and southern Sangamon Counties appears to have begun somewhat later. The Pana Coal and Mining Company began mining No. 6 Coal in Christian County in 1884. Mining began at Taylorville, which is within the report area, in 1889.

In recent years there has been a marked decline of coal mining in the area. At present only relatively small-scale mining of No. 5 Coal is being carried on in Logan, Menard, and Sangamon Counties. Only one large-scale mine, in western Christian County, is now operating in No. 6 Coal.

Herrin (No. 6) Coal is more than 8 feet thick in some parts of southern Sangamon and northern Christian Counties, and it averages about 7 feet thick over an area of several townships. It thins northward and in approximately the northern

two-thirds of the area is too thin for mining. As No. 6 Coal becomes thinner toward the north, No. 5 Coal thickens and becomes minable. The maximum thickness of No. 5 Coal is about 6 feet, and this thickness appears to prevail over a large part of northern Sangamon and Menard Counties.

The manner of transition in thickness of the two coals is shown in cross section (pl. 3), and the approximate areas of measured thickness of each are plotted by isopachs (lines showing equal thickness) on the map of figure 4.

Sufficient information is not yet available to permit more accurate plotting of isopachs on either coal. The information that is available, however, shows an elongate east-west trending area of about 450 square miles wherein both coals are considered to be of minable thickness. This tract has an apex in T. 15 N., R. 5 W., from whence it widens eastward and extends through most of northern Christian County and approximately the southern one-third of Macon County. This is the area included between the two 3-foot isopachs in figure 4.

Cady and others (1952), in a survey of minable coal reserves of Illinois, indicated by maps the areal extent of minable coals in four categories of reliability. More information on thickness is available now than when the earlier study was made, and an evaluation of all data indicates that the earlier estimates of coal reserves probably were conservative. Estimates based on the isopachs of figure 4 indicate somewhat greater reserves of No. 5 Coal in all counties of this report but especially in Macon and Logan Counties. Reserves of No. 6 Coal in Macon County are indicated to be about 50 percent greater than were indicated by previous estimates, and about 30 percent and 20 percent greater in Sangamon and Christian Counties, respectively. The current estimates were made after excluding mined-out areas and areas of concentrated petroleum drilling.

In table 1, Cady's estimates of coal reserves are given, followed by figures in parentheses showing the percentage of increase based on the current evaluation.

TABLE 1 - TOTAL RESERVES OF HERRIN (NO. 6) AND SPRINGFIELD (NO. 5) COALS*
(in thousands of tons)

COUNTY	No. 6 Coal	No. 5 Coal	Total
Christian†	2,085,673 (+20%)‡	1,045,463 (+20%)	3,131,136
Logan	-	1,992,046 (+30%)	1,992,046
Macon	108,619 (+50%)	1,126,640 (+50%)	1,235,259
Menard	-	1,867,605 (+10%)	1,867,605
Sangamon	1,688,382 (+30%)	3,066,892 (+10%)	4,755,274
TOTAL	3,882,674	9,098,646	12,981,320

* Modified from Cady and others, 1952, Part III, Tabulated Data.

† Includes reserves for only that part of Christian County included in the area of this report.

‡ Percentage figures in parentheses are estimates, based on the present study, of how much previous estimates of reserve tonnages should be increased.

Two factors contribute to the greater reserves estimated in this report. Additional information suggests that both coals probably are present in minable thickness over a somewhat larger area than was previously thought, and it is also believed that a large part of the area classified by Cady and others (1952) as II-B (weakly indicated) and limited to a maximum thickness of 28 inches is actually underlain by coal thicker than 28 inches, thereby increasing tonnage figures for those areas. Reserves in Macon and Logan Counties are especially affected in this respect. The larger estimates seem justified on the basis of all available information, but they should not be construed to mean proved reserves of minable coal.

As a result of this study the implication is clear that the counties concerned have large areas underlain by minable thicknesses of Herrin (No. 6) and Springfield (No. 5) Coals, and that in all probability exploratory drilling will show minable reserves of at least some of the coals above and below the two major ones.

Table 2, which follows, is a tabulation of available data on the thickness of No. 6 and No. 5 Coals that can be considered reasonably reliable. This information, supplemented to a very limited degree with electric log information, was used in constructing the isopach map (fig. 4).

