

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

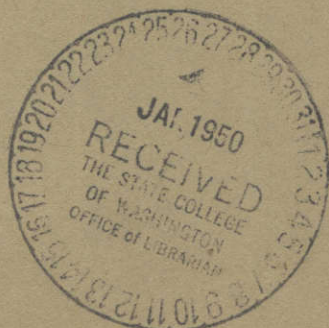
INVESTIGATION OF LOWER COAL BEDS IN GEORGES
CREEK AND NORTH PART OF UPPER POTOMAC
BASINS, ALLEGANY AND GARRETT COUNTIES, MD.

Reserves, Petrographic and Chemical Characteristics of
Coals, and Stratigraphy of Area

By

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H. L. SMITH, H. J. O'DONNELL, H. M. COOPER,
R. F. ABERNETHY, and KARL WAAGE

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UNITED STATES DEPARTMENT OF THE INTERIOR

J. A. KRUG, Secretary

BUREAU OF MINES

JAMES BOYD, Director

Technical Paper 725

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Coals, and Stratigraphy of Area**

- I. Investigation of Field and Estimated Reserves, by Albert L. Toenges, Louis A. Turnbull, and Lloyd Williams
- II. Petrographic Examination of Coal Cores, by H. L. Smith and H. J. O'Donnell
- III. Analysis of Drill-Core Samples, by H. M. Cooper and R. F. Abernethy
- IV. Stratigraphy of Georges Creek Coal Basin, by Karl M. Waage
- V. General Conclusions



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FOREWORD

There has been a steady decline in the annual production of coal from mines in Maryland since 1931 owing principally to depletion of the upper coal beds, Pittsburgh (Big Vein) and Sewickley (Tyson), which are nearing exhaustion. Unless production can be increased from the lower, thinner coal beds, the annual output is certain to decline further, with accompanying economic loss to the communities. The development of mines in these lower coal beds (which are low-volatile coking coals, some suitable for blending in the manufacture of metallurgical coke) depends upon the knowledge of reserves, the chemical properties of the coals, and physical characteristics of the surrounding strata. The purpose of this investigation was to determine these factors. In order that the findings of the work may be a permanent record, the results of the investigation are given in this technical paper.

RALPH L. BROWN,
Chief, Coal Branch,
Fuels and Explosives Division.

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INVESTIGATION OF LOWER COAL BEDS IN GEORGES CREEK AND NORTH PART OF UPPER POTOMAC BASINS, ALLEGANY AND GARRETT COUNTIES, MD.

Reserves, Petrographic and Chemical Characteristics of Coals, and Stratigraphy of Area ¹

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AND KARL M. WAAGE⁹

INTRODUCTION

The annual production of coal from mines in the Georges Creek field in Allegany and Garrett Counties, Md., has declined from 2,250,000 tons before 1931 to about 1,800,000 tons in the past few years. The greater part of this production was from mines working in the upper coal beds—Pittsburgh (Big Vein) and Sewickley (Tyson)—which are approaching depletion after many years of mining. The annual production of the field is certain to decline further, with an accompanying loss of employment for miners, unless production from the lower, thinner beds can be increased.

The coals of the lower beds are low-volatile coking coals, some of which are suitable for blending in the manufacture of metallurgical coke. Another important use for this semismokeless coal is for domestic and industrial use in the nearby Washington, Baltimore, and Pittsburgh areas. Little was known of the continuity and thickness of these beds; and the purpose of this investigation was to determine the reserves, thickness, physical characteristics, and chemical properties of these coals, with the objective of obtaining necessary data for developing mines in these lower beds.

Briefly summarized, the results of the engineering and geological investigation and diamond drilling show that the total reserve of coal

¹ Work on manuscript completed October 18, 1948.

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(measured, indicated, and inferred) over 18 inches thick in 10 lower coal beds is over 600 million tons. The percentage of recovery in mining at present probably is not more than 50 to 60 percent. However, the development of modern, mechanized mines in this field should increase recovery to 75 or 80 percent. The coals of the lower beds are strongly coking and, classified by rank, they fall into the low-to medium-volatile bituminous group. The sulfur and ash content of the coals is relatively high. The weighted average sulfur content ranges from 1.8 to 4.5 percent and the ash, from 12.3 to 21.2 percent. Tests in the Bureau of Mines laboratories indicate that the sulfur and ash can be improved by washing.

Petrographic analyses classify the coals as bright, common-banded coals. They are sparsely to moderately medium- and thin-banded and abundantly microbanded, bright matrix and friable; thin lenses of fusain and pyrite are present throughout the beds.

Geologists of the Federal Geological Survey cooperated with Bureau of Mines engineers in correlating the coal beds, and the names used for individual beds follow Pennsylvania terminology, which is standard for the northern Appalachian field.

ACKNOWLEDGMENTS

The field survey and investigation were under the direction of Albert L. Toenges, Louis A. Turnbull, and Lloyd Williams. The initial diamond drilling was begun under the supervision of James J. Dowd and Joseph J. Shields, mining engineers of the Bureau of Mines. The preparation of thin sections and petrographic analyses of coal samples were supervised by H. L. Smith, assisted by H. J. O'Donnell. Coal analyses were under the direction of H. M. Cooper and R. F. Abernethy. Miscellaneous analyses were directed by W. A. Selvig, chief chemist, Miscellaneous Analysis Section. Illustrations were prepared by the Graphic Section at Pittsburgh, under the supervision of Louis F. Perry, supervising engineer. Geological field work was conducted by D. A. Andrews, C. Merrels, Norman M. Denson, and Karl M. Waage, geologists of the Federal Geological Survey, whose assistance throughout the project is acknowledged. The stratigraphy of the area is discussed by Dr. Waage.

The cooperation and assistance of Joseph T. Singewald, Jr., director; John J. Rutledge, chief mine engineer; and Frank T. Powers and Clyde J. Rowe, district mine inspectors, of the Maryland Department of Geology, Mines, and Water Resources, are gratefully acknowledged. Thanks are extended to William Claus, general manager, Cumberland & Pennsylvania Railroad Co.; Andrew B. Crichton and other officials of the Johnstown Coal & Coke Co.; William E. Jenkins, president, Consolidated Fuel Co.; and other mine operators in the district, for their cooperation and many courtesies throughout the investigation.



FIGURE 2.—Looking south in Georges Creek Valley.



FIGURE 3.—Diamond-drill set-up.

PART I.—INVESTIGATION OF FIELD AND ESTIMATED RESERVES

By ALBERT L. TOENGES, LOUIS A. TURNBULL, AND LLOYD WILLIAMS

INTRODUCTION

A reconnaissance of the area was made in the summer of 1944. Following this reconnaissance, the investigation of the lower coal beds in this field was undertaken. Mines operating in the lower beds were examined, and all maps and other available information regarding abandoned mines were procured. Face samples of each bed were obtained for petrographic and chemical analyses and for tests to determine the washability characteristics of the coals. Results of washability tests have been published.¹⁰

The thickness of the beds and the physical conditions in and surrounding these beds were determined from cores of 26 diamond-drill holes. The locations of these holes are shown in figure 1. The diamond-drill cores of the coal beds also were used for petrographic examination and chemical analysis.

The investigation was confined to the coal beds underlying the Pittsburgh (Big Vein) and Sewickley (Tyson) beds.

DESCRIPTION OF AREA INVESTIGATED

The area investigated comprises the Georges Creek Basin in Maryland, between Dans Mountain and Big Savage Mountain, from the Pennsylvania-Maryland State line south to the Savage River; also the northern part of the Upper Potomac Basin between the Potomac River (Maryland-West Virginia State line) and Backbone Mountain, from the Savage River south to Lostland Run.

The topography of the area is rough, and elevations range from about 1,000 feet in the Georges Creek Valley to 3,000 feet on Big Savage Mountain and 2,800 feet on Dans Mountain. Elevations in the northern part of the Upper Potomac Basin range from 1,000 feet in the Potomac River Valley to 3,000 feet on Backbone Mountain. A typical view of the topography in the Georges Creek field is shown in figure 2.

The Cumberland & Pennsylvania Railroad Co. (now operated by the Western Maryland Ry. Co.) traverses the Georges Creek Valley from north to south, and mine spurs have been built from the main line to many of the mines in this field. Mines operating on the slopes of the hills use trucks or inclined planes to transport coal to railroad sidings in the valley or load directly into railroad cars. Coal produced at mines on Big Savage, Dans, and Backbone Mountains is transported by trucks to railroad loading points. A branch of the Baltimore & Ohio Railroad extends diagonally across the south end of the Georges Creek Basin in the Savage River Valley. The Western Maryland Railway traverses the Upper Potomac Basin from north to

¹⁰ Crentz, W. L., and Fraser, Thomas, Preparation Characteristics of Maryland Coals: Bureau of Mines Tech. Paper 701, 1947, 65 pp.

south in the Potomac River Valley on the West Virginia side of the river, with branch lines across the Potomac River at Chaffie and Dodson. A branch line extends from Chaffie across the river, up Threefork Run, to mines in the vicinity of Vindex.

United States Highway No. 40 traverses the Georges Creek field from east to west through Frostburg. A paved highway extends from Frostburg to Westernport in the Georges Creek Valley, and many paved and graveled county roads traverse both the Georges Creek and Upper Potomac Basins in every direction. Many areas on the mountain slopes can be reached over side roads and trails that are accessible by automobile only in good weather.

DIAMOND DRILLING

Diamond drilling was contracted by the Bureau of Mines to the Pennsylvania Drilling Co., Pittsburgh, Pa. As a guide for estimating the cost of diamond drilling to secure cores of $2\frac{1}{8}$ inches minimum diameter in this general locality, and under similar conditions, unit contract prices are given:

1. Drilling and setting standpipe through overburden to accommodate continued drilling as ordered by resident Government engineer:	<i>Per foot</i>
A. 0 to 50 feet.....	\$3. 80
B. Beyond depth of 50 feet.....	3. 80
2. Prices to be paid for drilling from bottom of standpipe to bottom of hole except for reaming and casing—drilling with diamond bit to secure core of $2\frac{1}{8}$ inches minimum diameter: 3,500 feet of drilling guaranteed.	3. 80
3. Additional diamond-drill-core boring as may be ordered by the resident Government engineer in excess of the minimum guarantee for items 1 and 2, inclusive, shall be performed at the following prices:	
From 3,500 to 12,000 feet.....	3. 50
More than 12,000 feet.....	3. 25
4. Reaming hole and installing casing.....	2. 00
5. For cementing, waiting for cement to set, and drilling out cement.....	7. 00
6. Surveying.....	<i>Per hour</i> \$4. 50
7. Plugging holes with cement from bottom of hole to 50 feet above minable coal beds.....	<i>Per hole</i> \$85. 00

Twenty-six diamond-drill holes were drilled at locations shown in figure 1. Each hole is designated by a serial number followed by two letters. The serial numbers designate the order of drilling and the letters "GC" show that the hole was drilled at the Georges Creek project. A typical drill set-up is shown in figure 3.

Detailed logs of the drill holes and analyses of coal cores are given in the appendix. Hole locations are shown in figure 1 and sketches of each location are given in the appendix. The Georges Creek area is not subdivided into sections, and descriptions of hole locations follow:

- Hole 1-GC:* On Mill Run, Garrett County, Md., 1.6 mi. S. 82° W. of Barton. Hole is 55 feet N. 77° E. of a bridge across a branch of Mill Run. Landowner: Kinsley McDonald.
- Hole 2-GC:* On Moores Run, Allegany County, Md., 1.3 mi. east of Barton. Hole is 90 feet S. 53° E. of a bridge across Moores Run. Landowner: Potomac Coal Co., Inc.
- Hole 3-GC:* On Laurel Run, Garrett County, Md., 2.5 mi. N. 2° W. of Barton. Hole is 128 feet S. 9° W. of a bridge across Laurel Run. Landowner: Arthur Bowser.

- Hole 4-GC:* On a north branch of Mill Run, Garrett County, Md., 2.3 mi. N. 56° W. of Barton. Hole is 130 feet S. 18° W. of a bridge across a branch of Mill Run. Landowner: Georges Creek Coal Co.
- Hole 5-GC:* On Koontz Run, Allegany County, Md., 2.0 mi. N. 31° W. of Lonaconing. Hole is 178 feet S. 47° E. of a bridge across Koontz Run. Landowner: Koontz Coal Co.
- Hole 6-GC:* On Jackson Run, Allegany County, Md., 1.0 mi. S. 20° E. of Lonaconing. Hole is 270 feet S. 26° E. of east corner of dam breast across Jackson Run. Landowner: Lonaconing Water Co.
- Hole 7-GC:* On Elklick Run, Allegany County, Md., 2.4 mi. N. 70° E. of Lonaconing. Hole is 263 feet S. 40° E. of NE. corner of dam breast across Elklick Run. Landowner: Georges Creek Coal Co.
- Hole 8-GC:* On Stony Run, Allegany County, Md., 2.1 mi. N. 60° E. of Westernport. Hole is 44 feet S. 45° E. of a bridge across Stony Run. Landowner: Charles W. Clark.
- Hole 9-GC:* Approximately 3,000 feet NE. of Aaron Run, Garrett County, Md., 2.7 mi. N. 39° W. of Westernport. Hole is approximately 1,150 feet S. 60° E. of Thomas Magruder residence. Landowner: Charles Michaels estate.
- Hole 10-GC:* Approximately 1,000 feet NE. of Winebrenner Run, Allegany County, Md., 1.8 mi. S. 60° W. of Frostburg Post Office. Hole is 35 feet S. 48° W. from centerline of road at gate. Landowner: Ben Filer.
- Hole 11-GC:* On an east branch of Neff Run, Allegany County, Md., 1.2 mi. S. 8° E. of Vale Summit, Allegany County, Md. Hole is 33 feet S. 30° E. of beginning of stone fence, which is 181 feet S. 58° W. of brick residence of Henry Long. Landowner: Henry Long.
- Hole 12-GC:* On Aaron Run, Garrett County, Md., 2.8 mi. N. 66° W. of Westernport. Hole is 53 feet N. 40° W. of bridge across Aaron Run. Landowner: Eva Duckworth.
- Hole 13-GC:* On Bloomington Hill, Garrett County, Md., 1.7 mi. N. 82° W. of Bloomington. Hole is 111 feet N. 81° W. of the second opening of Pattison No. 2 mine. Landowner: Pattison estate.
- Hole 14-GC:* On Caldonia Hill side of Mill Run, Allegany County, Md., 0.9 mi. S. 43° W. of Barton. Hole is 415 feet N. 32° W. of bull wheel near Barton mine portal, Georges Creek Coal Co. Landowner: Morrison estate.
- Hole 15-GC:* On a south branch of Braddock Run, Allegany County, Md., 0.1 mi. NW. of Loarville. Hole is 8 feet S. 73° W. of a Consolidated Fuel Co. property corner, which is 58 feet N. 17° W. of Loarville Road. Landowner: Consolidated Fuel Co.
- Hole 16-GC:* On a north branch of Braddock Run, Allegany County, Md., 1.5 mi. N. 84° E. of Eckhart Mines. Hole is 18 feet N. 30° E. from a point on a fence equal distance from 2 walnut trees on north side of road. Landowner: Agnes M. Booth.
- Hole 17-GC:* On a south branch of Laurel Run, Garrett County, Md., 3.9 mi. S. 74° W. of Bloomington. Hole is 97 feet N. 23° W. of bridge across branch of Laurel Run. Landowner: Troxall J. Tichnell.
- Hole 18-GC:* On a south branch of Folly Run, Garrett County, Md., 5.0 mi. S. 68° W. of Bloomington. Hole is 543 feet N. 72° E. of residence of Blanche Sharpless. Landowner: Blanche C. Sharpless.
- Hole 19-GC:* Approximately 700 feet west of a south branch of Jennings Run, Allegany County, Md., 0.5 mi. N. 58° E. of Mount Savage. Hole is approximately 900 feet S. 40° E. of residence of Stanley Weimer. Landowner: Stanley Weimer.
- Hole 20-GC:* On a north branch of Jennings Run, Allegany County, Md., 2.2 mi. N. 40° E. of Mount Savage. Hole is 80 feet S. 75° W. of a bridge across a branch of Jennings Run. Landowner: Louis C. Smith and others.
- Hole 21-GC:* On a west branch of Georges Creek headwaters along old U. S. Route 40, Allegany County, Md., 1.3 mi. N. 34° W. of Frostburg Post Office. Hole is 1,030 feet N. 50° W. of Frostburg filtration plant. Landowner: Borden Mining Co.

- Hole 22-GC:* Approximately 1,000 feet north of Bell Run, a north branch of Wolfden Run, Garrett County, Md., 2.2 mi. N. 53° W., of Kitzmiller. Hole is 176 feet N. 87° W. of intersection of dirt road with Kitzmiller-Oakland paved road. Landowner: Claude O. Ruhrbaugh.
- Hole 23-GC:* On Mount Zion Church Hill, Garrett County, Md., 1.8 mi. N. 23° E. of Vindex. Hole is 540 feet S. 54° E. of the intersection of Mount Zion Church road and another road. Landowner: Rowland C. Duckworth.
- Hole 24-GC:* On a branch of Lostland Run, Garrett County, Md., 4.5 mi. due west of Kitzmiller. Hole is 72 feet S. 20° W. of a bridge across a branch of Lostland Run. Landowner: Elsie C. Collins.
- Hole 25-GC:* On a north branch of Jennings Run in Dutch Hollow, Allegany County, Md., 1.6 mi. S. 82° W. of Mount Savage. Hole is 106 feet N. 6° W. of a bridge across a branch of Jennings Run. Landowner: Mount Savage Refractories Co.
- Hole 26-GC:* On Georges Creek, Allegany County, Md., 1.2 mi. N. 30° E. of Lonaconing. Hole is 234 feet S. 83° E. of a railroad bridge across Georges Creek. Landowner: Georges Creek Coal & Iron Co.

Diamond drilling was begun January 12, 1945. Two drills operated one shift each a day, 6 days a week, until March 13, 1945. From March 14 to September 26, 1945, one drill operated one shift a day and one drill, two shifts a day. Double shifting then was discontinued; and two drills were operated one shift each a day, 6 days a week, until drilling was completed on July 13, 1946. Progress of drilling at the project follows:

Holes drilled.....	26
Feet drilled.....	22, 351
Drill shifts (number of drilling shifts).....	845
Average feet per drill per drilling shift.....	26. 5
Drill shifts, including moves and repairs.....	1, 013
Average feet per drill per shift, including moves and repairs.....	22. 1
Total shifts, including moves, repairs, inclement weather, and all other delays.....	1, 054
Average feet per drill per shift, including moves, repairs, inclement weather, and all other delays.....	21. 2

COAL BEDS PENETRATED IN DRILLING

All drill holes were started at about the horizon of the Barton bed, which is below the horizon of the Pittsburgh (Big Vein), Sewickley (Tyson), and Franklin beds. The remaining reserves and areas of unmined coal in the Pittsburgh and Tyson beds are well-known, and this investigation was planned to determine the reserves in the beds below these horizons. Most of the holes were drilled through the horizon of the Mount Savage coals into the Homewood sandstone. No minable coal beds were encountered below the Mount Savage horizon. Five holes (5-GC, 6-GC, 20-GC, 21-GC, and 22-GC) were drilled to the Mauch Chunk red beds (Mississippian) to obtain geological information and to check the thickness of the coal beds in the Pottsville formation.

The coal beds in the Georges Creek Basin lie in a wide, flat, synclinal basin. The limbs of this syncline are steeply pitching near the coal outcrops on the slopes of Big Savage and Dans Mountains. The axis of the syncline is northeast, southwest, and roughly parallels the course of Georges Creek. The strata dip from the outcrops toward the axis of the syncline, and the dip of the coal beds is greater near the bed outcrops than in the center of the basin. Diamond-drill holes were spaced too far apart to compute accurately dips of the

coal beds in various areas. For this reason, the maps in this report do not show this information. In general, the dip of the coal beds ranges from practically flat-lying in the center of the basin to 15° near some of the coal outcrops.

Thirteen beds of coal between the horizons of the Barton and Mount Savage beds were penetrated in drilling. These beds, from the top downward, are:

Barton.—Also known locally as the Bakerstown and as the Four Foot and Elklick near the Monroe mine on the west side of the Potomac River, opposite Barnum, W. Va.

Federal Hill.—This bed is not persistent in this field and has not been mined commercially. Diamond drilling did not show any areas of minable thickness, although hole 20-GC penetrated a coal bed 20 inches thick containing a ½-inch shale parting at the Federal Hill horizon.

Harlem.—Also known as Brush Creek.

Upper Bakerstown.—Also known locally as Upper Freeport, Mahoning, and Maynadier.

Lower Bakerstown.—Also known locally as the Lower Freeport in the Georges Creek Basin, Upper Freeport in the Upper Potomac Basin, the "E" bed at Vindex, and the Thomas bed.

Brush Creek.—Also known locally as the Upper Kittanning. No mining operations are known to have been conducted in this bed in either the Georges Creek or Upper Potomac Basins. This bed is confused with the Harlem bed, which is mined near Mount Savage.

Mahoning.—Also known locally as the Middle Kittanning, Lower Kittanning, Piedmont, Six Foot, Clean Six in the vicinity of Westernport, and "C" bed at Vindex.

Upper Freeport.—Also known locally as the Split Six, Davis, Lower Kittanning in the vicinity of Kitzmiller, and "B" bed at Vindex.

Lower Freeport.—Also known locally as the Barrelville and Parker in the vicinity of Mount Savage.

Upper Kittanning.—Also known locally as the Bond, Bluebaugh and Montell at Mount Savage and Frostburg, Clarion in the vicinity of Kitzmiller and Vindex, and sometimes as the "A Prime" at Vindex.

Middle Kittanning.—Also known locally as the Piney Mountain, Brookville near Luke and Westernport, and "A" bed at Vindex.

Lower Kittanning.

Mount Savage.—This bed is thin and irregular and is not mined in the Georges Creek and Upper Potomac Basins. The bed derives its name from the Mount Savage fireclay, with which it is closely associated.

INTERPRETATION OF DRILLING RESULTS AND ESTIMATED RESERVES OF COAL

Estimates of reserves of coal remaining in the lower coal beds have been made. The terms "Measured," "Indicated," and "Inferred" reserves are used. These definitions of classification have been agreed upon by the Bureau of Mines and the Geological Survey and the definition of each classification is given below so that the meaning of the estimates may be readily understood:

Measured ore (or coal): Is ore (coal) for which tonnage is computed from dimensions revealed in outcrops, trenches, workings, and drill holes and for which

the grade is computed from the results of detailed sampling. The sites for inspection, sampling, and measurement are so closely spaced and the geologic character is so well-defined that the size, shape, and mineral content are well-established. The computed tonnage and grade are judged to be accurate within limits which are stated, and no such limit is judged to differ from the computed tonnage or grade by more than 20 percent.

Indicated ore (or coal): Is ore (coal) for which tonnage and grade are computed partly from specific measurements, samples, or production data and partly from projection for a reasonable distance on geologic evidence. The sites available for inspection, measurement, and sampling are too widely or otherwise inappropriately spaced to outline the ore (or coal) completely or to establish its grade throughout.

Inferred ore (or coal): Is ore (coal) for which quantitative estimates are based largely on broad knowledge of the geologic character of the deposit and for which there are few, if any, samples or measurements. The estimates are based on an assumed continuity or repetition for which there is geologic evidence; this evidence may include comparison with deposits of similar type. Bodies that are completely concealed may be included if there is specific geologic evidence of their presence. Estimates of inferred ore (coal) should include a statement of the spacial limits within which the inferred ore (coal) may lie.

Estimates of reserves are based upon the results obtained in diamond drilling, examinations of operating mines, information obtained from maps of abandoned mines and other sources, and a thorough engineering and geologic study of the field.

Estimated reserves for each bed are tabulated as to thickness of the coal bed under the headings from 18 to 24 inches, 24 to 30 inches, 30 to 36 inches, and over 36 inches thick. This report does not intend to state that coal 18 inches thick can be economically mined at present or to determine the minimum thickness that might be profitably mined. The estimates are presented in this form to give the coal-mine operators and others interested in the field as much detailed information as possible. The areas of estimated reserves are shown on the maps of each coal bed. The maps also show sections of the coal bed in these areas. Almost without exception, additional investigation of the areas by diamond drilling should be done before large-scale mine development is planned or undertaken.

The percentage of recovery of coal at most mines in this field under present mining practices probably is 50 to 60 percent. The development of modern mechanized mines should increase recovery per acre 75 to 80 percent.

A discussion of each coal bed, together with the estimated reserves of coal, follows:

Barton (refer to fig. 4):

The Barton bed has been mined extensively in the Georges Creek Valley between Westernport and Moscow Mills. Most of the mining in this area has been east and west from the outcrop of the bed in the valley. Most of the reserves remaining are estimated to be in the area from Westernport to Lonaconing. The bed has been mined to a small extent near Mount Savage, and some mining has been done west of Bloomington and near Barnum.

Estimated reserves of coal—Barton bed

Area	Acres	Estimated reserves (thousands of tons)			
		18 to 24 in.	24 to 30 in.	Over 30 in.	Total
Frostburg-Mount Savage:					
Indicated.....	1,696	4,437			4,437
Inferred.....	1,884	4,917			4,917
	3,580	9,354			9,354
Westernport-Lonaconing:					
Indicated.....	6,548	4,400	15,082	2,297	21,779
Inferred.....	8,173	3,596	18,288	6,699	28,583
	14,721	7,996	33,370	8,996	60,362
Barnum: Indicated.....	828			3,602	3,602
Total:					
Indicated.....	9,072	8,837	15,082	5,899	29,818
Inferred.....	10,067	8,513	18,288	6,699	33,500
	19,129	17,350	33,370	12,598	63,318

Harlem (refer to fig. 5):

The Harlem bed underlies the fossil-bearing Ames shale and is one of the most persistent beds in the Georges Creek Basin. It is easily identified and therefore is of assistance in correlating the coal beds and other strata in this field. However, the bed is thin and has been mined only to a small extent in the vicinity of Mount Savage, where it reaches a thickness of 25 inches. Most of the reserves of coal 18 inches or more thick are in the Barton-Lonaconing area, where the bed is 19 inches thick in holes 5-GC and 6-GC and 21 inches thick in hole 2-GC.

Estimated reserves of coal—Harlem bed

Area	Acres	Estimated reserves (thousands of tons)		
		18 to 24 in.	24 to 30 in.	Total
Mount Savage: Indicated.....	1,296	1,396	2,645	4,041
Barton-Lonaconing: Indicated.....	4,574	11,939		11,939
Upper Potomac: Inferred.....	257	671		671
Total:				
Indicated.....	5,869	13,335	2,645	15,980
Inferred.....	257	671		671
	6,126	14,006	2,645	16,651

10 GEORGES CREEK AND UPPER POTOMAC COAL BEDS, MD.

Upper Bakerstown (refer to fig. 6):

No commercial mines are operating in the Upper Bakerstown bed at this time. Several small mines were developed in the Frostburg-Mount Savage area, but these mines have been abandoned. The bed usually contains one to four shale partings, and analyses of the coal show a high ash content, even with the partings removed. The weighted average ash content of diamond-drill cores from this bed is 21.2 percent (refer to table 1, pt. III), which probably is the reason this bed has not been mined more extensively.

Estimated reserves of coal—Upper Bakerstown bed

Area	Acres	Estimated reserves (thousands of tons)				
		18 to 24 in.	24 to 30 in.	30 to 36 in.	Over 36 in.	Total
Frostburg-Mount Savage:						
Indicated.....	4,645	1,177	11,014	4,476		16,667
Inferred.....	2,860	7,465				7,465
	7,505	8,642	11,014	4,476		24,132
Vale Summit:						
Indicated.....	2,395		4,869	4,333		9,202
Inferred.....	493	1,287				1,287
	2,888	1,287	4,869	4,333		10,489
Barton-Lonaconing:						
Measured.....	1,395				7,282	7,282
Indicated.....	7,191	2,000	10,155	13,785	1,764	27,704
Inferred.....	3,086	4,941	1,987	1,736	1,164	9,828
	11,672	6,941	12,142	15,521	10,210	44,814
Total:						
Measured.....	1,395				7,282	7,282
Indicated.....	14,231	3,177	26,038	22,594	1,764	53,573
Inferred.....	6,439	13,693	1,987	1,736	1,164	18,580
	22,065	16,870	28,025	24,330	10,210	79,435

Lower Bakerstown (refer to fig. 7):

This bed has been mined near Mount Savage, north and west of Westernport, in the Kitzmiller-Vindex area and to a small extent near the headwaters of Lostland Run in the Upper Potomac Basin. The bed is irregular in thickness and in most areas contains at least one and sometimes several shale partings. Diamond drilling shows that the most favorable bed conditions and largest reserves of coal are in the Westernport-Lonaconing area.

Estimated reserves of coal—Lower Bakerstown bed

Area	Acres	Estimated reserves (thousands of tons)				
		18 to 24 in.	24 to 30 in.	30 to 36 in.	Over 36 in.	Total
Mount Savage:						
Indicated.....	4,401	1,065	2,172	2,366	14,747	20,350
Inferred.....	1,027		1,810	2,205		4,016
	5,428	1,065	3,982	4,571	14,747	24,365
Westernport-Lonaconing:						
Indicated.....	16,313		4,761	43,013	26,398	74,172
Inferred.....	4,031	4,239	1,785	8,239		14,263
	20,344	4,239	6,546	51,252	26,398	88,435
Kitzmiller-Barnum:						
Indicated.....	1,002	321	981	2,597		3,899
Inferred.....	3,598	963	1,260	12,471		14,694
	4,600	1,284	2,241	15,068		18,593
Total:						
Indicated.....	21,716	1,386	7,914	47,976	41,145	98,421
Inferred.....	8,656	5,202	4,855	22,915		32,972
	30,372	6,588	12,769	70,891	41,145	131,393

Mahoning (refer to fig. 8):

Several commercial mines were operated in the Mahoning bed near Westernport. These mines now are abandoned. Diamond drilling indicated that there may be an area of unmined Mahoning coal north of Westernport surrounding hole 8-GC. Based upon all information available, the principal reserves of Mahoning coal are in the Kitzmiller-Vindex area.

Estimated reserves of coal—Mahoning bed

Area	Acres	Estimated reserves (thousands of tons)				Total
		18 to 24 in.	24 to 30 in.	30 to 36 in.	Over 36 in.	
Westernport: Inferred.....	1, 814	1, 498	1, 643	3, 341		6, 482
Kitzmiller-Vindex:						
Indicated.....	1, 459		585	3, 998	1, 942	6, 525
Inferred.....	1, 599	851	3, 852	722		5, 425
	3, 058	851	4, 437	4, 720	1, 942	11, 950
Total:						
Indicated.....	1, 459		585	3, 998	1, 942	6, 525
Inferred.....	3, 413	2, 349	5, 495	4, 063		11, 907
	4, 872	2, 349	6, 080	8, 061	1, 942	18, 432

Upper Freeport (refer to fig. 9):

The Upper Freeport bed has been mined to some extent near Vale Summit and Westernport. It has been extensively mined in the Kitzmiller-Vindex area, and present mining is confined to this area.

Estimated reserves of coal—Upper Freeport bed

Area	Acres	Estimated reserves (thousands of tons)				Total
		18 to 24 in.	24 to 30 in.	30 to 36 in.	Over 36 in.	
Frostburg-Vale Summit:						
Indicated.....	6, 237			11, 092	19, 247	30, 339
Inferred.....	6, 579	7, 514	10, 868	2, 510		20, 892
	12, 816	7, 514	10, 868	13, 602	19, 247	51, 231
Westernport-Lonaconing:						
Indicated.....	10, 786	13, 282	4, 869		22, 436	40, 587
Inferred.....	6, 372	2, 850	3, 584	3, 136	18, 421	27, 991
	17, 158	16, 132	8, 453	3, 136	40, 857	68, 578
Kitzmiller-Barnum:						
Measured.....	1, 717			848	7, 945	8, 793
Indicated.....	2, 999		8, 675		2, 641	11, 316
Inferred.....	1, 611			7, 008		7, 008
	6, 327		8, 675	7, 856	10, 586	27, 117
Total:						
Measured.....	1, 717			848	7, 945	8, 793
Indicated.....	20, 022	13, 282	13, 544	11, 092	44, 324	82, 242
Inferred.....	14, 562	10, 364	14, 452	12, 654	18, 421	55, 891
	36, 301	23, 646	27, 996	24, 594	70, 690	146, 926

12 GEORGES CREEK AND UPPER POTOMAC COAL BEDS, MD.

Lower Freeport (refer to fig. 10):

A relatively small area of this bed has been mined east of Mount Savage, and one mine is now operating in this area. A reserve of coal is inferred between the workings of these mines and the Pennsylvania-Maryland State line.

Estimated reserves of coal—Lower Freeport bed

Area	Acres	Estimated reserves (thousands of tons)				
		18 to 24 in.	24 to 30 in.	30 to 36 in.	Over 36 in.	Total
Mount Savage: Inferred.....	932	606	2,436	.....	.....	3,042

Upper Kittanning (refer to fig 11):

Most of the past mining in this bed has been in the vicinity of Vale Summit, Eckhart Mines, and Mount Savage. The bed also has been mined near Vindex in the Upper Potomac Basin. The weighted average ash analysis of cores from 10 diamond-drill holes is 14.4 percent. This is about the average ash content of coal from the lower beds in this field and is lower than the Upper Bakerstown, Lower Bakerstown, Middle Kittanning, and Lower Kittanning.

Estimated reserves of coal—Upper Kittanning bed

Area	Acres	Estimated reserves (thousands of tons)				
		18 to 24 in.	24 to 30 in.	30 to 36 in.	Over 36 in.	Total
Vale Summit-Mount Savage:						
Indicated.....	1,943	3,474	1,549	.....	872	5,895
Inferred.....	4,431	217	6,612	7,060	4,307	18,196
	6,374	3,691	8,161	7,060	5,179	24,091
Westernport-Moscow Mills:						
Indicated.....	10,422	7,728	21,172	5,990	.....	34,890
Inferred.....	3,810	6,481	1,496	4,337	.....	12,314
	14,332	14,209	22,668	10,327	.....	47,204
Kitzmiller-Barnum:						
Measured.....	2,372	606	1,086	7,952	.....	9,644
Indicated.....	2,529	971	1,855	7,064	.....	9,890
Inferred.....	1,366	2,041	2,032	.....	.....	4,073
	6,267	3,618	4,973	15,016	.....	23,607
Total:						
Measured.....	2,372	606	1,086	7,952	.....	9,644
Indicated.....	14,894	12,173	24,576	13,054	872	50,675
Inferred.....	8,707	8,739	10,140	11,397	4,307	34,583
	26,973	21,518	35,802	32,403	5,179	94,902

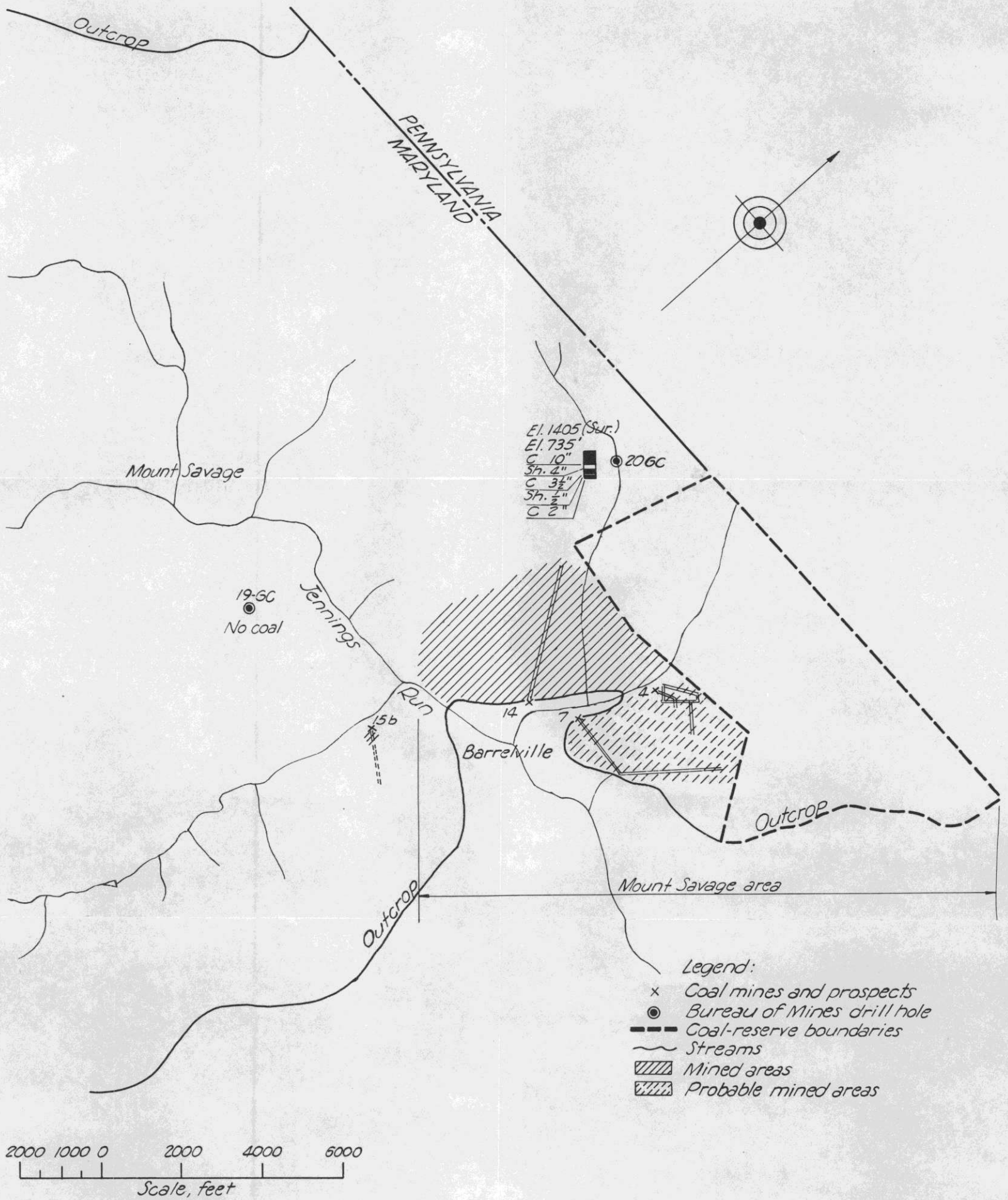


FIGURE 10.—Map of Lower Freeport coal bed.

