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DEPARTMENT OF REGISTRATION AND EDUCATION  
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# CLASSIFICATION OF THE PENNSYLVANIAN ROCKS OF ILLINOIS AS OF 1956

by  
Harold R. Wanless


## CORRELATION CHART

compiled by  
Raymond Siever

DIVISION OF THE  
ILLINOIS STATE GEOLOGICAL SURVEY  
JOHN C. FRYE, *Chief* URBANA

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## ABSTRACT

The historical development of classification schemes for the Pennsylvanian rocks of Illinois is briefly traced from the latter part of the 19th century, when primary emphasis was given to economically significant coal beds, through various changes in definition of major and minor divisions within the system, to the classification based on the cyclical character of the section in current usage by the Illinois State Geological Survey. The application of this classification to the Pennsylvanian section in different parts of the State is discussed, and standard sections are given for western, central, and southern Illinois giving current terminology. Classification of major divisions of the Pennsylvanian rocks in neighboring areas in relation to the Illinois classification is discussed briefly. A table gives type localities of cyclothems and named beds in current usage by the Survey.

A correlation chart compiled by Raymond Siever shows most of the names currently used for Pennsylvanian units in Illinois by the Survey.

## INTRODUCTION

Pennsylvanian rocks occur at the surface or beneath a mantle of Pleistocene glacial deposits in about three-fourths of Illinois. Since the earliest geological studies in the State, in the nineteenth century, the rocks have attracted attention because of their great areal extent and their content of valuable resources of coal, petroleum, clay and shale, limestone, and other materials.

The classification of the Pennsylvanian rocks of Illinois currently used by the Illinois State Geological Survey is shown on the accompanying chart compiled by Raymond Siever. It formalizes and states explicitly the application of this classification scheme to the entire Pennsylvanian section in all parts of Illinois and, as such, supplements the classification used in previously published stratigraphic reports on individual quadrangles, counties, and subregional areas. This report presents a brief history of the development of the classification, some discussion of the status of correlations between various parts of the State, and a tabulation of type localities.

The reasons for adopting this classification scheme, which is based on the use of a cyclothem as a rock unit, have been stated in the past (Weller, 1930, 1931; Wanless, 1931; Wanless and Weller, 1932). Because this report is intended to summarize the application of the classification rather than to discuss its merits, it does not discuss the advantages and disadvantages of cyclothem classification.

The Survey is currently studying the classification of the Pennsylvanian rocks of Illinois with a view to possible revision. As a first step, this report will clarify stratigraphic nomenclature in use as of 1956.

The manuscript was critically read by H. B. Willman, J. A. Simon, Raymond Siever, and R. M. Kosanke of the Survey.

### HISTORY OF CLASSIFICATION

A. H. Worthen (1866, 1868) described general features of the Coal Measures, as the Pennsylvanian system was called then, and proposed a division into Upper and Lower Coal Measures, the dividing horizon being the Shoal Creek limestone. He also numbered some of the coal beds, Nos. 1-7 being designated from localities in or near Fulton County (Worthen, 1870) and Nos. 8-17 from localities in the central part of the coal basin, described in the report on Bond County (Worthen, 1875).

Subsequent studies showed that the coals numbered 2 and 3 in Fulton County are the same coal. Also the numbers 4 and 5 were later discovered to refer to the same coal. The coals numbered 3 and 4 have since been designated Nos. 2 and 5. More recently the number 4 has been applied to a thin but widespread coal, which Worthen failed to recognize, 10 to 50 feet below the No. 5 coal. The number 3 has remained unused in Illinois. Worthen's coal No. 8 has proved to be a widespread thin coal and this number remains in use, but coals numbered 9 to 17 by Worthen have not been so designated since. The practice of numbering coals has proved to be a source of confusion, for generally only commercially important coals are numbered and the numerical system breaks down when coal beds intervening between two successively numbered coals are discovered.

During 1906 to 1908 David White (1907, 1907a, 1909) studied the floras of the Illinois Pennsylvanian strata to determine the Illinois equivalents of the major subdivisions of the Coal Measures of Pennsylvania. White found a flora associated with the No. 2 coal of Fulton County and the Murphysboro coal of southern Illinois, then correlated with No. 2, that he believed to be equivalent to the base of the Allegheny formation. He applied the Appalachian term Pottsville to strata below the No. 2 coal, but because he was uncertain as to whether the Upper Freeport coal (the top of the Allegheny) is equivalent to the No. 6 or No. 7 coal, he did not introduce the terms Allegheny and Conemaugh into Illinois terminology.