TABLE 2 - COAL RESOURCES BY COUNTY

Twp.	Rge.	Sec.	Quarter section	Type*	Company Name & No.	Surf. elev. (ft.)	NO. 6 COAL Depth	Elev.	Thk.	NO. 5 COAL Depth	Elev.	Thk.	Total depth
					CHRISTIAN COUNTY								
13N	1W	6	C-SE SE	DD	Byrd & Son No. 1	626	495	131	7'11"				506
13N	1W	12	NE SE NE	DD	Byrd-Willey No. 10	587	471	116	7'9"	489	98	4'6"	495
13N	1W	15	C-SW SW	DD	Byrd & Son No. 3	588	450	138	7'	475	113		520
13N	1W	30	SE NE NW	DD	Consolidated Coal Co. No. 2	586	449	137	8'1"				458
13N	1W	32	NW SW NW	DD	Byrd-Taylor No. 5	597	469	128	7'5"	488	109		588
13N	1W	34	Center	DD	Consolidated Coal Co. No. 1	620	505	115	8'5"				519
13N	1W	35	NE SE NE	DD	Byrd-Taylor No. 8	608	534	74	6'	556	52	3'	964
13N	2W	8	NW SE NW	DD	Peabody Coal Co.	611	425	186	7'6"				434
13N	2W	10	NE NE SE	DD	Byrd-Willey No. 12	608	466	142	8'				548
13N	2W	13	NW NE NE	DD	Byrd-Willey No. 13	619	473	146	7'11"				950
13N	2W	17	NW NE SW	DD	Peabody Coal Co. No. 17	609	425	184	8'				435
13N	2W	17	NW NE NW	DD	Peabody Coal Co. No. 18	609	422	187	6'6"				431
13N	2W	18	NW NW SW	DD	Peabody Coal Co. No. 6	603	No coal						440
13N	2W	18	SW SW NW	DD	Peabody Coal Co. No. 7	588	366	222	8'				435
13N	2W	18	SW NW SW	DD	Peabody Coal Co.	602	392	210	7'6"				400
13N	2W	19	NE SE NW	SA	Peabody Coal Co. No. 9	609	407	202	7'6"				420
13N	2W	26	SE NW NW	SA	Springfield Coal & Mining Co.	622	479	143	7'				512
13N	2W	26	S½ NW	DD	Taylorville Coal Co.	592	442	150	7'9"				500
13N	2W	30	NE SW SW	DD	Peabody Coal Co. No. 15	579	357	222	8'3"				375
13N	2W	33	C-W½ NE	SA	Peabody Coal Co. No. 58	616	438	178	8'				450
13N	3W	5	SE NW NE	DD	Peabody Coal Co. No. 12	564	306	258	6'10"				314

13N	3W	8	SE SE NW	SA	Peabody Coal Co. No. 8	600	363	237	7'				371
13N	3W	8	SE SW SW	DD	Peabody Coal Co. No. 20	599	360	239	6'10"				372
13N	3W	9	SE SW NE	DD	Peabody Coal Co. No. 22	601	342	252	7'				351
13N	3W	10	SE NW NE	DD	Peabody Coal Co. No. 1	570	320	250	7'				341
13N	3W	10	S½ SE	DD	Peabody Coal Co. No. 9	544	312	232	7'4"				323
13N	3W	13	NE SW SE	DD	Peabody Coal Co. No. 8	608	No coal			412	196	7"	420
13N	3W	13	SE NW NE	DD	Peabody Coal Co. No. 9	611	387	224	8'				397
13N	3W	14	NW NW NW	DD	Peabody Coal Co. No. 2	575	338	237	7'6"				346
13N	3W	14	SW NW NW	DD	Peabody Coal Co. No. 7	589	340	249	7'6"				350
13N	3W	16	SE SE SW	DD	Peabody Coal Co. No. 13	583	321	262	7'6"				333
13N	3W	23	NW NW	DD	Peabody Coal Co. No. 21	566	360	206	7'11"				373
13N	3W	26	NW NW	DD	Peabody Coal Co. No. 17	585	373	212	7'				387
13N	3W	32	NE SE NE	DD	Peabody Coal Co. No. 11	599	359	240	7'3"				375
13N	3W	34	SW NW NE	DD	Peabody Coal Co. No. 14	608	402	206	8'4"				413
13N	3W	34	SE NE NW	DD	Peabody Coal Co. No. 15	608	404	202	8'				414
13N	3W	34	NE SE NW	DD	Peabody Coal Co. No. 16	608	409	199	6'8"				418
13N	4W	1	SW NW SW	DD	Peabody Coal Co. No. 8	569	299	270	7'				310
13N	4W	10	NE NE SE	SL	Peabody Coal Co. No. 10	602	337	265	7'6"				350
13N	4W	23	NW NE NE	DD	Peabody Coal Co. No. 19	595	346	249	8'				360
14N	1W	24	SE NW	DD	Byrd-Willey No. 14	620	514	106	10'8"				539
14N	1W	28	SE NE	SA	Peabody Coal Co. No. 21	616	477	139	7'				485
14N	1W	28	SE SE NE	DD	Stonington Well	609	473	136	7'5"	498	111	4'2"	636
14N	2W	10	NW NW NW	DD	Byrd & Son No. 4	578	395	183	7'8"				408
14N	2W	13	NW SW SW	DD	Byrd-Willey No. 11	601	395	206	3'7"	423	178	5'2"	431
14N	2W	16	SE SW SW	DD	Byrd-Willey No. 9	605	407	198	4'	438	167	5'4"	494
14N	2W	16	N½ NW NW	DD	Byrd-Willey No. 15	600	384	216	7'4"	417	183	5'7"	480
14N	2W	20	SW NW NW	DD	Byrd-Willey No. 16	586	401	185	4'3"	429	157	5'	435