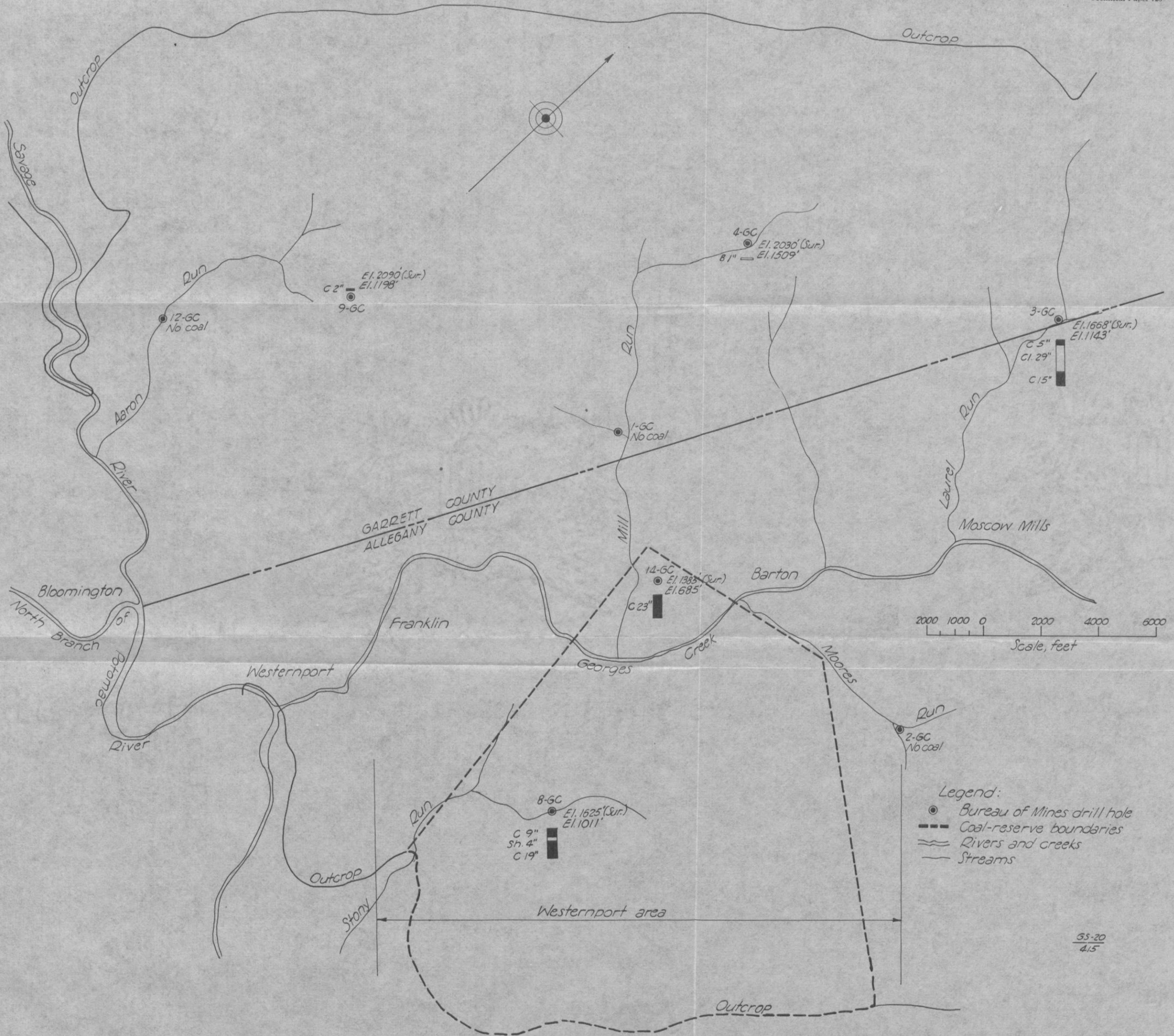


FIGURE 13.—Map of Lower Kittanning coal bed.

PART I.—INVESTIGATION OF FIELD AND ESTIMATED RESERVES 13

Middle Kittanning (refer to fig. 12):

The Middle Kittanning bed has been mined to some extent near Westernport and an inferred reserve of coal is indicated by diamond drilling north of Westernport. However, the principal reserve of coal in the bed is in the west side of the Upper Potomac Basin.

Estimated reserves of coal—Middle Kittanning bed

Area	Acres	Estimated reserves (thousands of tons)				
		18 to 24 in.	24 to 30 in.	30 to 36 in.	Over 36 in.	Total
Westernport-Barton: Inferred.....	6,659	11,019	8,481	-----	-----	19,500
Kitzmilller-Barnum:						
Measured.....	1,756	-----	-----	-----	9,166	9,166
Indicated.....	6,882	3,322	8,238	6,938	8,597	27,096
Inferred.....	1,434	736	755	1,131	3,524	6,146
	10,072	4,058	8,993	8,069	21,287	42,407
Total:						
Measured.....	1,756	-----	-----	-----	9,166	9,166
Indicated.....	6,882	3,322	8,238	6,938	8,597	27,095
Inferred.....	8,093	11,755	9,236	1,131	3,524	25,646
	16,731	15,077	17,474	8,069	21,287	61,907

Lower Kittanning (refer to fig. 13):

Mining in this bed has been conducted in only a few small drift mines southwest of Kitzmilller. Based upon information secured from drill holes 8-GC and 14-GC, an area of inferred reserve is assumed near Westernport.

Estimated reserves of coal—Lower Kittanning bed

Area	Acres	Estimated reserves (thousands of tons)				
		18 to 24 in.	24 to 30 in.	30 to 36 in.	Over 36 in.	Total
Westernport: Inferred.....	3,625	5,674	5,049	-----	-----	10,723

14 GEORGES CREEK AND UPPER POTOMAC COAL BEDS, MD.

Recapitulation of total estimated reserves of coal in lower beds, Georges Creek and north part of Upper Potomac Basins

Bed	Estimated reserves (thousands of tons)				
	18 to 24 in.	24 to 30 in.	30 to 36 in.	Over 36 in.	Total
Barton:					
Indicated.....	8,837	15,082	5,899		29,818
Inferred.....	8,513	18,288	6,699		33,500
	17,350	33,370	12,598		63,318
Harlem:					
Indicated.....	13,335	2,645			15,980
Inferred.....	671				671
	14,006	2,645			16,651
Upper Bakerstown:					
Measured.....				7,282	7,282
Indicated.....	3,177	26,038	22,594	1,764	53,573
Inferred.....	13,693	1,987	1,736	1,164	18,580
	16,870	28,025	24,330	10,210	79,435
Lower Bakerstown:					
Indicated.....	1,386	7,914	47,976	41,145	98,421
Inferred.....	5,202	4,855	22,915		32,972
	6,588	12,769	70,891	41,145	131,393
Mahoning:					
Indicated.....		585	3,998	1,942	6,525
Inferred.....	2,349	5,495	4,063		11,907
	2,349	6,080	8,061	1,942	18,432
Upper Freeport:					
Measured.....			848	7,945	8,793
Indicated.....	13,282	13,544	11,092	44,324	82,242
Inferred.....	10,364	14,452	12,654	18,421	55,891
	23,646	27,996	24,594	70,690	146,926
Lower Freeport: Inferred.....	606	2,436			3,042
Upper Kittanning:					
Measured.....	606	1,086	7,952		9,644
Indicated.....	12,173	24,576	13,054	872	50,675
Inferred.....	8,739	10,140	11,397	4,307	34,583
	21,518	35,802	32,403	5,179	94,902
Middle Kittanning:					
Measured.....				9,166	9,166
Indicated.....	3,322	8,238	6,938	8,597	27,095
Inferred.....	11,755	9,236	1,131	3,524	25,646
	15,077	17,474	8,069	21,287	61,907
Lower Kittanning: Inferred.....	5,674	5,049			10,723
Total—all beds:					
Measured.....	606	1,086	8,800	24,393	34,885
Indicated.....	55,512	98,622	111,551	98,644	364,329
Inferred.....	67,566	71,938	60,595	27,416	227,515
	123,684	171,646	180,946	150,453	626,729

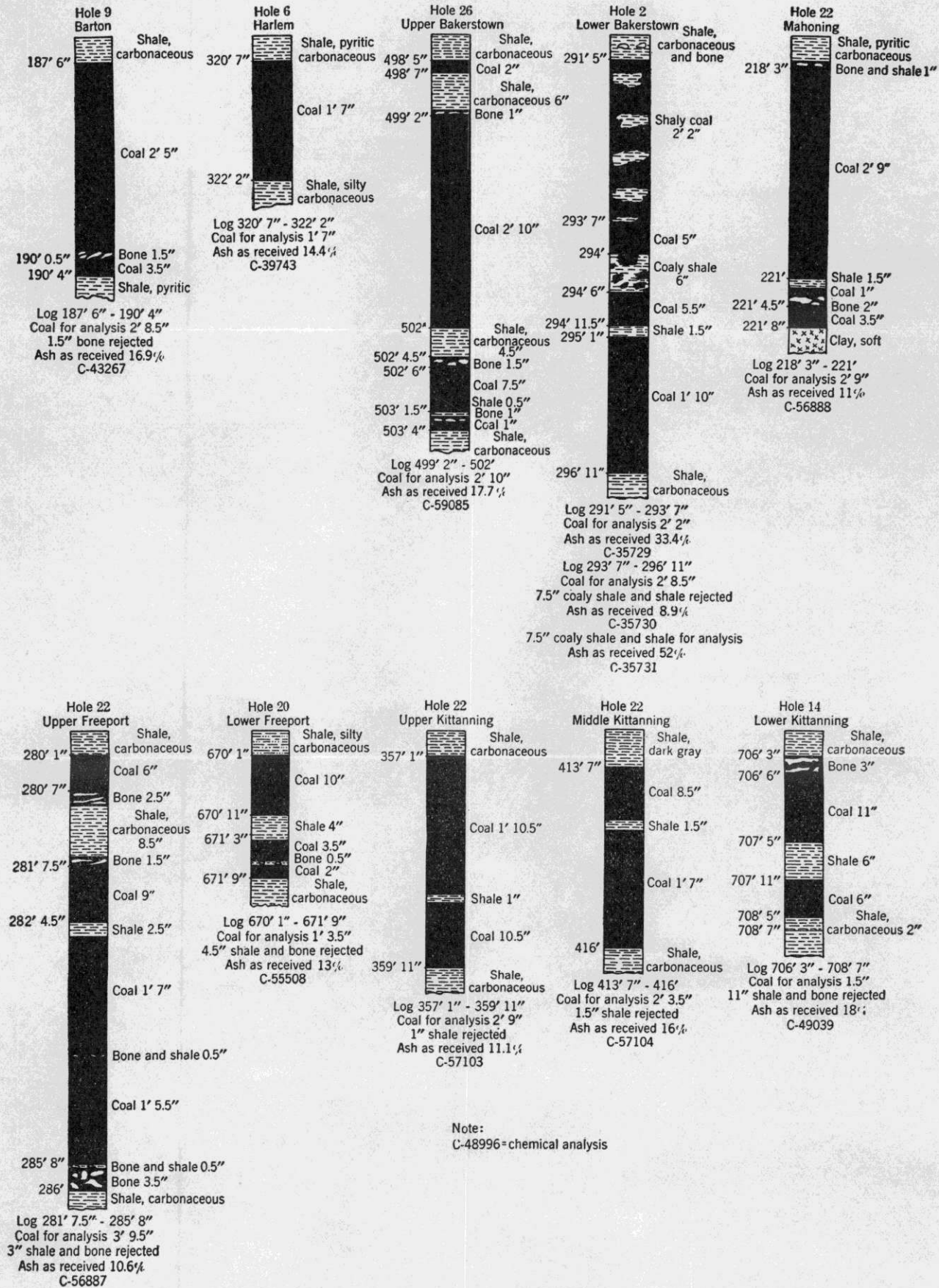


FIGURE 14.—Typical coal sections of drill cores from Georges Creek and north part of Upper Potomac Basins, Allegheny and Garrett Counties, Md.

PART II.—PETROGRAPHIC EXAMINATION OF COAL CORES

By H. L. SMITH AND H. J. O'DONNELL

Coal cores (2¼ inches in diameter) from 26 drill holes were placed in wooden boxes and shipped to the Bureau of Mines Petrographic Laboratory at Pittsburgh, Pa. A detailed examination was made of the 285 feet of coal received from the project. Each coal core was logged by placing a log strip alongside the coal in the box and recording on the strip the length of core received, the characteristics of the fractures and partings, and the mineral impurities present. Samples of the coals 1 foot or more in thickness, with parting ¾ inch or more thick removed, were selected for chemical analyses and agglutinating-value tests.

Data were recorded concerning the occurrence and abundance of the petrographic constituents—bright bands (anthraxylon), fusain lenses, and attrital coal. Information pertaining to luster, fracture, and the presence of mineral facings on cleat surfaces were described and recorded.

Figure 14 illustrates graphically the character of typical sections of the commercially important coal beds of the Georges Creek and Potomac Basins.

The coals of these basins may be classified as bright, common-banded coals. The Barton, Harlem, Lower Freeport, Upper Kittanning, Middle Kittanning, and Lower Kittanning coals are sparsely to moderately medium- and thin-banded, and abundantly micro-banded; having a bright matrix; friable; and with thin lenses of fusain and pyrite present throughout the beds.

The Upper Bakerstown, Lower Bakerstown, Mahoning, and Upper Freeport coals are characterized by numerous attrital layers. These coals are sparsely medium- and thin-banded and abundantly micro-banded with a dull to bright matrix. Numerous fusain and pyritic lenses are scattered throughout the beds. Facing minerals of pyrite, calcite, and kaolinite are found on the cleat surfaces.

A megascopic description of the amount and type of petrographic components found in each coal bed, illustrated in figure 14, based on the following classification, is presented:

1. *Frequency of anthraxylon bands:*
 - 0-15 percent—sparsely banded.
 - 15-30 percent—moderately banded.
 - 30-60 percent—abundantly banded.
 - 60-100 percent—predominantly banded.
2. *Type of anthraxylon bands:*
 - Less than ½ mm. thick—microbanded.
 - ½-2 mm. thick—thin-banded.
 - 2-5 mm. thick—medium-banded.
 - Thicker than 5 mm.—coarse-banded.
3. *Luster of matrix:*
 - Very bright.
 - Bright.
 - Moderately bright.
 - Moderately dull.
 - Dull.
 - Very dull.

4. Character of fracture:

- Smooth.
- Rough.
- Granular.
- Conchoidal.
- Cubical.

5. Fusain occurrence.

6. Mineral occurrence.

Barton coal—hole 9-GC

		<i>Thickness, in.</i>
Top:	Shale, dark gray carbonaceous.	
COAL:	Abundantly microbanded; bright matrix; thin fusain partings throughout.....	8
COAL:	Sparsely medium-banded; abundantly microbanded; bright matrix.....	5½
COAL:	Moderately medium-banded and abundantly microbanded.....	8
COAL:	Broken.....	7½
Bone:	.....	1½
COAL:	Microbanded.....	3½
Bottom:	Shale dark-gray, pyritic, carbonaceous.	

Harlem coal—hole 6-GC

Top:	Shale, dark-gray, pyritic, carbonaceous.	
COAL:	Medium, thin and microbanded; bright matrix; very friable.....	6½
COAL:	Broken.....	7½
COAL:	Dull microbanded.....	5
Bottom:	Shale, dark-gray, silty, carbonaceous.	

Upper Bakerstown coal—hole 26-GC

Top:	Shale, dark-gray, carbonaceous.	
COAL:	Broken.....	2
Shale:	Dark-gray, carbonaceous.....	6
Bone:	.....	1
COAL:	Broken.....	7
COAL:	Predominantly attrital; sparsely thin- and medium-banded; bright matrix; numerous fusain lenses; calcite facings on cleat surfaces.....	22
COAL:	Broken.....	5
Shale:	Dark-gray, carbonaceous.....	4½
Bone:	.....	1½
COAL:	Sparsely thin-banded; fusain lenses.....	7½
Shale:	Dark-gray, carbonaceous.....	½
Bone:	Predominantly attrital.....	1
Bottom:	Shale, dark-gray, carbonaceous.	

Lower Bakerstown coal—hole 2-GC

Top:	Shale, dark-gray, carbonaceous, bony.	
Shaly coal:	High-ash, thin-banded, attrital coal, moderately dull.....	9
Shaly coal:	Attrital coal; high ash; shaly horizontal fractures.....	5
Shaly coal:	Broken, thin to microbanded; dull matrix, cubical fracture.....	5
Coaly shale	Few thin anthraxylon bands.....	6
COAL:	Broken, thin to microbanded; dull matrix.....	5½
Shale:	Carbonaceous, bony.....	1½
COAL:	Thin to microbanded; bright matrix.....	13
COAL:	Bright attrital coal, somewhat friable.....	9
Bottom:	Shale, dark-gray, carbonaceous, hard.	

Mahoning coal—hole 22-GC

		<i>Thickness,</i> <i>in.</i>
Top:	Shale, dark-gray, pyritic, carbonaceous.	
COAL:	Predominantly attrital; dull matrix.....	1
COAL:	Bright; friable.....	3
COAL:	Sparsely thin- and medium-banded and abundantly microbanded; bright matrix; friable.....	17
COAL:	Predominantly attrital; dull matrix.....	6
COAL:	Broken, bright.....	6
Shale:	Dark-gray, carbonaceous.....	1½
COAL:	Sparsely thin-banded and abundantly microbanded; bright matrix; calcite facing minerals on cleat surfaces.....	1
Bone:	.....	2
COAL:	Predominantly attrital; dull matrix; high ash.....	3½
Bottom:	Clay, soft.	

Upper Freeport coal—hole 22-GC

Top:	Shale, dark-gray, carbonaceous, coal streaks.	
COAL:	Sparse to moderately thin-banded, abundantly micro- banded; moderately bright matrix.....	6
Bone:	.....	2½
Shale:	Carbonaceous.....	8½
Bone:	.....	1½
COAL:	Sparsely thin-banded and abundantly microbanded; bright matrix.....	9
Shale:	Dark-gray, carbonaceous, anthraxylon lenses.....	2½
COAL:	Broken, bright.....	4½
COAL:	Predominantly attrital; moderately bright.....	11
COAL:	Broken.....	3½
Bone and shale:	.....	½
COAL:	Broken, bright matrix; pyrite bands and pyritic fusain partings.....	8
COAL:	Sparsely medium- and thin-banded.....	9½
Bone and shale:	.....	½
Bone:	.....	3½
Bottom:	Shale, dark-gray, carbonaceous.	

Lower Freeport coal—hole 20-GC

Top:	Shale, dark-gray, slightly silty.	
COAL:	Abundantly medium, sparsely thin and microbanded; bright matrix, friable.....	10
Shale:	Dark-gray carbonaceous.....	4
COAL:	Moderately medium-banded and abundantly micro- banded.....	3½
Bone:	.....	½
COAL:	Abundantly microbanded, moderately bright matrix.....	2
Bottom:	Shale, dark-gray, carbonaceous.	

Upper Kittanning coal—hole 22-GC

Top:	Shale, dark gray, carbonaceous.	
COAL:	Moderately thin- and medium-banded, numerous fusain lenses.....	12
COAL:	Broken, bright.....	10½
Shale:	Dark-gray, carbonaceous.....	1
COAL:	Sparsely thin- and medium-banded; numerous pyritic fusain lenses.....	10½
Bottom:	Shale, dark-gray, carbonaceous.	

Middle Kittanning coal—hole 22-GC

		<i>Thickness in.</i>
Top:	Shale, dark-gray.	
COAL:	Sparsely thin- and medium-banded	8½
Shale:	Dark-gray, carbonaceous	1½
COAL:	Sparsely medium- and thin-banded; numerous fusain lenses and partings	7
COAL:	Broken, dull	12
Bottom:	Shale, carbonaceous.	

Lower Kittanning coal—hole 14-GC

Top:	Shale, carbonaceous; coal streaks.	
Bone:	Numerous pyritic lenses	3
COAL:	Moderately thin-banded; abundantly microbanded; numerous fusain lenses and partings	11
Shale:	Dark-gray, carbonaceous	6
COAL:	Sparsely thin-banded; abundantly microbanded; bright matrix	6
Shale:	Dark-gray, carbonaceous	2
Bottom:	Shale, gray, carbonaceous.	

PART III.—ANALYSES OF DRILL-CORE SAMPLES

By H. M. COOPER AND R. F. ABERNETHY

The analyses of drill-core samples given in the appendix were obtained by the standard procedures.¹¹ The percentages of moisture reported are not the true values, because of the method of sampling. The percentage of bed moisture should be between 1.5 and 3.0 percent, as indicated by mine samples from other surveys in this field. The dry, ash-free volatile matter averages 21 percent for the various beds, with variations for individual analyses. The ash and sulfur percentages are erratic. Considerable variations are found in the same bed in the same vicinity. The coal substance on the moisture-, ash-, and sulfur-free basis is very constant, as shown by the ultimate analysis and British thermal units. The softening temperatures of the ash for the individual samples vary from 2,100° to 2,900° F. A low ash and high sulfur usually give a low softening temperature, and a high ash and low sulfur give a high softening temperature.

The coal, classified by rank, falls into the low-volatile bituminous group.

Calculated composite analyses for beds 18 inches or more thick are given in table 1. For example, the Barton bed was found in drill holes Nos. 2, 9, 18, 20, 21, and 26 to be 18 inches or more thick, and the total length of core represented by the analysis was 142 inches.

¹¹ Stanton, F. M., and Fieldner, A. C., *Methods of Analyzing Coal and Coke*: Bureau of Mines Tech. Paper 8, 1913, 42 pp. (Rev. in 1938 by F. M. Stanton, A. C. Fieldner, and W. A. Selvig, 59 pp.)

TABLE 1.—*Calculated weighted composite analyses, by beds*¹

Bed	Drill-hole numbers	Total length of cores in sample (inches)	Dry basis				Moisture and ash-free B. t. u.
			Volatile matter	Fixed carbon	Ash	Sulfur	
Barton.....	2, 9, 18, 20, 21, 26	142	17.2	68.2	14.6	2.5	15, 510
Federal Hill.....	20	20	21.1	66.6	12.3	2.9	15, 630
Harlem.....	6, 20, 23	62	18.1	68.0	13.9	1.9	15, 600
Upper Bakerstown.....	2, 3, 11, 14, 15, 19, 20, 21, 25, 26	309	16.4	62.4	21.2	2.4	15, 390
Lower Bakerstown.....	1, 2, 3, 5, 8, 9, 12, 14, 19, 23	384	16.0	68.3	15.7	3.1	15, 380
Mahoning.....	8, 22, 23	101	17.2	68.2	14.6	1.8	15, 500
Upper Freeport.....	2, 8, 9, 10, 11, 12, 14, 21, 22, 24, 26	415	16.9	68.6	14.5	4.1	15, 430
Upper Kittanning.....	1, 2, 4, 8, 11, 14, 18, 19, 22, 26	269	15.5	70.1	14.4	3.2	15, 470
Middle Kittanning.....	4, 9, 14, 17, 18, 22, 23	189	16.8	64.9	18.3	3.0	15, 360
Lower Kittanning.....	8, 14, 24	72	15.1	66.6	18.3	4.5	15, 390
Mount Savage.....	7, 12	46	16.8	60.3	22.9	1.4	15, 210

¹ See appendix for detailed analyses.PART IV.—STRATIGRAPHY OF GEORGES CREEK COAL BASIN ¹²

By KARL M. WAAGE

INTRODUCTION

In conjunction with the Bureau of Mines drilling program in the Georges Creek Basin, the Federal Geological Survey and the Maryland Department of Geology, Mines, and Water Resources jointly conducted geologic studies in the area to determine the distribution of the coal and clay resources in relation to the stratigraphy.

At the beginning of drilling, the geologic work was carried on by Charles W. Merrels, 2d, and Norman M. Denson, both of the Geological Survey, who were responsible for the accumulation of data on coal, and by the writer, who was responsible for the accumulation of data on clay. With the transfer of Merrels and Denson to other assignments, the writer assumed the responsibility for all geologic work, and for preparation of the present chapter.

The areal geology and stratigraphy of the western Maryland coal basins, including the Georges Creek Basin, were described in detail by C. K. Swartz in 1920.¹³ This publication corrected the errors in coal-bed correlations made in the earlier Maryland coal report of 1905,¹⁴ and established a standard section for the Pennsylvanian strata of Maryland. In addition to the work of Swartz, Reger's report¹⁵ on the West Virginia portion of the Upper Potomac Basin gives additional information concerning the geology of the area covered by the drilling program.

Detailed subsurface data furnished by the core drilling make possible some refinements of part of Swartz's standard section and afford a clearer picture of the details of the stratigraphy in the Georges Creek Basin and the north part of the Upper Potomac Basin. This

¹² Published by permission of the Director, Federal Geological Survey.¹³ Swartz, C. K., and Baker, W. A., Jr., Second Report on the Coals of Maryland: Maryland Geol. Survey, 1920, pp. 221-651.¹⁴ Clark, W. B., and others, Report on the Coals of Maryland: Maryland Geol. Survey, 1905, 296 pp.¹⁵ Reger, David B., Mineral and Grant Counties: West Virginia Geol. Survey, County Report, 1924.

chapter will be limited to a description of these stratigraphic details, as the broader phases of the geology are adequately covered in the works cited above.

The sequence of coal-bearing strata of primary interest to the drilling project extends from the top of the Barton coal, in the middle of the Conemaugh formation, down to the top of the Mount Savage coal, which, in Maryland, marks the base of the Allegheny formation. Of the 26 holes drilled, 18 started at or above the Barton coal, 2 between the Barton and Harlem coals, 1 at the Harlem coal, 4 between the Harlem and Upper Bakerstown coal, and 1 at the Lower Bakerstown coal. Most of the holes were bottomed after penetrating the Mount Savage coal, as no commercial coals are known below it. To furnish stratigraphic control, however, five holes were continued through the base of the Pottsville formation and bottomed in the Mauch Chunk shale of Mississippian age. The location of the individual drill holes is shown on figure 1.

GENERAL STRATIGRAPHIC FEATURES

The subdivisions of the Pennsylvanian section between the top of the Mississippian Mauch Chunk shale and the Barton coal, approximately in the middle of the Conemaugh formation, are shown on figure 15. This figure includes a generalized section compiled from the drill-hole records and gives both the terminology used by Swartz and the revised terminology employed in this report.

The boundary between the Allegheny and Conemaugh formations is at the top of the Upper Freeport coal, a bed that is persistent throughout the area investigated. The interval between the Upper Freeport and the Barton coal averages 480 feet—a little over half the total thickness of the Conemaugh in the Georges Creek Basin.

The combined Pottsville and Allegheny strata range in thickness from a minimum of 335 feet in the north end of the area (hole 20-GC) to a maximum of 592 feet near the south end of the area (hole 22-GC).

The strata between the top of the lower part of the Conemaugh and the base of the Pottsville show an increasing degree of irregularity downward in the section. The lower part of the Conemaugh contains persistent coal beds, fossiliferous marine shales, and "redbeds," all forming a relatively regular sequence. In contrast, the Pottsville and Allegheny strata contain no marine shales or redbeds, and only those coal beds down to the Middle Kittanning coal are persistent enough for use as key beds in correlation. Below the Middle Kittanning, the coal beds are highly variable in number and thickness, and correlation of individual beds generally is not possible for more than a few miles.

POTTSVILLE AND ALLEGHENY SEQUENCE

Division of the beds in the interval between the Mauch Chunk shale and the Upper Freeport coal into the Pottsville and Allegheny formations is not practical in the Georges Creek and Upper Potomac Basins because the arbitrary contact between the two formations falls within the zone of highly irregular deposition below the Middle Kittanning coal. The best division for purposes of this discussion is

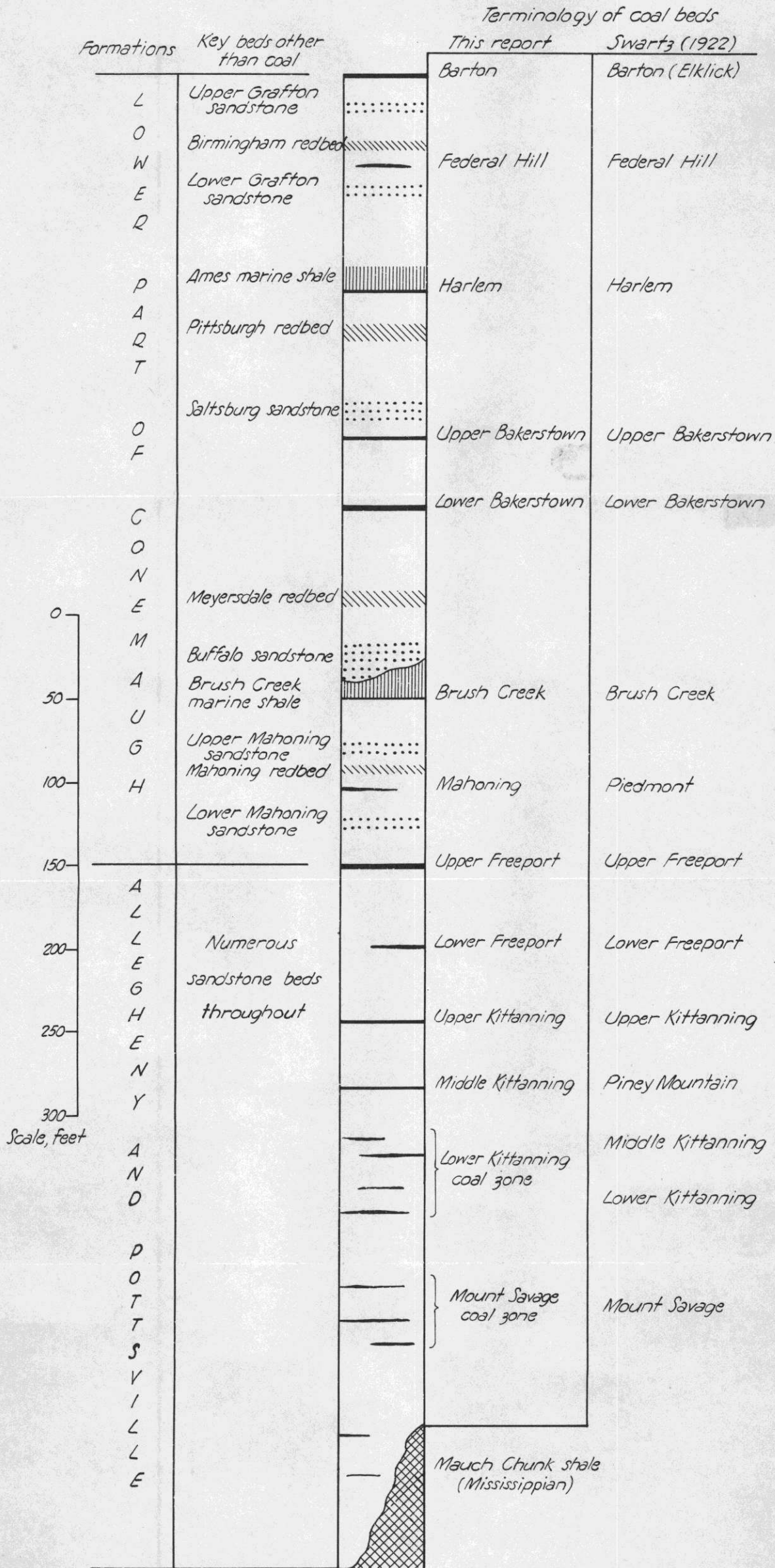


FIGURE 15.—Generalized columnar section for Georges Creek and Upper Potomac Basins. (Prepared by Karl M. Waage, Geological Survey.)

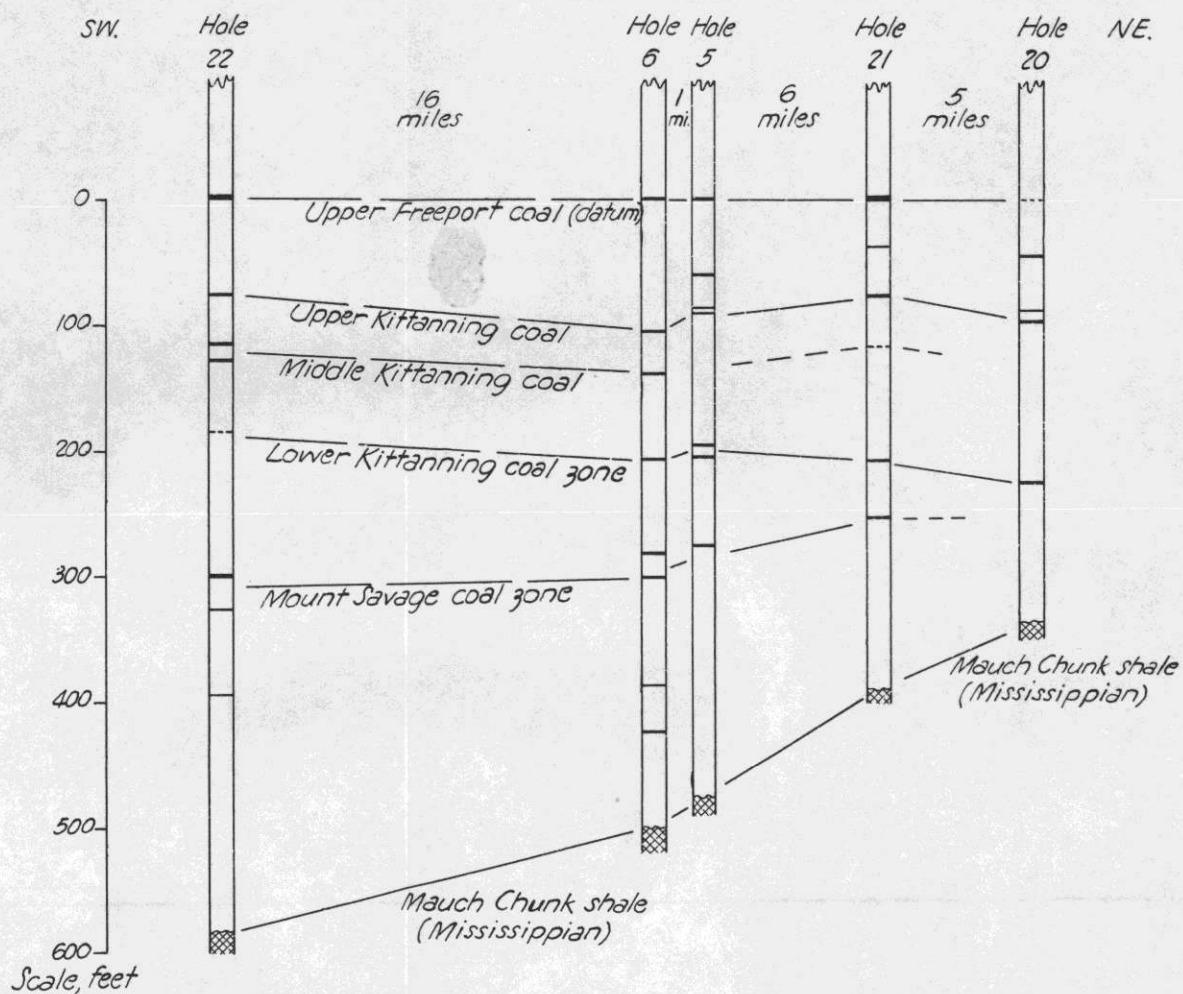


FIGURE 16.—Thickening of section between lower Kittanning coal and Mauch Chunk shale to southwest in area investigated. (Prepared by Karl M. Waage, Geological Survey.)

at the top of the Middle Kittanning coal, below which the strata show pronounced lateral variation, and above which the section is relatively uniform.