The interval from the base of the No. 2 coal to the top of the No. 6 coal was designated Carbondale from a town in southern Illinois which is within the outcrop belt of this formation (Lines, 1912). The Pennsylvanian strata above the No. 6 coal were designated the McLeansboro formation (DeWolf, 1910) because a diamond drill core had been recovered near McLeansboro, Hamilton County, showing about 800 feet of strata above the No. 6 coal. No definite equivalents of the Monongahela (Upper Productive Measures) of Pennsylvania have been recognized in Illinois although the uppermost part of the McLeansboro may be equivalent to Monongahela beds.

Thus major divisions of the Pennsylvanian in Illinois were named the Pottsville, Carbondale, and McLeansboro formations. The nomenclature was not well chosen; the type section of the Pottsville is a conglomerate in the southern



anthracite field of Pennsylvania, nearly 700 miles from Illinois; no particular outcrop or series of outcrops was designated as the type exposure for the Carbondale, and the McLeansboro is based on a drill core, only a few feet of the upper McLeansboro outcropping near the town of that name.

While they mapped the geology of several quadrangles in the Illinois coal basin, Savage, Udden, Cady, and others traced several of the coals of the Fulton County area into other parts of the coal basin and named representative key beds such as the Seville and Lonsdale limestones, Vergennes and Vermilionville sandstones, and Francis Creek and Farmington shales. They also used geographic names for some of the numbered coals from localities where each is economically important. Thus the No. 1 was called the Rock Island coal, the No. 2 was called the LaSalle coal in northern and the Colchester coal in western Illinois. The No. 5 was called the Springfield coal in central and western Illinois and the Harrisburg coal is southeastern Illinois. The No. 6 coal was called the Belleville in southwestern Illinois and the Herrin coal in southern Illinois. The No. 7 was named the Danville coal in eastern Illinois. The names and numbers were applied in combination, as the Colchester (No. 2) or the Harrisburg (No. 5) coal.

Udden (1912), in describing the geology of the Peoria quadrangle, noted a recurrent sequence of beds associated with coals 5, 6, and 7 and the Lonsdale limestone which more or less closely resemble each other, suggesting a pattern of cyclic or rhythmic sedimentation. He stated that the beds consist, in ascending order, of coal, black shale, limestone, gray shale, sandstone, and underclay. He noted that the relative thickness of the beds varies in the four sequences, but that each lithologic type is represented in each of the four sequences.

In the course of regional studies of the paleontology of the Illinois Pennsylvanian during 1926 to 1928, Weller (1930) noted that the pattern of cyclic sedimentation described by Udden for the Peoria quadrangle is widespread throughout the Illinois coal field. He considered an "ideal cycle" to consist of ten lithologic units of which the lower six, (1) sandstone, (2) sandy shale, (3) "fresh water" limestone, (4) underclay, (5) coal, and (6) gray roof shale, were probably deposited under nonmarine conditions and the remaining four (7) marine limestone, (8) black fissile shale, (9) marine limestone and calcareous shale, and (10) upper gray shale, are of marine origin.

Weller noted that most cyclic successions do not contain the full sequence of ten units and that they may be reduced to only two, coal and underclay. He believed that there were two significant breaks in deposition, first between the upper shale (10) and the overlying sandstone (1) and second at the surface of the underclay (4-5). The break below the sandstone was considered to be marked by the development of channels cut locally as deep as 50 to 80 feet into the underlying strata and generally filled with sandstone coarser than sandstones outside the channel areas. The second break was thought to be shown by apparent leaching of carbonate and some sort of soil development in the underclay just before coal deposition. Weller considered that the time lapse at the top of the underclay might be greater than that at the base of the sandstone, but that there was no evidence of diastrophism in a widespread level surface of clay that was undergoing soil development. He thought there was suggestive evidence of regional uplift that provided gradients sufficient for channel develop-

ment. He therefore proposed that each cycle be considered to start with the unconformable surface on which sandstone deposition took place.

It was later proposed (Wanless, 1931) that the strata recording a cycle of sedimentation constitute a more logical stratigraphic unit for the subdivision of the Pennsylvanian rocks than divisions that were then in use (Pottsville, Carbondale, and McLeansboro). At first the terms "sequence" and "suite" were applied to the sediments formed during a cycle of sedimentation (Wanless, 1929) and later the term "cyclical formations" was proposed (Wanless, 1931). Because of the great variety of lithologic types included in the units, they were considered to differ from normal formations and the term "cyclothem," was introduced (Wanless and Weller, 1932).