TABLE 2 - Continued

Twp.	Rge.	Sec.	Quarter section	Type*	Company Name & No.	Surf. Elev. (ft.)	NO. 6 COAL Depth	NO. 6 COAL Elev.	NO. 6 COAL Thk.	NO. 5 COAL Depth	NO. 5 COAL Elev.	NO. 5 COAL Thk.	Total depth
					CHRISTIAN COUNTY - Continued								
14N	2W	22	SE SE SE	DD	Byrd-Willey No. 17	609	439	170	6'9"	470	139	2'9"	476
14N	2W	24	SW SE NE	DD	Byrd-Willey No. 18	590	416	174	6'4"	444	146	5'6"	452
14N	2W	31	NE SE SE	DD	Byrd-Willey No. 7	581	391	190	7'7"	415	166		466
14N	2W	34	NW NW NE	DD	Byrd & Son No. 2	599	428	171	6'2"	448	151	4'8"	456
14N	3W	1	NW SW NW	DD	Taylor-Byrd No. 6	583	332	251	2'6"?	364	219	5'2"	876
14N	3W	14	SE SE NW	SA	Edinburg Coal Co.	598	364	234	7'8"				386
14N	3W	35	NE NE NW	DD	Peabody Coal Co. No. 14	555	337	218	5'6"				349
14N	4W	25	NE NE SE	DD	Peabody Coal Co. No. 18	549	279	270	7'				288
					LOGAN COUNTY								
18N	2W	14	SW SW SE	SA	Mt. Pulaski Colliery	638				360	278	4'	
19N	2W	5	SE SW SE	SH	Lincoln Coal Co.	565	220	335		263	302	5'2"	268
20N	2W	30	SE SE NE	SA	Brewerton Coal Co.	600				271	329	5'2"	280
20N	2W	32	SW SW NW	SA	Brewerton Coal Co.	591	211	380	1'	266	325	5'	271
20N	3W	27	NE NW SE	SA	Bliss Mining Co.	565	213	352		271	294	6'	285
20N	3W	27	NW NW SE	CH	Bliss Mining Co.	565	205	360	2'6"	262	303	6'	268
					MACON COUNTY								
15N	1E	32	NE NW SW	SA	Blue Mound Coal Co.	615	467	148	5'	490	125	5'4"	
15N	1E	32	NW NE SW	DD	Blue Mound Coal Co.	614	459	155	3'6"	489	125	5'3"	850
16N	2E	14	NW SW SW	SA	Macon County Coal Co. No. 1	615	510	105		546	69	4'2"	558
16N	2E	21	NW NE NE	DD	Wabash Railroad	594				484	110	4'6"	