BEDS BETWEEN MAUCH CHUNK SHALE AND TOP OF MIDDLE KITTANNING COAL

The strata below the Middle Kittanning coal are typified by an erratic distribution of rock types, accompanied by sharp local variations in the number and distribution of coal beds. The five drill holes that bottomed in the Mauch Chunk shale penetrated a total of 1,655 feet of strata in this interval. Of this footage, 72 percent was sandstone and siltstone, 14 percent shale, and 14 percent clay, claystone, and a minor amount of coal. These rock types were present in similar proportions in the remainder of the holes that penetrated only the upper part of the sequence. Three loosely defined coal horizons are present in the sequence, but otherwise no suitable lithologic divisions can be made. The coal horizons are listed below, with the oldest at the bottom:

Middle Kittanning coal.
Lower Kittanning coal.
Mount Savage coal.
(Mauch Chunk shale.)

Sandstone beds, which occur between all the coal horizons, are lenticular and are rarely continuous for more than several miles. Conglomerate and conglomeratic sandstone occur in small amounts throughout the sequence. There is no marked concentration of conglomerate at the base of the Pottsville formation; actually, conglomerate beds are much more common in and around the Mount Savage coal horizon than below it.

Underclays, and the claystones that normally underlie them, comprise the most varied lithologic group in the sequence of beds between the Mauch Chunk shale and the Middle Kittanning coal. Many varieties of clay, including refractory flint clay, may be present locally as underclays of the several coals. The clay beds are less persistent than the coal beds and are subject to sharp local variations in thickness. None of the various clay types is diagnostic of any particular coal horizon. Flint clays locally occur in association with the underclays of the Mount Savage coal and with the two coal horizons above it, but they have not been found in strata below the Mount Savage clay.

The most striking feature of the sequence of beds between the Mauch Chunk shale and the top of the Middle Kittanning coal, and one that contributes greatly to its complexity, is a gradual thickening of the sequence from 220 feet at the north end of the area investigated to 460 feet at the south end. Details of this thickening are shown in figure 16. Only that part of the sequence that lies below the Lower Kittanning coal is involved in the thickening. The Lower Kittanning-Middle Kittanning interval appears to increase slightly in thickness in the opposite direction. The greater increase in the southward thickening takes place below the Mount Savage coal and is the result of the addition of older beds at the base of the section. Apparently the area lies across the northern feather-edge of the great wedge of

Pottsville sediments, which attain a thickness of several thousand feet in the southern coal-producing States.

A rapid thinning to the north appears to take place in the Mount Savage-Lower Kittanning sequence in the north end of the Georges Creek Basin. This is nearly balanced by the thickening of the overlying Lower Kittanning-Middle Kittanning sequence, and the combined thickness of the two sequences shows only slight variations throughout the area explored by drilling.

Because individual coal beds could rarely be traced from hole to hole, the coal in the sequence between the Mauch Chunk shale and the Middle Kittanning coal was correlated by comparing the intervals between the various coal beds and the persistent, easily identifiable, Upper Kittanning coal.

MIDDLE KITTANNING COAL

The Middle Kittanning coal is a fairly persistent bed lying between 20 and 70 feet below the Upper Kittanning coal. This bed was identified in 19 of the drill holes, 15 of which contained coal beds 6 inches or more in thickness.

LOWER KITTANNING COAL ZONE

The Lower Kittanning coal is a variable unit containing one to four coal beds lying between 70 and 120 feet below the Upper Kittanning coal. It was identified in 19 of the drill holes. Coal beds 6 inches or more thick were present in 12 of the holes, of which half contained a single coal bed and half contained two to four coal beds.

MOUNT SAVAGE COAL ZONE

The Mount Savage coal is a variable unit containing two or three coal beds lying between 150 and 200 feet below the Upper Kittanning coal. It was identified in 20 of the holes, of which 14 contained 1 or more beds of coal 6 inches or more in thickness.

In the five holes that were continued to the Mauch Chunk shale four coal beds were penetrated below the Mount Savage coal. None of these was over 6 inches thick, and no persistent coal bed was discernible.

BEDS BETWEEN MIDDLE KITTANNING COAL AND TOP OF UPPER FREEPORT COAL

The beds in the sequence between the Middle Kittanning and Upper Freeport coals show considerable lithologic variation resulting from the erratic development of three sandstone units. The presence of several persistent coal beds, however, gives regularity to the sequence, in sharp contrast with the irregularity in the section below the Middle Kittanning coal. The sequence may be divided into several fairly well defined units as follows:

Upper Freeport coal.
Bolivar clay.
(Sandstone.)
Lower Freeport coal.
(Sandstone.)
Upper Kittanning coal.
Hardman clay.
(Sandstone.)
Middle Kittanning coal.

Sandstone, the dominant lithologic type in the sequence, is present as three variable units between the coals. In each sandstone the beds are lenticular and vary considerably in thickness, areal extent, and frequency of occurrence. Where sandstone is absent between coal beds, siltstone, silty claystone, and silty shale are present. As with most sandstone beds in the coal measures, local thickening at the expense of underlying coal is common.

Two fairly persistent clay beds are present in the sequence. One, the Bolivar clay, occurs 5 to 25 feet below the Upper Freeport coal; and the other, the Hardman clay, 2 to 10 feet below the Upper Kittanning coal. The Bolivar clay is impure, commonly containing fragmental claystone with minor zones and inclusions of flint clay. The Hardman clay may be represented by numerous clay types, including flint clay of good grade.

Calcareous claystone and argillaceous limestone are locally present in the underclays of both the Upper Kittanning and Upper Freeport coals. This is the lowest appearance in the section of a lithologic type that becomes increasingly common in underclays higher in the section. The lime may occur as pellets scattered through the underclay or may consist of hard masses of argillaceous limestone ranging up to several feet in thickness. Calcareous beds of this type were observed under the Upper Kittanning coal in 12 of the drill holes and under the Upper Freeport coal in 14 of the holes.

Between 100 and 150 feet of relatively uniform strata lie between the Middle Kittanning coal and the Upper Freeport coal, which marks the top of the Allegheny formation. This sequence includes three coal beds, two of which—the Upper Kittanning and Upper Freeport—are fairly persistent, whereas the third—the Lower Freeport—is only rarely present.

UPPER FREEPORT COAL

The Upper Freeport coal marks the top of the Allegheny formation and is 85 to 120 feet below the Brush Creek coal of the overlying Conemaugh. It was identified in 21 of the 26 holes and in 19 holes was represented by a foot or more of coal. In the Upper Potomac Basin a "rider" was commonly present between 10 and 20 feet above the main bed.

LOWER FREEPORT COAL

The Lower Freeport coal lies between 40 and 60 feet below the Upper Freeport coal. It was present in only six of the holes and in only one hole did the thickness of coal exceed 6 inches.

UPPER KITTANNING COAL

The Upper Kittanning coal lies 80 to 105 feet below the Upper Freeport coal. It was identified in 24 of the 26 holes and in 19 holes was represented by a foot or more of coal. In eight holes a rider was present 5 to 30 feet above the main bed.

LOWER PART OF CONEMAUGH FORMATION

The lower part of the Conemaugh formation contains a well-defined sequence of key beds, including persistent coal beds, fossiliferous

marine shales, and beds of red clay or shale, which can be correlated throughout most of the Georges Creek Basin. These units are listed by name in the following table, and the frequency of occurrence of the most persistent key beds as noted in the 26 holes drilled on this project and in 5 additional holes, is expressed in percentages. The relatively discontinuous sandstone units in the section are included to indicate their stratigraphic position.

Sequence of key beds lower part of Conemaugh formation

Unit	Frequency of occurrence		
	Over 75 percent	50 to 75 percent	Under 50 percent
Barton	84		
(Upper Grafton sandstone)			
Birmingham redbeds			
Federal Hill COAL		68	
(Lower Grafton sandstone)			
Ames marine shale		67	
Harlem coal	92		
Pittsburgh redbed		58	
(Saltsburg sandstone)			
Upper Bakerstown COAL	79		
Lower Bakerstown COAL	90		
Meyersdale redbed		53	
(Buffalo sandstone)			
Brush Creek marine shale		55	
Brush Creek COAL	81		
(Upper Mahoning sandstone)			
Mahoning redbed			13
Mahoning COAL			19
Mahoning clay	89		
(Lower Mahoning sandstone)			

As the table indicates, coal beds are the most persistent units in the lower part of the Conemaugh. A single exception is the Mahoning coal, which is present only in local areas and was cut by only 6 of the 26 holes. The Mahoning coal lies 40 to 50 feet above the Upper Freeport coal; it is entirely separate from this latter bed and is not a local extension of the Freeport rider. Where the Mahoning coal is absent, its position is marked by the unusually persistent Mahoning clay. This clay, although quite variable, commonly consists of a zone of fragmental claystone and siltstone, which is often strikingly colored, with green, black, and brown fragments in a lighter matrix of siltstone, sandstone, clay, and occasionally ironstone.

The Brush Creek coal occurs 80 to 120 feet above the Upper Freeport coal. It is an important key bed in drill-hole correlation, as it is one of two coal beds in the lower part of the Conemaugh overlain by fossiliferous marine shale. The coal was penetrated in 20 of the holes; the marine shale was present in 15. In the north end of the Georges Creek Basin two marine shales were found above the Brush Creek coal. The second marine shale immediately overlies a thin "rider" coal 25 to 50 feet above the main Brush Creek bed. The persistent Buffalo sandstone, which overlies the Brush Creek in 21 of the holes, is present between the two marine shales.

The Lower Bakerstown coal lies 100 to 125 feet above the Brush Creek coal. Coal was found in 21 of the 25 holes that cut the horizon. Between 30 and 40 feet above the Lower Bakerstown coal is the Upper Bakerstown coal. This was represented by coal in 19 of the 25 holes.

The interval between these two coal beds is quite uniform, and together they form an easily recognizable sequence.

The Harlem coal, which was encountered in 19 of 20 drill holes, is 120 to 140 feet above the Lower Bakerstown coal. Like the Brush Creek coal, the Harlem coal is also generally overlain by a marine shale, which here is considered an extension of the Ames shale of West Virginia. This unit is represented by black fossiliferous shale, with occasional thin beds of limestone. It was present in 15 of the 20 drill holes.

Between 115 and 155 feet above the Harlem coal is the Barton coal. This coal was present in 13 of 17 holes. The interval between the Harlem and Barton coals shows a gradual thinning from 155 feet at the north end of the area to 115 feet at the south end. This was the only regional change in thickness noted in the lower part of the Conemaugh. Most of this change occurs between the Barton coal and a minor coal—the Federal Hill—which is 40 to 70 feet below the Barton. The Federal Hill coal showed a few inches of coal in 12 of the 19 holes that penetrated it.

Most of the coal beds in the lower part of the Conemaugh formation have calcareous underclays, which locally become dense, argillaceous limestones. The Mahoning coal is the only consistent exception to this, although both the Brush Creek and Lower Bakerstown coals locally may have lime-free underclays. Both the amount of calcareous material and the frequency of its occurrence appear to increase upward in the section.

In addition to the coals, marine shales, and limy underclays, the lower part of the Conemaugh is typified by four redbed units. These normally consist of red and green clays, claystones, and some siltstones. Although the red color is most conspicuous, green usually predominates. The lowest unit in the section is the Mahoning redbed, which occurs at or immediately above the Mahoning coal. Red strata were found at the horizon of the Mahoning coal in only three holes, but green beds were common in many of the other holes.

The Meyersdale redbed, one of the two most persistent redbeds in the sequence, occurs between the Buffalo sandstone and the Lower Bakerstown coal. The other persistent redbed, the Pittsburgh, occurs below the argillaceous limestones and limy claystones that underlie the Harlem coal.

In the south end of the area a fourth redbed was cut in two holes. This unit, the Birmingham redbed, occurs between the Federal Hill coal and the Upper Grafton sandstone, which lies below the Barton coal.

The sandstone beds in the lower part of the Conemaugh are much more persistent than those encountered below the Upper Freeport coal. Nevertheless, they are discontinuous and vary in thickness and lithology from hole to hole. The relative stratigraphic positions and names applied to the sandstones of the lower part of the Conemaugh are shown in figure 15. The three most persistent units are the Buffalo sandstone, which overlies the Brush Creek marine shale; the Saltsburg sandstone, which overlies the Upper Bakerstown coal; and the Lower Grafton sandstone, which overlies the Ames marine shale. Conglomeratic sandstones are fairly common in the Buffalo and Saltsburg zones but are rare elsewhere.

The lower part of the Conemaugh as a whole differs from the section below it in possessing more varied lithologic types and a much lower percentage of arenaceous sediments. In four of the five holes that bottomed in the Mauch Chunk shale, complete sections of the lower part of the Conemaugh, totaling 1,965 feet, were cut. Taking these as representative of the lower part of the Conemaugh, the total footage is made up of the various rock types, as follows: Siltstone and sandstone, 35 percent; shale, 19 percent; clay, claystone, and calcareous beds, 43 percent; and coal and bone, 3 percent.

CORRELATION OF COAL BEDS

Two charts covering the correlation of the 26 holes drilled in the Georges Creek Basin are given as figures 17 and 18. The principal control in hole-to-hole correlation was the persistent sequence of key beds in the lower part of the Conemaugh formation between the Barton and Brush Creek coals. Below the Brush Creek coal the intervals between coal beds become the only possible control, because key beds, other than the coals, were not present. In the zone of highly irregular strata below the Middle Kittanning, various means of correlating the coal beds were attempted, including comparison of detailed sections of the coal beds and analyses of these coals. Only the intervals between coal beds, however, proved to be useful.

The only major difference between the sections shown in this report and those given by Swartz is in the interpretation of the section below the Middle Kittanning coal. With the more detailed information afforded by the diamond drilling, it has become obvious that this part of the section was oversimplified in previous reports. Because of the lack of uniformity in the strata below the Middle Kittanning, the more generalized classification of these coal zones as used in this report is considered more practical as well as more accurate stratigraphically.

The names used for all coal beds in the Georges Creek Basin, except for the Mount Savage coal, follow Pennsylvania terminology, which is the standard for the Northern Appalachian coal field. Although the Mount Savage coal horizon appears to maintain an interval below the Upper Kittanning coal comparable to that of the Clarion coal of Pennsylvania, certain stratigraphic complications at the north end of the area investigated suggest the possibility that the Mount Savage coal wedges out a short distance to the north. Until the true relationships of the Mount Savage and the Clarion coals can be determined, it is considered wiser to retain the local name.

PART V.—GENERAL SUMMARY AND CONCLUSIONS

1. The greater part of the production of the Georges Creek coal field is from mines operating in the Pittsburgh (Big Vein) and Sewickley (Tyson) beds, which are approaching depletion after many years of mining. Production of coal in this field is certain to decline, with an accompanying loss of employment for miners, unless production from the lower, thinner beds can be increased. The coals of the lower beds are low-volatile coking coals, which, with proper preparation, might be suitable for blending in the manufacture of metallurgical coke. Another important use for this semismokeless coal is for

domestic and industrial use in nearby metropolitan areas. Little was known of the continuity and thickness of these beds; and an investigation was undertaken to determine the reserves, thickness, and extent of the beds and the chemical and petrographic properties of the coals. A geologic study of the stratigraphy of the area also was made.

2. The Georges Creek and the north part of the Upper Potomac Basins were investigated by diamond drilling, engineering examination, and geologic study. Operating and abandoned mines, where accessible, were examined, and all available maps and information regarding mined-out areas were secured. Thirteen beds of coal were penetrated in drilling. These beds, from the top downward, are: Barton, Federal Hill, Harlem, Upper Bakerstown, Lower Bakerstown, Brush Creek, Mahoning, Upper Freeport, Lower Freeport, Upper Kittanning, Middle Kittanning, Lower Kittanning, and Mount Savage. The total estimated reserves of coal (including measured, indicated, and inferred reserves) 18 inches or more thick in 10 beds follow:

Coal bed:	<i>Estimated reserves, tons</i>	Coal bed—Con.	<i>Estimated reserves, tons</i>
Barton.....	63, 318, 000	Lower Freeport.....	3, 042, 000
Harlem.....	16, 651, 000	Upper Kittanning.....	94, 902, 000
Upper Bakerstown.....	79, 435, 000	Middle Kittanning.....	61, 907, 000
Lower Bakerstown.....	131, 393, 000	Lower Kittanning.....	10, 723, 000
Mahoning.....	18, 432, 000		
Upper Freeport.....	146, 926, 000	Total.....	626, 729, 000

Possible reserves in the Federal Hill, Brush Creek, and Mount Savage beds were not estimated, because these beds are either too thin or not extensive enough to be important at present.

3. The minimum thickness of bed used in estimating reserves is 18 inches, but it may not be economical to mine a bed of this thickness in this field at present. The minimum thickness that can be mined depends upon many economic factors, some of which are as follows:

- a. Kind and quality of the coal.
- b. Location of mine with reference to markets.
- c. Selling price of the coal.
- d. Annual production, which affects fixed charges.

4. The percentage of recovery of coal at most mines in this field under present mining practices is 50 to 60 percent. The development of modern mechanized mines should increase recovery per acre to 75 or 80 percent.

5. Based upon examination of coal cores from diamond-drill holes, the coals are classified as bright, common-banded coals. The Barton, Harlem, Lower Freeport, Upper Kittanning, Middle Kittanning, and Lower Kittanning coals are sparsely to moderately medium- and thin-banded and abundantly microbanded, with bright matrix, and friable; thin lenses of fusain and pyrite are present throughout the beds. The Upper Bakerstown, Lower Bakerstown, Mahoning, and Upper Freeport coals are similar in petrographic components and contain numerous attrital layers. Facing minerals of pyrite, calcite, and kaolinite are found on the cleat surfaces of all of the coals.

6. The coals of the lower beds are strongly coking and classified by rank fall into the low-volatile bituminous group. The bed moisture ranges from 1.5 to 3.0 percent, and the dry, ash-free volatile matter

for all of the coals averages 21 percent. The ash and sulfur content of the coals is relatively high and varies considerably in the different beds and in the same bed in the same area. The weighted average ash analysis of all samples analyzed, on the moisture-free basis (excluding samples of the Mount Savage coal), ranges from 12.3 percent for the Federal Hill bed to 21.2 percent for the Upper Bakerstown bed; the weighted average sulfur, on the same basis (excluding the Mount Savage coal) ranges from 1.8 percent for the Mahoning bed to 4.5 percent for the Lower Kittanning bed. However, the ash and sulfur content of these coals can be improved by washing.¹⁶

7. The correlation of the coal beds penetrated in drilling was made possible by a study of the stratigraphy of the Georges Creek and the north part of the Upper Potomac Basins. The principal control in hole-to-hole correlation was the persistent sequence of key beds in the lower part of the Conemaugh formation between the Barton and the Brush Creek coals. Below the Brush Creek coal the intervals between coal beds was the only possible control because key beds, other than coals, were not present. Identification of coal beds shown in the logs, data used in estimating reserves, and information on maps of individual coal beds (figs. 4 to 13) were based on this method of correlation. The names used for coal beds, other than the Mount Savage coal, follow Pennsylvania terminology, which is standard for the Northern Appalachian coal field.

¹⁶ Crentz, W. L., and Fraser, Thomas, work cited in footnote 10, p. 3.

APPENDIX

LOGS OF DIAMOND-DRILL HOLES

The logs of drill holes contained in the appendix show the names of the coal beds penetrated and the laboratory numbers of the coal cores in the column headed "Remarks."

Analyses of the coal cores also are given in the appendix. These analyses are listed separately for each coal bed. The column headed "Drill hole" shows, in the order listed, the drill hole from which the sample was recovered and the depth below the surface from which the core was secured. The columns "Core received," "Core rejected," and "Core analyzed" show the part of the diamond-drill core that was analyzed. Most of the coal beds in the Georges Creek and Upper Potomac Basins contain partings of shale and bone, and all partings three-eighths inch or more thick were removed before the sample was sent to the analytical laboratory for analysis.

Factual data regarding mines (operating and abandoned) in the lower beds were obtained during the investigation. These data are tabulated in the appendix under the heading "Description of operating and abandoned mines and outcrop prospects." This table probably gives the most authentic and complete information available regarding mining operations in the area. The numbers in the table correspond to locations shown in figures 1 and 4 to 13.

The area investigated is not subdivided into sections; and, as an aid in the identification of hole locations in the field, a sketch of the location of each drill hole is given in figures 19 to 31.

Log, hole 1-GC

Location: On Mill Run, Garrett County, Md., 1.6 mi. S. 82° W. of Barton. Hole is 55 feet N. 77° E. of a bridge across a branch of Mill Run. Drive 1½ mi. S. from Barton on Rt. 36, then turn right 2 mi. (Refer to fig. 19.)

Surface elevation: 1,458 feet—from U. S. G. S. bench mark.

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
0	0	Overburden.....	62	0
62	0	Gray shale.....	8	0
70	0	Soft gray shale.....	1	6
71	6	Fine sandstone at top, medium at bottom.....	28	6
100	0	Gray shale, slightly calcareous, clayey at base.....	40	0
140	0	Gray, pyritic clay shale.....	9	0
149	0	Carbonaceous shale, limestone stringers and streaks.....	2	0
151	0	Shale and carbonaceous shale.....	1	0
152	0	Gray clay shale.....	3	1
155	1	Coal.....	6	½
155	7½	Bone.....	1	½
155	8¾	Coal.....	2	¼
158	8¾	Coal.....	3	5
158	1	Clay.....	3	5
161	6	Clay shale.....	7	0
169	6	Gray clay.....	2	6
171	0	Clay shale and shale.....	29	0
200	0	Fine sandstone and siltstone.....	5	0
205	0	Shaly sandstone, fine to coarse at base.....	11	0

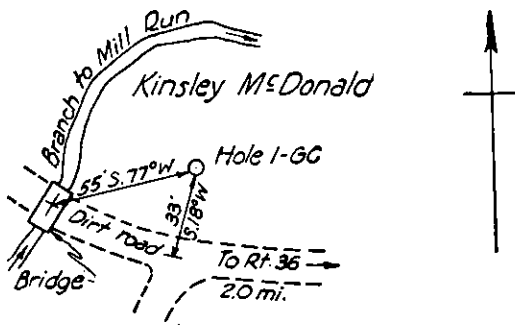
} Lower Bakerstown,
el. 1,303 ft., C-34034.

Log, hole 1-GC—Continued

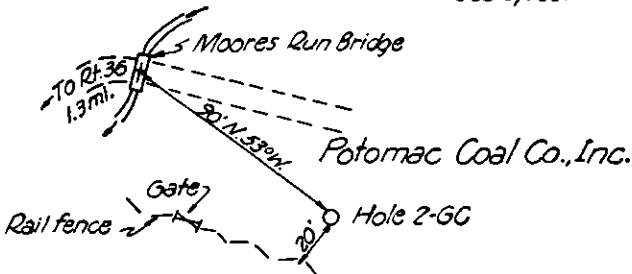
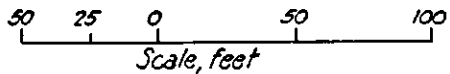
Depth		Material	Thickness		Remarks
From—	To—		Ft.	In.	
Ft.	in.		Ft.	in.	
216	0	Coarse, conglomeratic sandstone.....	5	6	
221	6	Silty shale.....	4	6	
226	0	Fine sandstone.....	4	0	
230	0	Medium sandstone, stringers and blebs shale.....	12	6	
242	6	Shale conglomerate, limestone pebbles....	2	0	
244	6	Coarse sandstone.....	2	4	
244	8	Gray shale.....	9	10	
254	6	Carbonaceous, pyritic shale.....	3	2	
257	8	Coal.....		10	Brush Creek, el. 1,200 ft., C-34396.
258	6	Silty clay.....		6	
259	0	Siltstone and sandstone streaks.....	30	6	
289	6	Shaly siltstone, shale streaks upper part; greenish clay streaks at 315 ft.....	30	6	
320	0	Hard, medium sandstone.....	24	0	
344	0	Shale and sandstone, limy at base.....	4	6	
348	6	Siltstone.....	8	6	
357	0	Clayey shale.....	10	10	
367	10	Fine gray sandstone and mica.....	10	2	
378	0	Shale and carbonaceous shale.....	1	4	
379	4	Coal.....	1	8	Upper Freeport, el. 1,079 ft., C-34397.
381	0	Silty clay.....	5	9	
386	9	Plastic clay.....	6	3	
393	0	Silty sandstone.....	7	0	
400	0	Sandy siltstone.....	18	5	
418	5	Medium sandstone.....	13	10	
432	3	Coal.....		10	Lower Freeport, el. 1,026 ft., C-34930.
433	1	Silty clay.....	3	6	
436	7	Silty clay and siltstone.....	5	11	
442	6	Hard, shaly clay.....	8	7	
451	1	Silty hard clay.....		2	
451	3	Gray shale and silty shale.....	2	9	
454	0	Plastic, semihard clay.....	2	6	
456	6	Clay, siltstone and silty clay.....	11	2	
467	8	Shale and sandstone streaks.....	3	10	
471	6	Carbonaceous shale.....	2	9	
474	3	Coal.....	1	4	
475	7	Binder.....		1	
475	8	Coal.....		11	Upper Kittanning, el. 984 ft., C-34931.
476	7	Clay shale, silty clay.....	2	0	
478	7	Siltstone and silty clay.....	1	2	
479	9	Semihard clay.....	6	6	
480	3	Clay siltstone and silty clay.....	1	8	
481	11	Siltstone.....	3	1	
485	0	Highly micaceous sandstone.....	2	0	
487	0	Silty clay and clayey siltstone.....	6	4	
493	4	Siltstone.....	6	2	
499	6	Medium to fine micaceous sandstone.....	25	4	
524	10	Bone.....	1	2	
525	0	Coal.....	1	7	Middle Kittanning, el. 933 ft., C-34932.
526	7	Silty clay.....	2	10	
529	5	Clay shale, sandstone streaks.....	2	3	
531	8	Black clay shale.....	6	4	
538	0	Sandy clay shale.....	3	4	
541	4	Carbonaceous shale.....	2	6	
541	6	Carbonaceous clay.....	1	5	
544	0	Hackled sandstone, coal blebs.....	10	7	
545	5	Sandy siltstone.....	15	9	
556	0	Fine sandstone.....	10	3	
571	9	Sandy siltstone.....	6	0	
582	0	Fine to medium sandstone.....	4	0	
588	0	Clay shale.....	1	0	
592	0	Medium to coarse hackled sandstone.....	8	9	
593	0	Medium and coarse conglomeratic sandstone.....	6	6	
601	9	Clay sandstone.....	1	7	
608	3	Silty semihard clay.....	2	2	
609	10	Sandy clay.....	8	0	
610	0	Sandy clay and sandstone.....	1	0	
618	0	Carbonaceous clay.....	2	9	
619	0	Sandy clay.....	5	11	
621	9	Carbonaceous clay.....	5	0	
622	8	Carbonaceous clay.....	2	10	
627	8	Carbonaceous clay and sandstone.....	2	10	
627	8	Carbonaceous clay shale.....	5	10	
630	6				

Log, hole 1-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i> <i>in.</i> 636 4	<i>Ft.</i> <i>in.</i> 637 4	Coal.....	<i>Ft.</i> <i>in.</i> 1 0	Upper Mount Savage, el. 822 ft., C-34833.
637 4	642 2	Silty clay.....	4 10	
642 2	642 6	Sandstone.....	4 4	Lower Mount Savage, el. 810 ft.
642 6	644 9	Silty shale.....	2 3	
644 9	645 1	Coal.....	4 4	
645 1	648 5	Clay silt to silty clay.....	3 4	
648 5	648 7½	Body coal.....	2½	
648 7½	649 6	Coal.....	10½	
649 6	650 0	Carbonaceous clay.....	6 6	
650 0	656 0	Siltstone and clayey siltstone.....	6 0	
656 0	666 0	Silty shale.....	10 0	
666 0	669 9	Semihard clay an silty clay.....	3 9	
669 9	671 5	Silty clay and siltstone.....	1 8	
671 5	673 1	Silty to sandy shale, streaks fine sandstone.....	1 8	
673 1	677 0	Fine micaceous sandstone, sandy shale, and siltstone.....	3 11	



Drive 1.6 mi. south from Barton on Rt. 36, then turn right 2 mi.
Hole 1-GC on Mill Run, Garrett County, Md., 1.6 mi. S. 82° W. of Barton



Drive to south end of Barton on Rt. 36, then turn east 1.3 mi.
Hole 2-GC on Moore's Run, Allegany County, Md., 1.1 mi. due E. of Barton

FIGURE 10.—Location of holes 1-GC and 2-GC.

32 GEORGES CREEK AND UPPER POTOMAC COAL BEDS, MD.

Log, hole 2-GC

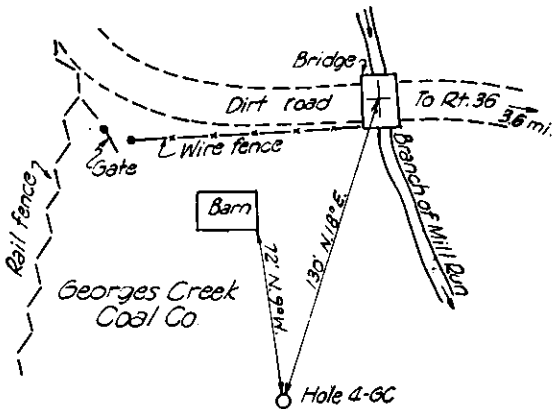
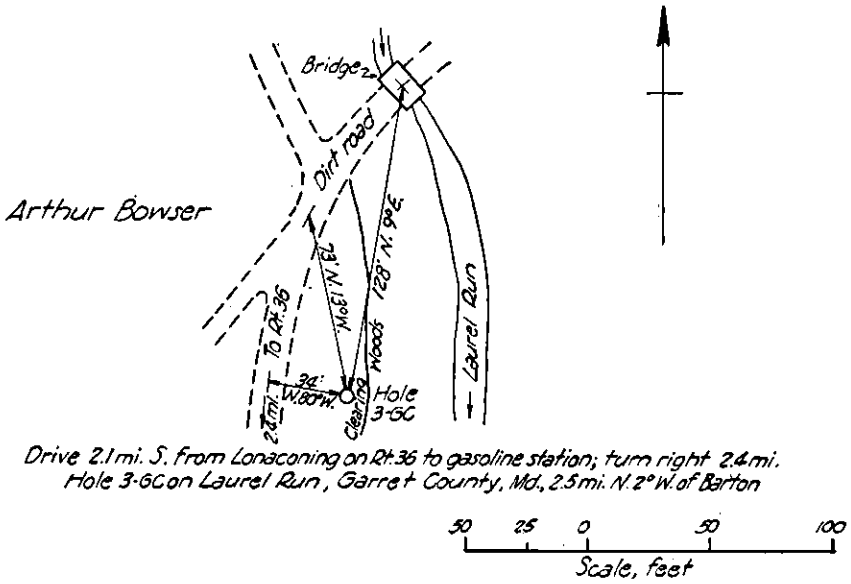
Location: On Moores Run, Allegany County, Md., 1.1 mi. E. of Barton. Hole is 90 feet S. 53° E. of a bridge across Moores Run. Drive to S. limits of Barton on Rt. 36, then turn E. 1.3 mi. (Refer to fig. 19.)
 Surface elevation: 1,560 feet—by aneroid barometer.

Depth		Material	Thickness		Remarks
From—	To—		Ft.	in.	
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>	
0	0	Overburden.....	9	0	
9	0	Semiplastic, silty, clay.....	6	0	
15	0	Carbonaceous shale, silty streaks.....	14	10	
29	10	Coal.....	1	11	} Barton, el. 1,530 ft., C-35240.
31	9	Shale.....	1	3/4	
31	10 1/4	Coal.....	18	10	
32	2	Argillaceous limestone.....	5	9	
51	0	Semiplastic, calcareous clay.....	7	10	
56	9	Fine sandstone, medium at base, clay partings.....	21	5	
64	7	Mudstone, carbonaceous at base.....	4	1/2	} Federal Hill, el. 1,474 ft., C-35625.
86	0	Coal.....	8		
86	4 1/2	Calcareous shale.....	7	6 1/2	
86	5	Coal.....	20	0	
87	1	Bony coal.....	6	6	
87	5 1/2	Clay siltstone.....	7	2	
95	0	Calcareous green to gray mudstone.....	8	0	
115	0	Fine sandstone, flecks of carbon.....	6	6	
121	6	Fine sandstone, clay partings.....	2	10	
128	8	Carbonaceous shale, sandstone streaks.....	2	10	
136	8	Carbonaceous shale.....	7		
139	6	Fossiliferous shale.....	25	8	} Water flow at 150 ft., 15 g. p. m. Harlem, el. 1,394 ft., C-35626.
140	1	Carbonaceous shale, scattered fossils.....	1	9	
165	9	Coal.....	6	9	
167	6	Calcareous claystone, speckled with pyrite.....	5	9	
174	3	Calcareous, speckled mudstone.....	1	0	
180	0	Limestone.....	11	4	
181	0	Calcareous, speckled mudstone.....	5	8	
192	4	Clay and sandstone.....	2	0	
198	0	Clay, semihard, silty.....	21	2	
200	0	Silty red and gray clay, claystone streaks.....	13	10	
221	2	Mudstone, claystone streaks.....	19	0	
235	0	Silty sandstone and siltstone.....	7	0	
254	0	Sandstone and dark shale.....	4	6	
261	0	Carbonaceous shale, sandstone streaks.....	4	4	
265	6	Coal.....	3		} Upper Bakerstown, el. 1,295 ft. C-35728.
265	10	Shale.....	2	4	
266	1	Coal.....	1	1	
268	5	Shale.....	2	1 1/2	
268	9 1/2	Coal.....	2	0	
268	9 1/2	Shale.....	2	5	
269	10 1/2	Claystone, limestone pellets.....	3	7	
272	0	Semiplastic clay.....	4	8	
274	0	Argillaceous limestone.....	6	9	
276	5	Semiplastic clay.....	12	3	
280	0	Gray clay shale.....	25	5	
284	8	Carbonaceous clay and claystone, pyrite at base.....	5	9	
291	5	Coal.....	2	2 1/4	} Lower Bakerstown, el. 1,269 ft., C-35729, C-35730, C-35731, C-35732.
293	0	Broken coal.....	6		
294	0	Coaly shale.....	5 1/2		
294	6	Coal.....	1	1 1/2	
294	11 1/2	Shale.....	1	10	
295	1	Coal.....	3	7	
296	11	Carbonaceous clay, pyrite.....	10	1	
300	6	Mudstone, limestone pellets.....	2	0	
310	7	Sandstone.....	25	5	
312	7	Mudstone.....	5	9	
338	0	Coarse sandstone.....	12	3	
343	9	Sandstone, claystone, and shale streaks.....	25	4	
356	0	Dark shale.....	1	0	
381	4	Sandstone.....	3	2	
382	4	Silty shale.....	7	6	
385	6	Sandstone, shale fragments at base.....	2	0	
393	0	Dark, shaly clay.....	8	0	
395	0	Shaly siltstone, sandy at base.....	2	2	} Brush Creek horizon, el. 1,157 ft.
403	0	Bony, carbonaceous sandstone.....	7	0	
403	2	Claystone and silty claystone.....	2	2	
405	4	Silty clay, calcareous pellets upper part.....			