The term means literally a "cyclic deposit." A series of names for cyclical units was proposed (Wanless, 1931), covering the part of the Pennsylvanian system exposed in western Illinois. Several additions and changes have been made since then (Weller et al., 1942; Willman and Payne, 1942; Dunbar and Henbest, 1942). The accompanying correlation chart (column 2) incorporates the latest revisions.

In places Pennsylvanian beds below No. 2 coal thin to a few feet. The thinner sections are largely refractory clay in two parts of the basin: in northern Illinois east of the LaSalle anticline and in southwest central Illinois. The latter belt (Cheltenham clay) extends along the outcrop from near Mt. Sterling, Brown County, southward for nearly 150 miles to near Campbell Hill, Jackson County. Farther south and eastward in the deeper part of the Illinois basin in southeastern Illinois the pre-Carbondale strata aggregate as much as 1200 feet as compared with a general maximum of 200 feet in western Illinois.

Because exact correlations between western and southeastern Illinois are uncertain, different names were proposed for the series of cyclothems below the Liverpool cyclothem in southern Illinois. The system was proposed in a chapter on stratigraphy (Wanless, 1939) in an unpublished manuscript on the Lower Pennsylvanian floras of Illinois by the late David White, but many of the new names were published by Weller (1940, pp. 36-42). Studies, by C. B. Read, of the type Pottsville section in Pennsylvania showed that it includes a hiatus between a conglomerate of lower Allegheny age (above) and strata that yield a New River or "Middle Pottsville" flora (beneath). A great series of beds that had been called Upper Pottsville in many parts of the United States is actually unrepresented at Pottsville. Because most of the strata which had been called Pottsville in Illinois belong to the "Upper Pottsville" group, this name for the lower Pennsylvanian in Illinois was abandoned.

For many years early Pennsylvanian beds of western Kentucky had been called Tradewater and Caseyville (Glenn, 1912; Owen, 1856), the names being applied to units that generally correlate with Upper and Middle Pottsville respectively. The type areas of the Tradewater and Caseyville units are within a few miles of southeastern Illinois and the names were adopted as substitutes for the term Pottsville and given the rank of groups (Wanless, op. cit. as quoted in Weller, 1940, p. 36). As thus revised the major divisions of the Illinois Pennsylvanian rocks are:

McLeansboro group (top of column to Anvil Rock [Copperas Creek]  
sandstone)

- Carbondale group (Jamestown through Liverpool cyclothems)
- Tradewater group (base of Isabel sandstone to base of Grindstaff sandstone)
- Caseyville group (strata below Grindstaff sandstone).

The terminology for the lower Pennsylvanian cyclothems and named units in southern Illinois, as slightly revised, is as follows:

- Tradewater group
  - Dekoven cyclothem
    - Dekoven coal
  - Colbert cyclothem (called Davis by Weller)
    - Davis coal
  - Stonefort cyclothem (includes more than one cyclothem)
    - Stonefort limestone
    - Stonefort coal
    - Bald Hill coal
    - Curlew sandstone
  - Macedonia cyclothem (includes more than one cyclothem)
    - Curlew coal
    - Curlew limestone
    - New Burnside (Mannington coal of Kentucky)
    - Murray Bluff sandstone
  - Delwood cyclothem
    - Delwood (Ice House coal of Kentucky)
    - Delwood sandstone
  - Grindstaff cyclothem
    - Boskydell marine zone
    - Willis coal
    - Grindstaff sandstone
- Caseyville group
  - Pounds cyclothem
    - Reynoldsburg coal
    - Pounds sandstone (Makanda sandstone in restricted sense)
  - Battery Rock cyclothem
    - Drury shale
    - Battery Rock coal
    - Sellers limestone
    - Battery Rock (Lick Creek) sandstone or conglomerate
  - Lusk formation
    - Wayside marine zone

In the above classification the name Colbert is substituted for the former cyclothem name, Davis, because the latter name is pre-empted. However, because coal bed names are informal, the name Davis is retained for the coal bed itself. The type section for the Colbert cyclothem is half a mile west of Colbert school in the SE 1/4 SW 1/4 sec. 23, T. 10 S., R. 7 E., Saline County, Illinois.

On the basis of fossil spores extracted from coals, Kosanke (1950) concluded that all western Illinois coals belong to the Tradewater group, although



the Babylon cyclothem is probably at its base. The Caseyville rocks of southern Illinois extend northward into the Illinois basin but they wedge out before reaching the outcrop area in western Illinois.