16N	2E	22	NE NE NE	SA	Mfg. & Consumers Coal Co. No. 2	615				555	60	5'	560
16N	1W	12	SW SW NW	SA	Niantic Coal Co.	602	308	294	2'6"	349	253	5'6"	355
					MENARD COUNTY								
17N	6W	1	SE NE NE	SA	Athens Mining Co. No. 2	609				200	409	6'	
17N	6W	2	W½ SE NE	SA	H. A. Perkins	565				154	411	6'	
17N	7W	6	SE SW	SA	Tallula Coal Co.	619				179	440	6'	185
17N	7W	6	NW NW SW	SA	I. N. Biggs	573				126	447	6'	132
17N	7W	23	NE NE NW	SH	Loyd Mine	598				150	448	5'6"	
17N	8W	12	NE SE SW	SA	Forden Coal Co.	625				147	478	6'	
18N	6W	17	SW SE NW	SH	Storey Coal Co.	570				134	436	6'	140
18N	6W	30	SW NW NW	SA	Old Salem Mine	551						6'10"	
18N	6W	36	SE SW NW	SA	Wabash Coal Co.	614				203	411	6'	209
18N	7W	12	NE NW SW	SA	Pleasant Hill Coal Co.	576				144	432	6'	150
18N	7W	13	SW NE SE	SA	Black Diamond Coal Co.	519				80	438	6'	86
18N	7W	24	SW SW NW	SA	South Mountain Coal Co.	510				80	430	6'	86
18N	7W	25	SE SW SW	SA	J. W. Mallengren	510				52	457	6'	58
18N	7W	35	NE SE NE	SA	Lincoln Coal Mine	600				145	455	6'	151
18N	7W	36	NW SW SE	SH	Wilcox & Verna	600				147	453	6'	153
18N	8W	14	NW NE SE	SA	Tebrugge Bros.	548				84	464	5'6"	92
19N	4W	19	SW NW NE	SA	Middletown Coal Co.	605				210	395	6'	216
19N	5W	26	NE NE NE	SA	Johnson Valley Coal Co.	570				159	411	5'8"	164
19N	6W	26	SW NE SE	DD	Greenview Coal Co.	599				170	429	6'	179
19N	6W	26	SE SW SE	DD	Greenview Coal Co. No. 6	595				150	445	6'2"	158
19N	6W	26	SE SW NE	DD	Greenview Coal Co. No. 7	584				136	452	6'5"	144
19N	6W	26	SE SE SE	DD	Greenview Coal Co. No. 9	580				162	418	6'1"	170
19N	6W	26	NW NE SW	DD	Greenview Coal Co.	590				127	463	5'7"	133

TABLE 2 - Continued

Twp.	Rge.	Sec.	Quarter section	Type*	Company Name & No.	Surf. elev. (ft.)	NO. 6 COAL Depth	Elev.	Thk.	NO. 5 COAL Depth	Elev.	Thk.	Total depth
					MENARD COUNTY - Continued								
19N	6W	27	NE NW NE	SA	Greenview Coal Co.	565				104	461	6'2"	110
19N	6W	35	NE SE NE	DD	Greenview Coal Co.	602				162	430	Horse-back	171
19N	6W	35	NE NE NW	DD	Greenview Coal Co. No. 10	600				156	444	6'7"	163
19N	6W	36	SE NW NW	SA	Greenview Coal Co.	594				177	417	6'	184
19N	6W	36	NW NE NW	DD	Greenview Coal Co.					180		6'	187
19N	6W	36	NW NW NW	DD	Greenview Coal Co.	601				178	423	6'3"	186
19N	6W	36	SW SW NW	DD	Greenview Coal Co. No. 3	606				182	424	6'8"	190
19N	6W	36	SE SE NE	DD	Greenview Coal Co. No. 4	607				170	437	6'2"	178
19N	6W	36	SW NW NW	SA	Greenview Coal Co.	600				172	428	6'3"	178
19N	6W	36	SE NW NW	SA	Greenview Coal Co.	594				177	417	6'	183
					SANGAMON COUNTY								
13N	4W	8	NE NW	DD	Peabody Coal Co. No. 5	605	305	300	7'				316
13N	4W	9	700'W of C	DD	Peabody Coal Co.	611	320	291	8'8"				328
13N	4W	9	SE NE NE	DD	Peabody Coal Co. No. 16	602	329	273	8'				341
13N	4W	30	NE NE NE	DD	Peabody Coal Co. No. 2	603	343	260	8'				356
13N	4W	33	SE NE SE	DD	Peabody Coal Co. No. 7	614	359	255	8'				368
13N	5W	12	SE SW NE	SA	Peabody Coal Co. No. 5	610	322	288	6'				329
13N	5W	15	NW NW SW	DD	Madison Coal Co. No. 4	613	294	319	8'				1000
13N	5W	17	NE NE SW	DD	Madison Coal Co. No. 2	617	298	319	5'				1000
13N	5W	20	NE NE NW	DD	Madison Coal Co. No. 5	619	300	319	8'3"				700
13N	5W	20	SW SW SE	DD	Madison Coal Co. No. 6	627	311	316	8'6"				700