Long, hole 2-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
412	4	Shaly siltstone.....	10	8
423	0	Silty clay.....	3	0
426	0	Clay siltstone.....	5	8
431	8	Sandstone and shaly siltstone.....	8	0
439	8	Medium to fine sandstone.....	16	0
456	8	Silty clay.....	5	4
461	0	Siltstone and clay sandstone.....	20	0
481	0	Medium to coarse sandstone.....	38	4
519	4	Silty to sandy dark shale.....	3	1
522	5	Coal.....	1	1
523	6	Shale.....		3
523	9	Coal.....		7
524	4	Shale.....		11½
524	5½	Coal.....	1	9½
526	3	Shale.....		2
526	5	Coal.....		9
527	2	Shale.....		2
527	4	Coal.....		1
527	5	Shale.....		2
527	7	Coal.....	1	6
529	1	Silty claystone.....	1	3
530	4	Hard limestone.....	2	8
533	0	Silty claystone.....	10	0
543	0	Limestone.....	1	6
544	6	Silty clay and claystone.....	2	6
547	0	Semihard, plastic clay.....	1	8
548	8	Mudstone and siltstone, 30-in. clay at 564 ft.	33	4
582	0	Shale, siltstone, and clay.....	9	2
591	2	Sandstone, carbonaceous clay fragments.....	1	3
592	5	Carbonaceous silty clay.....	3	0
595	5	Sandy siltstone and silty shale.....	34	7
630	0	Coal.....	2	4
632	4	Coaly shale.....	3	3
632	7	Shaly siltstone, pyrite.....	2	7
635	2	Clay.....	6	2
641	4	Shaly siltstone.....	13	8
655	0	Sandstone and siltstone.....	3	6
658	6	Silty shale.....	11	0
669	6	Coal and bone.....	1	1
670	7	Clay.....	3	1
673	8	Siltstone.....	5	4
679	0	Quartzitic fine sandstone.....	19	0
698	0	Quartzitic fine sandstone, hackled and carbonaceous.....	29	0
727	0	Silty claystone and quartzitic sandstone.....	17	0
744	0	Shaly siltstone, sandy streaks.....	16	8
760	8	Clay siltstone.....	5	4
766	0	Carbonaceous clay.....	6	6
766	6	Carbonaceous clay siltstone.....	6	6
767	0	Hard clay (Mount Savage?).....	5	3
772	3	Hard, gray, sandy siltstone.....	1	4
773	7	Fine sandstone.....	3	10
777	5	Semihard clay, silty.....	4	8
782	1	Carbonaceous silty clay.....	10	10
782	11	Clay siltstone.....	1	0
783	11	Silty clay.....	4	5
788	4	Dark, silty shale.....	10	10
789	2	Fine-grained sandstone and siltstone.....	4	10
794	0	Dark, silty shale.....	5	6
799	6	Dark, shaly siltstone, sandstone streaks.....	11	6
811	0	Fine to medium sandstone, carbonaceous streaks.....	4	0

Upper Freeport,
el. 1,038 ft., C-36192.Upper Kittanning,
el. 930 ft., C-36247.Middle Kittanning,
el. 890 ft.



Drive to N. end of Barton on Rt. 36 then turn west 3.6 mi. Hole 4-GC on Branch of Mill Run, Garrett County, Md., 2.3 mi. N. 36° W. of Barton

FIGURE 20.—Location of holes 3-GC and 4-GC.

Log, hole 3-GC

Location: On Laurel Run, Garrett County, Md., 2.5 mi. N. 2° W. of Barton. Hole is 128 feet S. 9° W. of a bridge across Laurel Run. Drive 2.1 mi. S. from Lonaconing on Rt. 36 to gasoline station, turn right 2.4 mi.

(Refer to fig. 20.)

Surface elevation: 1,668 feet—from U. S. G. S. bench mark.

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
0	0	Overburden.....	14	0
14	0	Fine, micaceous, crossbedded sandstone.....	3	6
17	6	Conglomeratic sandstone.....	15	6
33	0	Sandy siltstone.....	4	5
37	5	Silty sandstone, limy pellets.....	18	9
56	2	Siltstone and sandstone.....	19	4
75	6	Coal.....	1	2
76	8	Shale.....	4	4
77	0	Coal.....	7½	4
77	7½	Shale.....	½	4
77	8	Coal.....	5	5
78	1	Mudstone.....	2	1
80	2	Siliceous clay.....	7	7
80	2	Silty clay with pyrite.....	5	5
81	2	Sandy, calcareous siltstone.....	13	3
94	5	Sandstone and siltstone.....	6	3
100	8	Shale, clay, and siltstone.....	3	0
103	8	Calcareous siltstone.....	10	10
104	6	Silty, calcareous clay shale.....	2	3
106	9	Semiplastic, dark clay.....	8	8
107	5	Silty claystone, limy at base.....	9	9
108	2	Carbonaceous, pyritic clay.....	1	6
109	8	Coal.....	2	3½
111	11½	Bone.....	½	½
112	0	Coal.....	1	0
113	0	Silty clay, claystone at base.....	5	7
118	7	Fine, clayey sandstone.....	2	0
120	7	Shaly, sandy claystone.....	14	5
135	0	Semiplastic, silty clay.....	5	4
140	4	Silty, calcareous claystone.....	5	2
145	6	Clay siltstone, calcareous at base.....	17	1
162	7	Sandy siltstone, sandstone streaks.....	9	5
172	0	Coarse sandstone.....	10	5
182	5	Carbonaceous, silty shale.....	5	7
188	0	Clay shale, sandy at base.....	6	6
193	6	Medium to coarse sandstone.....	11	2
204	8	Dense, fossiliferous limestone.....	9	9
205	5	Carbonaceous, fossiliferous clay shale.....	20	11
226	4	Coal.....	8	8
227	0	Silty claystone.....	2	4
229	4	Semiplastic, carbonaceous, pyritic clay.....	5	5
234	9	Semihard, silty, carbonaceous clay.....	6	9
241	6	Claystone with sandstone.....	32	9
274	3	Semihard, fragmental clay.....	2	4
276	7	Hard, fragmental clay.....	1	10
278	5	Semihard, silty, pyritic clay.....	8	8
279	1	Silty claystone, sandy at base.....	24	4
279	1	Fine sandstone and siltstone.....	2	11
303	5	Carbonaceous, clayey shale.....	2	0
308	4	Silty claystone.....	4	5
312	9	Medium to fine sandstone.....	11	3
324	0	Carbonaceous clay.....	4	4
324	4	Coal, bony.....	3	3
324	4	Coal.....	2½	4
324	7½	Shale.....	½	4
324	10¾	Coal.....	5	½
324	11	Shale, coal streaks.....	3	3
324	11	Siltstone and sandstone.....	14	5
325	4	Fine, cross-bedded sandstone.....	21	3
325	7	Medium sandstone, shale fragments at base.....	25	6
340	0	Silty claystone.....	26	3
361	3	Silty shale, sandy streaks.....	5	0
386	9	Sandstone and shaly sandstone.....	4	0
413	0	Silty pyritic claystone.....	4	11½
418	0	Coal.....	10½	½
422	0	Shale.....	1	1
422	0	Coal.....	1½	1
426	11½			
427	10			
427	10			
427	11			
427	11			

Dip, 10°.

Upper Bakerstown,
el. 1,593 ft., C-37008.Lower Bakerstown,
el. 1,568 ft. C-37009.

Brush Creek, el. 1,442 ft.

Dip, 12°.

Upper Freeport,
el. 1,344 ft.

Dip, 15°.

Upper Kittanning,
el. 1,241 ft.

Log, hole 3-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
428	1/4	431 5	3	4 1/2
431	5	432 7	1	2
432	7	433 5		10
433	5	436 0	2	7
436	0	440 4	4	4
440	4	445 2	4	10
445	2	495 4	50	2
495	4	502 2	6	10
502	2	503 6	1	4
503	6	519 3	15	9
519	3	525 5	6	2
525	5	525 10	5	5
525	10	528 3	2	5
528	3	529 6	1	3
529	6	533 6	4	0
533	6	540 8	7	2
540	8	548 5	7	9
548	5	550	1	7
550		568 1	18	1
568	1	580 9	12	8
580	9	584 6	3	9
584	6	585 9	1	3
585	9	596 6	10	9
596	6	597 2	8	8
597	2	597 3	1	1
597	3	597 10	7	7
597	10	613 7	15	9
613	7	614 10	1	3
614	10	616 10	2	0
616	10	618 0	1	2
618	0	625 0	7	0
625	0	625 10		10
625	10	642 6	16	8
642	6	643 0		6

Log, hole 4-GC

Location: On a branch of Mill Run, Garrett County, Md., 2.3 mi. N. 56° W. of Barton, Md. Hole is 130 feet S. 18° W. of bridge across a branch of Mill Run. Drive to N. limits of Barton on Rt. 36 and then W. 3.6 mi.

(Refer to fig. 20.)

Surface elevation: 2,030 feet—by aneroid barometer.

<i>Ft.</i>	<i>in.</i>	<i>Ft.</i>	<i>in.</i>	<i>Ft.</i>	<i>in.</i>
0	0	44	0	44	0
44	0	48	0	4	0
48	0	52	9	4	9
52	9	53	3		6
53	3	56	0	2	9
56	0	83	9	27	9
83	9	85	2	1	5
85	2	85	9		7
85	9	88	5	2	8
88	5	96	0	7	7
96	0	98	4	2	4
98	4	108	10	10	6
108	10	119	0	10	2
119	0	124	0	5	0
124	0	129	0	5	0
129	0	130	0	1	0
130	0	142	0	12	0
142	0	142	10		10
142	10	143	0	5	2
148	0	150	0	2	0
150	0	160	0	10	0
160	0	168	0	8	0
168	0	168	1		1
168	1	179	0	10	11
179	0	187	10	8	10
187	10	188	8	10	

Log, hole 4-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
188 8	192 4	Silty claystone.....	3 8	
192 4	196 0	Silty clay, limy nodules.....	3 8	
196 0	201 0	Clay siltstone and claystone.....	5 0	
201 0	204 0	Fine sandstone.....	3 0	
204 0	210 0	Sandy clay siltstone.....	6 0	
210 0	212 0	Silty clay.....	2 0	
212 0	221 3	Clay siltstone.....	9 3	
221 3	236 0	Sandstone and siltstone.....	14 9	
236 0	242 6	Siliceous hard clay, sandstone matrix.....	6 6	
242 6	258 4	Silty claystone, silty clay streaks.....	15 10	
258 4	260 0	Limestone.....	1 8	
260 0	265 6	Silty claystone.....	5 6	
265 6	270 0	Semihard clay, flint fragments.....	4 6	
270 0	289 10	Fine sandstone, medium at base, silty streaks.....	19 10	
289 10	291 0	Shaly siltstone.....	1 2	
291 0	313 0	Clay siltstone.....	22 0	
313 0	313 3	Carbonaceous shale, coal streaks.....	3	Upper Freeport horizon, el. 1,717 ft.
313 3	341 0	Sandstone and siltstone, limestone partings at top.....	27 9	
341 0	349 0	Fine sandstone.....	8 0	
349 0	360 0	Medium hackled sandstone.....	11 0	
360 0	369 10	Dark sandstone and siltstone.....	9 10	
369 10	371 6	Silty, hard clay.....	1 8	
371 6	381 7	Hard clay.....	10 1	
381 7	387 0	Siltstone and sandstone.....	5 5	
387 0	390 2	Sandy shale.....	3 2	
390 2	392 10	Carbonaceous shale, coal streaks.....	2 8	
392 10	405 0	Interbedded shaly siltstone and sandstone.....	12 2	
405 0	406 10	Silty shale.....	1 10	
406 10	411 11	Carbonaceous shale.....	5 1	
411 11	413 2	Coal.....	1 3	Upper Kittanning, el. 1,618 ft., C-37903.
413 2	413 3	Shale.....	1 1	
413 3	414 4	Coal.....	1 1	
414 4	420 0	Calcareous clay siltstone.....	5 8	
420 0	431 10	Silty claystone, calcareous streaks.....	11 10	
431 10	438 8	Silty clay shale, sandy streaks.....	6 10	
438 8	440 3	Coal.....	1 7	Middle Kittanning, el. 1,591 ft., C-37904.
440 3	446 4	Interbedded clay siltstone and sandstone.....	6 1	
446 4	446 6	Coal.....	2 2	
446 6	447 1	Shale.....	7 7	Middle Kittanning, el. 1,584 ft.
447 1	447 3	Coal.....	2 2	
447 3	454 6	Interbedded siltstone and sandstone.....	7 3	
454 6	471 0	Dark shale, sandstone streaks.....	16 6	
471 0	483 0	Sandy, silty hard and soft clay.....	12 0	
483 0	484 0	Siltstone.....	1 0	
484 0	490 0	Dark clay shale, coal partings.....	6 0	
490 0	508 0	Clay siltstone and silty shale, sandstone streaks.....	18 0	
508 0	511 6	Silty to sandy clay and carbonaceous clay.....	3 6	
511 6	521 0	Fine sandstone and siltstone.....	9 6	
521 0	524 0	Carbonaceous claystone, coal partings.....	3 0	
524 0	524 1	Bone.....	1	Lower Kittanning horizon, el. 1,509 ft.
524 1	526 6	Silty clay.....	2 5	
526 6	533 3	Silty claystone.....	6 9	
533 3	533 5	Carbonaceous claystone, coal streaks.....	2 2	
533 5	545 0	Clay siltstone.....	11 7	
545 0	563 0	Sandy siltstone and sandstone.....	18 0	
563 0	570 2	Fine, quartzitic sandstone, carbonaceous streaks.....	7 2	
570 2	593 0	Dark-gray siltstone.....	22 10	
593 0	597 10	Dark, shaly siltstone.....	4 10	
597 10	597 11	Coal.....	1	Mount Savage horizon, el. 1,432 ft.
597 11	601 1	Dark-clay siltstone.....	3 2	
601 1	602 1	Hard clay.....	1 0	
602 1	610 1	Clay siltstone.....	8 0	
610 1	612 0	Fine, dark-gray sandstone.....	1 11	
612 0	613 9	Fine, micaceous, quartzitic sandstone.....	1 9	
613 9	615 8	Gray siltstone.....	1 11	
615 8	626 0	Fine to medium quartzitic sandstone, coal partings.....	10 4	

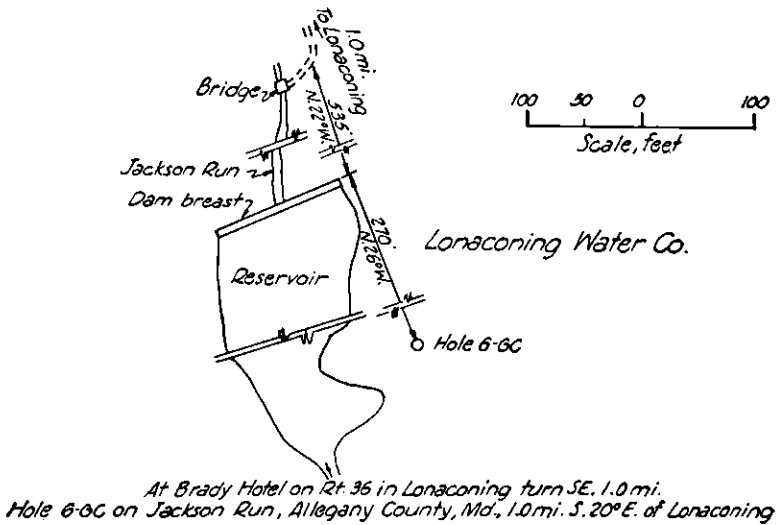
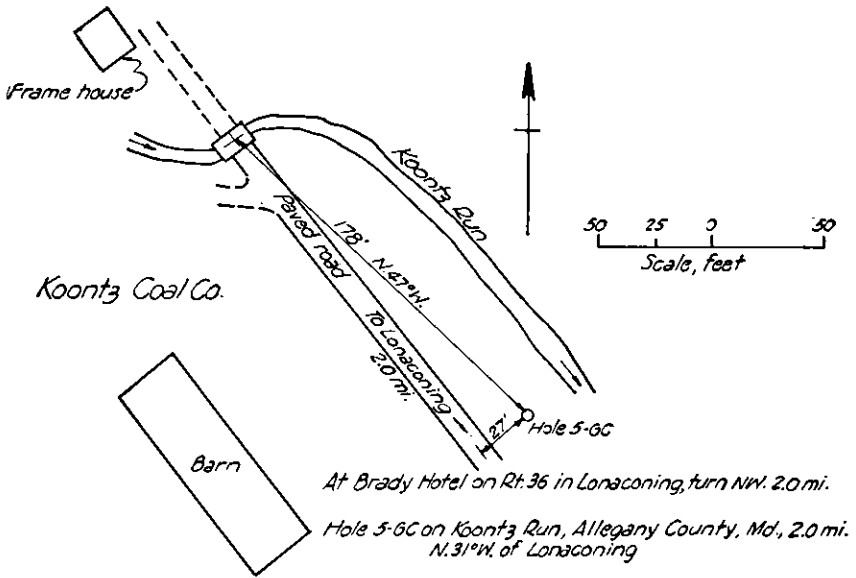


FIGURE 21.—Location of holes 5-GC and 6-GC.

Log, hole 5-GC

Location: On Koontz Run, Allegany County, Md., 2.0 mi. N. 31° W. of Lonaconing. Hole is 178 feet S. 47° E. of bridge across Koontz Run. Drive 1.9 mi. NW. from Rt. 36 at Brady Hotel in Lonaconing. (Refer to fig. 21.)

Surface elevation: 2,000 feet—by aneroid barometer.

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
0	0	Overburden.....	16	0
16	0	Weathered sandstone.....	27	0
43	0	Medium crossbedded sandstone.....	18	0
61	0	Sandstone, shale partings and fragments.....	1	2
62	2	Dark siltstone.....	2	8
64	10	Limestone.....	3	3
65	1	Calcareous clay and siltstone, limestone nodules.....	13	11
79	0	Silty clay.....	1	9
80	9	Calcareous claystone and siltstone.....	20	1
100	10	Limestone.....	4	4
101	2	Dark shale clay.....	1	6
102	8	Shaly siltstone.....	14	4
117	0	Shaly sandstone.....	5	5
122	5	Coal.....	2	1
124	6	Siltstone and silty clay, calcareous nodules.....	23	6
148	0	Silty and sandy clay.....	1	0
149	0	Claystone and sandy claystone.....	19	8
168	8	Quartzitic sandstone.....	1	5
170	1	Claystone and siltstone.....	23	5
193	6	Fine sandstone, locally calcareous.....	4	6
198	0	Siltstone.....	8	0
206	0	Interbedded sandstone and siltstone.....	10	2
216	2	Medium sandstone.....	7	10
224	0	Silty, shaly clay.....	12	9
236	9	Fossiliferous, dark shale.....	11	2
247	11	Carbonaceous shale, coal streaks.....	12	5
248	4	Silty clay shale.....	12	7
260	11	Carbonaceous shale, coal partings.....	4	8
265	7	Coal.....	1	4
266	5	Silty clay.....	2	9
267	9	Silty clay, calcareous nodules.....	17	4
270	6	Claystone and siltstone.....	14	4
287	10	Medium to coarse sandstone.....	6	10
302	2	Conglomeratic sandstone.....	14	8
309	0	Silty claystone.....	3	0
323	8	Mottled clay.....	13	10
326	8	Silty claystone.....	10	6
340	6	Sandy siltstone and claystone.....	1	8
351	0	Coal.....	17	1
352	8	Silty clay and claystone.....	5	3
369	9	Sandy siltstone and claystone.....	8	5
375	0	Mottled clay.....	2	3
383	5	Carbonaceous claystone.....	1	0
385	8	Coal.....	1	3
386	8	Clay shale.....	3	3
387	11	Coal and shale.....	8	2
388	2	Shale.....	2	8
388	10	Coal.....	1	9
389	0	Dark shale, carbonaceous.....	3	5
390	9	Mottled clay.....	6	10
394	2	Sandy shale.....	13	6
401	0	Clay.....	3	6
414	0	Sandy clay.....	3	6
418	0	Sandstone and sandy clay.....	5	6
421	6	Sandstone.....	2	0
427	0	Sandy siltstone.....	2	8
429	0	Red, silty claystone.....	3	4
431	8	Mottled sandstone.....	11	0
435	0	Red, silty claystone.....	2	6
446	0	Silty clay.....	6	0
448	6	Sandstone.....	24	2
454	6	Sandy siltstone.....	3	4
478	8	Dark, silty shale.....	12	6
482	0	Dark, fossiliferous shale.....	10	6
484	0	Dark shale and limestone pellets.....		
494	6			

Barton, el. 1,878 ft.

Water at 220 ft., 25 g. p. m.

Harlem, el. 1,735 ft.

Water at 305 ft., 150 g. p. m.

Upper Bakerstown, el. 1,650 ft.

C-38837.

Lower Bakerstown, el. 1,615 ft., C-38838.

Log, hole 5-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
505 0	506 1	Coal.....	1 1	Brush Creek, el. 1,495 ft., C-38839.
506 1	548 6	Silty, sandy claystone and clay.....	42 5	
548 6	550 6	Carbonaceous claystone.....	2 0	
550 6	553 6	Clay.....	3 0	
553 6	586 4	Silty, sandy shale.....	32 10	
586 4	586 6	Coal.....	2 2	
586 6	587 3	Shale.....	9 9	
587 3	587 8	Coal.....	5 5	Upper Freeport, el. 1,415 ft., C-39344.
587 8	588 0	Shale.....	4 4	
588 0	589 0	Coal.....	1 0	
589 0	593 8	Dark, silty clay.....	4 8	
493 8	595 8	Clay.....	2 0	
595 8	605 8	Claystone.....	10 0	
605 8	641 0	Sandy siltstone.....	35 4	
641 0	648 1	Medium sandstone.....	7 1	
648 1	648 3	Coal.....	2 2	Lower Freeport, el. 1,352 ft.
648 3	650 9	Plastic, silty clay.....	2 6	
650 9	652 9	Semihard, silty clay.....	2 0	
652 9	671 0	Siltstone and sandstone.....	18 3	
671 0	672 3	Dark clay.....	1 3	
672 3	672 4	Coal.....	1 1	
672 4	678 9	Clay and claystone.....	6 5	Upper Kittanning, el. 1,328 ft.
678 9	678 1	Coal.....	4 4	
679 1	684 0	Sandy clay.....	4 11	
684 0	694 0	Clay sandstone.....	10 0	
694 0	712 4	Sandstone and siltstone.....	18 4	
712 4	733 4	Fine to medium sandstone.....	21 0	
733 4	738 4	Dark, sandy shale and sandstone.....	5 0	
738 4	761 0	Sandstone, carbonaceous partings, hatched at base.	22 8	
761 0	789 0	Siltstone and sandstone.....	8 0	
789 0	779 6	Medium sandstone.....	10 6	
779 6	785 4	Carbonaceous clay.....	5 10	
785 4	785 6	Coal.....	2 2	
785 6	788 6	Dark, shaly clay.....	3 0	
788 6	791 6	Flat clay.....	3 0	Lower Kittanning, el. 1,215 ft., C-39345.
791 6	791 11	Coal.....	5 5	
791 11	792 4	Shale.....	5 6	
792 4	792 10	Coal.....	6 6	
792 10	796 10	Sandy clay.....	4 0	
796 10	804 9	Silty clay and claystone, speckled at base.	7 11	
804 9	814 4	Dark clay and siltstone.....	9 7	
814 4	825 0	Silty claystone.....	10 8	
825 0	840 0	Sandy siltstone.....	15 0	
840 0	852 0	Fine sandstone.....	12 0	
852 0	883 6	Shaly siltstone.....	11 6	
883 6	884 0	Coal.....	6 6	Mount Savage, el. 1,137 ft.
884 0	887 5	Silty clay.....	3 5	
887 5	870 0	Fine sandstone.....	2 7	
870 0	879 2	Dark shale and silty shale.....	9 2	
879 2	882 0	Plastic, silty clay.....	2 10	
882 0	885 9	Clay siltstone.....	6 9	
885 9	890 9	Carbonaceous shale.....	2 0	
890 9	945 0	Fine to medium hatched sandstone.....	54 3	
945 0	983 0	Dark clay siltstone, sandy and shaly at base.	38 0	
983 0	1,041 0	Medium to coarse sandstone.....	58 0	
1,041 0	1,063 0	Sandy siltstone.....	22 0	
1,063 0	1,070 0	Red, silty claystone.....	7 0	
1,070 0	1,086 0	Gray, sandy siltstone, red, silty claystone.	16 0	
1,086 0	1,127 0	Red, silty claystone, gray and green at bottom.	41 0	

Log, hole 6-GC

Location: On Jackson Run, Allegany County, Md., 1.1 mi. S. 20° E. of Lonaconing. Hole is 270 feet S. 26° E. of E. corner of dam breast across Jackson Run. At Brady Hotel on Rt. 36 in Lonaconing turn SE. 0.9 mi. (Refer to fig. 21.)
 Surface elevation: 1,770 feet—by aneroid barometer.

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
0	0	Overburden.....	29	0
29	0	Quartzitic sandstone.....	27	0
56	0	Claystone and silty claystone, interbedded fine sandstone.	31	0
87	0	Sandy siltstone.....	12	0
99	0	Medium to coarse, quartzitic hackled sandstone.	12	0
111	0	Dark, micaceous sandstone.....	5	0
116	0	Silty clay.....	7	7
116	7	Argillaceous limestone.....	8	5
125	0	Silty clay.....	2	0
127	0	Silty claystone.....	38	0
165	0	Medium to coarse sandstone, irregular coaly streaks.	5	0
170	0	Clay siltstone, pyritic stringers and concretions.	9	10
179	10	Coal.....	1	2
181	0	Silty claystone and clay, limy pellets....	14	0
195	0	Silty claystone and siltstone, sandy streaks.	6	0
201	0	Silty clay, calcareous streaks.....	4	6
206	6	Sandstone to siltstone.....	14	0
220	6	Dark, silty shale, interbedded sandstone	24	0
244	6	Fine sandstone.....	1	0
245	6	Silty clay, limy nodules.....	8	6
254	0	Claystone and siltstone.....	16	0
270	0	Dark-gray siltstone, silty shale, interbedded sandstone.	49	7
319	7	Carbonaceous shale, plants.....	1	0
320	7	Coal.....	1	7
322	2	Speckled claystone, limy pellets.....	35	10
358	0	Fine quartzitic sandstone.....	4	0
362	0	Claystone and siltstone, limy pellets....	52	0
414	0	Coal.....	2	2
414	2	Dark, argillaceous limestone.....	6	4
420	6	Silty clay, limy pellets.....	3	6
424	0	Silty claystone and mudstone.....	20	0
444	0	Dark clay shale.....	2	6
446	6	Coal.....	7	7
447	1	Shale.....	1	1
447	2	Carbonaceous shale.....	1	1/2
448	2 1/2	Cannel coal.....	8	1/2
448	11	Carbonaceous shale.....	1	0
449	11	Dark shale.....	2	7
452	6	Semihard clay.....	4	8
457	2	Green, silty shale.....	4	2
461	4	Silty clay.....	6	8
468	0	Silty claystone.....	16	2
484	2	Green, silty clay.....	3	4
487	6	Siltstone and claystone.....	25	6
513	0	Red, silty claystone.....	1	6
514	6	Silty claystone.....	6	6
521	0	Fine to medium sandstone.....	23	0
544	0	Dark clay shale, pyritic, fossiliferous.....	21	6
565	6	Coal.....	10	10
566	4	Silty claystone.....	7	2
573	6	Clay, limestone pellets.....	5	6
579	0	Silty clay.....	2	0
581	0	Silty claystone and siltstone.....	17	0
598	0	Green mudstone.....	31	0
629	0	Silty, semihard clay.....	1	5
630	5	Claystone and silty clay, limy stringers.	7	7
638	0	Shaly siltstone.....	2	10
640	10	Siltstone, sandstone bands; silty claystone top and bottom.	28	7
669	5	Clay shale.....	1	3
670	8	Coal.....	2	2
670	10	Shale.....	2	2
671	0	Coal.....	11	11
671	11	Dark-gray siltstone.....	6	1

Barton, el. 1,590 ft., C-39742.

Harlem, el. 1,450 ft., C-39743.

Upper Bakerstown, el. 1,356 ft.

Lower Bakerstown, el. 1,324 ft., C-39744.

Brush Creek, el. 1,204 ft.

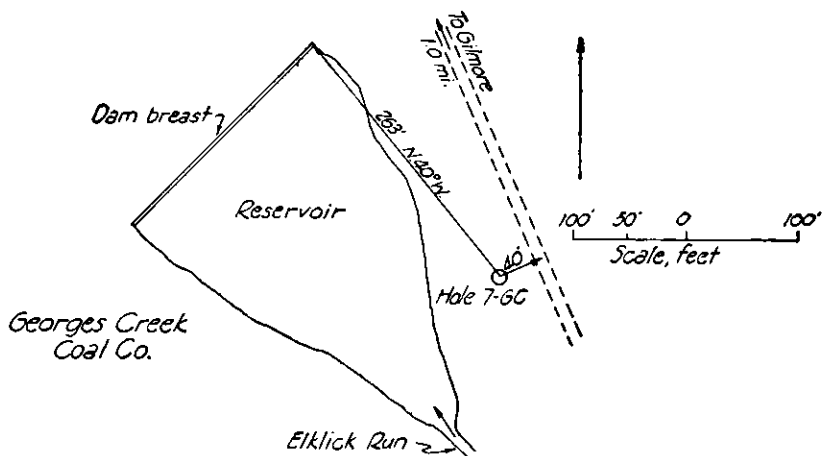
Upper Freeport, el. 1,100 ft.

42 GEORGES CREEK AND UPPER POTOMAC COAL BEDS, MD.

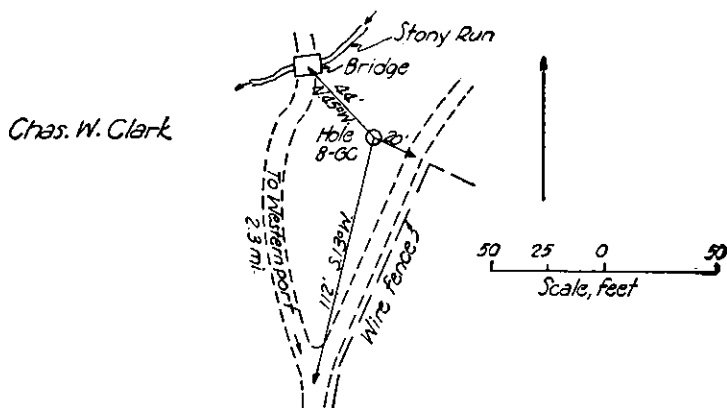
Log, hole 6-GC—Continued

Depth		Material	Thickness	Remarks			
From—	To—						
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>			
678	0	709	8	Claystone and siltstone, minor sandstone streaks.	31	8	
709	8	722	0	Medium sandstone	12	4	
722	0	740	8	Siltstone, claystone and calcareous nodules at base.	18	8	
740	8	742	8	Silty clay	2	0	
742	8	774	9	Sandstone, interbedded shale, and siltstone.	32	1	
774	9	775	2	Coal	5		Upper Kittanning, el. 995 ft.
775	2	776	2	Carbonaceous clay	1	0	
776	2	780	2	Siltstone	4	0	
780	2	807	3	Medium sandstone, coarse at base, backed below 800 feet.	27	1	
807	3	810	0	Dark to carbonaceous shale	2	9	
810	0	810	9	Coal	9		Middle Kittanning, el. 960 ft.
810	9	814	5	Argillaceous limestone, grading to limy claystone.	3	8	
814	5	818	5	Hard clay	4	0	
818	5	824	10	Siltstone and silty claystone	6	5	
824	10	835	10	Siltstone and hard, silty clay fragments	11	0	
835	10	837	0	Silty gray shale and shaly clay	1	2	
837	0	841	2	Dark-gray siltstone	4	2	
841	2	846	0	Dark, shaly siltstone and carbonaceous shale, coaly streaks.	4	10	
846	0	853	6	Silty carbonaceous shale and shaly limestone, interbedded fine sandstone.	7	6	
853	6	857	6	Fine hackled sandstone	4	0	
857	6	858	0	Dark, shaly siltstone and interbedded fine sandstone.	6		
858	0	863	8	Shaly black siltstone, irregular sandstone stringers.	5	8	
863	8	875	7	Carbonaceous shale	11	11	
875	7	877	7	Siltstone with 1/4- to 1/2-in. clay inclusions	2	0	
877	7	878	10	Coal	1	3	Lower Kittanning, el. 892 ft.
878	10	882	0	Dark, sandy siltstone	3	2	
882	0	898	0	Fine to medium, irregularly bedded sandstone.	16	0	
898	0	931	0	Medium- to coarse-hackled sandstone, locally conglomeratic.	33	0	
931	0	939	0	Hard, dense, clayey siltstone	8	0	
939	0	950	4	Interbedded fine sandstone and siltstone	11	4	
950	4	950	7	Coal	3		
950	7	951	9	Shale	1	2	Upper Mount Savage, el. 820 ft.
951	9	952	2	Coal	5		
952	2	955	0	Clayey siltstone, plants	2	10	
955	0	964	6	Fine sandstone and silty sandstone	9	6	
964	6	971	10	Dark, silty shale	7	4	
971	10	972	0	Coal	2		Lower Mount Savage, el. 798 ft.
972	0	978	6	Clayey, carbonaceous siltstone and silty claystone, plants.	6	6	
978	6	999	0	Sandy siltstone	20	6	
999	0	1,010	0	Fine to medium sandstone, siltstone bands.	11	0	
1,010	0	1,051	0	Dark, sandy, micaceous siltstone	41	0	
1,051	0	1,058	6	Carbonaceous, micaceous siltstone	7	6	
1,058	6	1,058	11	Coal	5		
1,058	11	1,076	0	Sandy, micaceous shale	17	1	
1,076	0	1,083	6	Irregularly interbedded fine sandstone and siltstone.	7	6	
1,083	6	1,085	2	Conglomeratic sandstone	1	8	
1,085	2	1,094	8	Carbonaceous shale	9	6	
1,094	8	1,094	11	Coal	3		
1,094	11	1,100	6	Carbonaceous siltstone, plants	5	7	
1,100	6	1,120	6	Conglomeratic sandstone, hackled at base.	20	0	
1,120	6	1,124	0	Sandy siltstone and shale	3	6	
1,124	0	1,172	0	Fine to medium crossbedded sandstone	48	0	
1,172	0	1,198	6	Light-green siltstone, mottled red and green siltstone.	26	6	
1,198	6	1,215	0	Dark-red, clayey siltstone, some green irregular patches, calcareous inclusions near top.	16	6	

NOTE.—At the request of the land owner, this hole was not plugged with cement. Upon completion, water stood 40 feet below collar of hole.



Drive S. on Rt. 36 to Gilmore then turn left 1.0 mi.
 Hole 7-GC on Elklick Run, Allegany County, Md., 2.4 mi. N. 70° E. of Lonaconing



Drive S. to Baptist Church on Rt. 36 in Westernport turn left 2.3 mi.
 Hole 8-GC on Stony Run, Allegany County, Md., 2.1 mi. N. 60° E. of Westernport

FIGURE 22—Location of holes 7-GC and 8-GC.

44 GEORGES CREEK AND UPPER POTOMAC COAL BEDS, MD.

Log, hole 7-GC

Location: On Elklick Run, Allegany County, Md., 2.4 mi. N. 70° E. of Lonaconing. Hole is 263 feet S. 40° E. of N.E. corner of dam breast across Elklick Run. Drive S. on Rt. 36 to Gilmore, then turn left 1 mi.

(Refer to fig. 22.)

Surface elevation: 1,905 feet—by aneroid barometer.

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
0	0	Overburden	59	0
59	0	Calcareous, clayey siltstone	14	6
73	6	Medium to fine sandstone	17	6
91	0	Dark, silty shale, plants	11	0
102	0	Sandy siltstone, irregular stringers sandstone at top	27	0
129	0	Dark, clayey shale, plants	7	1
136	1	Coal	1	3
137	4	Dark to light-gray, argillaceous limestone	24	2
161	6	Light-gray to green, silty claystone, limy pellets	32	0
193	6	Fine sandstone, some interbedded siltstone	37	6
231	0	Clayey siltstone, calcareous at base	17	6
248	6	Dark medium to coarse sandstone	4	0
252	6	Siltstone and interbedded sandstone	5	2
257	8	Dark, clayey siltstone	9	6
267	2	Carbonaceous shale, coal fleck	3	10
271	0	Dark, clayey siltstone	9	0
280	0	Silty claystone, limy pellets	10	0
290	0	Siltstone	13	6
303	6	Claystone	3	6
307	0	Sandy, clayey siltstone	30	0
337	0	Mottled red and gray-green claystone	10	6
347	6	Siltstone, beds of fine sandstone	29	6
377	0	Dark, fossiliferous limestone	19	6
396	6	Coal	2	2
396	8	Silty claystone	6	10
403	6	Clayey siltstone	9	0
412	6	Sandy siltstone	13	0
425	6	Fine to medium sandstone	7	0
432	6	Sandy and clayey siltstone, plants	14	6
447	0	Coal	8	8
447	8	Shale	2	2
447	10	Coal	4	4
448	2	Clayey siltstone, limy pellets	16	10
465	0	Fine to medium sandstone	7	0
472	0	Interbedded sandstone and siltstone	20	0
492	0	Clayey siltstone	1	8
493	8	Coal	5	5
494	1	Clayey and sandy siltstone, plants	14	11
509	0	Medium sandstone	3	8
512	8	Siltstone, calcareous at top	59	5
572	0	Medium- to coarse-hackled sandstone	20	4
592	4	Coal	8	8
593	0	Dark, clayey siltstone, plants	12	0
605	0	Siltstone and interbedded fine sandstone	21	0
626	0	Medium to fine sandstone	11	0
637	0	Clayey and sandy siltstone	3	7
640	7	Coal	4	4
640	11	Carbonaceous, shaly siltstone, plants	23	1
664	0	Sandy siltstone	28	0
692	0	Medium- to fine-hackled sandstone	3	5
695	5	Silty shale	10	4
705	9	Coal	1	1
705	10	Dark, silty shale, clayey at top	6	8
712	6	Sandy siltstone, claystone band, clay inclusions	19	6
732	0	Fine sandstone	7	0
739	0	Siltstone and interbedded quartzitic sandstone	24	0
763	0	Clay siltstone, plants	13	0
776	0	Sandy siltstone	1	10
777	10	Carbonaceous shale, plants	1	2

Harlem, el. 1,769 ft.