Some cyclothems may wedge out or merge, as in the Cheltenham clay district. Exposures and clay mines near Alton show that there are several coal streaks in the Cheltenham clay and that the clays separated by the coal streaks are different in color and other properties. At one location the Seahorne limestone forms the roof of the clay, and the Seahorne, Upper DeLong, Middle DeLong, Pope Creek, and Tarter coal streaks and clays, 6 inches of No. 1 coal, and a foot of Bernadotte sandstone may be recognized in the Cheltenham clay. Elsewhere the Seahorne limestone is missing and the No. 2 coal is the top of the clay. Thus six or more cyclothems may be represented in 20 feet of clay, the underclay of each persisting where all other members have wedged out.

In some areas there is an intercalation of a new cyclic sequence. Along the western border of the basin from Kewanee at the north to Murphysboro on the south, no coal is found in the beds between coal No. 5 and No. 6 of the St. David and Brereton cyclothems. East of the Duquoin monocline, however, the interval between these coals expands and a coal that has been called No. 5a in southern Illinois and No. 10 in western Kentucky intervenes; this coal is associated, at least locally, with most of the rock types of a cyclothem. The marine limestone extends about as far northwest as the Mississippi bluffs near Belleville, Illinois, but the coal is restricted to the area east of the monocline. The name Crab Orchard was proposed for these beds as an additional cyclothem, but has only informal usage because of its prior use for a Silurian formation in Kentucky. This type of intercalation occurs in areas in other parts of the section. In some areas a single bed may be the sole representative of a cycle that is much more complete in other areas.

The interval above the Shoal Creek limestone is not exposed in the region in which the cyclothem classification was worked out, and as yet virtually no detailed surface mapping has been done in the deeper part of the basin where beds younger than the Shoal Creek crop out. Electric-log studies (Wanless, 1955) show that the younger McLeansboro strata attain a maximum thickness of about 820 feet in southwestern Jasper County.

There is one excellent marker about 200 to 250 feet above the Shoal Creek limestone in eastern and central Illinois, called the Millersville limestone in central Illinois and the Livingston limestone in the area east of the LaSalle anticline. It seems likely, on the basis of lithologic similarity and conodont study (Stevenson, 1955), that the LaSalle limestone of northern Illinois is also a correlative.

Simon (1946) worked out a sequence above the Shoal Creek limestone in Bond County and proposed the terms "Sorento," "Bunje," and "Flat Creek," named in ascending order, for three cyclothem units in the lower half of the interval. Electric-log studies seem to show that the successions are persistent throughout most of the basin. Another persistent cyclic succession intervenes between the Flat Creek and Millersville. The term "Reel limestone" has been used for the limestone of this succession in southeastern Illinois. Although the cyclothems mentioned have not previously been published as a series, the succession may be put together as follows:



Millersville cyclothem

    Millersville (Livingston, LaSalle?) limestone

Unnamed cyclothem

    Reel limestone

"Flat Creek" cyclothem

"Bunje" cyclothem

"Sorento" cyclothem

Shoal Creek cyclothem

    Shoal Creek (New Haven) limestone

The Millersville limestone, thickest of all Pennsylvanian limestones, shales out southward along a line crossing Christian, Fayette, Effingham, Jasper, and Crawford counties. The stratigraphic positions of the Millersville limestone and its associated strata can be carried through much of the southern part of the basin where the limestone is missing.

In several counties of the deeper part of the basin strata higher than the Millersville limestone are about 550 feet thick. Several beds and a number of cyclothem have been named in this interval. Most of the field work on these younger beds by Weller and Newton (1937) and S. E. Ekblaw preceded the development of the Illinois basin oil field, which began in 1937 and prevented proposed correlations from place to place from being checked with subsurface information. The area is one of shallow dissection and there are extensive flat prairies without any outcrops. The study of the younger beds is hampered even now by the fact that electric logs of oil-test drillings extend only up to the base of the surface pipe at depths of 80 to 200 feet and there is thus no record, or only a partial record, of the youngest Pennsylvanian rocks. The following is a list of some proposed names for the higher beds in what seems to be their sequence in descending order.