13N	5W	21	SE NE SW	DD	Madison Coal Co.	624	321	303	7'11"	344	280		604
13N	5W	21	SE NE SE	DD	Madison Coal Co. No. 7	623	316	307	8'				700
13N	5W	29	SW SW NW	DD	Madison Coal Co. No. 3	616	290	326	8'				2000
13N	6W	2	SE NE NW	SA	Illinois Coal & Coke Co.	621	260	361	8'				
13N	6W	10	NW NE NE	SA	Union Fuel Co.	623	263	360	6'8"				270
13N	6W	15	SE NE SW	SA	Peabody Coal Co. No. 54	638	301	337	7'				308
13N	6W	34	NW SW NW	SA	C. W. & F. Coal Co.	653	292	361	7'10"				300
13N	7W	7	NE NE SW	DD	Waverly C. M. & P. Co.	626	150	476	4'				500
14N	4W	29	Center	DD	Peabody Coal Co. No. 4	584	291	293	8'				306
14N	6W	13	SE NE NE	SA	Illinois Collieries No. 3	603	243	360	7'				250
14N	6W	35	NW NE NE	SA	Panther Creek Coal Co. No. 1	626	258	368	7'				
14N	7W	18	E½ NW	SA	Reynolds Coal Co. No. 56	637	175	462	4'9"				680
15N	4W	5	N½ NW SE	DD	Sullivan Machinery Co. No. 2	550	180	370	3'3"	220	330	5'5"	302
15N	4W	5	NW NW SW	SA	Union Fuel Co. No. 2	571				220	351	5'10"	230
15N	4W	16	NE SE	CH	Sun Oil Co.	575	186	389	2'	224	351	6'	240
15N	5W	1	SW NW SW	SA	Brewerton Coal Co.	591				235	356	5'6"	242
15N	5W	3	SE NW SW	SA	Peabody Coal Co. No. 53	606				238	368	6'6"	245
15N	5W	5	SE¼	DD	Junction Mining Co.	575	176	399	6"	215	360	6'	1500
15N	5W	9	E½ NE	SA	Springfield Coal & Mng. Co. No. 5	606				250	356	6'	256
15N	5W	9	SE SW NW	SA	Peabody Coal Co. No. 55	613				250	363	6'	256
15N	5W	18	SE SE SW	DD	Peabody Coal Co. No. 4	600	182	418		220	380	3'9"	224
15N	6W	12	NE NE SW	DD	Peabody Coal Co. No. 3	605				209	396	4'11"	214
15N	6W	13	NW SE NW	DD	Peabody Coal Co. No. 2	612				204	408	5'2"	284
15N	7W	4	NW NE NW	SA	Wildwood Coal Co.	590				159	431	5'6"	