Brush Creek, el. 1,509 ft.

Mahoning, cl. 1,458 ft.

Upper Freeport, el. 1,411 ft.

Water at 585 ft., 300 g. p. m.
Upper Kittanning, el. 1,313 ft.

Middle Kittanning, el. 1,265 ft.

Lower Kittanning, el. 1,200 ft.

Log, hole 7-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
779 0	780 8	Coal.....	1 8	Upper Mount Savage, el. 1,136 ft., C-42286.
780 8	787 8	Carbonaceous siltstone.....	7 0	
787 8	789 8	Silty shale, coal partings.....	2 0	Lower Mount Savage, el. 1,115 ft.
789 8	790 3	Coal.....	7	
790 3	792 1	Clayey siltstone.....	1 10	
792 1	792 7	Coal.....	6	
792 7	792 9	Shale.....	2	
792 9	792 11	Coal.....	2	
792 11	793 4	Shale.....	5	
793 4	793 9	Coal.....	5	
793 9	794 0	Clayey shale.....	3	
794 0	831 0	Medium to coarse sandstone locally conglomeratic, hackled at base.	37 0	

Log, hole 8-GC

Location: On Stony Run, Allegany County, Md., 2.1 mi. N. 60° E. of Westernport. Hole is 44 feet S. 45° E. of a bridge over Stony Run. Drive S. to Baptist Church on Rt. 36 in Westernport, turn left 2.3 mi. (Refer to fig. 22.)
Surface elevation: 1,625 feet—by aneroid barometer.

<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
0 0	26 0	Overburden.....	26 0	Harlem, el. 1,560 ft., C-42798.
26 0	35 6	Fine sandstone and interbedded siltstone.	9 6	
35 6	62 10	Dark, calcareous shale, silty streaks, fossiliferous.	27 4	
62 10	74 8	Silty shale, plants at top.....	11 10	
74 8	76 1	Coal.....	1 3	
76 1	82 0	Siltstone, limy pellets.....	5 11	
82 0	104 0	Dark, fine, crystalline limestone.....	22 0	
104 0	128 0	Green and red clayey siltstone, calcareous zones.	24 0	
128 0	136 4	Siltstone, silty clay at top.....	8 4	
136 4	148 6	Medium to fine sandstone.....	12 2	
148 6	163 6	Siltstone, interbedded fine sandstone at base.	18 4	Upper Bakerstown, el. 1458 ft., C-43264.
163 6	167 0	Dark clay shale.....	3 6	
167 0	168 4	Coal.....	1 4	
168 4	172 8	Dark, silty clay.....	4 4	
172 8	191 0	Siltstone, interbedded sandstone at base.	18 4	
191 0	191 9	Cannel coal.....	9	
191 9	192 3	Carbonaceous calcareous siltstone.....	6	
192 3	192 9	Cannel coal.....	6	
192 9	195 9	Dark, limy siltstone.....	3 0	
195 9	207 8	Dark, clayey siltstone, limy pellets at base.	11 11	
207 8	208 1	Coal.....	5	Lower Bakerstown, el. 1418 ft., C-43265.
208 1	208 2	Shale.....	1	
208 2	208 11½	Coal.....	9½	
208 11½	209 1½	Shale.....	2	
209 1½	211 2	Coal.....	2 ½	
211 2	215 2	Silty clay, calcareous stringers.....	4 0	
215 2	225 6	Clayey siltstone, calcareous stringers.....	10 4	
225 6	229 6	Fine sandstone.....	4 0	
229 6	233 9	Shaly siltstone, sandy at top.....	4 3	
233 9	237 0	Silty clay.....	3 3	
237 0	248 6	Limestone.....	11 6	
248 6	250 0	Calcareous siltstone, upper part mottled red and gray.	1 6	
250 0	263 0	Siltstone and interbedded sandstone.....	13 0	
263 0	267 0	Fine sandstone.....	4 0	
267 0	271 0	Sandy siltstone.....	4 0	
271 0	296 0	Dark, silty shale, some interbedded sandstone.	25 0	
296 0	302 6	Sandy siltstone, calcareous at base.....	6 0	
302 6	312 0	Dark, calcareous, streaked shale, fossil bed at 307 ft.	9 6	

Log, hole 8-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
312	0	Bony coal	4	Brush Creek, el. 1,313 ft.
312	4	Carbonaceous shale	6	
312	10	Coal	5	
313	3	Sandy siltstone, limy inclusions	10	
323	6	Silty claystone	4	
328	0	Sandy siltstone	7	Mahoning, el. 1,260 ft., C-43266.
335	0	Fine to medium sandstone	27	
362	8	Crossbedded shaly sandstone	2	
364	10	Bone	2	
365	0	Coal	6	
365	6	Bone	1	
365	7	Coal	1	
366	7	Shale	1	
366	8	Coal	1	
367	10	Shaly coal	6	
367	11	Dark, clayey, sandy siltstone	5	C-43706.
374	0	Silty claystone	5	
379	0	Irregularly interbedded sandstone and siltstone	26	
405	8	Carbonaceous shale	2	
407	8	Coal	2	
410	0	Shale	4	
410	3	Shale	3	
410	3	Coal	2	
410	5	Shale	10	
411	3	Coal	1	
412	4	Shale	1	Upper Freeport, el. 1,218 ft., C-43707.
412	4 $\frac{1}{2}$	Coal	2	
412	4 $\frac{1}{2}$	Shaly siltstone, calcareous pellets	2	
414	7 $\frac{1}{2}$	Limestone and limy claystone	2	
417	0	Limestone and limy claystone	3	
420	0	Limy clay	2	
422	0	Silty clay, minor claystone, ironstone pellets	3	
422	0	Irony, fragmental clay	2	
428	7	Silty clay, zones hard sandstone	9	
428	7	Silty clay, zones hard sandstone	5	
434	0	Dark, shaly clay and siltstone	2	
436	0	Siltstone and fine sandstone	2	
436	6	Fine sandstone	31	
467	6	Fine sandstone	1	
469	0	Carbonaceous shale to sandy siltstone	1	
470	9	Fine sandstone, gray, thin-bedded siltstone	2	
473	1	Medium sandstone, local zones siltstone, shaly partings	4	
473	1	Medium sandstone, local zones siltstone, shaly partings	31	
504	7	Dark, silty claystone to shaly siltstone	6	
511	0	Coal	5	Upper Kittanning, el. 1,114 ft., C-43850.
511	0	Coal	1	
512	4	Carbonaceous clay shale	4	
514	8	Coal	2	
514	8	Coal	1	
516	0	Shale	1	
516	1	Coal	1	
517	5	Shale	4	
517	5	Coal	1	
517	6	Shale	2	
517	8	Shale	2	
517	10	Coal	1	
517	11 $\frac{1}{2}$	Silty, carbonaceous clay	2	
520	0	Silty clay, calcareous pellets	2	
522	7	Dark, crystalline limestone	7	
522	7	Dark, crystalline limestone	2	
524	9	Dark siltstone and silty clay	2	
524	9	Dark siltstone and silty clay	6	
530	9	Interbedded sandy siltstone and sandstone	4	
530	9	Interbedded sandy siltstone and sandstone	0	
534	9	Medium sandstone	20	
534	9	Medium sandstone	3	
555	0	Shaly siltstone to silty clay shale	1	
555	0	Shaly siltstone to silty clay shale	6	
556	6	Coal	3	
556	9	Shale	4	
557	1	Bone	4	
557	1	Bone	4	
557	5	Coal	2	
557	5	Coal	2	
557	7	Shale	1	
557	7	Shale	1	
557	8	Coal	4	
558	0	Carbonaceous and silty clay	5	
558	0	Carbonaceous and silty clay	9	
563	9	Interbedded fine sandstone and shaly siltstone	19	
563	9	Interbedded fine sandstone and shaly siltstone	10	
583	7	Coal	0	
583	7	Coal	3	
583	10	Intrbedded sandstone and shaly siltstone	11	
583	10	Intrbedded sandstone and shaly siltstone	2	
595	0	Gray shale with pyrite	2	
597	5	Gray shale with pyrite	5	
597	5	Hard clay	3	
597	5	Hard clay	0	
597	5	Hard clay	0	

Log, hole 8-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
600	5	Coal.....	10	Lower Kittanning, el. 1,025 ft., C-43954.
601	3	Clay.....	1 6	
602	9	Coal.....	3	
603	0	Shale.....	1	
603	1	Coal.....	5	
603	6	Silty, carbonaceous clay and siltstone.....	8 1	Lower Kittanning, el. 1,011 ft., C-44026.
611	7	Carbonaceous clay.....	2 0	
613	7	Cannel coal.....	9	
614	4	Shale.....	4	
614	8	Coal.....	1 2	
615	10	Cannel coal.....	5	
616	3	Siltstone.....	9 6	
625	9	Fragmental, silty, hard clay.....	4 0	
629	9	Carbonaceous shale.....	4 6	
634	3	Silty to sandy clay.....	2 2	
636	5	Siltstone and sandstone.....	3 2	
639	7	Carbonaceous shale.....	6 0	
645	7	Siltstone.....	1 0	
646	7	Fragmental, silty claystone.....	2 11	
649	6	Fragmental, silty, hard clay.....	7 1	
656	7	Siltstone.....	4 0	
660	7	Dark, silty shale.....	7 1	
667	8	Gray siltstone.....	21 4	
689	0	Interbedded siltstone and sandstone.....	4 4	
693	4	Medium sandstone, hackled at base.....	19 1	
712	5	Shale and silty shale.....	21 11	
734	4	Coal.....	2	Lower Mount Savage, el. 891 ft.
734	6	Silty clay and shale.....	8 6	
743	0	Siltstone and interbedded sandstone.....	11 0	
754	0	Dark shale.....	0 6	
754	6	Interbedded sandstone and siltstone.....	10 5	
764	11	Medium to coarse sandstone, locally hackled at bottom.	65 1	

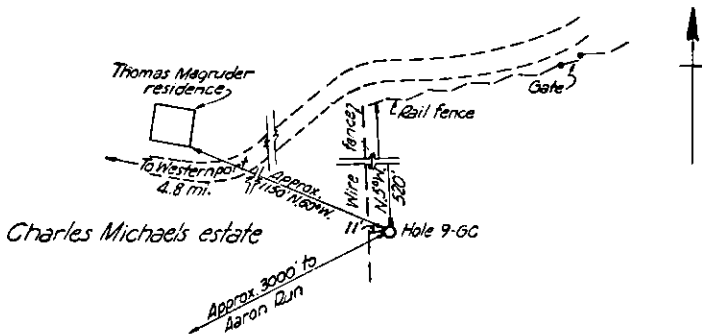
NOTE.—Hole surveyed at 407 feet—1° from vertical.

Log, hole 9-GC

Location: Approx. 3,000 feet NE. of Aaron Run, Garrett County, Md., 2.7 mi. N. 39° W. of Westernport. Hole is approximately 1,150 feet S. 60° E. of Thomas Magruder residence. Drive 4.4 mi. on Aaron Run road from Westernport, then turn right 0.4 mi.
(Refer to fig. 23.)

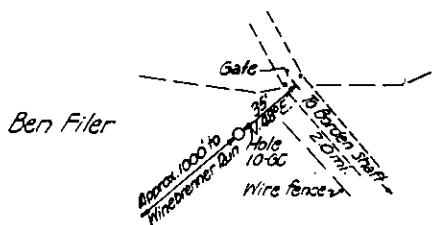
Surface elevation: 2,080 feet—by aneroid barometer.

0	0	Overburden.....	20	0
20	0	Siltstone and interbedded sandstone.....	9	0
29	0	Claystone and siltstone, calcareous stringers.	4	0
33	0	Siltstone and interbedded sandstone.....	35	0
68	0	Medium to coarse sandstone, plants, hackled at base.	15	0
83	0	Interbedded siltstone and sandstone.....	9	0
92	0	Dark, finely crystalline limestone.....	15	0
107	0	White and dark-gray clay, limy pellets.....	1	4
108	4	Fragmental dark- and light-gray pyritic clay and interbedded argillaceous lime- stone.	9	8
118	0	Dark-gray pyritic shale and light-gray clay.	2	5
120	5	Silty carbonaceous shale with coaly specks.	3	11
121	4	Dark-gray, silty clay, limy stringers, 6 in. limestone at top.	3	10
125	2	Gray, clayey shale and shaly siltstone.....	5	2
130	4	Fragmental silty claystone, dark frag- ments in light-gray matrix, limy frag- ments in upper foot.	4	8
135	0	Gray limestone and siltstone.....	4	0
139	0	Light-gray to greenish-gray silty clay, calcareous stringers.	16	6
155	6	Silty clay, carbonaceous streaks at base.....	1	6
157	0	Silty claystone, minor streaks siltstone, limy pellets.	18	8
175	8	Carbonaceous shale, plants.....	11	10



Drive 4.4 mi. on Aaron Run Road from Westernport, then turn right 0.4 mi.
 Hole 9-GC approx. 3000' NE. Aaron Run, Garrett County, Md., 2.7 mi. N. 39° W. of Westernport

50 25 0 25
 ───────────
 Scale, feet



Drive on Rt. 36 from Frostburg to Borden Shaft; then turn right 2.0 miles
 Hole 10-GC approx. 1000' NE. of Wirebrenner Run, Allegany County, Md., 1.8 mi. S. 60° W. of Frostburg Post Office

FIGURE 23.—Location of holes 9-GC and 10-GC.

Log, hole 9-GC—Continued

Depth		Material	Thickness	Remarks	
From—	To—				
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>	
187	6	Coal.....	2	0	Barton, el. 1,903 ft., C-43267.
190	0	Shale.....	1	1	
190	1	Coal.....	3	3	
190	4	Coal.....	15	3	
190	4	Limy claystone and silty clay.....	8	5	
205	7	Mottled gray and yellow, clayey siltstone.....	2	6	
214	0	Gray to greenish, silty clay.....	2	8	
216	6	Interbedded mottled sandstone and clayey siltstone.....	2	2	
219	2	Medium-gray sandstone.....	9	11	Federal Hill, el. 1,854 ft.
221	4	Sandy and silty claystone.....	5	0	
231	3	Shaly, silty clay, carbonaceous at base.....	4	4	
236	3	Coal.....	11	7	
236	7	Silty claystone and sandstone.....	4	4	
245	2	Gray, silty clay, calcareous inclusions.....	8	4	
252	6	Greenish mottled claystone, silty toward base.....	19	6	
260	10	Fine- to medium-grained sandstone, calcareous upper 5 ft.....	4	6	
280	4	Interbedded siltstone and sandstone.....	19	0	
284	10	Medium-gray, hackled sandstone.....	10	10	
303	10	Carbonaceous shale, coal partings.....	3	0	Harlem, el. 1,775 ft., C-43705.
304	8	Shaly siltstone and sandstone.....	6	10	
307	8	Carbonaceous, silty shale.....	8	8	
314	6	Coal and bone.....	4	3	
315	2	Coal.....	10	5	
315	6	Shale.....	6	6	
315	9	Coal.....	14	6	
316	7	Calcareous, silty claystone.....	11	8	
327	0	Calcareous, silty clay.....	2	4	
333	6	Fine sandstone, siltstone streaks at base.....	4	0	
348	0	Red and gray claystone and calcareous clay.....	5	6	
359	8	Calcareous claystone.....	6	6	Lower Bakerstown, el. 1,645 ft., C-43849.
362	0	Silty claystone.....	4	0	
366	0	Calcareous claystone.....	4	0	
371	6	Silty clay.....	16	0	
375	6	Clayey siltstone.....	18	8	
391	6	Fine to medium sandstone.....	3	5	
410	2	Sandstone and siltstone.....	20	1	
413	7	Dark shale, sandstone streaks.....	9	8	
433	8	Siltstone.....	1	4	
443	4	Dark clay.....	1	1	
443	8	Coal.....	1	1	
444	8	Carbonaceous shale.....	2	2	
444	9	Coal.....	1	1	
444	10	Carbonaceous shale.....	1	1	
444	11	Coal.....	2	2	
445	1	Carbonaceous shale.....	1	1	
445	2	Coal.....	2	2	
445	4	Carbonaceous shale.....	2	2	
445	6	Coal.....	3	3	
445	9	Carbonaceous shale.....	3	0	
445	9	Coal.....	7	11	
448	9	Silty clay, limy pellets.....	16	4	
456	8	Siltstone and sandstone.....	7	10	
473	0	Sandy clay.....	1	2	
480	10	Limestone.....	13	10	
482	0	Claystone and clay.....	15	2	
482	0	Clay shale.....	10	0	
495	10	Sandy siltstone.....	13	0	
511	0	Fine to medium sandstone.....	16	10	
511	0	Clay shale, limy pellets, scattered fossils.....	9	9	
521	0	Coal.....	28	5	Brush Creek, el. 1,540 ft., C-43953.
534	0	Sandstone and clay siltstone.....	3	0	
534	0	Fine sandstone.....	10	6	
534	0	Silty claystone.....	11	6	
534	0	Siltstone.....	27	7	
534	0	Sandy, silty clay and flint clay.....	18	10	
534	0	Shaly siltstone.....	1	0	
534	0	Dark shale.....	2	2	
534	0	Coal.....	1	1	
534	0	Shale.....	4	4	
534	0	Coal.....	1	0	
534	0	Shale.....	1	7	
534	0	Coal.....			Upper Freeport, el. 1,438 ft., C-43955.
534	0	Shale.....			

50 GEORGES CREEK AND UPPER POTOMAC COAL BEDS, MD.

Log, hole 9-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
655	7	Dark, silty shale.....	5	5
661	0	Silty clay.....	5	4
666	4	Siltstone.....	18	7
684	11	Sandstone and siltstone.....	6	6
691	5	Medium sandstone.....	15	1
706	6	Sandstone and siltstone.....	5	5
711	11	Carbonaceous clay.....	6	6
712	5	Coal.....	5	5
712	10			Lower Freeport, el. 1,378 ft.
719	5	Silty clay.....	6	7
723	5	Calcareous siltstone.....	4	0
728	0	Clay.....	4	7
728	0	Siltstone and sandstone.....	14	4
742	4	Medium sandstone, carbonaceous streaks at base.	24	5
766	9	Siltstone.....	1	3
768	0	Coal.....	2	2
768	2	Shale.....	1	1
768	3	Coal.....	11	11
769	2	Limestone.....	4	10
774	0	Clay.....	1	0
775	0	Siltstone and fine sandstone.....	8	6
783	6	Clay shale.....	17	3
800	9	Coal.....	1	6½
802	3½	Shale.....	1	0½
802	4	Coal.....	1	0
803	4	Dark silty shale.....	8	8
812	0	Coal.....	10	10
812	10			Middle Kittanning, el. 1,290 ft., C-44534.
831	6	Siltstone.....	18	8
847	10	Silty shale.....	16	4
847	10	Silty clay.....	5	6
853	4	Clayey siltstone.....	11	3
864	7	Silty shale.....	5	1
869	8	Siltstone and fine sandstone.....	9	10
879	6	Medium to coarse quartzitic sandstone.....	12	6
892	0	Coal.....	2	2
892	2			Lower Kittanning, el. 1,198 ft.
900	0	Clay.....	7	10
900	0	Silty clay shale.....	16	8
916	8	Coal.....	5	5
917	1	Dark shale and siltstone.....	5	9
922	10	Coal.....	4	4
923	2	Bone.....	5	5
923	7	Coal.....	1	0
924	7	Dark, silty shale.....	1	3
925	10	Carbonaceous siltstone and sandstone.....	5	8
931	6	Medium quartzitic sandstone, hacked at base.	18	1
949	7	Coal.....	4	4
949	11			Lower Mount Savage, el. 1,140 ft.
949	11	Silty sandstone.....	7	1
949	11			

NOTE.—Hole surveyed at 957 feet—1° from vertical.

Log, hole 10-GC

Location: Approx. 1,000 feet NE. of Winebrenner Run, Allegany County, Md., 1.8 mi. S. 60° W. of Frostburg Post Office. Hole is 35 feet S. 48° W. from \odot of road at gate. Drive on Rt. 36 from Frostburg to Borden Shaft, then turn right 2.0 mi.
(Refer to fig. 23.)

Surface elevation: 2,165 feet—by aneroid barometer.

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
0	0	Overburden	33	0
33	0	Silty shale	22	0
55	0	Bone and carbonaceous shale	1	9
56	9	Coal	1	0
57	9	Silty clay, zones plastic clay	3	9
61	6	Silty shale	4	6
66	0	Coal	1	2
67	2	Silty shale	1	10
69	0	Silty clay	15	0
84	0	Silty shale and shaly siltstone	3	0
87	0	Clay shale and sandstone beds	10	8
97	8	Coarse sandstone	2	1
99	9	Coal	4	4
100	1	Fine, quartzitic sandstone	9	5
109	6	Dark clay shale, silty at top	18	0
127	6	Coal	1	0
128	6	Silty claystone, calcareous nodules	7	6
136	0	Sandstone and siltstone	7	0
143	0	Silty claystone and clayey siltstone	18	0
161	0	Medium sandstone	17	0
178	0	Siltstone	1	6
179	6	Clay	1	9
181	3	Argillaceous limestone	12	5
193	8	Silty, calcareous claystone	14	10
208	6	Fine sandstone	2	0
210	6	Silty clay shale, sandy at base	5	0
215	6	Coal and bone	10	10
216	4	Silty clay, carbonaceous shale at base	4	0
220	4	Bone	9	9
221	1	Coal	7	7
221	8	Shale	2	2
221	10	Coal	11	11
222	9	Calcareous clay and claystone	7	5
230	2	Silty claystone	15	2
245	6	Silty clay shale, sandy at top	18	8
264	0	Dark shale, streaks of sandstone and siltstone in upper part.	19	4
283	4	Silty sandstone	12	5
295	9	Siltstone	7	3
303	0	Silty claystone, calcareous stringers	18	4
321	4	Sandstone, interbedded siltstone at top, coarse at base.	22	8
344	0	Coal	4	4
344	4	Silty clay	5	2
349	6	Silty claystone	10	4
359	10	Shaly siltstone, interbedded sandstone at top.	21	8
381	6	Silty shale	3	6
385	0	Dark shale, fossiliferous	8	0
393	0	Silty shale and interbedded fine sandstone.	22	0
415	0	Fine to medium sandstone	10	4
425	4	Coal	4	4
425	8	Silty claystone, calcareous nodules	17	10
443	6	Red, silty clay	4	6
448	0	Siltstone and silty claystone, green at top	24	6
472	6	Fine sandstone medium in upper half	40	6
513	0	Black shale	6	6
513	6	Coal	1	2½
514	8½	Shale	1	3
515	11½	Coal	0	3½
516	3	Calcareous claystone	2	0
518	3	Silty claystone	5	9
524	0	Calcareous claystone	1	3
525	3	Slightly silty claystone	12	3
537	6	Silty clay shale	6	0
543	6	Clay	8	6
552	0	Black shale	4	0

Upper Hoffman,
el. 2,108 ft., C-45060.

Upper Hoffman,
el. 2,099 ft., C-45051.

Lower Hoffman,
el. 2,065 ft.

Clarysville, el. 2,037 ft.,
C-45052.

Wellersburg, el. 1,950 ft.,
C-45053.

Federal Hill, el. 1,821 ft.

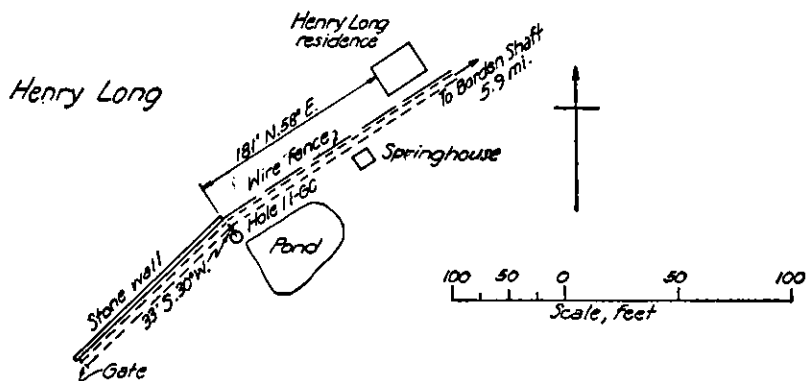
Harlem, el. 1,740 ft.

Water at base.

C-45939, Upper Bakers-
town, el. 1,651 ft.

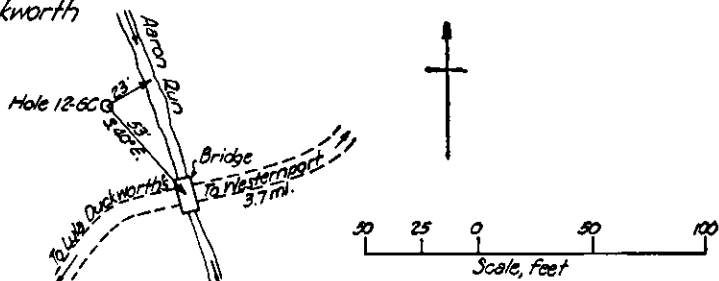
Log, hole 10-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
556	0	Coal	3	Lower Bakerstown, el. 1,608 ft.
556	3	Shale	1	
556	4	Coal	11	
557	3	Carbonaceous shale	7	Lower Bakerstown, el. 1,600 ft.
564	11	Coal	7	
565	6	Pyritic, silty, carbonaceous shale	1	Brush Creek, el. 1,483 ft.
566	8	Claystone	17	
584	0	Shaly siltstone, laminated sandstone at top.	42	
626	3	Claystone	8	Brush Creek, el. 1,483 ft.
635	0	Silty shale	26	
661	0	Dark shale, slightly silty	21	
682	2	Coal	11	
683	1	Silty claystone to silty clay, calcareous at top.	5	
688	8	Siltstone	9	
698	0	Clay and silty clay	6	
704	0	Siltstone, sandstone and claystone in middle.	39	
743	0	Sandstone	41	Upper Freeport, el. 1,380 ft., C-46320.
784	6	Coal	8	
785	2	Shale	8	
785	10	Coal	3	
788	10	Silty clay	8	
797	0	Silty claystone	2	
799	10	Shaly, silty claystone	14	
814	0	Dark, silty shale	2	
816	2	Shaly siltstone	5	
822	1	Fine sandstone	1	
823	5	Shaly siltstone	1	
825	4	Medium sandstone	11	
826	3	Silty carbonaceous shale, coal streaks at base.	1	
827	7	Clay and claystone	11	
839	3	Fine to medium sandstone	38	
877	6	Coal	1	
879	0	Medium to coarse quartzitic sandstone, conglomeritic at base, carbonaceous partings and minor hackling.	16	Upper Kittanning, el. 1,288 ft., C-46762.
895	10	Carbonaceous shale	1	
897	0	Clay and claystone	17	Lower Kittanning, el. 1,202 ft.
914	8	Siltstone, sandy claystone	17	
932	6	Fragmental clay	7	
933	1	Siltstone and sandstone	4	
938	0	Dark shale	10	
948	0	Shaly siltstone	3	
951	0	Dark shale, clayey at base	12	
963	3	Coal	6	
963	9	Shale	1	
965	0	Coal	3	
965	3	Shale	3	
965	6	Coal	5	
965	11	Fine to medium sandstone, quartzitic at base, carbonaceous partings and some hackling.	17	
983	9	Siltstone, silty clay at top, iron pellets in middle part.	14	
998	0	Dark sandy siltstone	12	
1,010	0	Medium sandstone, some carbonaceous partings and zones of pyrite.	24	
1,034	4	Carbonaceous shale, silty streaks	4	Upper Mount Savage el. 1,127 ft.
1,038	6	Coal	3	
1,038	9	Carbonaceous clayey siltstone	2	Lower Mount Savage, el. 1,122 ft.
1,041	0	Clay, carbonaceous and silty at top	2	
1,043	8	Coal and bone	3	
1,043	11	Carbonaceous clay, slightly pyritic	3	
1,047	0	Coal	2	
1,047	2	Carbonaceous clay	1	
1,049	0	Interbedded siltstone and fine sandstone	4	
1,053	8	Shale, silty and sandy at top	8	
1,062	6	Fine to medium sandstone	18	
1,062	6		6	



Drive 0.8 mi. S. from Borden Shaft on Rt. 36, then turn left 4.6 mi. then turn right 0.5 mi. Hole 11-GC on an east branch of Neff Run, Allegany County, Md., 1.2 mi. S. 8° E. of Vale Summit.

Evs Duckworth



Drive 3.5 mi. on Aaron Run Rd. from Westernport, then turn left 0.2 mi. Hole 12-GC on Aaron Run, Garrett County, Md., 28 mi. N. 66° N. of Westernport.

FIGURE 24.—Location of holes 11-GC and 12-GC.

54 GEORGES CREEK AND UPPER POTOMAC COAL BEDS, MD.

Log, hole 11-GC

Location: On an east branch of Neff Run, Allegany County, Md., 1.2 mi. S. 8° E. of Vale Summit. Hole is 33 feet S. 30° E. of beginning of stone fence, which is 181 feet S. 58° W. of the brick residence of Henry Long. Drive 0.8 mi. from Borden Shaft on Rt. 36, then turn left 4.6 mi., then turn right 0.5 mi.

(Refer to fig. 24.)

Surface elevation: 2,420 feet—by aneroid barometer.

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
0	0	Overburden	25	1
25	1	Shaly siltstone	20	3
45	4	Sandy siltstone, carbonaceous at base	8	9
54	1	Coal and bone	11	1/2
55	1/2	Shale	1	6
56	6 1/2	Coal and bone	4	1/2
56	11	Argillaceous limestone and silty clay	11	8
68	7	Clay, limestone pellets	6	9
75	4	Silty clay	3	8
79	0	Clay siltstone, sandstone streaks	12	5
91	5	Silty clay	7	2
98	7	Sandstone and sandy clay	2	10
101	5	Black shale, interbedded sandstone	5	1
106	6	Dark shale	2	4
108	10	Coal	7	
109	5	Silty clay, calcareous concretions	18	7
128	0	Clay siltstone	4	0
132	0	Medium to fine light sandstone	4	0
136	0	Calcareous siltstone, claystone upper part, clay middle part, claystone at base	27	8
163	8	Medium sandstone, siltstone pellets	11	4
175	0	Coarse sandstone, conglomeratic at base	20	0
195	0	Coal	9	
195	9	Carbonaceous clay, pyritic	1	3
197	0	Silty, argillaceous limestone	4	6
201	6	Calcareous clay	7	1
208	7	Argillaceous limestone	8	5
217	0	Clay	1	9
218	9	Clay siltstone	5	9
224	6	Interlaminated siltstone and fine sandstone, shaly in lower part	16	4
240	10	Coal and bone	3	
241	1	Coal	1	3 1/2
242	4 1/2	Shale and bone	2	1/2
242	7	Siltstone, limy stringers	12	5
242	0	Siltstone and sandstone, medium to coarse at base	12	4
255	0	Conglomerate, fine pebbles	16	8
267	4	Gray, calcareous, mottled shaly clay, fossiliferous	8	4
292	4	Interlaminated sandstone and siltstone	9	8
302	0	Carbonaceous, shaly siltstone, sandstone streaks	20	0
322	0	Coal	1	1
323	1	Silty marl	15	11
323	0	Silty clay, calcareous pellets	13	0
352	0	Silty claystone, calcareous stringers	26	0
378	0	Interbedded siltstone and fine sandstone	10	7
388	7	Sandstone and siltstone	9	8
398	3	Shaly siltstone, sandy streaks	3	9
402	0	Carbonaceous black shale	1	7
403	7	Dark shale	3	
403	10	Coal	10	
404	8	Shale	1	
404	9	Coal	1	2
405	11	Dark, silty clay, marcasite inclusions	8	1
414	0	Silty claystone	22	6
436	6	Siltstone, interbedded sandstone	10	6
447	0	Coal	1	
447	1	Bone	1	
447	2	Dark, silty sandstone, slightly pyritic	15	2
462	4	Dark, shaly clay	3	8
466	0	Silty claystone	4	3
470	3	Siltstone and sandstone	9	9
490	0	Clay shale	5	0
485	0	Clay	6	0
491	0	Silty clay shale	9	0
500	0	Medium sandstone	7	0

Upper Clarysville, el. 2,366 ft., C-45451.

Lower Clarysville, el. 2,311 ft.

Barton, el. 2,225 ft.

Federal Hill, el. 2,179 ft., C-45936.

Harlem, el. 2,098 ft., C-45937.

Upper Bakerstown, el. 2,016 ft., C-45938.

Lower Bakerstown, el. 1,973 ft.

Log, hole 11-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
507 0	516 0	Silty clay shale.....	9 0	
516 0	524 8	Redbed, silty clay shale, mottled at top, gray at base.	8 8	
524 8	568 10	Medium sandstone, fine at top.....	44 8	
568 10	574 0	Carbonaceous, fossiliferous shale.....	5 2	Brush Creek, el. 1,846 ft.
574 0	574 7	Coal.....	7	
574 7	576 0	Carbonaceous, fossiliferous clay shale.....	1 5	
576 0	585 3	Silty claystone to clay shale, calcareous pellets.	9 3	
585 3	606 4	Medium sandstone, fine at top, conglomeratic at base.	21 1	
606 4	608 0	Fragmented, semihard clay.....	1 8	
608 0	640 5	Sandy siltstone.....	32 5	
640 5	667 7	Medium sandstone, fragmented at 654 ft.	27 2	
667 7	686 10	Fine sandstone and siltstone.....	19 3	
686 10	687 1	Coal.....	3	Upper Freeport, el. 1,733 ft., C-46250, C-46251.
687 1	687 3	Shale.....	2	
687 3	688 0	Coal.....	9	
688 0	688 10½	Shale.....	10½	
688 10½	692 0	Coal.....	3 1½	
692 0	693 1	Pyritic, silty clay.....	1 1	
693 1	711 3	Siltstone, clay shale, limy at base.....	18 2	
711 3	713 2	Flinty iron clay, hard and semihard (fireclay).	1 11	
713 2	720 1	Silty clay shale.....	6 11	
720 1	731 0	Silty clay shale, fine sandstone.....	10 11	
731 0	739 2	Siltstone.....	8 2	
739 2	748 8	Pyritic clay, claystone.....	9 6	
748 8	754 2	Siltstone.....	5 6	
754 2	761 3	Clay shale.....	7 1	
761 3	774 7	Siltstone, interbedded and interlaminated sandstone.	13 4	
774 7	780 4	Silty shale.....	5 9	
780 4	791 3	Carbonaceous clay shale.....	10 11	
791 3	791 5	Bone.....	2	C-46321.
791 5	792 8½	Coal.....	1 3½	
792 8½	792 9½	Shale.....	1	Upper Kittanning, el. 1,629 ft.
792 9½	793 6	Coal.....	8½	
793 6	793 7	Shale.....	1	
793 7	793 7½	Coal.....	½	
793 7½	793 8	Shale.....	½	
793 8	793 11	Coal.....	3	
793 11	794 ½	Shale.....	1½	
794 ½	794 2	Coal.....	1½	
794 2	794 10	Carbonaceous shale.....	8	
794 10	798 3	Slightly calcareous, silty claystone.....	3 5	
798 3	803 0	Silty claystone.....	4 9	
803 0	809 0	Interlaminated sandstone and siltstone.....	6 0	
809 0	815 0	Silty clay shale.....	6 0	
815 0	823 6	Interlaminated sandstone and siltstone.....	8 6	
823 6	824 0	Carbonaceous shale.....	6	
824 0	825 0	Coal.....	1 0	Middle Kittanning, el. 1,595 ft., C-46322.
825 0	829 6	Silty clay shale.....	4 6	
829 6	855 8	Interlaminated sandstone and siltstone.....	26 2	
855 8	859 5	Shale.....	3 9	
859 5	859 11	Coal.....	6	
859 11	861 10	Carbonaceous shale.....	1 11	
861 10	864 1	Clay and shaly clay.....	2 3	Lower Kittanning, el. 1,560 ft., C-46323.
864 1	864 9	Bone and shale.....	8	
864 9	865 2	Coal.....	5	
865 2	865 4	Shale.....	2	
865 4	865 11	Coal.....	7	
865 11	866 3	Siltstone.....	4	
866 3	866 11	Plastic clay.....	8	
866 11	867 11	Coarse sandstone.....	1 0	
867 11	868 2	Clay.....	3	
868 2	872 2	Silty clay shale.....	4 0	
872 2	873 0	Coal.....	10	
873 0	873 5	Clay shale.....	5	Lower Kittanning, el. 1,548 ft.
873 5	875 10	Plastic clay.....	2 5	
875 10	878 4	Clay, siltstone and sandstone.....	2 6	
878 4	880 3	Clay and clay shale.....	1 11	
880 3	880 5	Coal.....	2	
880 5	882 3	Siltstone.....	1 10	
882 3	923 0	Fine-baked, quartzitic sandstone, coarse at base.	40 9	

Log, hole 11-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
923 0	926 8	Shaly siltstone, sandy at base.....	3 8	
926 8	949 6	Fine to medium quartzitic sandstone.....	22 10	
949 6	953 3	Shaly, sandy siltstone.....	3 9	
953 3	953 8	Fine-hackled sandstone.....	5 5	
953 8	959 0	Dark, shaly clay, silty at top.....	5 4	
959 0	960 3	Claystone and silty clay.....	1 3	
960 3	961 0	Carbonaceous shale, coal streaks.....	9 9	
961 0	978 8	Fine to medium quartzitic sandstone, silty and clayey at top.....	17 8	
978 8	980 0	Clayey siltstone.....	1 4	
980 0	981 10	Dark, silty shale.....	1 10	
981 10	984 7	Sandy siltstone.....	2 9	
984 7	992 8	Shaly siltstone.....	8 1	
992 8	1,008 5	Medium-to-fine-hackled quartzitic sand- stone.....	15 9	
1,008 5	1,011 0	Sandy shale.....	2 7	

Log, hole 12-GC

Location: On Aaron Run, Garrett County, Md., 2.8 mi. N. 66° W. of Westernport. Hole is 53 feet N. 40° E. of bridge over Aaron Run. Drive 3.5 mi. on Aaron Run Road from Westernport, then turn left 0.2 mi.
(Refer to fig. 24.)