Upper Bogota cyclothem

Lower Bogota cyclothem

Woodbury cyclothem

Gila cyclothem

Greenup cyclothem

    Greenup limestone

Newton cyclothem

"Effingham" beds

Shumway cyclothem

    Shumway limestone

Omega cyclothem

    Omega limestone

Shelbyville coal and associated beds

Cohn cyclothem

Millersville cyclothem

    Millersville (Livingston, LaSalle?) limestone

Probably the interval contains other beds and other cyclic sequences not here named. In northern Illinois the Little Vermilion cyclothem overlies the LaSalle limestone and is in turn overlain by an unnamed cyclothem, neither of which have been correlated with the Illinois basin succession.

In summary, 39 cyclothems have been proposed in central and western Illinois and 38 in southern Illinois, not including more local successions such as those associated with coal No. 5a and the Cutler Rider coals.

### CLASSIFICATIONS IN NEIGHBORING AREAS

Moore (1936, 1944) and others have presented evidence that in the northern mid-continent region there were a few significant episodes of tectonism during the Pennsylvanian period, especially in the tectonically unstable area of southern Oklahoma, and that tectonism there is reflected elsewhere in regional uplift and channel-cutting or in truncation of older strata. He noted that these breaks also are reflected in faunal changes that can be traced outside the disturbed area, including the disappearance of Fusulina, Chaetetes, Prismopora, and Mesolobus at the end of the Des Moines stage. The genera listed are all present in the Lonsdale limestone of the Gimlet cyclothem but have not been found in the Trivoli cyclothem. It is not certain whether any of them are in the intervening Exline cyclothem.

Correlation and matching of many Illinois beds with corresponding beds of southern Iowa were reported by Weller et al. (1942). Fusulinid studies by Dunbar and Henbest (1942) show that the Shumway and Greenup limestones may be of Virgil age, though no physical evidence of a break corresponding to that at the Virgil-Missouri boundary has been noted. Spores from coal and leaf floras indicate that the Caseyville is of Morrowan age.

In Indiana the terms Pottsville, Allegheny, and Conemaugh are used as major divisions of the system; these are divided into groups, formations, and members named entirely from Indiana localities. The coals are designated by roman rather than arabic numerals, and Nos. V, VI, and VII correspond in part with equivalent arabic-numbered coals in Illinois.

In western Kentucky three of the major units of classification correspond to those in Illinois - Carbondale named from an Illinois locality, and Tradewater and Caseyville named from Kentucky localities. The equivalent of the McLeansboro in Kentucky is divided into two formations, the Lisman below and the Henshaw above. The column has not been divided into cyclothems, and the coals, although numbered, do not have numbers that correspond to those in Indiana or Illinois. The two principal coals, Nos. 9 and 11, are correlatives of Illinois coal No. 5 and No. 6.

### TYPE LOCALITIES

Type localities for many named units have been described and published, but others are discussed in unpublished manuscripts. Publications that assigned some of the older names before 1920 did not identify the precise type locality. In the following table the locality is stated by county, township, range, section, and location in the section. They are arranged as nearly as possible in stratigraphic order, beginning with the oldest beds, and include groups, formations, cyclothems, and named beds or members. Where the type locality for a cyclothem and bed is the same, the locality is listed only once. Type localities are described in abbreviated form and no attempt has been made to cite the references.

True stratigraphic order is not possible because some of the type localities are too far apart to permit accurate correlation.

