



THICKNESS OF COAL BEDS

Listed below are the average thicknesses and range in thicknesses of coal beds in the area covered by this report. Figures on the right side of the table show thickness of all coal in each bed; figures on the left side of the table show total thickness of all coal and all shale partings in each bed.

Bed No.	Average		Range		Percentage of refuse	
	Thick.	Thin.	Thick.	Thin.	Thick.	Thin.
11	7	5	19	0	5	11
10	7	5	19	0	2	13
9	10	1	22	6	8	7
8 1/2	5	2	15	5	4	6
8	5	0	7	22	6	4
7	5	1	16	7	4	11
L	No data available					
6	4	4	1	24	2	3
5T	5	5	1	6	10	1
5	11	0	4	25	0	8
3	No data available					
2 1/2	No data available					
2	4	6	3	10	2	2

INTRODUCTION

The Western Middle anthracite field is one of four structural basins in eastern Pennsylvania containing anthracite. This report describes the geology of the eastern end of the Western Middle field, which lies in the western part of the Delano quadrangle (see index map, sheet 2). This is the ninth in a series of reports describing different parts of the Western Middle field. Previous reports, which have been prepared by several different authors, are listed under Literature cited; areas covered by these reports are shown on the index map of the Western Middle field, sheet 2.

This report has been prepared to aid in planning exploratory, development, and water-control operations by showing: (a) the location of all known coal outcrops (sheet 1), (b) the depth and structure of representative coal beds (sheet 1), (c) the natural and artificial barriers between mines and the structural relationships between the basins (sheets 1 and 2), (d) the stratigraphy and intervals between coal beds (sheet 2), and (e) the nomenclature of the coal beds.

Information presented in this report was obtained, in part, from data shown on mine maps, cross sections, drill logs, and other records made available by the Lehigh Valley Coal Co. The cooperation of this organization is appreciated.

Royal R. Haley, Harold H. Arndt, Holly C. Wagner, Walter Danilchik, and Thomas M. Kohn, of the U. S. Geological Survey, aided in the field mapping of this area and the preparation of this report.

STRATIGRAPHY

Rocks of late Paleozoic and Cenozoic age crop out in the mapped area. The rocks of late Paleozoic age here comprise the Mississippian Mauch Chunk formation and the Pennsylvania Potsville, Allegheny, and Conemaugh formations. The Cenozoic rocks are assigned to the Quaternary system and consist of unconsolidated stream deposits that are composed of clay, silt, sand, and gravel; talus deposits that occur at the bases of the steeper mountain slopes; and deposits of stream-transported mine waste that include varying quantities of detrital coal. These deposits of stream-transported mine waste are in many localities the sites of valuable accumulations of detrital coal, and those large enough to be economically important are therefore shown on the outcrop map (sheet 1).

MISSISSIPPIAN ROCKS

The Mauch Chunk formation crops out in the northern part of the mapped area on the north flank of Locust Mountain and in the valley occupied by Messers Run. In the southern part of the area the formation crops out on the crests of Frackville and Eisenhuth Run anticlines in the valleys occupied by Hosenock and Codorus Creeks, respectively. Approximately 1,500 feet of the upper part of the formation is exposed in the mapped area.

The strata that comprise the Mauch Chunk formation consist mainly of red claystone, shale, siltstone, and fine-grained sandstone; but green siltstone and fine-grained sandstone, red or green medium- to coarse-grained sandstone, and scattered lenses of gray or green conglomerate are also present. Some of the beds locally appear to be lenticular. The contact between the Mauch Chunk formation and the overlying Potsville formation is gradational, and is marked at horizon below which the beds are predominantly red and above which they are predominantly gray, green, or brown.

INTRODUCTION (continued)

The Western Middle anthracite field is one of four structural basins in eastern Pennsylvania containing anthracite. This report describes the geology of the eastern end of the Western Middle field, which lies in the western part of the Delano quadrangle (see index map, sheet 2). This is the ninth in a series of reports describing different parts of the Western Middle field. Previous reports, which have been prepared by several different authors, are listed under Literature cited; areas covered by these reports are shown on the index map of the Western Middle field, sheet 2.

This report has been prepared to aid in planning exploratory, development, and water-control operations by showing: (a) the location of all known coal outcrops (sheet 1), (b) the depth and structure of representative coal beds (sheet 1), (c) the natural and artificial barriers between mines and the structural relationships between the basins (sheets 1 and 2), (d) the stratigraphy and intervals between coal beds (sheet 2), and (e) the nomenclature of the coal beds.

Information presented in this report was obtained, in part, from data shown on mine maps, cross sections, drill logs, and other records made available by the Lehigh Valley Coal Co. The cooperation of this organization is appreciated.

Royal R. Haley, Harold H. Arndt, Holly C. Wagner, Walter Danilchik, and Thomas M. Kohn, of the U. S. Geological Survey, aided in the field mapping of this area and the preparation of this report.

STRATIGRAPHY (continued)

Rocks of late Paleozoic and Cenozoic age crop out in the mapped area. The rocks of late Paleozoic age here comprise the Mississippian Mauch Chunk formation and the Pennsylvania Potsville, Allegheny, and Conemaugh formations. The Cenozoic rocks are assigned to the Quaternary system and consist of unconsolidated stream deposits that are composed of clay, silt, sand, and gravel; talus deposits that occur at the bases of the steeper mountain slopes; and deposits of stream-transported mine waste that include varying quantities of detrital coal. These deposits of stream-transported mine waste are in many localities the sites of valuable accumulations of detrital coal, and those large enough to be economically important are therefore shown on the outcrop map (sheet 1).