Surface elevation: 1,655 feet—by aneroid barometer.

<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
0 0	20 0	Overburden.....	20 0	
20 0	35 0	Medium sandstone.....	15 0	
35 0	44 0	Limestone and limestone fragments in claystone.....	9 0	
44 0	45 0	Carbonaceous shale and clay.....	1 0	
45 0	47 3	Coal.....	2 3	Lower Bakerstown, el. 1,640 ft., C-47043.
47 3	49 4	Plastic clay.....	2 1	
49 4	60 10	Claystone, minor pyrite.....	11 6	
60 10	91 7	Clayey shale, interbedded silty and sandy streaks.....	30 9	
91 7	93 3	Fine to medium sandstone, mottled clayey matrix, shaly siltstone.....	1 8	
93 3	97 8	Shaly siltstone.....	4 5	
97 8	105 9	Clay and silty claystone, gray to greenish gray—streaks at 98 ft. 5 in. to 99 ft. 3 in. Green, silty clay, siltstone to fine sand- stone.....	8 1	
105 9	113 0	Medium sandstone.....	7 3	
113 0	146 0	Medium sandstone.....	33 0	
146 0	151 8	Claystone and silty claystone at base.....	5 8	
151 8	156 6	Siltstone, shaly streaks.....	4 10	
156 6	157 6	Limestone.....	1 0	
157 6	160 4	Fine sandstone, minor siltstone.....	2 10	
160 4	179 5	Silty claystone, sandy at top.....	19 1	
179 5	182 2	Claystone.....	2 9	
182 2	195 0	Silty claystone and siltstone at top.....	12 10	
195 0	199 10	Fine to medium sandstone.....	4 10	
199 10	202 3	Green, shaly siltstone.....	2 5	
202 3	202 11	Reddish purple claystone.....	8 8	
202 11	207 7	Fragmental clay in sandstone matrix.....	4 8	
207 7	234 0	Silty green and gray claystone, silty streaks.....	26 5	
234 0	245 6	Silty sandstone.....	11 6	
245 6	253 6	Shaly clay, sandstone at base.....	8 0	
253 6	254 8	Sandy, carbonaceous clay.....	1 2	
254 8	256 3	Coal.....	1 7	
256 3	256 10	Shale.....	7 3	Upper Freeport, el. 1,430 ft., C-47481.
256 10	257 1	Coal.....	3 3	
257 1	290 0	Shaly claystone and clayey siltstone.....	32 11	
290 0	327 8	Medium-hackled sandstone.....	37 8	
327 8	329 0	Shaly siltstone.....	1 4	
329 0	329 4	Coal.....	4 4	Lower Freeport, el. 1,356 ft.
329 4	331 4	Carbonaceous shale.....	2 0	
331 4	339 0	Clayey siltstone.....	7 8	
339 0	360 4	Fine to medium sandstone and interbed- ded shaly siltstone.....	11 4	

Log, hole 12-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
350 4	351 0	Coal.....	8	Upper Kittanning, el. 1,335 ft., C-47482.
351 0	351 1	Shale.....	1	
351 1	351 7	Coal.....	6	
351 7	355 5	Clay and claystone, silty at top.....	3 10	
355 5	405 8	Fine to medium sandstone interbedded with claystone in upper part, minor hackling at base.....	50 3	
405 8	410 10	Dark siltstone, sandy toward base.....	5 2	Middle Kittanning, el. 1,267 ft.
410 10	416 3	Coarse sandstone, carbonaceous partings.....	5 5	
416 3	418 6	Silty claystone and interbedded sandstone.....	2 3	
418 6	418 10	Coal.....	4	
418 10	429 3	Silty claystone and siltstone.....	10 5	
429 3	469 6	Fine to medium sandstone interbedded with dark, shaly siltstone in upper half, coarse sandstone with some shaly pebbles in basal 2 ft.....	40 3	
469 6	476 7	Silty carbonaceous shale, show of coal at 475 ft., 9 in.....	7 1	
476 7	481 6	Bastard clay, sandy streaks.....	4 11	
481 6	490 4	Interbedded siltstone and fine sandstone.....	8 10	
490 4	538 3	Fine to medium quartzitic sandstone, minor hackling and carbonaceous partings at base.....	47 11	
538 3	539 0	Carbonaceous shale.....	9	Mount Savage, el. 1,146 ft., C-47762.
539 0	539 8	Coal.....	8	
539 8	539 10	Shale.....	2	
539 10	540 8	Coal.....	10	
540 8	541 2	Shale.....	6	
541 2	541 11	Coal.....	9	
541 11	542 8	Coal and bone.....	9	
542 8	543 10	Bastard clay, shaly, carbonaceous clay at top.....	1 2	
543 10	545 4	Argillaceous siltstone.....	1 6	
545 4	550 2	Fine to medium sandstone.....	4 10	
550 2	574 5	Coarse to conglomeratic sandstone show of coal at 574 ft.....	24 3	

Log, hole 13-GC

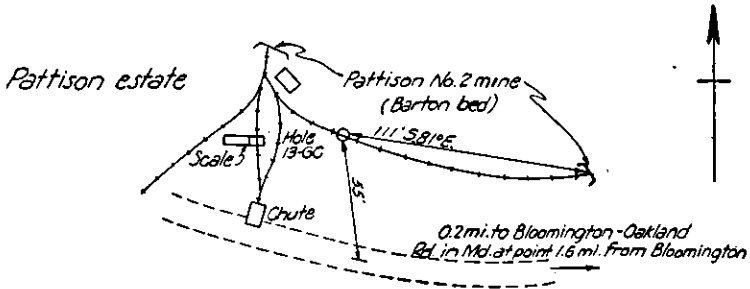
Location: On Bloomington Hill, Garrett County, Md., 1.7 mi. N. 82° W. of Bloomington. Hole is 111 feet N. 81° W. of second opening to Pattison No. 2 mine. Drive 1.6 mi. from Bloomington toward Oakland, then turn left 0.2 mi.
(Refer to fig. 25.)

Surface elevation: 1,750 feet—by aneroid barometer.

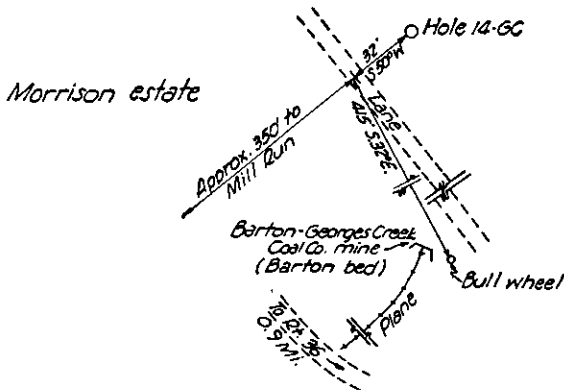
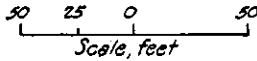
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
0 0	26 0	Overburden.....	26 0	Federal Hill, el. 1,703 ft.
26 0	29 0	Siltstone and fine sandstone.....	3 0	
29 0	39 10	Shale and silty shale.....	10 10	
39 10	45 2	Interbedded shale and shaly siltstone.....	5 4	
45 2	47 6	Sandy bastard clay with minor pyrite.....	2 4	
47 6	47 8	Coal.....	2	
47 8	65 0	Clay shale, calcareous clay, limy pellets.....	17 4	
65 0	66 0	Shaly clay.....	1 0	
66 0	80 0	Siltstone.....	14 0	
80 0	83 0	Fine sandstone.....	3 0	
83 0	88 0	Siltstone and shaly siltstone.....	5 0	
88 0	100 0	Shale with 6 in. fossiliferous limestone at base.....	12 0	
100 0	104 0	Siltstone, sandy at base.....	4 0	
104 0	108 3	Fine to medium sandstone.....	4 3	
108 3	115 4	Shale, sandy in middle, bony streak at 111 ft.....	7 1	
115 4	116 2	Bony streaks.....	10	Harlem, el. 1,632 ft.
116 2	118 0	Shale.....	1 10	
118 0	118 10	Coal.....	10	
118 10	130 0	Limestone.....	11 2	
130 0	140 9	Limy claystone to clay with limy pellets.....	10 9	
140 9	143 0	Silty claystone.....	2 3	
143 0	147 0	Silty clay, claystone at base.....	4 0	
147 0	149 10	Fine sandstone.....	2 10	

Log, hole 13-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
149 10	156 0	Silty bastard clay.....	6 2	
156 0	159 0	Redbeds.....	3 0	
159 0	170 6	Silty claystone and siltstone, sandy at top.....	11 6	
170 6	172 0	Fine sandstone.....	1 6	
172 0	184 0	Silty claystone, sandy streaks.....	12 0	
184 0	192 6	Shaly siltstone.....	8 6	
192 6	193 4	Carbonaceous shale.....	10 10	
193 4	208 8	Silty shale.....	15 4	
208 8	210 0	Carbonaceous shale.....	1 4	
210 0	211 0	Coal.....	1 0	Upper Bakerstown, el. 1,540 ft.
211 0	214 3	Carbonaceous shale, sandy at base.....	3 3	
214 3	220 8	Interbedded shale and fine sandstone with carbonaceous partings.....	6 5	
220 8	221 2	Cannel coal.....	6 6	
221 2	222 10	Shale, carbonaceous at base.....	1 8	
222 10	225 8	Limestone and carbonaceous limestone.....	2 10	
225 8	242 0	Interbedded limestone, clay and shale.....	16 4	
242 0	272 0	Bastard clay, claystone, and clayey silt- stone, sandy streaks at 254 ft.....	30 0	
272 0	279 0	Silty shale and interbedded sandstone.....	7 0	
279 0	285 0	Fine sandstone, shale partings.....	6 0	
285 0	289 2	Silty clay shale to silty clay.....	4 2	
289 2	292 0	Red, silty clay.....	2 10	
292 0	293 0	Gray, silty clay.....	1 0	
293 0	324 0	Fine to medium sandstone.....	31 0	
324 0	334 0	Dark, shaly clay, fossiliferous at base.....	10 0	
334 0	249 6	Silty, shaly clay and claystone, limy pellets.....	15 6	
349 6	426 0	Interbedded siltstone and fine sandstone.....	76 6	
426 0	449 6	Fine to medium sandstone.....	23 6	
449 6	449 10	Coal.....	4 4	Upper Freeport, el. 1,301 ft.
449 10	461 0	Silty clay and claystone, carbonaceous at top.....	11 2	
461 0	479 0	Interbedded siltstone and sandstone.....	18 0	
479 0	509 7	Medium cross-laminated sandstone, quartzitic in basal 5 ft.....	30 7	
509 7	510 3	Coal and bone.....	8 8	Lower Freeport, el. 1,240 ft.
510 3	515 5	Bastard clay.....	5 2	
515 5	516 6	Coal and bone.....	1 1	Upper Kittanning, el. 1,235 ft.
516 6	517 4	Silty bastard clay.....	10 10	
517 4	529 4	Fine sandstone, mottled in basal 5 ft.....	12 0	
529 4	534 0	Medium sandstone, shaly partings.....	4 8	
534 0	556 0	Coarse conglomeratic sandstone.....	22 0	
556 0	652 7	Medium sandstone, ironstone inclusions 593 ft. to 595 ft. 8 in.....	96 7	
652 7	652 8	Coaly streaks.....	1 1	Lower Kittanning, el. 1,097 ft.
652 8	664 10	Coarse sandstone, conglomeratic at top.....	12 2	
664 10	671 5	Silty carbonaceous shale.....	6 7	
671 5	671 6	Bony coal.....	1 1	
671 6	680 0	Claystone grading to siltstone.....	8 6	
680 0	690 4	Siltstone and fine sandstone.....	10 4	
690 4	707 7	Fine to medium sandstone, coarse at base, occasional hackles.....	17 3	
707 7	715 3	Dark siltstone to fine sandstone at base.....	7 8	
715 3	725 0	Dark silty shale.....	9 9	
725 0	727 1	Coal and bone.....	2 1	
727 1	728 6	Shale.....	1 5	
728 6	729 1	Bone.....	7 7	Mount Savage, el. 1,025 ft.
729 1	729 7	Coal.....	6 6	
729 7	729 9	Bone.....	2 2	
729 9	738 9	Shaly, carbonaceous siltstone.....	9 0	
738 9	740 9	Medium quartzitic sandstone.....	2 0	
740 9	747 0	Conglomerate.....	6 3	



Drive 1.6 mi. from Bloomington on road toward Oakland, then turn left 0.2 mi.
 Hole 13-GC on Bloomington Hill, Garrett County, Md., 1.7 mi. N. 82° W. of Bloomington



Drive 1.6 mi. S. from Barton on Rt. 36, then turn right 0.9 mi.
 Hole 14-GC on Caledonia Hill, side of Mill Run, Allegany County, Md., 0.9 mi. S. 43° W. of Barton

FIGURE 25.—Location of holes 13-GC and 14-GC.

60 GEORGES CREEK AND UPPER POTOMAC COAL BEDS, MD.

Log, hole 14-GC

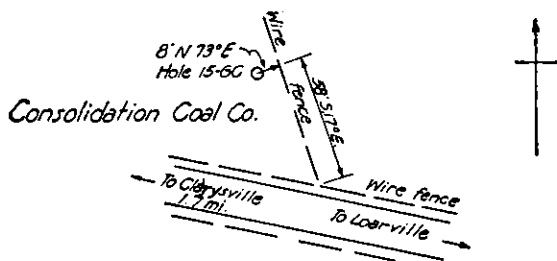
Location: On Caledonia Hill side of Mill Run, Allegany County, Md., 0.9 mi. S. 43° W. of Barton. Hole is 415 feet N. 32° W. of bull wheel near Barton mine portal, Georges Creek Coal Co., near Mill Run. Drive 1.6 mi. S. from Barton, then turn right 0.9 mi. (Refer to fig. 25.)

Surface elevation: 1,385 feet—by aneroid barometer.

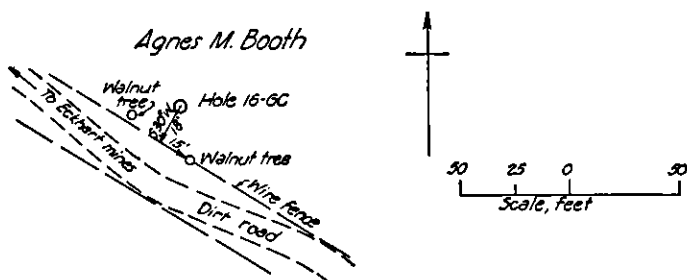
Depth		Material	Thickness	Remarks
From—	To—			
Ft. in.	Ft. in.		Ft. in.	
0 0	16 3	Overburden.....	16 3	
16 3	20 8	Shale.....	4 5	
20 8	27 3	Dark claystone.....	6 7	
27 3	29 5	Old mine opening and gob.....	2 2	Barton, el. 1,368 ft.
29 5	49 9	Calcareous clay and claystone to clay-limy pellets.	20 4	
49 9	61 0	Silty claystone grading to argillaceous siltstone.	11 3	
61 0	67 0	Medium sandstone.....	6 0	
67 0	82 2	Silty clay shale, sandy streaks near base.	15 2	
82 2	82 10	Coal.....	8 8	Federal Hill, el. 1,303 ft.
82 10	86 2	Bastard clay.....	3 4	
86 2	94 0	Silty claystone, calcareous pellets grading to siltstone and fine sandstone.	7 10	
94 0	107 3	Bastard clay and slightly calcareous claystone.	13 3	
107 3	117 0	Interbedded siltstone and fine sandstone, argillaceous at base.	9 9	
117 0	130 0	Shale, silty at top.....	13 0	
130 0	130 6	Fossiliferous limestone.....	6 6	
130 6	136 0	Dark, fossiliferous shale, 3 in. fossiliferous limestone at base.	5 6	
136 0	148 0	Silty shale, sandy at base, plant remains.	12 0	
148 0	154 0	Silty claystone.....	6 0	
154 0	161 0	Silty shale, coaly streaks at base.....	7 0	
161 0	162 4	Coal.....	1 4	Harlem, el. 1,224 ft., C-48462.
162 4	176 6	Silty clay and claystone.....	14 2	
176 6	188 0	Interbedded silty claystone and siltstone, calcareous at base.	11 6	
188 0	202 0	Medium sandstone, fine at top.....	14 0	
202 0	213 0	Bastard clay and claystone.....	11 0	
213 0	214 6	Red bastard clay.....	1 6	
214 6	243 0	Silty clay and claystone, locally shaly.	28 6	
243 0	250 7	Dark, silty shale.....	7 7	
250 7	253 7	Coal.....	3 0	Upper Bakerstown, el. 1,134 ft., C-48463.
253 7	256 7	Dark, silty shale.....	3 0	
256 7	260 8	Silty claystone.....	4 1	
260 8	262 0	Coal.....	1 4	Upper Bakerstown, el. 1,124 ft.
262 0	268 0	Limestone, silty at base.....	3 0	
268 0	278 0	Claystone, zones of limestone.....	10 0	
278 0	290 7	Siltstone to fine silty claystone.....	12 7	
290 7	290 11½	Bony coal.....	4½	
290 11½	292 1½	Coal.....	1 2	
292 1½	292 2	Bony coal.....	½	Lower Bakerstown, el. 1,084 ft., C-48496
292 2	293 5	Coal.....	1 3	
293 5	293 7	Bony coal.....	2 2	
293 7	300 6	Gray, semiplastic clay grading to light-gray, fragmental clay, silty zones.	6 11	
300 6	319 0	Shaly siltstone and silty shale.....	18 6	
319 0	320 6	Silty clay and claystone.....	1 6	
320 6	336 0	Siltstone.....	16 6	
336 0	353 3	Fine to medium sandstone.....	17 3	
353 3	359 4	Clay to silty claystone.....	6 1	
359 4	381 0	Fine to medium sandstone.....	21 8	
381 0	397 8	Black, fossiliferous shale.....	16 8	
397 8	397 9	Coal.....	1 1	
397 9	397 10	Shale.....	1 1	
397 10	398 5	Coal.....	7 7	Brush Creek, el. 987 ft.
398 5	405 0	Siltstone.....	6 7	
405 0	412 0	Clay shale and bastard clay.....	7 0	
412 0	465 0	Greenish, silty claystone and shaly siltstone, locally fragmental.	53 0	
465 0	492 0	Argillaceous siltstone grading to siltstone.	27 0	
492 0	521 10	Fine sandstone grading to medium.....	29 10	

Log, hole 14-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
521	10	Bony coal.....	3	
522	1	Coal.....	1	1/2
523	1 1/2	Shale.....	1	
523	2 1/2	Coal.....	1	4
524	6 1/2	Bone.....	1	1 1/2
524	8	Argillaceous limestone.....	1	0
525	8	Interbedded limestone and dark, calcareous siltstone.....	17	7
543	3	Fragmental, silty claystone.....	9	0
552	3	Siltstone to silty claystone, sandy beds in basal part.....	35	6
587	9	Silty claystone, local sandy streaks and clay zones.....	9	11
597	8	Interbedded siltstone and fine sandstone.....	6	0
603	8	Dark to carbonaceous shale.....	5	6
609	2	Coal.....	1	1
610	3	Shale.....	1	1
610	4	Coal.....	3	10
611	2	Interbedded silty claystone, limy pellets and argillaceous limestone.....	3	10
615	0	Silty claystone, minor sandy streaks.....	10	0
625	0	Interbedded siltstone and fine sandstone.....	6	0
631	0	Fine to medium sandstone, numerous zones shaly siltstone.....	25	0
656	0	Medium sandstone, hackled and quartzitic at base.....	18	2
674	2	Coal.....	2	0
676	2	Coaly, carbonaceous shale.....	6	6
676	8	Dark, shaly siltstone and interbedded sandstone.....	5	5
682	1	Bony coal.....	4	
682	5	Dark shaly siltstone and interbedded sandstone.....	7	4
689	9	Dark shale.....	7	3
697	0	Silty claystone.....	3	1
700	1	Coal.....	1	11
702	0	Silty carbonaceous clay with sandy streaks.....	4	3
706	3	Coal.....	1	2
707	5	Shale.....	6	6
707	11	Coal.....	8	8
708	7	Shale.....	2	2
708	9	Silty clay and claystone, grading to clay shale.....	4	11
713	8	Interbedded sandstone and dark siltstone.....	1	4
715	0	Silty clay shale and siltstone.....	3	7
718	7	Silty clay and flint clay.....	11	10
730	5	Interbedded gray siltstone and fine sandstone.....	12	10
743	3	Bony coal.....	2	
743	5	Dark clay shale.....	2	7
746	0	Silty claystone.....	6	0
752	0	Coal.....	1	1
752	1	Shale.....	2	2
752	3	Coal.....	2 1/2	
752	5 1/2	Shale.....	2	
752	7 1/2	Coal.....	4 1/2	
753	0	Silty claystone to dark, silty clay shale.....	13	4
766	4	Coal.....	1	4
767	8	Shale.....	2	2
767	10	Coal.....	10	
768	8	Fine sandstone.....	1	4
770	0	Interbedded fine sandstone, siltstone, and dark shale.....	6	0
775	0	Dark-gray to black shale.....	6	5
781	5	Bony coal.....	1	1
781	6	Light, silty claystone, siderite pellets.....	5	6
787	0	Dark, silty shale.....	9	0
796	0	Interbedded sandstone and siltstone.....	5	0



Drive from Frostburg E. on U.S. Rt. 40 to Clarysville, then turn right 1.5 mi., then turn left 0.2 mi. Hole 15-GC on a south branch of Braddock Run, Allegany County, Md., 0.1 mi. NW. of Loarville



Drive from Frostburg E. on U.S. Rt. 40 to Eckhart mines, 0.2 mi. past R.R. crossing then turn left 1.5 mi. Hole 16-GC on a north branch of Braddock Run, Allegany County, Md., 1.5 mi. N. 84° E. of Eckhart mines.

FIGURE 26.—Location of holes 15-GC and 16-GC.

Log, hole 15-GC

Location: On a south branch of Braddock Run, Allegany County, Md., 0.1 mi. NW. of Loarville. Hole is 8 feet S. 73° W. of Consolidated Fuel Co. property corner on a property line fence which is 58 feet N. 17° W. of Loarville Rd. Drive from Frostburg east on Rt. 40 to Clarysville, then turn right 1.5 mi., then turn left 0.2 mi.
(Refer to fig. 26.)

Surface elevation: 2,000 feet—by aneroid barometer.

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
0	0	Overburden.....	31	0
31	0	Silty claystone, siltstone.....	11	0
42	0	Siltstone.....	10	0
52	0	Silty shale, sandy streaks.....	16	7
68	7	Dark shale, pyritic clay in lower foot.....	6	1
74	8	Coal.....	3	3
74	11	Gray clay shale, limy streaks and pellets.....	4	1
79	0	Argillaceous limestone.....	4	0
83	0	Silty clay and claystone, limy zones and nodules.....	22	0
105	0	Shale, silty at top.....	21	0
126	0	Bone.....	3	½
126	3½	Coal.....	1	2½
127	6	Silty bastard clay, limy pellets.....	22	6
150	0	Interbedded fine sandstone and silty claystone.....	14	0
164	0	Shaly siltstone.....	6	0
170	0	Dark shale.....	6	0
176	0	Dark fossiliferous shale.....	27	0
203	0	Coal.....	1	1
203	1	Bone.....	2	2
203	3	Coal.....	9	9
204	0	Limy bastard clay, limestone nodules.....	18	0
222	0	Silty bastard clay grading to silty shale.....	46	0
268	0	Dark shale, silty and sandy in upper part.....	13	5
281	5	Fine sandstone.....	2	7
284	0	Dark silty shale, sandy streaks in upper part.....	12	3
296	3	Coal.....	2	9
299	0	Shale.....	3	½
299	3½	Bony coal.....	3	½
299	7	Shale.....	1	1
299	8	Bony coal.....	4	4
300	0	Bastard clay and calcareous claystone, limy nodules.....	14	0
314	0	Siltstone and silty claystone.....	6	0
320	0	Fine to medium sandstone.....	10	0
330	0	Shale and bastard clay, limestone with ostracods from 331 ft. 3 in. to 332 ft.....	6	0
336	0	Coal.....	4	4
336	4	Shale.....	1	½
336	5½	Coal.....	1	9½
338	3	Black shale.....	10	9
349	0	Limy bastard clay, minor fragmental clay.....	7	0
356	0	Interbedded fine sandstone and silty claystone.....	16	0
372	0	Gray, silty bastard clay.....	6	0
378	0	Interbedded siltstone and silty claystone.....	7	0
395	0	Interbedded sandstone and shaly siltstone.....	21	7
416	7	Fine sandstone.....	4	5
421	0	Dark shale, coaly streaks.....	3	2
424	2	Siltstone and interbedded sandstone.....	10	10
435	0	Fine to medium sandstone.....	14	0
449	0	Medium to coarse sandstone, conglomeratic at top and bottom.....	18	0
467	0	Argillaceous siltstone.....	6	8
473	8	Silty bastard clay.....	1	4
475	0	Interbedded siltstone and sandstone.....	18	0
493	0	Silty clay.....	2	0
495	0	Red, silty clay.....	7	0
502	0	Silty claystone to siltstone.....	6	0
508	0	Siltstone grading to fine sandstone.....	16	0
524	0	Medium sandstone.....	62	6
576	6	Sandy to silty shale.....	6	6

Barton, el. 1,925 ft.

Federal Hill, el. 874 ft.
C-49261.

Harlem, el. 1,797 ft.

C-49325.
Upper Bakerstown,
el. 1,704 ft.

Lower Bakerstown,
el. 1,664 ft., C-49326.

Log, hole 15-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
557	0	Coal.....	7	
577	7	Shale.....	9	Upper Freeport, el. 1,623 ft.
578	4	Coal.....	7	
578	11	Claystone, calcareous pellets.....	11	1
590	0	Silty claystone, calcareous in lower half.....	24	0
614	0	Siltstone, silty claystone at base.....	10	4
624	4	Fine sandstone.....	6	8
631	0	Argillaceous siltstone.....	10	0
641	0	Interbedded siltstone and claystone, sandy at top.....	14	0
655	0	Fine to medium sandstone.....	10	6
665	6	Black to carbonaceous shale.....	4	9
670	3	Coaly shale.....	3	3
670	6	Interminated fine sandstone and silt- stone.....	9	8
680	2	Silty shale.....	3	0
683	2	Bone.....	1	1
683	3	Coal.....	6	6
683	9	Bone and shale.....	3	1/2
684	0	Coal.....	3	1/2
684	1/2	Bone and shale.....	2	1/2
684	3	Silty shale.....	6	6
684	9	Argillaceous limestone.....	2	9
687	6	Siltstone to silty claystone.....	9	2
696	8	Gray to dark shale, interbedded fine sand- stone.....	4	6
701	2	Carbonaceous shale.....	4	0
705	2	Coal and bone.....	11	11
706	1	Coaly shale.....	1	3
707	4	Silty shale, sandy at top.....	14	8
722	0	Fine sandstone.....	10	0
732	0	Dark to carbonaceous shale.....	13	0
745	0	Semihard clay and 1 in. ironstone con- cretion.....	2	0
747	0	Silty claystone, grading to fine sandstone.....	4	0
751	0	Dark shale, sandy at top.....	3	0
754	0	Silty claystone.....	1	6
755	6	Coal.....	1	1
755	7	Silty claystone to siltstone, sandy at base.....	6	5
782	0	Interbedded, interlaminated fine sand- stone and siltstone.....	21	0
783	0	Medium- to coarse-grained quartzitic sandstone, conglomeratic zones and oc- casional hackles.....	32	0
815	0	Siltstone grading to fine sandstone.....	14	0
829	0	Carbonaceous siltstone, coaly streaks.....	2	0
831	0	Dark siltstone.....	4	7
836	7	Interlaminated siltstone and fine to me- dium sandstone.....	17	5
853	0	Claystone, carbonaceous clay at base.....	3	4
856	4	Bone.....	3	3
856	7	Claystone to siltstone, siderite pellets in basal 2 ft.....	6	5
863	0	Shale, silty at base.....	12	0
875	0	Carbonaceous clay and silty claystone with siderite concretion.....	3	1
878	1	Coal.....	3	3
878	4	Coal and bone.....	3	3
878	7	Silty bastard clay and claystone.....	6	9
885	4	Silty claystone and fine sandstone.....	11	8

Upper Kittanning,
el. 1,317 ft.Middle Kittanning,
el. 1,295 ft.Lower Kittanning,
el. 1,244 ft.Upper Mount Savage,
el. 1,144 ft.Lower Mount Savage,
el. 1,122 ft.

Log, hole 16-GC

Location: On a north branch of Braddock Run, Allegany County, Md., 1.5 mi. N. 84° E. of railroad crossing, Rt. 40 at Eckhart Mines. Hole is 18 feet N. 30° E. from a point on a fence equal distance from 2 walnut trees on the north side of the road. Drive from Frostburg east on Rt. 40 to Eckhart Mines 0.2 mi. past railroad crossing, then turn left 1.5 mi.
(Refer to fig. 26.)

Surface elevation: 2,066 feet—by aneroid barometer.

Depth		Material	Thickness		Remarks
From—	To—		Ft.	In.	
		Overburden	23	0	
		Dark, sandy shale	14	5	
		Gray, plastic clay, slightly silty, some lime nodules.	5	1	
		Silty, gray claystone	8	6	
		Fine sandstone	13	0	
		Silty shale grading to shaly claystone	7	0	
		Bone and coaly shale	1	2	Wellersburg, el. 1,994 ft.
		Argillaceous limestone	5	0	
		Limy bastard clay	7	9	
		Coaly shale, minor bone	30	1	
		Gray to dark shales, silty to sandy top and base, plant remains scattered throughout.			
		Coal	7		Barton, el. 1,956 ft.
		Silty, carbonaceous claystone	8	0	
		Argillaceous limestone	10	4	
		Green and gray bastard clay and claystone, limy in upper part.	3	8	
		Fine sandstone, shaly in lower part	15	7	
		Silty to sandy gray claystone, limy stringers, shaly in lower part.	9	5	
		Dark-gray, silty claystone grading to siltstone, plant remains in upper part.	27	8	
		Dark-gray siltstone, scattered sandstone zones, minor silty claystone.	10	4	
		Interbedded dark siltstone and fine sandstone.	30	0	
		Fine to medium sandstone, shaly zones at top, hackles and quartzitic in basal 5 feet.	24	3	
		Black, fossiliferous shale, limy zones	1	3	Harlem, el. 1,816 ft. C-50764.
		Coal	13	6	
		Argillaceous limestone	11	0	
		Claystone grading to green bastard clay, limy pellets.	2	0	
		Fine sandstone	5	0	
		Green bastard clay, limy pellets.	7	0	
		Mottled red and green silty clay and claystone.	21	0	
		Mottled gray and greenish silty to sandy claystone, interbedded sandstone near base.	6	0	
		Fine, shaly sandstone	22	10	
		Silty to sandy shale with interbedded and interlaminated sandstone, coaly streaks at 319 ft. 10 in.	1	8	C-50755.
		Coal	4		
		Shale	3	3/2	Upper Bakerstown, el. 1,726 ft.
		Coal	1		
		Shale	3		
		Coal	1	6 1/2	
		Argillaceous limestone, minor clayey streaks.	13	10	
		Silty bastard clay grading to claystone, limy pellets in upper half.	3	2	
		Argillaceous fine sandstone	8	0	
		Silty claystone	4	0	
		Silty shale, sandy in upper part.	2	4	
		Coal	2	10	
		Sandy claystone, coaly streaks, 6 in. clay at base.	6		
		Bone	3		
		Coal	2		Lower Bakerstown, el. 1,693 ft.
		Shale	5		
		Coal	5		
		Coal and bone	5		
		Coal	10		

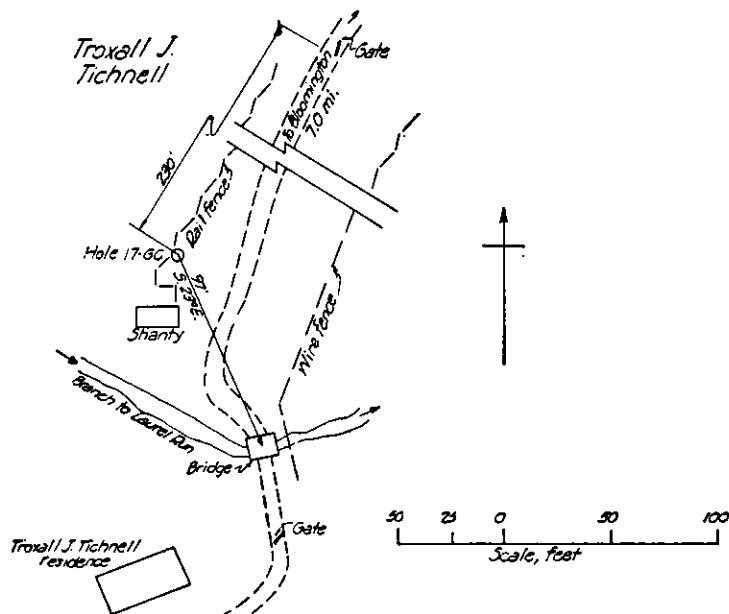
Log, hole 16-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
377	9	Dark-gray shale.....	5	10
383	7	Fine mottled gray sandstone.....	1	9
385	4	Dark to carbonaceous shale, lingulas at base.	5	6
390	10	Coal.....		6
391	4	Silty bastard clay, limy pellets.....	2	8
394	0	Limestone.....	2	0
396	0	Bastard clay, limy pellets and inclusions.....	7	8
403	8	Fine sandstone.....	4	7
408	3	Silty to sandy greenish bastard clay, limy inclusions.	2	9
411	0	Gray, silty clay, shaly at top.....	6	0
417	0	Mottled red and green silty clay.....	5	0
422	0	Gray and green silty clay and claystone.....	5	3
427	3	Fine sandstone, limy in upper 5 ft.....	8	9
436	0	Silty claystone and interbedded sandy siltstone and sandstone.	7	9
443	9	Dark-gray shale, sandy streaks and limy concretions.	21	8
465	5	Coaly shale and bone.....		7
466	0	Dark to carbonaceous shale, coaly streaks at 471 ft., coaly shale in basal 6 in.	8	0
474	0	Irregularly bedded fine to medium sandstone.	30	0
504	0	Carbonaceous claystone with ironstone concretion.	2	2
506	2	Bone.....	1	
506	3	Coal.....	11	
507	2	Silty claystone.....	1	6
508	8	Limestone.....	1	0
509	8	Bastard clay, limy pellets in upper part.....	3	0
512	8	Sandy claystone and argillaceous sandstone.	8	11
521	7	Claystone, sandy at base.....	6	10
528	5	Limestone.....	1	2
529	7	Interbedded claystone, sandy claystone and siltstone, minor sandstone.	15	0
544	7	Semihard iron clay.....	3	0
547	7	Fine to medium sandstone.....	11	11
559	6	Claystone, sandy at top.....	5	6
565	0	Blue limestone.....		4
565	4	Semihard clay, fragmental in upper part, limy inclusions.	5	8
571	0	Silty claystone.....	2	5
573	5	Interbedded fine to medium sandstone, siltstone and silty shale.	26	3
599	8	Dark shale, 6 in. pyritic fragmental clay at base.	2	9
602	5	Coal and bone.....	7	
603	0	Pyritic, carbonaceous shale.....	2	3
605	3	Fragmental claystone and interbedded argillaceous limestone.	3	6
608	9	Silty claystone.....	4	3
613	0	Limy siltstone, interbedded limestone.....	5	8
618	8	Zone of fragmental claystone, interbedded limestone.	8	4
627	0	Limestone.....	2	4
629	4	Silty, bastard, limy clay, grading to silty claystone.	8	0
637	4	Fine sandstone and sandy siltstone.....	13	0
650	4	Silty claystone grading to silty shale.....	9	0
659	4	Plastic to semihard clay.....	6	6
665	10	Sandy claystone grading to shaly sandy siltstone.	24	2
690	0	Fine to medium sandstone.....	35	3
725	3	Coal.....	1	5
726	8	Shale.....	2	
726	10	Coal.....	3	
727	1	Shale.....	1	
727	2	Coal.....	4	
727	4	Argillaceous limestone, 6 in. carbonaceous silty clay at top.	4	2
731	6	Fragmental claystone, limy at top.....	2	3

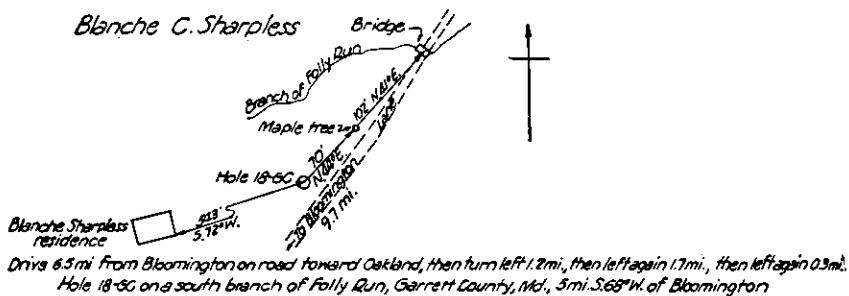
} Brush Creek, el. 1,559 ft.,
C-51239.} Upper Freeport,
el. 1,463 ft.} Upper Kittanning,
el. 1,340 ft.