TABLE OF TYPE LOCALITIES

| Name   | State    | County      | T.                                    | R.  | Sec.   | Part            |
|--|----------|-------------|---------------------------------------|-----|--------|-----------------|
| Caseyville group                               | Kentucky | Union       | Vicinity of Caseyville on Ohio River  |     |        |                 |
| Lusk cyclothem                                 | Illinois | Pope        | 12-13S                                | 6E  |        |                 |
|  |          |             | 12S                                   | 5E  |        |                 |
| Wayside sandstone                              | Illinois | Johnson     | 11S                                   | 2E  | 30     | N $\frac{1}{2}$ |
|  |          |             |                                       |     | 31     | NE NW           |
| Battery Rock cyclothem                         | Illinois | Hardin      | 11S                                   | 10E | 26     |                 |
| Lick Creek sandstone                           | Illinois | Johnson     | 11S                                   | 2E  | 31     | NE              |
| Drury shale                                    | Illinois | Jackson     | 10S                                   | 1W  | 33, 34 |                 |
| Sellers limestone                              | Illinois | Hardin      | 11S                                   | 10E | 21     | SE              |
| Pounds cyclothem                               | Illinois | Gallatin    | 10S                                   | 8E  | 35, 36 |                 |
| Reynoldsburg coal                              | Illinois | Johnson     | 11S                                   | 4E  | 32     |                 |
| Tradewater group                               | Kentucky | Union       | Along Tradewater River below Sturgis  |     |        |                 |
| Grindstaff cyclothem                           | Illinois | Gallatin    | 10S                                   | 8E  | 28     | NE              |
| Willis coal                                    | Illinois | Gallatin    | 10S                                   | 9E  | 30     |                 |
| Babylon cyclothem                              | Illinois | Fulton      | 7N                                    | 1E  | 14     |                 |
| Boskydell marine zone                          | Illinois | Jackson     | 10S                                   | 1W  | 8      | NE              |
| Delwood cyclothem                              | Illinois | Pope        | 11S                                   | 6E  | 5      |                 |
| Ice House coal                                 | Kentucky | Union       | An ice house 2 miles south of DeKoven |     |        |                 |
| Tarter cyclothem                               | Illinois | Fulton      | 5N                                    | 1E  | 2      | SE              |
| Pope Creek cyclothem                           | Illinois | Mercer      | 14N                                   | 2W  | 33     | cen.            |
| Macedonia cyclothem                            | Illinois | Saline      | 10S                                   | 6E  | 27     | NW              |
| Murray Bluff sandstone                         | Illinois | Saline      | 10S                                   | 5E  | 35     | NE              |
| Curlew limestone, coal,<br>and sandstone       | Kentucky | Union       | Indian Hill, near Curlew              |     |        |                 |
| Seville cyclothem                              | Illinois | Fulton      | 6N                                    | 1E  | 23     | SW SW           |
| Bernadotte sandstone                           | Illinois | Fulton      | 5N                                    | 2E  | 19     | SW              |
| Rock Island coal (No. 1)                       | Illinois | Rock Island | 17-18N                                | 1E  |        |                 |
| Murphvsboro coal                               | Illinois | Jackson     | 9S                                    | 2W  | 9      | SE              |
| DeLong cyclothem (Upper,<br>Middle, and Lower) | Illinois | Knox        | 9N                                    | 2E  | 6, 8   |                 |
| Stonefort cyclothem                            | Illinois | Saline      | 10S                                   | 5E  | 30     | SW              |
| Bald Hill coal                                 | Illinois | Williamson  | 10S                                   | 4E  | 35     | SE              |
| Seahorne cyclothem                             | Illinois | Fulton      | 3N                                    | 3E  | 4, 5   | S $\frac{1}{2}$ |
| Cheltenham clay                                | Missouri | St. Louis   | Cheltenham district, St. Louis        |     |        |                 |
| Wiley cyclothem                                | Illinois | Fulton      | 7N                                    | 2E  | 16     | SW NW           |
| Colbert cyclothem                              | Illinois | Saline      | 10S                                   | 7E  | 23     | SE SW           |

TABLE OF TYPE LOCALITIES (continued)