TABLE 2 - Continued

Twp.	Rge.	Sec.	Quarter section	Type*	Company Name & No.	Surf. elev. (ft.)	NO. 6 COAL Depth	Elev.	Thk.	NO. 5 COAL Depth	Elev.	Thk.	Total depth
					SANGAMON COUNTY - Continued								
15N	7W	8	SW NW SE	SA	Island Grove Coal Co.	637				189	448	6'	195
15N	7W	23	NE SW NW	DD	D. W. Smith No. 1	636	183	453	3'1"	192	444		274
15N	7W	26	NE SW NE	DD	D. W. Smith No. 2	642	206	436	1'5"	217	425		432
16N	3W	8	NW NW SW	SA	Dawson Coal & Mng. Co.	599				243	356	5'	250
16N	3W	26	SW SW SE	SA	Coronado Coal Co.	590	277	313	5'	300	290	5'	305
16N	4W	4	NE NE SE	SA	Standard Washed Coal Co.	581				250	331	6'	
16N	4W	8	NW SW SW	SA	Standard Washed Coal Co. No. 2	578				240	338	5'6"	
16N	4W	9	S½ SE	SA	Peabody Coal Co. No. 1	551	157	394	5"	224	327	6'	230
16N	4W	10	NW NW SW	SA	Peabody Coal Co. No. 52	563				232	331	6'	238
16N	4W	12	NW SE SE	SA	Farrand Coal Co.	585				262	323	5'	267
16N	5W	1	NE SW	DD	Peabody Coal Co. No. 1		145			173		6'	181
16N	5W	1	NE SE	DD	Peabody Coal Co. No. 3					219		6'	226
16N	5W	1	NW NE	DD	Peabody Coal Co. No. 6					179		6'	187
16N	5W	5	NE SE NE	DD	Peabody Coal Co. No. 1	520	79	441	2'1"	123	397	6'1"	260
16N	5W	10	SW SW SW	SA	Peabody Coal Co. No. 59	550	120	430	2'	161	389	6'	167
16N	5W	12	SW SW NW	SA	Chicago-Springfield Coal Co.	574				230	344	6'2"	235
16N	5W	13	E½ NW SW	SA	Peabody Coal Co. No. 59	588	181	407	1'	225	363	5'10"	233
16N	5W	13	NE NW SE	DD	Springfield Colliery Co.	582	173	409	3"	218	364	5'8"	224
16N	5W	14	NE SW SW	SA	Lincoln Coal Corp. No. 1	597				244	353	6'	
16N	5W	19	NW NE SE	SA	Panther Creek Coal Co. No. 3	538	126	412	4"	167	371	5'11"	173

16N	5W	20	SE	NE	SE	SA	No. 12 Coal Co.	580				174	406	6'	180
16N	5W	21	NE	SE	SW	SA	Panther Creek Mines, Inc. No. 2	577				194	383	5'10"	200
16N	5W	22	SE	SW	NE	SA	Panther Creek Mines, Inc. No. 5	606				244	362	5'10"	250
16N	5W	24	NW	NE	SW	SA	Springfield Coal & Mining Co. No. 3	595				259	336	6'	265
16N	5W	26	NE	SE	NE	SA	Sangamon Coal Co. No. 2	607				250	357	6'	256
16N	5W	29	NE	SE	NE	SA	Panther Creek Mines, Inc. No. 4	554				150	404	6'6"	156
16N	5W	31	NW	SW	SE	SA	Citizens Mining & Sales "B"	611				205	406	5'6"	210
16N	5W	32	SE	NW	NW	SA	Mine "B" Coal Co. - Mine "A"	596				205	391	5'6"	212
16N	5W	32	SW	NW	NW	DD	Coyne Drilling Co.	570				175	395	5'10"	189
16N	5W	35	SW	NE	NW	SA	Peabody Coal Co. No. 57	606				225	381	5'6"	230
16N	6W	1	SE	NE	NE	SA	Peabody Coal Co. No. 2		90		9"	136		6'2"	214
16N	6W	32	SE	SW	NW	SA	Riddle Hill Coal Co.	560						5'	
16N	7W	4	SW	SW	NW	SA	Plains Mining Co.	614				128	486	5'8"	134
17N	4W	17	SW	SE	NW	SA	Union Fuel Co. No. 5	591	205	386	6"	267	324	5'6"	272
17N	4W	19	NE	SE	SW	SA	Wenneborg Coal Co.	583				245	338	6'	250
17N	4W	35	NE	SW	SW	SA	Barclay Coal Mining Co.	575	186	389	2"	249	326	6'1"	267
17N	5W	6	NW	NE	NE	SA	Barr Coal Co.	614				224	390	6'	230
17N	5W	8	SE	SE	NW	SA	Buckley Coal Co.	613				207	406	6'	213
17N	5W	16	SW	NE	NW	SH	Eddy Coal Co.	570				150	420	6'	
17N	5W	21	SW	NW	NW	SH	Cantrall Coal Co.	580				195	385	6'	
17N	5W	27	NW	SW	SE	SA	Peabody Coal Co. No. 51	584				202	382	5'6"	
17N	5W	31	SW			DD	Peabody Coal Co. No. 4	590				183	407	6'	189
17N	5W	31	NW			DD	Peabody Coal Co. No. 5	595				192	403	6'	200
17N	5W	36	NE	SW		DD	Peabody Coal Co. No. 2					191		6'	292