Log, hole 16-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
733 9	740 0	Irregularly bedded silty and sandy claystone.	6 3	
740 0	748 0	Silty claystone grading to silty shale.	8 0	
748 0	749 0	Sandstone.	1 0	
749 0	754 1	Dark to carbonaceous shale and pyritic claystone.	5 1	
754 1	754 3	Bony coal.	2	
754 3	755 2	Coal.	11	
755 2	755 5½	Bony coal.	3½	Middle Kittanning, el. 1,311 ft., C-51610.
755 5½	755 7	Coal.	1½	
755 7	755 8	Bone.	1	
755 8	756 3	Shale.	7	
756 3	756 4½	Coal.	1½	
756 4½	758 0	Carbonaceous siltstone.	1 7½	
758 0	767 0	Interlaminated sandstone and siltstone.	9 0	
767 0	769 1	Shale and silty shale, plant remains, coaly streaks at 767 ft. 5 in. and 768 ft. 1 in.	2 1	
769 1	786 0	Interbedded sandstone and siltstone.	16 11	
786 0	787 7	Shale, sandy streak at base.	1 7	
787 7	792 9	Hard and semihard clay.	5 2	
792 9	793 2	Coal.	5 5	
793 2	794 3	Siltstone.	1 1	
794 3	794 10½	Coal.	7½	
794 10½	795 11	Shale.	3	
795 11	795 81	Coal.	7	
795 81	796 6½	Bone and coal.	10	
796 6½	797 4	Coal.	9½	
797 4	799 4	Silty shale.	2 0	
799 4	799 6	Mud.	2	
799 6	799 7	Shale.	1	
799 7	800 0	Coal.	5	
800 0	801 5	Bastard clay, pyritic.	1 5	
801 5	802 0	Bone and coaly shale.	7	
802 0	803 4	Irregularly bedded, mottled, fine sandstone, coaly at base.	6 4	
808 4	811 4	Fragmental, silty claystone.	3 0	
811 4	812 7	Coal.	1 3	
812 7	815 0	Carbonaceous pyritic shale, coaly and sandy streaks.	2 5	
815 0	816 0	Fragmental, semihard clay.	1 0	
816 0	824 9	Light-tan silty clay grading to claystone.	8 9	
824 9	836 9	Interbedded siltstone and fine sandstone.	12 0	
836 9	838 5	Silty claystone.	1 8	
838 5	840 0	Hard clay and claystone.	1 7	
840 0	840 8	Coal.	1 8	
840 8	841 11	Shale.	1 3	
841 11	842 2	Bone.	3	
842 2	842 4	Coal.	2	
842 4	842 9	Bone.	1 5	
842 9	844 4	Coal.	1 7	
844 4	854 0	Claystone, grading to shaly siltstone.	9 8	
854 0	884 0	Fine to medium sandstone.	30 0	
884 0	896 8	Gray siltstone and interbedded sandstone.	12 8	
896 8	921 3	Medium sandstone.	24 7	
				Basal Lower Kittanning, el. 1,226 ft., C-52001.



Drive 3.0 mi. from Bloomington on road toward Oakland, then turn left 1.6 mi., then turn right 0.4 mi.; Hole 17-GC on a south branch of Laurel Run, Garrett County, Md., 5.72 mi. W. of Bloomington, 3.9



Drives 6.3 mi. from Bloomington on road toward Oakland, then turn left 1.2 mi., then left again 1.7 mi., then left again 0.3 mi.; Hole 18-GC on a south branch of Folly Run, Garrett County, Md., 3 mi. S. 65° W. of Bloomington

FIGURE 27.—Location of holes 17-GC and 18-GC.

Log, hole 17-GC

Location: On a south branch of Laurel Run, Garrett County, Md., 4.0 mi. S. 74° W. of Bloomington. Hole is 97 feet N. 23° W. of bridge over branch of Laurel Run. Drive 5.0 mi. from Bloomington on road toward Oakland, then turn right 0.4 mi.
(Refer to fig. 27.)

Surface elevation: 2,120 feet—by aneroid barometer.

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
0 0	27 0	Overburden.....	27 0	
27 0	42 6	Fine-grained, cross-laminated sandstone.....	15 6	
42 6	52 6	Gray to carbonaceous pyritic shale, sandy at top.	10 0	
52 6	53 2	Coal.....	8	Harlem, el. 2,067 ft.
53 2	54 2	Calcareous bastard clay, lime pellets.....	1 0	
54 2	76 0	Interbedded, argillaceous limestone and calcareous claystone, lime pellets.	21 10	
76 0	79 0	Bastard clay, lime pellets.....	3 0	
79 0	86 0	Mottled red and green bastard clay, lime pellets.	7 0	
86 0	98 0	Gray bastard clay, lime pellets.....	12 0	
98 0	121 0	Interbedded, silty claystone and siltstone, minor sandy zones in upper part, calcareous stringers, blebs.	23 0	
121 0	138 0	Interbedded siltstone and fine sandstone.	17 0	
138 0	140 6	Fine sandstone, quartzitic at base.....	2 6	
140 6	144 6	Pyritic silty shale.....	4 0	
144 6	145 2	Coal.....	8	Upper Bakerstown, el. 1,975 ft.
145 2	151 8	Dark-gray shale, plant remains in lower part.	6 6	
151 8	153 8	Highly carbonaceous shale, jointed limy filling in cracks, considerable pyrite.	2 0	
153 8	158 0	Carbonaceous to light-gray argillaceous limestone.	4 4	
158 0	175 0	Interbedded bastard clay, argillaceous limestone, coaly streaks at 159 ft. and 168 ft.	17 0	
175 0	186 8	Micaceous shaly siltstone grading to shale.	11 8	
186 8	190 0	Silty bastard clay.....	3 4	
190 0	196 0	Silty claystone, grading to siltstone.....	6 0	
196 0	199 4	Fine sandstone, quartzitic at base.....	3 4	
199 4	217 0	Interbedded siltstone and fine sandstone.	17 8	
217 0	217 9	Semibard clay.....	9	
217 9	221 10	Green claystone, calcareous stringers.....	4 1	
221 10	226 0	Interbedded fine sandstone and siltstone.	4 2	
226 0	253 6	Fine to medium cross-laminated sandstone.	27 6	
253 6	262 2	Siltstone, silty shale and silty claystone.....	8 8	
262 2	263 0	Dark-gray clay.....	10	
263 0	263 5	Bony coal.....	5	Brush Creek, el. 1,857 ft.
263 5	284 10	Gray, silty claystone, lime pellets, sandy zones.	21 5	
284 10	286 0	Argillaceous limestone.....	1 2	
286 0	294 0	Green bastard clay, lime pellets grading to claystone, calcareous stringers.	8 0	
294 0	296 0	Greenish siltstone and fine sandstone, minor fragmental claystone.	2 0	
296 0	299 8	Fragmental claystone.....	3 8	
299 8	308 6	Interbedded green siltstone and fine sandstone grading to claystone.	8 10	
308 6	315 3	Fragmental claystone.....	6 9	
315 3	328 0	Mottled red and green claystone.....	12 9	
328 0	362 0	Interbedded siltstone and silty claystone, sandy at base.	34 0	
362 0	363 1	Coal.....	1 1	Upper Freeport, el. 1,758 ft., C-50996.
363 1	365 0	Dark claystone, scattered sand grains.....	1 11	
365 0	365 2	Coal.....	2	
365 2	365 4	Shale.....	2	
365 4	365 8	Coal.....	4	
365 8	376 6	Dark claystone, pyritic bastard clay at top.	10 10	
376 6	376 11	Coal.....	5	
376 11	387 0	Dark claystone, limy pellets at base.....	10 1	
387 0	395 0	Light-gray clay, lime film on partings.....	8 0	
395 0	412 0	Interbedded fine sandstone and sandy siltstone.	17 0	
412 0	464 6	Fine to medium sandstone, quartzitic in lower half.	52 6	

Log, hole 17-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
464 6	469 6	Hard, silty shale, sandy streaks in lower part.	5 0	
469 6	470 6	Coal.....	1 0	} Upper Kittanning, el. 1,650 ft., C-51240.
470 6	470 7	Shale.....	1 1	
470 7	470 10	Coal.....	3 3	
470 10	473 10	Dark, soft clay, grading to semihard clay.	3 0	
473 10	494 0	Interbedded silty and sandy claystone and fine sandstone, latter increases downward.	20 2	
494 0	543 3	Medium cross-laminated sandstone, quartzitic, hackles near base.	49 3	
543 3	544 8	Shaly sandstone with 2 in. pyritic carbonaceous shale at base.	1 5	
544 8	546 10	Coal.....	2 2	} Middle Kittanning, el. 1,575 ft., C-51266.
546 10	547 2	Bone.....	4 4	
547 2	548 8	Coal.....	1 6	
548 8	552 8	Pyritic shaly sandstone, coaly streaks, ¼-in. coal at base.	4 0	
552 8	555 0	Semihard to hard clay and pyritic iron concretions.	2 4	
555 0	559 0	Clay shale, sandy streaks in lower part.	4 0	
559 0	580 10	Medium to coarse sandstone, locally quartzitic, hackles.	21 10	
580 10	581 2	Coaly clay.....	4 4	
581 2	582 0	Coarse sandstone.....	10 10	
582 0	588 3	Dark silty and sandy shale and claystone, coaly shale at base and ½-in. streak of bony coal at 585 ft. 7 in.	6 3	
588 3	591 0	Medium sandstone.....	2 9	
591 0	604 0	Fine, cross-laminated sandstone.....	13 0	
604 0	620 0	Hard clay, pyritic, silty, carbonaceous claystone, ironstone and siltstone.	16 0	
620 0	630 0	Conglomeratic sandstone.....	10 0	
630 0	645 0	Medium quartzitic sandstone.....	15 0	
645 0	652 0	Dark siltstone, coaly streaks in middle part.	7 0	
652 0	663 0	Conglomeratic sandstone, crossbedded.	11 0	
663 0	676 0	Coarse conglomerate.....	13 0	

Log, hole 18-GC

Location: On a south branch of Folley Run, Garrett County, Md., 5.0 miles S. 68° W. of Bloomington. Hole is 543 feet N. 72° E. of residence of Blanche Sharpless. Drive 6.5 mi. from Bloomington on road toward Oakland, then turn left 1.2 mi., then turn left again 1.7 mi.
(Refer to fig. 27.)

Surface elevation: 2,450 feet—by aneroid barometer.

0 0	35 0	Overburden.....	35 0	
35 0	46 0	Greenish, hard siltstone, sandy toward base.	11 0	
46 0	58 6	Fine, irregularly bedded sandstone.....	12 6	
58 6	63 0	Medium sandstone.....	4 6	
63 0	65 6	Siltstone, grading to dark, silty claystone.	2 6	
65 6	65 9	Bone.....	3 3	} Wellersburg, el. 2,384 ft.
65 9	65 11	Coal.....	2 2	
65 11	76 0	Limy bastard clay, limestone pellets and inclusions.	10 1	
76 0	88 0	Gray, silty claystone and siltstone, limy stringers.	12 0	
88 0	103 0	Interbedded siltstone and fine sandstone.	15 0	
103 0	117 4	Medium-grained sandstone, coarse in basal 3 ft., some hackles and siltstone streaks.	14 4	
117 4	121 0	Pyritic black to carbonaceous shale.....	3 8	
121 0	121 5	Coal.....	5 5	
121 5	121 6	Bone.....	1 1	
121 6	121 7	Shale.....	1 1	
121 7	122 10	Coal.....	1 3	} Barton, el. 2,329 ft., C-52000.
122 10	122 11	Shale.....	1 1	
122 11	123 7	Coal.....	8 8	
123 7	123 8	Shale.....	1 1	
123 8	124 0	Coal.....	4 4	
124 0	136 0	Limy claystone, limestone pellets, minor bastard clay.	12 0	
136 0	145 0	Claystone and bastard clay.....	9 0	

Log, hole 18-GC—Continued

Depth		Material	Thickness	Remarks	
From—	To—				
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>	
145	0	157	0	Interbedded sandstone and siltstone, interlaminated in upper 4 ft.	12 0
157	0	159	0	Fine to medium sandstone.	2 0
159	0	159	7	Dark shale, fossils.	7 7
159	7	161	6	Bastard clay, gray to green, red splotches.	1 11
161	6	170	0	Green to gray fine sandstone.	8 6
170	0	172	9	Medium sandstone.	2 9
172	9	174	9	Shaly clay, coaly streaks at base.	2 0
174	9	176	0	Bastard clay, limy pellets.	1 3
176	0	182	6	Silty to sandy claystone, limy stringers.	6 6
182	6	183	6	Limy siliceous claystone.	1 0
183	6	192	0	Fine sandstone, calcareous in upper 4 ft.	8 6
192	0	197	6	Medium sandstone.	5 6
197	6	200	0	Greenish, shaly clay, ferruginous streaks.	2 6
200	0	209	0	Limy claystone and shaly clay, scattered fossils, 2 in. hard claystone at base.	9 0
209	0	225	9	Dark shale, scattered fossils, 220-221 ft. highly fossiliferous.	16 9
225	9	229	6	Irregularly bedded sandstone.	3 9
229	6	241	0	Silty and sandy shale, plant remains.	11 6
241	0	241	9	Coal.	9 9
241	9	260	0	Bastard clay, limy pellets.	18 3
260	0	270	0	Silty to sandy claystone, limy stringers.	10 0
270	0	289	0	Mottled red and green, silty claystone, limy stringers and pellets.	19 0
289	0	303	0	Siltstone, grading to fine sandstone.	14 0
303	0	313	0	Interbedded siltstone and fine sandstone.	10 0
313	0	344	0	Medium sandstone.	31 0
344	0	347	6	Pyritic dark to carbonaceous shale.	3 6
347	6	347	8½	Coal.	2½
347	8½	347	10	Bone.	1½
347	10	348	8	Carbonaceous clay.	10 0
348	8	349	2	Bone and coal.	8 8
349	2	350	6	Limestone, argillaceous.	1 4
350	6	366	0	Interbedded, argillaceous limestone, bony shale with fossils, clay.	16 6
366	0	366	10	Pyritic carbonaceous shale.	10 10
366	10	368	1	Coal.	1 3
368	1	372	0	Bastard clay, limy pellets.	3 11
372	0	381	0	Siltstone and silty claystone, 1 ft. fragmental, semihard clay at top.	9 0
381	0	392	0	Gray to green bastard clay, sandy at base.	11 0
392	0	394	6	Fine sandstone.	2 6
394	6	394	9	Hard clay.	3 3
394	9	410	9	Interbedded siltstone and sandstone, minor sandy shale.	16 0
410	9	411	9	Sandy clay, semihard.	1 0
411	9	422	0	Green, silty clay and claystone, red zone 2 ft. from base.	10 3
422	0	462	0	Fine to medium sandstone.	40 0
462	0	474	0	Claystone, sandy to shaly locally, limy in lower 2 ft.	12 0
474	0	478	0	Calcareous clay.	4 0
478	0	509	0	Siltstone and silty claystone.	31 0
509	0	511	0	Shale.	2 0
511	0	512	0	Carbonaceous shale and clay, pyritic.	1 0
512	0	512	2	Coal.	1 2
512	2	532	0	Semihard clay, grading to silty claystone.	19 10
532	0	551	6	Interbedded medium and fine sandstone and siltstone.	19 6
551	6	555	0	Irregularly bedded fine and coarse sandstone, conglomeratic in lower half.	3 6
555	0	560	0	Interbedded medium and fine sandstone and siltstone.	5 0
560	0	581	6	Silty claystone and siltstone, shaly, plant remains at base.	21 6
581	6	582	2	Carbonaceous clay.	8 8
582	2	584	9	Bone, coal streaks.	2 7
584	9	588	6	Sandy siltstone.	3 9
588	6	591	0	Shaly siltstone.	2 6
591	0	592	0	Soft and semihard fragmental clay.	1 0
592	0	596	0	Silty, pyritic claystone, limestone pellets in basal part.	4 0
596	0	597	9	Fragmental hard clay.	1 9
597	9	599	9	Mottled gray and greenish soft clay.	2 0
599	9	610	0	Claystone grading through silty claystone to clayey siltstone, greenish.	10 3

Harlem, el. 2,209 ft.

Upper Bakerstown, el. 2,102 ft.

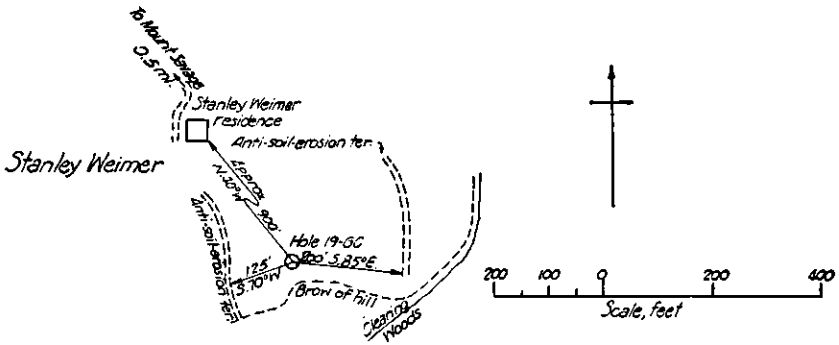
Lower Bakerstown, el. 2,083 ft., C-52966.

Mahoning, el. 1,938 ft.

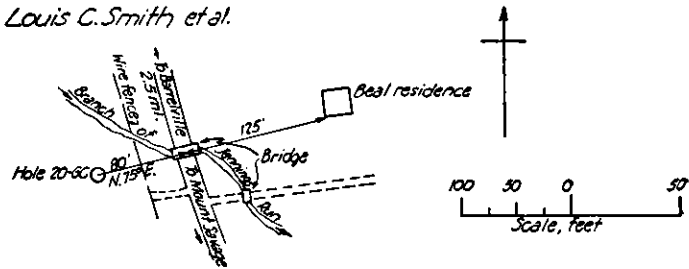
Upper Freeport, el. 1,868 ft., C-53279.

Log, hole 18-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
610 0	616 0	Silty shaly claystone, limy stringers.....	6 0	
616 0	617 5	Semihard flint clay.....	1 5	
617 5	629 8	Interbedded shaly siltstone and fine sandstone, shale partings.	12 3	
629 8	630 5	Pyritic, carbonaceous shale.....	9	
630 5	630 8	Silty, pyritic clay.....	3	
630 8	631 9	Coal streaks, bone and shale.....	1 1	Lower Freeport, el. 1,820 ft.
631 9	641 6	Silty claystone, locally soft and shaly, carbonaceous at top.	9 9	
641 6	645 0	Semihard and semiflint fragmental clay, ironstone concretions.	3 6	
645 0	648 0	Clayey siltstone and silty claystone.....	3 0	
648 0	657 0	Interbedded greenish shale and thin zones sandstone.	9 9	
657 0	663 6	Dark to carbonaceous shale, sandy streaks.	6 6	
663 6	664 7	Coal.....	1 1	Upper Kittanning, el. 1,787 ft., C-53372.
664 7	664 8	Shale.....	1	
664 8	665 2	Coal.....	6	
665 2	666 6	Carbonaceous to gray shaly claystone.....	1 4	
666 6	670 0	Irony soft to semihard bastard clay, sandy at base.	3 6	
670 0	671 0	Medium sandstone, clay partings.....	1 0	
671 0	700 0	Gray shaly, silty, and sandy claystone, some shale zones and sandstone streaks, ironstone stringers in upper half.	29 0	
700 0	705 6	Silty shale, sandy at top, plant remains.....	5 6	Middle Kittanning, el. 1,743 ft., C-53373.
705 6	707 0	Medium sandstone.....	1 6	
707 0	708 3	Coal.....	1 3	
708 3	708 4½	Bone.....	1½	
708 4½	709 0	Coal.....	7½	
709 0	712 0	Bastard clay.....	3 0	
712 0	714 6	Shaly siltstone.....	2 6	
714 6	714 10	Quartzitic sandstone.....	4	
714 10	715 2	Silty shale.....	4	
715 2	715 3	Coal and bone.....	1	
715 3	715 5	Semihard clay.....	2	
715 5	724 0	Bastard clay, grading to silty claystone, sandy at base.	8 7	
724 0	728 0	Interbedded sandstone and siltstone.....	4 0	
728 0	754 0	Fine to medium gray cross-laminated sandstone, hackled in lower part.	26 0	
754 0	757 0	Coarse quartzitic sandstone, hackled.....	3 0	
757 0	761 0	Conglomeratic sandstone, some large coal fragments in middle part, quartzitic.	4 0	
761 0	771 0	Poorly sorted, cross-laminated, coarse sandstone.	10 0	
771 0	772 0	Gray shale.....	1 0	
772 0	773 4	Coarse, quartzitic sandstone.....	1 4	
773 4	784 10	Cross-laminated, finely hackled sandstone, fungi.	11 6	
784 10	789 4	Gray silty to sandy shale.....	4 6	
789 4	805 0	Fine to medium cross-laminated sandstone, finely hackled.	15 8	
805 0	810 0	Coarse, quartzitic sandstone.....	5 0	
810 0	811 0	Fragmental hard clay.....	1 0	
811 0	814 6	Dark gray claystone.....	3 6	
814 6	818 5	Silty and sandy gray shale, carbonaceous at base.	3 11	
818 5	820 2	Carbonaceous shale and claystone.....	1 9	
820 2	820 4	Bony shale.....	2	
820 4	821 8	Silty claystone.....	1 4	
821 8	822 4	Coal.....	8	
822 4	826 0	Silty claystone.....	3 8	Upper Mount Savage, el. 1,628 ft.
826 0	828 0	Carbonaceous shale, coaly streaks.....	2 0	
828 0	830 0	Gray shale, interbedded sandstone at base.	2 0	
830 0	831 6	Fine to medium sandstone.....	1 6	Lower Mount Savage, el. 1,615 ft.
831 6	835 0	Conglomeratic sandstone and conglomerate.	3 6	
835 0	835 5	Coal.....	5	
835 5	836 2	Gray shale.....	9	
836 2	836 10	Coal and bone.....	8	
836 10	840 6	Gray shale.....	8	
840 6	848 0	Irregularly bedded fine to coarse conglomeratic sandstone.	7 6	



Drive from Duffy's 5- and 10-cent store in Mount Savage, then turn left 0.5 mi.
 Hole 19-GC approx. 700' W. of a branch of Jennings Run, Allegany County, Md., 0.5 mi. N. 38° E. of Mount Savage.



Drive from Frostburg to Barrelville then turn left 1.7 mi., then turn left again 0.8 mi.
 Hole 20-GC on a north branch of Jennings Run, Allegany County, Md., 2.2 mi. N. 40° E. of Mount Savage.

FIGURE 28.—Location of holes 19-GO and 20-GO.

74 GEORGES CREEK AND UPPER POTOMAC COAL BEDS, MD.

Log, hole 19-GC

Location: Approx. 700 feet west of a south branch of Jennings Run, Allegany County, Md. 0.5 mi. N. 58° E. of Mount Savage. Hole is approx. 900 feet S. 40° E. of residence of Stanley Weimer. Drive from Frostburg to Duffy's 5 and 10 cent store in Mount Savage, then turn left 0.5 mi. (Refer to fig. 28.)

Surface elevation: 1,390 feet—by aneroid barometer.

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
0	0	Overburden.....	18	8
18	8	Siltstone grading to silty clay claystone, ironstone concretions at base.	5	2
23	10	Gray to black silty clay, shaly at base.....	4	8
28	6	Black silty to sandy shale, sandstone streaks near base, plant remains in upper part.	10	0
38	6	Coal.....	3	
38	9	Silty clay shale and bastard clay.....	1	0
39	9	Calcareous clay and claystone, limestone pellets.	4	9
44	6	Silty claystone and clayey siltstone, ferruginous stringers.	8	6
53	0	Interbedded siltstone and siliceous claystone, silty claystone at top.	14	0
67	0	Interbedded shaly siltstone and fine sandstone.	12	0
79	0	Silty shale and minor shaly siltstone.....	7	0
86	0	Silty to sandy shaly claystone, interbedded fine sandstone at base.	6	0
92	0	Fine to medium sandstone.....	13	8
105	8	Coal.....	2	½
105	10½	Shale.....	1	½
106	0	Coal.....	1	
106	1	Calcareous silty clay grading to silty clay, limestone pellets throughout.	11	11
118	0	Silty clay.....	3	0
121	0	Silty to sandy shaly claystone, fine-sandstone streaks near base.	9	0
130	0	Fine sandstone, some interlaminated siltstone.	13	0
143	0	Interlaminated fine sandstone and dark shale.	8	0
151	0	Fossiliferous dark-gray to black shale.....	36	10
187	10	Coal.....	1	4
189	2	Argillaceous limestone grading to calcareous claystone, limestone pellets.	22	10
212	0	Silty clay, lime pellets.....	3	0
215	0	Interbedded siltstone, silty claystone, and fine sandstone.	9	6
224	6	Limestone.....	1	6
226	0	Greenish claystone, limestone inclusions.	7	6
233	6	Calcareous claystone, 2 ft. light-tan limestone at top.	8	6
242	0	Gray and black silty clay and claystone.	3	0
245	0	Interbedded green, shaly siltstone and sandstone.	12	0
257	0	Medium sandstone.....	6	0
263	0	Gray to black shale, plant remains.....	9	0
272	0	Coal.....	1	8½
273	8½	Shale.....	5	½
274	2	Coal.....	10	
275	0	Argillaceous limestone and limy claystone, limestone pellets.	2	0
277	0	Silty clay and claystone, lime pellets throughout.	8	0
285	0	Silty shale, sandy streaks.....	15	0
300	0	Dark to carbonaceous shaly clay.....	2	1
302	1	Coal.....	1	4
302	5	Shale.....	3	
302	8	Coal.....	2	½
302	9½	Shale.....	2	
302	11½	Coal.....	1	½
303	1	Dark bastard clay, limestone pellets.....	4	6
307	7	Coal.....	3	9
311	4	Bone.....	2	
311	6	Coal.....	6	½
312	½	Shale.....	1	½
312	2	Coal.....	1	2

Barton, el. 1,351 ft.

Federal Hill, el. 1,284 ft.

Harlem, el. 1,202 ft., C-52994.

Upper Bakerstown, el. 1,118 ft., C-52995.

Lower Bakerstown, el. 1,088 ft., C-53112.

Lower Bakerstown, el. 1,082 ft., C-53113.

Log, hole 19-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i> 313 4	<i>Ft. in.</i> 317 3	Dark, silty, pyritic claystone grading to limy claystone.	<i>Ft. in.</i> 3 11	
317 3	332 0	Gray to dark-gray claystone and siliceous claystone, iron streaks, minor semihard clay.	14 9	
332 0	335 0	Silty gray semiplastic clay	3 0	
335 0	339 0	Silty to sandy claystone	4 0	
339 0	345 0	Interbedded siltstone and fine sandstone	6 0	
345 0	347 0	Greenish, shaly claystone, iron stringers	2 0	
347 0	354 0	Interbedded shaly siltstone, fine sandstone and silty claystone.	7 0	
354 0	367 6	Silty clay shale, sandy streaks, gray, red, and green.	13 6	
367 6	371 6	Red, semihard clay and claystone, lower 1 ft. fragmental, gray.	4 0	
371 6	381 0	Sandy limestone, grading to limy sandstone.	9 6	
381 0	401 0	Gray clay shale, silty to sandy	20 0	
401 0	430 5	Dark locally carbonaceous shale, fossiliferous in lower 10 ft.	29 5	
430 5	431 5	Coal	1 0	Brush Creek, el. 960 ft., C-53072.
431 5	437 5	Silty claystone, silty semihard, minor hard clay.	6 0	
437 5	443 6	Siliceous claystone and shaly claystone, 1 ft. sandstone at top.	6 1	
443 6	450 0	Gray to dark-gray siltstone, sandy at top.	6 6	
450 0	452 4	Semihard clay grading to silty claystone.	2 4	
452 4	459 0	Silty clay shale grading to siltstone	6 8	
459 0	462 0	Fine sandstone	3 0	
462 0	464 0	Silty clay shale grading to shaly clay	2 0	
464 0	466 0	Shaly, semihard clay	2 0	
466 0	467 6	Siliceous claystone, siderite pellets	1 6	
467 6	470 0	Green, shaly claystone	2 6	
470 0	472 2	Fragmental claystone and hard clay	2 2	
472 2	491 0	Interbedded claystone, silty claystone, minor siltstone.	18 10	
491 0	508 0	Sandstone, siltstone zones	17 0	
508 0	512 0	Dark, silty shale	4 0	
512 0	516 1	Siltstone grading to silty, fragmental claystone.	4 1	Upper Freeport horizon.
516 1	520 3	Claystone and hard clay	4 2	
520 3	522 0	Fragmental, silty claystone	1 9	
522 0	532 0	Fine sandstone	10 0	
532 0	547 0	Interbedded silty claystone and siltstone, dark, silty clay at base.	15 0	
547 0	555 0	Interbedded fine sandstone and siltstone ..	8 0	
555 0	584 0	Medium sandstone	29 0	
584 0	586 0	Silty claystone, plant remains	2 0	
586 0	587 2	Gray clay	1 2	
587 2	607 2	Interbedded siltstone and fine sandstone ..	20 0	
607 2	636 1	Fine to medium sandstone	28 11	
636 1	636 3	Coal	2	
636 3	637 3	Shale	1 0	
637 3	639 0	Coal	1 9	
639 0	639 1	Shale	1	
639 1	639 7½	Coal	6½	Upper Kittanning,
639 7½	639 10½	Shale	3	el. 754 ft., C-53280.
639 10½	640 0	Coal	1½	
640 0	640 2½	Shale	2½	
640 2½	640 4	Coal	1½	
640 4	641 0	Silty, carbonaceous clay	8	
641 0	644 8	Argillaceous limestone	3 8	
644 8	650 5	Silty clay and claystone	5 9	
650 5	654 0	Siltstone and fine sandstone	3 7	
654 0	657 3	Silty shale	3 3	
657 3	657 9	Coal	6	
657 9	658 6½	Shale	9½	
658 6½	658 11	Coal	4½	Middle Kittanning,
658 11	660 11	Shale	2 0	el. 733 ft., C-53371.
660 11	661 10	Bone and coal	11	
661 10	663 4	Silty to sandy dark shale	1 6	
663 4	673 4	Fine to medium sandstone	10 0	
673 4	677 6	Dark to carbonaceous shale	4 2	
677 6	694 0	Dark siltstone and fine sandstone	16 6	
694 0	761 0	Medium sandstone, some fine, some hackled, conglomerate 735 to 741 ft.	67 0	

Log, hole 19-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
761	0	771	0	Dark-gray siltstone and sandy siltstone..
771	0	802	0	Medium sandstone, fine at top.....
802	0	806	0	Dark siltstone and silty clay.....
806	0	820	0	Medium sandstone.....
820	0	828	0	Interbedded siltstone and fine sandstone..
828	0	836	0	Silty, dark shale.....
836	0	837	6	Dark claystone and clay.....
837	6	838	11	Coal.....
838	11	840	0	Medium sandstone.....
840	0	842	0	Silty shale.....
842	0	845	0	Shaly sandstone.....
845	0	876	0	Medium sandstone, carbonaceous partings near base.
876	0	878	0	Interbedded sandy shale and sandstone..

Lower Mount Savage, el. 553 ft., C-53824.

Log, hole 20-GC

Location: On a north branch of Jennings Run, Allegany County, Md., 2.2 mi. N. 40° E. of Mount Savage Hole is 80 feet S. 75° W. of a bridge across a branch of Jennings Run. Drive from Frostburg to Barrelville, then turn left 1.7 mi., turn left again 0.8 mi. (Refer to fig. 28.)

Surface elevation: 1,405 feet—by aneroid barometer.

<i>Ft.</i>	<i>in.</i>	<i>Ft.</i>	<i>in.</i>		
0	0	8	0	Overburden.....	8 0
8	0	36	5	Fine-gray to dark-gray sandstone locally shaly and irregularly bedded.	28 5
36	5	36	7	Coal.....	2
36	7	37	2	Shale.....	7
37	2	37	11½	Coal.....	9½
37	11½	38	0	Shale.....	½
38	0	38	½	Coal.....	½
38	½	40	2	Dark shale and bone.....	2 1½
40	2	40	6	Coal.....	4
40	6	41	1	Shale and bone.....	7
41	1	41	5	Coal.....	4
41	5	41	8	Shale.....	3
41	8	43	8	Coal.....	2 0
43	8	45	0	Dark, silty claystone.....	1 4
45	0	46	6	Calcareous claystone grading to argillaceous limestone, scattered fine, calcareous inclusions.	1 6
46	6	49	3	Silty bastard clay, scattered limestone inclusions.	2 9
49	3	55	6	Argillaceous siltstone and siltstone.....	6 3
55	6	61	0	Fine white, quartzitic sandstone.....	5 6
61	0	62	0	Interbedded hard, dark limestone and bastard clay.	1 0
62	0	64	0	Semiplastic to semihard clay.....	2 0
64	0	67	0	Hard, dark limestone, silty and clay streaks at base.	3 0
67	0	70	0	Semihard and semiplastic clay, upper 6 inches fragmental limestone inclusions.	3 0
70	0	79	0	Silty, locally shaly claystone, several 6-in. zones of ironstone.	9 0
79	0	88	9	Black, sandy shale, locally has sandstone laminae, plant remains.	9 9
88	9	90	3	Bone.....	1 6
90	3	90	11	Shale.....	8
90	11	92	8	Coal.....	1 9
92	8	98	10	Silty, carbonaceous bastard clay, grading to silty, light-gray claystone, ironstone inclusions at base.	6 2
98	10	104	6	Argillaceous siltstone and sandy siltstone.	5 8
104	6	109	2	Interbedded silty clay shale and shaly siltstone—2 in. iron pellets at base.	4 8
109	2	110	0	Fragmental hard clay.....	10
110	0	112	0	Silty claystone and siltstone.....	2 0
112	0	121	5	Calcareous zone, interbedded bastard clay, limestone nodules; argillaceous limestone, calcareous claystone, nodules and gradations of all types.	9 5

Wellersburg, el. 1,369 ft.

C-54109.

Barton, el. 1,316 ft., C-64571.

Log, hole 20-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
121	5	Interbedded siltstone and shaly siltstone, sandy near base.	18	3
139	8	Fine, cross-laminated, white sandstone, numerous shaly partings, locally quartzitic.	22	4
162	0	Coal	1	5
163	5	Shale	1	1/2
163	5 1/2	Coal	2	1/2
163	8	Soft bastard clay, limestone inclusions.	10	4
163	8	Gray, silty clay, grading to silty shaly claystone.	5	0
174	0	Siltstone and sandy siltstone, argillaceous at top.	5	0
179	0	Interbedded fine sandstone and siltstone, grading to interlaminated shaly sandstone and siltstone.	11	4
184	0	Sandy dark shale, grading to silty shale (highest fossil 202).	9	8
195	4	Dark-gray to black, fossiliferous shale (fossils highly concentrated in basal 18 in.).	16	2
205	0	221 2		
221	2	225 6		
225	6	229 0		
229	0	239 0		
239	0	247 0		
247	0	248 4		
248	4	250 4		
250	4	251 0		
251	0	273 5		
273	5	282 8		
282	8	286 6		
286	6	291 0		
291	0	301 0		
301	0	304 8		
304	8	307 0		
307	0	312 0		
312	0	323 6		
323	6	325 0		
325	0	336 0		
336	0	339 3		
339	3	339 8 1/2		
339	8 1/2	340 3		
340	3	341 5		
341	5	341 7		
341	7	342 5		
341	11	342 5 1/2		
342	5	343 2 1/2		
342	5 1/2	343 6		
343	2 1/2	343 9		
343	6	347 0		
343	9	348 6		
347	0	352 6		
348	6	352 6		
352	6	355 0		

Federal Hill, el. 1,243 ft., C-54568.