MISSISSIPPIAN ROCKS (continued)

The Mauch Chunk formation crops out in the northern part of the mapped area on the north flank of Locust Mountain and in the valley occupied by Messers Run. In the southern part of the area the formation crops out on the crests of Frackville and Eisenhuth Run anticlines in the valleys occupied by Hosenock and Codorus Creeks, respectively. Approximately 1,500 feet of the upper part of the formation is exposed in the mapped area.

The strata that comprise the Mauch Chunk formation consist mainly of red claystone, shale, siltstone, and fine-grained sandstone; but green siltstone and fine-grained sandstone, red or green medium- to coarse-grained sandstone, and scattered lenses of gray or green conglomerate are also present. Some of the beds locally appear to be lenticular. The contact between the Mauch Chunk formation and the overlying Potsville formation is gradational, and is marked at horizon below which the beds are predominantly red and above which they are predominantly gray, green, or brown.

STRUCTURE

The anthracite fields of Pennsylvania are northeast-trending composite synclines that range from 24 to 66 miles in length and from a fraction of a mile to 10 miles in width. The Western Middle anthracite field, one of the larger of these composite synclines, is about 36 miles long and attains a width of about 5 miles. This field consists of several overlapping anticlinal and synclinal folds, some of which have been broken by longitudinal thrust faults that trend northeast, usually subparallel to the axes of the folds. The component anticlines and synclines are best developed along the southern margin of the field, where they range from 10 to 20 miles in length. In contrast, features in the northern part of the field are generally only a few miles long.

The principal synclines that contain coal and some limbs of such synclines that are truncated by thrust faults are called basins. A basin, a practice that is followed in this report.

The structure contour map (sheet 1) shows the structure of the Buck Mountain (No. 3) coal bed by contour lines drawn at 100-foot intervals on the bottom of the coal bed. The structure contour map was compiled chiefly from data plotted from coal company mine maps. In those areas where the Buck Mountain coal bed is not known to have mined the structure contours are shown as dashed lines.

FOLDS

From north to south the major folds of the Western Middle anthracite field within the map area are the Delano, Mahanoy City, Mahanoy, and New Boston basins or synclines, and the Delano, Girardville, and Frackville anticlines.

These major folds trend N. 55°-60° E., and the dips of their axial planes range from 70° N. to 55° S. The folds are asymmetric and their limbs subequal angles ranging from 60° to 140°. The axes of the folds plunge to the southeast in the western part of the Delano quadrangle. The basins become shallower and the anticlines more prominent toward the eastern end of the Western Middle anthracite field.

The Delano syncline, the northernmost coal basin, is a relatively narrow feature that trends east-northeast across the area to the eastern end of the field. The fold is asymmetric, having a steeply dipping southern limb and a moderately dipping northern limb. The Delano anticline, which closely parallels the Delano syncline on the south, also extends across the area.

The Mahanoy City basin or syncline, which is separated from the Delano syncline by the Delano anticline, is subparallel to both of these folds. The dips of the limbs of the Mahanoy City syncline generally are 50° or less. The syncline is almost completely truncated near the central part of the mapped area by the east-northeast-trending Sulfok thrust fault. On the south the Mahanoy City syncline is flanked by the Girardville anticline. In the eastern part of the map area the southern limb of the Girardville anticline is broken near the crest by the Sulfok thrust fault. The subsurface extensions of the Mahanoy City syncline and Girardville anticline are believed to die out eastward beneath the plate of the Sulfok fault.

The southernmost major syncline in the mapped area is the Mahanoy basin. This is one of the larger and more continuous synclines in the Western Middle field. It extends eastward from the central part of the map area to a point a little beyond the eastern limit of the mapped area. The dips along the limbs of the syncline range from 25° to 50°.

The Frackville anticline, which separates the Mahanoy and New Boston synclines, also trends east-northeast across the area. It trends subparallel to the Mahanoy basin and is probably the major structural feature separating the Western Middle and Southern anthracite fields. Although coal beds locally are mined across the top of the anticline, it is in a regional sense the major anticlinal feature of this part of Pennsylvania. The New Boston basin or syncline, which lies to the south of the Frackville anticline, extends into the southwestern part of the map area. The Eisenhuth Run anticline flanks the New Boston syncline on the south. It extends across the southern part of the area, and it is the only anticline over which the coal-bearing strata of the Western Middle and Southern anthracite fields are not connected.

FAULTS

The principal faults in the area, the Delano and Sulfok faults, are thrust faults that generally parallel the axes of the folds and are the result of compression. The Delano fault trends east-northeast across the central part of the area. In the western part of the area it fractures the southern flank of the Delano anticline. Near the eastern border of the map area it joins the Sulfok fault. The Delano fault dips south-southeast at angles of 35° to 60°. The stratigraphic displacement in most places is less than 200 feet; however, the actual amount of movement is not known.

The Sulfok fault trends east-northeast in the western part of the map area, breaking the southern limb of the Girardville anticline near the crest of the fold. Near the central part of the area the strike of the fault changes to north-northeast and the fault truncates the Girardville anticline and the south limb of the Mahanoy City syncline. The

GEOLOGY OF ANTHRACITE IN THE WESTERN PART OF THE DELANO QUADRANGLE, PENNSYLVANIA

By
John A. Maxwell and Howard E. Rothrock