TABLE 2 - Continued

Twp.	Rge.	Sec.	Quarter section	Type*	Company Name & No.	Surf. elev. (ft.)	NO. 6 COAL			NO. 5 COAL			Total depth
							Depth	Elev.	Thk.	Depth	Elev.	Thk.	
					SANGAMON COUNTY - Continued								
17N	5W	36	SE SE	SA	Peabody Coal Co. No. 6	547				198	349	5'10"	204
17N	5W	36	SE SE	DD	Peabody Coal Co. No. 1					221		5'7"	227
17N	6W	29	NE NE SE	SA	Salisbury Coal Co.	590				144	446	6'	
17N	7W	32	SW NW	SA	Citizens Coal Co.	600				130	470	5'9"	
17N	7W	35	SW SW NW	SA	Happy Hollow Coal Co.	573				102	471	5'5"	
17N	7W	35	NW SW	DD	Richland Coal Co.	580	77	503	1'	114	466	4'6"	120
17N	8W	25	NE SE SW	SA	Bethel Mine	612				100	512	5'8"	105

* SA-Abandoned mine.
SH-Active shaft mine.
SL-Active slope mine.
DD-Diamond-drill hole.
CH-Churn-drill hole.

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Illinois State Geological Survey

Circular 312 — Plate I

STRUCTURE OF HERRIN (NO.6) COAL

Kenneth E. Clegg

JULY 1960

KEY

- Churn drill hole
- Rotary drill hole
- Core drill hole
- Location approximate
- Coal mine shaft
- A—B Line of cross section, plate 3
- Sandstone and siltstone at coal horizon
- 200 Contour, interval 25 feet
- 50 Depression contour

Numbers at datum points indicate elevation relative to mean sea level. Number followed by " E " indicates elevation computed from known elevation of No. 5 Coal.

SCALE

0 1 2 3 MILES

STRUCTURE OF SPRINGFIELD (NO. 5) COAL

Kenneth E. Clegg

JULY 1960

KEY

- Churn drill hole
- Rotary drill hole
- Core drill hole
- Location approximate
- Coal mine shaft
- A—B Line of cross section, plate 3
- 200 Contour, interval 25 feet
- 50 Depression contour

Numbers at datum points indicate elevation relative to mean sea level. Number followed by "E" indicates elevation computed from known elevation of No. 6 Coal.

SCALE

0 1 2 3 MILES

A

B

85	558	502	463	431	436	580	426	187
Madison Coal Corp.	K. M. Bayer—Dambacher No. 1	Shulman Bros.—Underwood No. 1	B. M. Heath—McClelland No. 1	B. M. Heath—Marine Bank No. 2	Kaybee Oil Co.—Williams No. 1	G. S. Engle—Marshall, Bell No. 1	Nat'l Assoc. Petro.—Kreider No. 1	L. Nonneman—Munson No. 1—A
17–13 N–5 W	16–13 N–5 W	31–14 N–4 W	28–14 N–4 W	15–14 N–4 W	12–14 N–4 W	25–15 N–4 W	19–15 N–3 W	9–15 N–3 W

Shoal Creek

C — Chapel (No. 8)

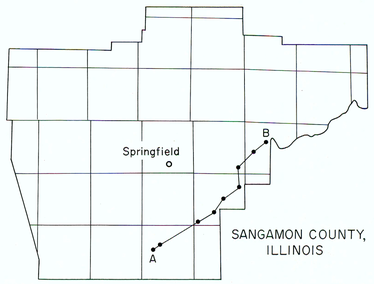
C — Herrin (No. 6)

Springfield (No. 5)

C — Summum (No. 4)

Datum Horizon

C — Colchester (No. 2)



KEY

Drift | Limestone | C Coal | Clay | Black shale | Gray shale | Sand- or siltstone

SOUTHWEST–NORTHEAST STRATIGRAPHIC CROSS SECTION ACROSS PART OF SANGAMON COUNTY

CIRCULAR 312

ILLINOIS STATE GEOLOGICAL SURVEY

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