| Name                     | State    | County     | T.  | R.  | Sec.       | Part               |
|--------------------------|----------|------------|---|-----|------------|--------------------|
| Davis coal               | Kentucky | Union      | Davis Mine, near DeKoven                    |     |            |                    |
| Greenbush cyclothem      | Illinois | Warren     | 8N  | 1W  | 24         | E $\frac{1}{2}$    |
| DeKoven cyclothem        | Kentucky | Union      | Near DeKoven Station                        |     |            |                    |
| Carbondale group         | Illinois | Jackson    | None designated                             |     |            |                    |
| Abingdon cyclothem       | Illinois | Knox       | 9N  | 2E  | 6          | cen.               |
| Isabel sandstone         | Illinois | Fulton     | 4N  | 3E  | 16         | NW NE              |
| Liverpool cyclothem      | Illinois | Fulton     | 5N  | 4E  | 17, 20, 21 |                    |
| Palzo sandstone          | Illinois | Williamson | 10S   | 4E  | 16         | SE                 |
| Browning sandstone       | Illinois | Schuyler   | 2N  | 1E  | 18         |                    |
| Colchester (No. 2) coal  | Illinois | McDonough  | 5N  | 4W  | 12, 13     |                    |
| Francis Creek shale      | Illinois | Fulton     | 5N  | 1E  | 22         | NE SW              |
| Oak Grove limestone      | Illinois | Fulton     | 5N  | 3E  | 6          | SW SE              |
| Purington shale          | Illinois | Knox       | 11N   | 2E  | 17         | SW                 |
| Summun cyclothem         | Illinois | Fulton     | 4N  | 2E  | 3          | NE                 |
| Pleasantview sandstone   | Illinois | Schuyler   | 2N  | 1E  | 31         | Along Mill Cr.     |
| Kerton Creek coal        | Illinois | Fulton     | 3N  | 2E  | 15         | cen. NE            |
| Summun No. 4 coal        | Illinois | Fulton     | 4N  | 2E  | 3          | NE                 |
| Hanover limestone        | Illinois | Greene     | 10N   | 11W | 27         | NE SW              |
| St. David cyclothem      | Illinois | Fulton     | 6N  | 4E  | 17         | SE SE              |
| Covel conglomerate       | Illinois | LaSalle    | 33N   | 3E  | 26         | SE SW              |
| Springfield (No. 5) coal | Illinois | Sangamon   | 16N   | 4W  | 16*        |                    |
| Harrisburg (No. 5) coal* | Illinois | Saline     | In coal mines in the vicinity of Harrisburg |     |            |                    |
| Canton shale             | Illinois | Fulton     | 6N  | 4E  | 9          | cen.               |
| Briar Hill (No. 5a) coal | Illinois | Saline     | 9N  | 7E  |            |                    |
| Brereton cyclothem       | Illinois | Fulton     | 7N  | 4E  | 1          | SE NE              |
| Cuba sandstone           | Illinois | Fulton     | 6N  | 3E  | 8          | E $\frac{1}{2}$ SE |
| Vermilionville sandstone | Illinois | LaSalle    | 32N   | 2E  | 9          | SE                 |
| Herrin (No. 6) coal*     | Illinois | Williamson | In coal mines in the vicinity of Herrin     |     |            |                    |
| Grape Creek coal         | Illinois | Vermilion  | 19N   | 11W | 33         | NW NW              |
| Herrin limestone         | Illinois | Williamson | In coal mines in the vicinity of Herrin     |     |            |                    |
| Brereton limestone       | Illinois | Fulton     | 7N  | 4E  | 1          | SE NE              |
| Sheffield shale          | Illinois | Bureau     | 16N   | 6E  | 24         | cen.               |
| Jamestown cyclothem      | Illinois | Perry      | 5S  | 4W  | 34         | NW NE              |



TABLE OF TYPE LOCALITIES (continued)

| Name                          | State    | County     | T.                                  | R.  | Sec.   | Part                 |
|-------------------------------|----------|------------|-------------------------------------|-----|--------|----------------------|
| Pokeberry limestone           | Illinois | Schuyler   | 2N                                  | 1W  | 26     | N $\frac{1}{2}$ SW   |
| McLeansboro group             | Illinois | Hamilton   | 4S                                  | 5E  | 25     |                      |
| Bankston cyclothem            | Illinois | Saline     | None designated                     |     |        |                      |
| Anvil Rock sandstone          | Kentucky | Union      | 1 $\frac{1}{2}$ miles NW of DeKoven |     |        |                      |
| Bankston Fork limestone       | Illinois | Saline     | 9S                                  | 5E  | 19     | NE NW                |
| Sparland cyclothem            | Illinois | Marshall   | 12N                                 | 9E  | 2      |                      |
| Copperas Creek sandstone      | Illinois | Fulton     | None designated                     |     |        |                      |
| Galum limestone               | Illinois | Perry      | 6S                                  | 4W  | 13     | N cen.               |
| No. 7 coal                    | Illinois | Fulton     | 7N                                  | 4E  | 3, 10  |                      |
| Danville (No. 7) coal         | Illinois | Vermilion  | 19N                                 | 11W | 7      | E $\frac{1}{2}$      |
| Piasa limestone               | Illinois | Jersey     | 8N                                  | 10W | 25     | E $\frac{1}{2}$      |
| Cutler limestone              | Illinois | Perry      | 6S                                  | 4W  | 2, 3   |                      |
| "Cutler Rider No. 1 coal"     | Illinois | Williamson | None designated                     |     |        |                      |
| "Cutler Rider No. 2 coal"     | Illinois | Williamson | None designated                     |     |        |                      |
| "Cutler Rider No. 3 coal"     | Illinois | Williamson | None designated                     |     |        |                      |
| Farmington shale              | Illinois | Fulton     | 8N                                  | 4E  |        |                      |
| Gimlet cyclothem              | Illinois | Marshall   | 12N                                 | 9E  | 16     | SE                   |
| Lonsdale limestone            | Illinois | Peoria     | 8N                                  | 7E  | 14     |                      |
| West Franklin limestone       | Indiana  | Posey      | 7S                                  | 12W | 24     |                      |
| Exline cyclothem              | Iowa     | Appanoose  | 67N                                 | 17W | 6      | SE                   |
| Scottville limestone and coal | Illinois | Macoupin   | 12N                                 | 9W  | 16     | W $\frac{1}{2}$ SW   |
| Collinsville limestone        | Illinois | Madison    | None designated                     |     |        |                      |
| Trivoli cyclothem             | Illinois | Peoria     | 8N                                  | 5E  | 3      | SE                   |
| No. 8 coal                    | Illinois | Gallatin   | 9S                                  | 10E | 17, 18 |                      |
| Turner cyclothem              | Illinois | Putnam     | 33N                                 | 1W  | 29     | NW NE                |
| Carlinville cyclothem         | Illinois | Macoupin   | 10N                                 | 7W  | 35     | SW SW                |
| Burroughs beds                | Illinois | Macoupin   | 10N                                 | 7W  | 27     | NW SW                |
| Macoupin cyclothem            | Illinois | Macoupin   | 9N                                  | 7W  | 2      | N $\frac{1}{2}$ cen. |
| Shoal Creek cyclothem         | Illinois | Clinton    | 4N                                  | 3W  | 34     |                      |
| New Haven limestone           | Illinois | Gallatin   | 7S                                  | 10E | 20     | NE                   |
| Mt. Carmel sandstone          | Illinois | Wabash     | 1S                                  | 12W | 21     |                      |
| Hicks cyclothem               | Illinois | Bureau     | 16N                                 | 11E | 33     | NW SW                |
| "Sorento" cyclothem           | Illinois | Bond       | 6N                                  | 4W  | 6, 7   | E $\frac{1}{2}$ edge |
| "Bunje" cyclothem             | Illinois | Bond       | 6N                                  | 4W  | 7      | S $\frac{1}{2}$      |
| "Flat Creek" cyclothem        | Illinois | Bond       | 6N                                  | 5W  | 24     | cen. E $\frac{1}{2}$ |

TABLE OF TYPE LOCALITIES (continued)

| Name                                       | State    | County     | T.       | R.         | Sec.            | Part  |
|--|----------|------------|----------|------------|-----------------|---|
| Hall cyclothem                             | Illinois | Bureau     | 16N      | 11E        | 33              | NW SW   |
| Reel limestone                             | Illinois | Wabash     | 1N       | 11W        | 8               |   |
| Millersville cyclothem                     | Illinois | Christian  | 12N      | 1W         | 28, 34          |   |
| Livingston limestones<br>(Upper and Lower) | Illinois | Clark      | 11N      | 11W        | 6               | SE NW   |
| LaSalle limestone                          | Illinois | LaSalle    | 33N      | 1E         | 14              |   |
| Friendsville coal                          | Illinois | Wabash     | 1N       | 13W        | 13, 24          |   |
| Cohn cyclothem                             | Illinois | Clark      | 11N      | 12W        | 1               | NE  |
| Little Vermilion cyclothem                 | Illinois | LaSalle    | 33N      | 1E         | 11              | SW SW   |
| Merom sandstone                            | Indiana  | Sullivan   | 7N       | 10W        | 7               |   |
| Shelbyville coal                           | Illinois | Shelby     | None     | designated |                 |   |
| Omega cyclothem                            | Illinois | Marion     | 3N       | 4E         | 18,19,30        | List Fork and<br>Bee Branch   |
| Shumway cyclothem                          | Illinois | Effingham  | 9N       | 5E         | 26              | SE SE SW  |
| "Effingham" beds                           | Illinois | Effingham  | 8N       | 6E         | 33              | Tributary to Salt<br>Creek $\frac{1}{2}$ mile<br>south of Effingham |
| Newton cyclothem                           | Illinois | Jasper     | 7N       | 10E        | 15,16,22,<br>27 |   |
| Greenup cyclothem                          | Illinois | Cumberland | 9N       | 9E         | 2, 3            |   |
| Gila cyclothem                             | Illinois | Jasper     | 8N       | 9E         | 31              | Mint Creek  |
| Woodbury cyclothem                         | Illinois | Cumberland | 9N       | 8E         | 32              | S $\frac{1}{2}$ SE  |
| Bogota cyclothem                           | Illinois | Jasper     | 5N<br>6N | 8E         | 17<br>29,32,33  | NE NE   |

\* Named from subsurface exposures in coal mines.

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INDEX MAP TO COLUMNS







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# ILLINOIS STATE GEOLOGICAL SURVEY

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