Harlem, el. 1,167 ft., C-54569.

Upper Bakerstown, el. 1,050 ft., C-54683.

Log, hole 20-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
355	0	Gray clay shale	1	8
356	8	Hard, silty, carbonaceous claystone	3	4
357	0	Argillaceous limestone, minor streaks dark claystone at top, fossiliferous in lower part.	3	0
360	0	Silty, pyritic claystone	2	0
362	0	Argillaceous limestone, streaks semihard clay	2	6
364	6	Dark to brown semihard clay	1	3
365	9	Semihard clay, pyritic limestone inclusions, grading to limy claystone	2	9
368	6	Bastard clay, coaly zone 369 ft. 6 in.	1	3
369	9	Dark-gray to black pyritic shale, scattered plant remains.	9	6
379	3	Coal and bone	2	
379	5	Coal	1	4½
380	9½	Shale	4	
381	1½	Coal	1½	
381	3	Dark to black shale, silty and pyritic at top, abundant plant remains.	7	9
389	0	Coal	1	4
390	4	Dark-gray pyritic claystone	1	0
391	4	Claystone, limestone inclusions, grading to argillaceous limestone	1	8
393	0	Argillaceous dense, hard, dark-gray limestone	3	0
396	0	Siliceous, pyritic claystone, grading to siliceous clay, limestone pellets.	7	3
403	3	Silty to siliceous, pyritic claystone	5	3
403	6	Irregularly bedded clay shale, yellow weathered-iron stringers, sandy at base.	4	6
413	0	Silty to clean, semihard gray clay	5	0
418	0	Mottled red and green, semihard clay and claystone, zone siderite pellets.	5	4
423	4	Fine sandstone and sandy siltstone	8	8
432	0	Green silty shale, lower 3 ft. gray and clayey, several zones siderite pellets.	9	10
441	10	Calcareous shale, locally silty to finely sandy, fossil fragments at base.	8	0
449	10	Dark gray to black shale, scattered fossils small limy concretions, lower 2 ft. plant remains in pyritic shale.	12	6
462	4	Bone	1½	
462	4½	Coal	8	
462	6	Coal and bone	8	
463	2	Fine to medium sandstone, upper 2 ft. dark and argillaceous, interbedded siltstones near base.	10	4
473	6	Gray interbedded siltstone and fine sandstone grading to dark, silty shale and shaly siltstone, plant remains.	31	6
505	0	Fossiliferous, dark-gray to black pyritic shale, small calcareous concretions.	13	0
518	0	Coal	1	0
519	0	Carbonaceous, silty, pyritic claystone	1	6
520	6	Light-gray claystone, limestone zones and inclusions	7	0
527	6	Interbedded siltstone and fine sandstone	7	8
535	2	Gray claystone	5	10
541	0	Siltstone and fine sandstone	5	0
546	0	Gray claystone and interbedded siltstone, minor silty shale.	14	1
560	1	Bone, coal streaks	10	
560	11	Dark silty claystone, becoming shaly at base.	4	5
565	4	Gray shale, silty in upper part, coaly partings at base.	5	8
571	0	Hard, dark-gray, silty claystone	1	0
572	0	Argillaceous limestone	1	6
573	6	Calcareous claystone, limy blebs	1	3
574	9	Fragmental claystone	9	
575	6	Fragmental claystone and siliceous flint clay	2	3
577	9	Siltstone	1	1
578	10	Fragmental claystone	8	

Lower Bakerstown,
el. 1,026 ft.Lower Bakerstown,
el. 1,016 ft., C-54684.Brush Creek rider,
el. 943 ft.

Brush Creek, el. 887 ft.

Mahoning, el. 845 ft.

Log, hole 20-GC—Continued

Depth		Materia	Thickness	Remarks			
From—	To—						
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>			
579	6	582	6	Dark-gray to black, silty claystone and siltstone.	3	0	
582	6	584	6	Calcareous claystone and bastard clay.....	2	0	
584	6	586	9	Argillaceous limestone, clayey streaks.....	2	3	
586	9	587	10	Fragmental shaly claystone, 3 in. limestone at base.	1	1	
587	10	592	0	Claystone and silty claystone, shaly at base.	4	2	
592	0	599	0	Interbedded shaly siltstone and fine sandstone.	7	0	
599	0	602	9	Silty to sandy claystone.....	3	9	
602	9	603	8	Shaly claystone, carbonaceous at top.....		11	
603	8	605	4	Fragmental claystone grading to shaly claystone, 2 in. argillaceous limestone at base.	1	8	
605	4	609	0	Dark siliceous claystone.....	3	8	
609	0	624	3	Fragmental claystones and siltstones.....	15	3	
624	3	628	4	Dark-gray siltstone.....	4	1	
628	4	635	0	Interbedded, siliceous, flinty claystone, calcareous claystone, argillaceous limestone.	6	8	
635	0	639	0	Silty claystone grading to siltstone.....	4	0	
639	0	642	0	Siltstone, becoming sandy at base.....	3	0	
642	0	664	5	Medium sandstone, minor silty sandstone and siltstone.	22	5	
664	5	669	6	Interbedded shaly siltstone and fine sandstone.	5	1	
669	6	670	1	Silty shale.....	7		
670	1	670	11	Coal.....	10		
670	11	671	3	Shale.....	4		
671	3	671	6½	Coal.....	3½		
671	6½	671	7	Shale.....	½		
671	7	671	9	Coal.....	2		
671	9	674	6	Dark-gray, calcareous claystone and bastard clay, limestone inclusions.	2	9	
674	6	677	0	Light-gray, mottled to fragmental, siliceous semihard clay with silty streaks.	2	6	
677	0	686	0	Gray, argillaceous siltstone grading to shaly siltstone, sandy streaks and laminae.	9	0	
686	0	703	0	Interbedded fine sandstone and siltstone interlaminated silty shale in lower 5 ft.	17	0	
703	0	707	6	Dark-gray to black shale and silty shale.....	4	6	
707	6	707	9½	Coal.....	3½		
707	9½	708	5½	Shale.....	8		
708	5½	708	9	Shale, coal streaks.....	3½		
708	9	711	9	Dark-gray, silty claystone.....	3	0	
711	9	719	6	Dark-gray, silty shale, sandstone laminae.	7	9	
719	6	719	7	Bone.....	1		
719	7	720	5	Coal.....	10		
720	5	720	11½	Shale.....	6½		
720	11½	721	2	Bone and coal.....	2½		
721	2	725	4	Dark-gray, argillaceous limestone.....	4	2	
725	4	730	0	Gray to black bastard clay and claystone, siliceous, ferruginous inclusions upper part and 5 in. semihard shaly clay at base.	4	8	
730	0	732	0	Irregularly interbedded siltstone and fine sandstone.	2	0	
732	0	735	6	Shaly claystone and clay shale.....	3	6	
735	6	738	0	Argillaceous siltstone.....	2	6	
738	0	747	0	Carbonaceous clay shale and shaly claystone.	9	0	
747	0	758	0	Dark-gray, silty shale.....	11	0	
758	0	760	10	Fine, micaceous sandstone.....	2	10	
760	10	782	2	Gray to black shale and silty shale, shaly siltstone in upper 5 ft.	21	4	
782	2	785	10	Carbonaceous semihard to semiflint clay, zones gray and brown semihard clay fragments.	3	8	
785	10	786	0	Coaly clay.....	2		
786	0	786	7	Carbonaceous, fragmental flint clay.....	7		
786	7	787	3	Dark-gray to black, silty claystone, scattered, coarse grains quartz.	8		
787	3	790	0	Tan bastard clay, upper 6 in. dark brown.	2	9	
790	0	805	0	Irregularly interbedded siltstone and fine sandstone.	15	0	

Lower Freeport,
el. 735 ft., C-55308.Upper Kittanning,
el. 698 ft.Upper Kittanning,
el. 686 ft.

Log. hole 20-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
805	0	Irregularly bedded fine sandstone, silty shale, zones and partings.	11	0
816	0	Fine to medium quartzitic sandstone.	17	6
833	6	Carbonaceous, pyritic claystone.	1	0
834	6	Fragmental flint clay, upper 3 in. dirty semifint.	11	
835	5	Fragmental, pyritic, hard, tan clay.	1	7
837	0	Shaly, semihard, tan clay.	1	7
837	7	Ironstone.	1	0
838	7	Semihard clay.	1	5
839	0	Carbonaceous silty claystone, scattered coarse-quartz grains.	1	0
840	0	Carbonaceous shale and clay shale.	7	9
847	9	Fragmental, dirty, semifint clay.	1	0
848	9	Bone.	2	½
848	11½	Shale.	1	
849	9	Bone.	1	
849	1½	Coal.	1	5½
849	1½	Bone.	2	
850	7	Bone.	2	
850	9	Coaly claystone, scattered quartz grains.	1	7
850	11	Interbedded, siliceous, pyritic, semihard and dark claystone.	2	6
852	6	Dark-gray siltstone, sandy streaks.	2	6
855	0	Shaly siltstone, grading to silty shale.	6	0
861	0	Carbonaceous shale.	6	6
861	6	Slight, tan, siliceous claystone, grading to siliceous siltstone.	4	0
865	6	Light-gray, hard, fine, siliceous siltstone, abundant ferruginous pellets.	8	6
874	0	Dark-gray to carbonaceous shale, scattered iron pellets in upper 1 ft.	2	6
876	6	Dark-gray to black, silty claystone.	3	3
879	9	Interbedded siltstone and fine sandstone.	23	9
903	6	Medium sandstone, locally cross-bedded, some quartzitic zones, shaly inclusions, minor fine sandstone zones.	36	6
940	0	Dark-gray to carbonaceous silty shale.	8	4
948	4	Carbonaceous claystone.	11	
949	3	Gray, argillaceous siltstone and silty claystone, zones of ferruginous pellets.	4	9
954	0	Gray, sandy siltstone and fine sandstone, local zones iron pellets.	1	6
955	6	Light- to dark-gray, fine sandstone.	3	6
959	0	Red, silty clay and gray, fine sandstone.	7	0
966	0	Red, silty claystone, some green mottling at base, some ferruginous pellets.	5	4
971	4	Red and green, silty claystone, grading through green-clay siltstone to sandy siltstone.	8	8

} Lower Kittanning,
el. 558 ft., C-55745.

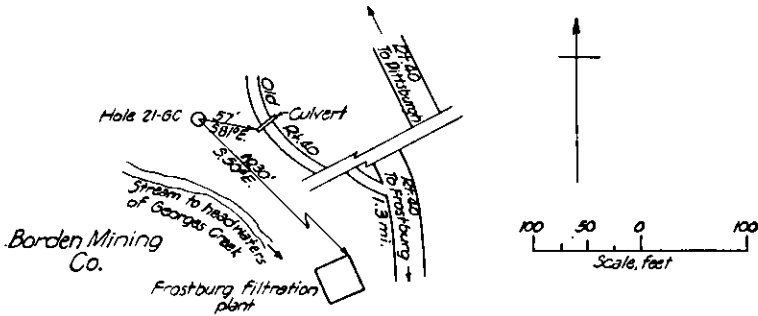
Log, hole 21-GC

Location: On a west branch of Georges Creek, headwaters near Rt. 40, Allegany County, Md., 1.3 mi. N. 34° W. of Frostburg Post Office. Hole is 1,030 feet N. 50° W. of Frostburg filtration plant. Drive west on Rt. 40 1.3 mi. from Frostburg Post Office.
(Refer to fig. 29.)

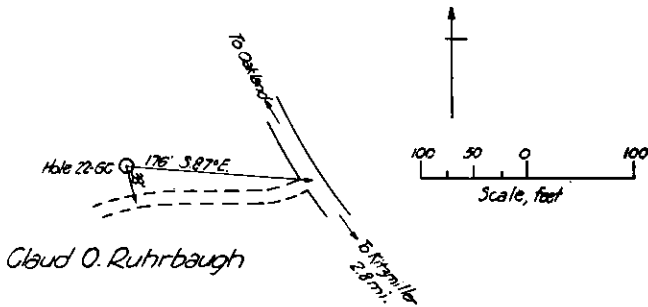
Surface elevation: 2,415 feet—by aneroid barometer.

<i>Ft.</i>	<i>in.</i>	<i>Ft.</i>	<i>in.</i>	<i>Ft.</i>	<i>in.</i>
0	0	22	0	22	0
22	0	26	0	4	0
26	0	44	6	18	6
44	6	46	6	2	0
46	6	46	11½	5½	
46	11½	47	2	2½	
47	2	47	8	6	
47	8	47	10	2	
47	10	48	11	1	
48	11	56	0	7	
56	0	69	0	13	0

} Wellersburg, el. 2,369 ft.,
C-54682.



Drive west on U.S. Rt. 40, 1.3 mi. from Frostburg Post Office
 Hole 21-GC on west branch of Georges Creek headwaters, Allegany County, Md., 1.3 mi. N.34°W. of Frostburg P.O.



Drive 2.8 mi. from Kitzyiller toward Oakland
 Hole 22-GC approx. 1000' N. of Bell Run, a branch of Halbtien Run, Garrett County, Md., 2.2 mi. N.53°W. of Kitzyiller

FIGURE 29.—Location of holes 21-GC and 22-GC.

Log, hole 21-GC—Continued

Depth		Material	Thickness	Remarks	
From—	To—				
<i>Ft.</i> 69	<i>in.</i> 0	<i>Ft.</i> 77	<i>in.</i> 0		
		Silty gray claystone and siltstone, calcareous stringers and hard ironstone carbonate concretions, limestone inclusions at base.	8	0	
77	0	80	9	Interlaminated fine sandstone and siltstone.	
80	9	92	6	Dark to gray, silty shale, plant remains, shaly siltstone at top.	
92	6	94	0	Laminated fine and medium, dark and light sandstone.	Water flow.
94	0	95	0	Dark shale, plant remains.	
95	0	97	0	Interlaminated silty shale and sandstone.	
97	0	115	10	Dark-gray shale.	
115	10	117	6	Coal.	
117	6	125	0	Silty, siliceous claystone, locally shaly, grading to fine siltstone.	
125	0	136	6	Calcareous, fine sandstone, silty in upper part, scattered lime pellets in upper 4 feet.	
136	6	137	6	Conglomeratic limestone, quartz pebbles in argillaceous limestone matrix, limestone fragments.	
137	6	140	0	Argillaceous limestone.	
140	0	143	0	Claystone and bastard clay, large, slightly calcareous inclusions.	
143	0	149	0	Interbedded siltstone and silty claystone.	
149	0	150	0	Fine sandstone.	
150	0	153	0	Shaly claystone.	
153	0	165	0	Silty, shaly claystone and shaly siltstone.	
165	0	169	9	Interlaminated fine sandstone and siltstone.	
169	9	171	0	Silty, shaly claystone.	
171	0	171	6	Fine sandstone.	
171	6	174	0	Dark-gray to black shale.	
174	0	174	11	Coal.	
174	11	183	0	Calcareous bastard clay, argillaceous limestone from 178 to 179 feet.	
183	0	186	0	Shaly claystone, grading to sandy siltstone.	
186	0	190	0	Speckled fine sandstone.	
190	0	207	0	Interlaminated shaly sandstone and siltstone; latter increases at base.	
207	0	211	6	Light-gray, silty shale, local sandy streaks.	
211	6	225	0	Dark-gray to black shale, marine fossils below 216 ft. 6 in., concentrated in lower 3 ft. argillaceous limestone in basal 1 ft.	
225	0	232	0	Pyritic, gray siltstone becoming sandy at base.	
232	0	236	6	Interbedded fine sandstone and siltstone.	
236	6	256	0	Fine sandstone, some medium sandstone.	
256	0	257	6	Coal.	
257	6	267	9	Argillaceous limestone.	
267	9	273	0	Calcareous claystone.	
273	0	275	6	Claystone, limestone pellets.	
275	6	287	0	Red- and green-mottled clay, claystone limestone pellets.	
287	0	306	0	Interbedded green siltstone and silty claystone, limy stringers.	
306	0	320	0	Medium sandstone.	
320	0	332	9	Interbedded shaly siltstone and silty shale.	
332	9	339	10	Dark-gray to black shale, silty at top, scattered plant remains.	
339	10	340	2	Coal.	
340	2	342	6½	Shale.	
342	6½	342	11½	Coal.	
342	11½	343	3½	Bony coal.	
343	3½	353	0	Interbedded claystone and argillaceous limestone.	
353	0	361	0	Claystone, limestone pellets.	
361	0	365	0	Gray siltstone.	
365	0	371	3	Silty claystone, gray to black at base.	
371	3	388	6	Dark-gray to black shale, silty at top.	
					Barton, el. 2,300 ft., C-55005.
					Federal Hill, el. 2,241 ft., C-55004.
					Harlem, el. 2,159 ft.
					Upper Bakerstown, el. 2,075 ft., C-55509.

Log, hole 21-GC—Continued

Depth		Material	Thickness	Remarks	
From—	To—				
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>	
388	6	Coaly shale.....	1	4	Lower Bakerstown, el. 2,045 ft., C-55742.
388	10	Coal.....	1	4	
390	2	Hard, dark-gray claystone, shaly in upper 1½ ft., calcareous 392 ft. to 393 ft., 6 in.	10	10	
401	0	Gray claystone grading to shaly clay- stone and siltstone, calcareous stringers in upper part.	11	6	
412	6	Dark-gray, silty clay and claystone, grading to greenish gray with 8-in. zone of siderite pellets at 418 ft.	7	6	
420	0	Siltstone and fine sandstone.....	3	5	
423	5	Silty, pyritic gray claystone.....	2	9	
424	2	Sandy siltstone.....	1	4	
425	6	Silty, shaly claystone, calcareous stringers and blotches.	3	6	
429	0	Fine, calcareous sandstone.....	3	0	
432	0	Interbedded sandstone and silty shale.....	6	6	
438	6	Silty to sandy gray shale, local zones of fine argillaceous sandstone.	12	6	
451	0	Dark-gray to black shale, fossiliferous in lower 5 ft., lower 3 in. carbonaceous.	10	6	
461	6	Interbedded gray to black silty shale and white fine sandstone.	6	6	
468	0	Gray, silty claystone and silty shale.....	5	0	
473	0	Black to carbonaceous shale, plant re- mains.	2	8	
475	8	Gray siltstone, minor silty claystone.....	4	8	
480	4	Fine gray sandstone, some siltstone.....	9	8	
490	0	Coarse white conglomeritic sandstone.....	22	6	Water flow.
512	6	Carbonaceous shale, pyritized fossils.....	1	0	
513	6	Coal.....	2½		
513	8½	Shale.....	2		Brush Creek, el. 1,902 ft., C-55743.
513	10½	Coal.....	1	1	
514	11½	Pyritic shale.....	1	½	
515	0	Calcareous claystone.....	3	0	
518	0	Gray bastard clay, slightly calcareous.....	1	6	
519	6	Shaly gray siltstone.....	6	6	
525	0	Gray bastard clay, calcareous at top.....	8	0	
533	0	Siltstone and silty claystone.....	2	3	
535	3	Fine sandstone.....	3	9	
536	0	Siltstone.....	3	0	
539	0	Interbedded silty claystone, siltstone and shaly claystone, calcareous in lower 6 ft.	26	0	
565	0	Fragmental, highly siliceous, hard clay.....	6		
565	6	Siliceous claystone, grading to siltstone.....	3	6	
569	0	Interbedded shaly siltstone and sand- stone.	7	6	
576	6	Fine and medium sandstone.....	43	6	
620	0	Carbonaceous, pyritic clay.....	11		
620	11	Coal and bone.....	5		
621	4	Clay.....	7		
621	11	Coal and bone.....	4	½	Upper Freeport, el. 1,794 ft.
622	4½	Sandstone.....	3	6½	C-55744.
622	8½	Coal.....	3	6½	
626	0	Bastard clay, locally calcareous.....	3	6	
629	6	Calcareous claystone.....	2	6	
632	0	Silty claystone, minor siltstone, calcare- ous stringers, some fragmental clay- stone.	15	0	
647	0	Gray clay shale.....	1	0	
648	0	Silty, fragmental claystone.....	1	0	
649	0	Silty clay shale, 6 in. calcareous claystone at base.	5	0	
654	0	Silty shale, sandy streaks and laminae.....	10	3	
664	3	Coal.....	5		Lower Freeport, el. 1,751 ft.
664	8	Slightly calcareous, gray, silty bastard clay.	4	4	
669	0	Siltstone, sandy in lower part, calcareous at top.	14	0	
683	0	Fine sandstone, minor siltstone.....	5	0	
688	0	Dark to carbonaceous shale.....	2	0	
690	0	Interlaminated fine sandstone and dark, silty shale.	7	0	

Log, hole 21-21GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
697	0	Coal	6	Upper Kittanning, el. 1,718 ft.
697	6	Shale	3	
697	9	Coal	2	
697	11	Shale	1	
699	1	Coal	10	
699	11	Coaly shale	5	
700	4	Dark-gray, silty shale	2	
703	3	Fine sandstone, shale inclusions in lower 3 ft.	7	
710	6	Medium sandstone	16	
726	6	Interbedded gray siltstone and fine sandstone	11	
738	0	Carbonaceous shale, calcareous lower half	2	Lower Kittanning, el. 1,584 ft.
740	3	Fragmental, fossiliferous, pyritic, argillaceous limestone	4	
740	9	Coaly shale	2	
740	9	Carbonaceous, silty shale	1	
742	5	Fragmental claystone	14	
756	7	Shaly siltstone, grading to silty gray shale	4	
761	0	Dark-gray to black shale	20	
781	0	Silty, pyritic claystone	1	
782	0	Dark silty shale	3	
785	0	Dark-gray shale, plant remains	8	
793	0	Fragmental claystone, light-gray, pyritic, silty claystone	7	
800	0	Dark-gray bastard clay	2	Mount Savage, el. 1,539 ft.
802	6	Coaly, pyritic shale	2	
804	6	Dark-gray silty claystone grading to siltstone	2	
806	6	Fine sandstone	2	
808	6	Medium and hackled coarse sandstone, conglomeratic basal 2 ft.	20	
829	0	Light- to dark-gray clay shale	2	
829	0	Bone	8	
831	8	Bony coal	2	
831	10	Shale	6½	
832	4¾	Coal	3½	
832	8	Silty to sandy bastard clay	3	
832	11	Semihard and bastard clay	3	
835	11	Silty tan claystone, grading to siltstone	3	
839	6	Interbedded siltstone and fine sandstone	9	
848	6	Fine and medium, irregularly bedded sandstone zones of shaly inclusions upper 5 ft., minor hackling	1	
850	0	Coaly shale	25	
875	0	Coal	1	Upper Kittanning, el. 1,718 ft.
876	0	Shale coal streaks	3	
876	3	Coal	4	
876	7	Coal	5	
877	0	Shale	1	
877	1	Coal	1½	
877	2¼	Irregularly bedded, fine sandstone, some siltstone	8	
896	0	Medium quartzitic, hackled sandstone	8	
912	0	Gray to carbonaceous shale	9½	
917	3	Medium cross-laminated sandstone, minor fine sandstone, zones of coaly and shaly inclusions	47	
965	0	Carbonaceous to coaly shale	1	Mount Savage, el. 1,539 ft.
966	0	Gray to brown-gray bastard clay, silty at base, plant fragments	6	
972	0	Silty claystone, siderite pellets	5	
977	0	Silty claystone, some large fragments of siltstone at base	8	
985	0	Black shale	3	
988	0	Gray fine sandstone, argillaceous in upper 3 ft., plant fragments, zones of iron pellets in middle and base	10	
998	0	Irregularly interbedded fine sandstone and siltstone, light-gray with greenish cast in lower layers; iron pellets at several zones	16	
1,014	0	Green, silty claystone and siltstone, minor silty shale and sandy zones	9	
1,023	0	Mottled red and green, silty shale and silty claystone, several zones iron pellets	7	

NOTE.—At the request of the landowner, this hole was not plugged with cement.

Log, hole 22-GC

Location: Approx. 1,000 feet N. of Bell Run, a N. branch of Wolfden Run, Garrett County, Md., 2.2 mi. N. 53° W. of Kitzmiller. Hole is 176 feet N. 87° W. of intersection of dirt road with Kitzmiller-Oakland paved road. Drive 2.8 mi. from Kitzmiller on road toward Oakland.
(Refer to fig. 29.)

Surface elevation: 2,450 feet—by aneroid barometer.

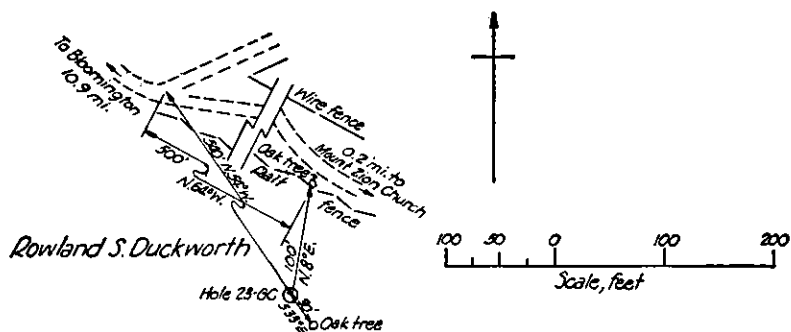
Depth		Material	Thickness	Remarks
From—	To—			
		Overburden		
		Interbedded, greenish gray, shaly siltstone and silty shale, zones of fine sandstone, ironstone bands.		
		Gray, silty clay shale		
		Bone		Lower Bakerstown el. 2,393 ft.
		Coal		
		Soft bastard clay		
		Silty clay and clay shale, grading to shaly siltstone, zones of fine sandstone, ironstone bands.		
		Silty clay shale and gray claystone		
		Fine, silty, soft-gray clay		
		Red and green silty claystone, minor silty clay.		
		Sandy, greenish gray siltstone and silty claystone; upper 2 ft. has several bands of coarse sandstone.		
		Red, silty claystone		
		Gray and green-gray, silty clay and silty claystone, limestone nodules and inclusions from 118 to 127 ft.		
		Silty claystone, thin beds of medium sandstone.		
		Clay shale (green and gray laminae), some ironstone.		
		Medium sandstone, peppered with dark-iron pellets.		
		Silty bastard clay and claystone		
		Argillaceous limestone and limy claystone.		
		Silty gray claystone and semihard clay; upper 3 ft. has fine, calcareous sandstone beds.		
		Silty, semihard clay and minor claystone.		
		Siltstone and silty claystone, grading to fine sandstone in lower half.		
		Medium sandstone, claystone conglomerate and ironstone pellets at base.		
		Clay shale ironstone zones		
		Dark-gray to black shale		
		Bone and shale		
		Coal		Mahoning, el. 2,232 ft., C-56888.
		Shale		
		Coal		
		Fragmental soft clay		
		Silty, semihard clay, pyritic in lower part, coaly streaks at base.		
		Silty bastard clay, grading to siltstone		
		Fine to medium, highly micaceous sandstone.		
		Shaly, semihard, silty clay		
		Carbonaceous shale, minor coal and bone.		
		Dark-gray to black pyritic claystone		
		Gray silty shale, interlaminated fine sandstone in upper part.		
		Coal		Upper Freeport, el. 2,170 ft., C-56887.
		Shale		
		Coal		
		Shale		
		Coal		
		Shale		
		Coal (pyritic film)		
		Shale		
		Bony coal		
		Black silty clay shale		
		Argillaceous limestone		
		Silty claystone and siltstone, limestone and ironstone, stringers and inclusions.		
		Gray clay shale, limestone and ironstone inclusions.		
		Interbedded fine sandstone and siltstone.		

Log, hole 22-GC—Continued

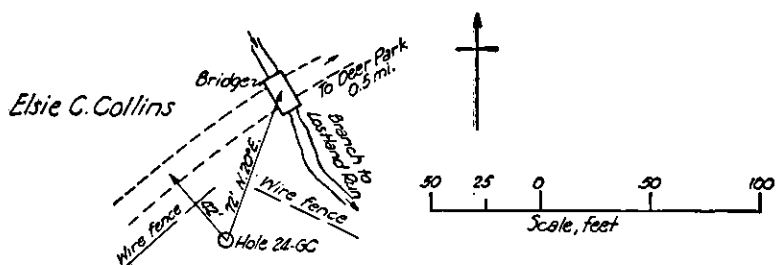
Depth		Material	Thickness		Remarks
From—	To—		Ft.	in.	
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>	
303	6	Gray to dark-gray clay shale, ironstone locally.	7	6	
311	0	Fragmental hard clay	3	8	
314	8	Silty bastard clay, grading to silty claystone.	8	8	
323	4	Soft to semihard clay, locally silty and shaly.	6	8	
330	0	Silty claystone	7	0	
337	0	Pyritic claystone	6	6	
337	6	Bone, minor coal	7	7	
338	1	Dark-gray silty claystone	3	5	
341	6	Fine sandstone, interbedded dark shale	3	0	
344	6	Gray and black shale	12	7	
357	1	Coal with pyrite	3	3	
357	4	Coal	1	7½	Upper Kittanning, el. 2,093 ft., C-57103.
358	11½	Shale	1	1	
359	11½	Coal with pyrite	10½	2	
359	11	Gray shale	7	7	
360	6	Argillaceous limestone and limy claystone.	2	0	
362	6	Silty claystone	9	4	
371	10	Silty shale and shaly siltstone, clay shale at top and base.	4	8	
376	6	Silty claystone	3	6	
380	0	Interbedded siltstone and fine sandstone.	4	6	
384	6	Silty shaly claystone, 8 in. fine sandstone at base.	3	6	
388	0	Carbonaceous shale	4	0	
392	0	Coal	1	1	
392	1	Interbedded silty claystone, siltstone, and sandstone.	4	11	
397	0	Black shale, clay, and claystone	2	5	
399	5	Shale and bone	8	8	Middle Kittanning, el. 2,050 ft.
400	1	Coal	3	3	
400	4	Shale	5	5	
400	9	Bone	2	2	
400	11	Coal	10	10	
401	9	Silty claystone, locally shaly	4	8	
406	5	Interbedded siltstone and fine sandstone	6	10	
413	3	Shale	2	2	
413	5	Bone	2	2	
413	7	Coal	8½	2	Middle Kittanning, el. 2 037 ft., C-57104.
414	3½	Shale	1½	1½	
414	5	Coal	1	7	
416	0	Fragmental, semihard and plastic clay, ironstone concretions.	9	0	
425	0	Shaly claystone grading to silty dark shale, sandy streaks.	15	0	
440	0	Silty claystone, grading to siltstone	16	3	
456	3	Coaly, pyritic shale	1	0	
457	3	Fine sandstone, shaly zones and laminae	4	9	
462	0	Dark-gray shale, sandy streaks in upper part, 6 in. carbonaceous shale at base.	8	6	
470	6	Carbonaceous, silty clay	6	6	
471	0	Irregularly bedded siltstone and silty claystone.	5	6	
476	6	Hackled fine sandstone	30	6	
507	0	Interbedded fine sandstone and siltstone	2	6	
509	6	Fine quartzitic sandstone	5	6	
515	0	Medium to coarse conglomeratic sandstone.	29	6	
544	6	Sandy siltstone	1	0	
545	6	Interlaminated light and dark shale	2	0	
547	6	Dark gray to black shale	15	6	
563	0	Fine and medium sandstone, carbonaceous streaks and partings.	5	0	
568	0	Silty claystone, ironstone concretion	1	6	
569	6	Siltstone	1	6	
571	0	Fine sandstone	8	0	
579	0	Carbonaceous shale, coaly streaks	3	3	
579	3	Dark-gray silty claystone, coal streaks at base.	1	9	
581	0	Dark shale, bony coal 583 ft. 4 in. to 583 ft. 6 in.	3	10	

Log, hole 22-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
584	10	Siltstone, sandy zones at base	3	2
588	0	Fine sandstone	6	8
594	8	Bone and carbonaceous clay	10	6
595	6	Siltstone	2	4
596	0	Irregularly bedded fine sandstone	1	8
598	4	Dark to carbonaceous clay, coaly streaks at top.	7	4
600	0	Fine, silty tan claystone	3	0
607	4	Dark-gray silty claystone	1	1
610	4	Dark-gray to black shale, sandy streaks	1	7
611	5	Bony coal	1	8
612	0	Dark claystone and fine sandstone	24	11
613	8	Fine to medium sandstone	13	5
638	7	Black shale, locally silty	8	7
652	0	Silty claystone, grading to argillaceous siltstone.	6	5
660	7	Siltstone and fine sandstone	1	9
667	0	Silty gray shale	11	0
668	9	Sandy siltstone and fine sandstone	6	2
679	9	Bony coal	6	1
679	11	Sandy siltstone and siltstone	6	0
686	0	Interbedded siltstone and fine sandstone	42	6
692	0	Medium and coarse sandstone	2	0
734	6	Silty claystone and siltstone	18	6
736	6	Interbedded silty shales and siltstones, dark-gray to black, 2 ft. silty tan claystone at base.	62	6
755	0	Medium and coarse sandstone, zones of conglomerate, irregularly bedded sandstone, numerous partings.	18	6
817	6	Interbedded dark-gray siltstone and sandstone, latter predominating in lower half.	9	0
836	0	Greenish gray, shaly claystone, becoming silty at base.	4	0
845	0	Green-gray, micaceous siltstone	5	0
849	0	Greenish, mottled, highly siliceous, fragmental claystone and silty claystone, zones of siltstone in basal part and several zones semihard, fragmental, silty clay.	8	0
854	0	Gray and black shale, plant remains (reeds).	3	6
862	0	Chiefly dark-gray siltstone, minor silty shale.	6	6
865	6	Dark-gray, pyritic shale, plant remains	4	0
872	0	Dense-gray siltstone, sandy zones near base.	1	0
876	0	Coarse sandstone	1	0
877	0	Fine, dark-gray sandstone	13	0
878	0	Red and green clay shale, becoming silty in basal part.	9	0
891	0	Interbedded greenish fine sandstone and sandy siltstone.		



Drive from Bloomington to top of Backbone Mountain 8.3 mi., then turn left 2.6 mi.
 Hole 23-GC at Mount Zion Church, Garrett County, Md., 1.8 miles N. 23° E. of Yindex



Drive from Bloomington to Deer Park R.R. Station then turn left 5.0 mi.
 Hole 24-GC on a branch of Lostland Run, Garrett County, Md., 4.5 mi. due west of Kitzmiller

FIGURE 30.—Location of holes 23-GC and 24-GC.

Log, hole 23-GC

Location: On Mt. Zion Church Hill, Garrett County, Md., 1.8 mi. N. 23° E. of Vindex. Hole is 540 feet S. 54° E. of intersection of Mount Zion Church road and another road. Drive from Bloomington 8.3 mi. to top of Backbone Mountain, turn left 2.6 mi. (Refer to fig. 30.)

Surface elevation: 2,550 feet—by aneroid barometer.

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
0	43	Overburden.....	43	0
43	0	Weathered yellowish claystone.....	4	9
47	9	Silty clay shale and argillaceous siltstone.	23	3
71	0	Siltstone.....	2	0
73	0	Light-gray shale, 3-in. black shale zone 1 ft. above base.	5	6
78	6	Black shale.....	1	6
80	0	Siltstone, 1 ft. silty shale at base.....	4	0
84	0	Silty, dark-gray bastard clay, limy pellets.	8	0
84	0	Greenish-gray bastard clay, red streaks at top and base, limy pellets.	8	0
100	0	Fine sandstone, minor siltstone at top.....	6	6
106	6	Hard, fine-green siltstone.....	6	6
113	0	Mottled gray and green clay shale, silty in upper half, lower 2 ft. fossiliferous.	4	6
117	6	Fossiliferous limestone.....	1	3
118	9	Greenish clay shale, local limestone concretions.	10	3
129	0	Hard black shale, fossil fragments.....	3	0
132	0	Fossiliferous limestone.....	6	7
132	7	Gray, silty clay shale.....	6	5
139	0	Interbedded dark-gray shale and fine sandstone.	13	4
152	4	Coal.....	1	7
153	11	Calcareous claystone, limestone pellets.....	26	1
179	0	Gray bastard clay.....	5	0
184	0	Greenish claystone and bastard clay, limestone inclusions at top and base.	26	0
210	0	Silty claystone.....	2	0
212	0	Fine sandstone.....	17	0
229	0	Gray claystone, locally silty, clay shale at top and base.	13	0
242	0	Coal and bone.....	1	1
243	1	Argillaceous limestone.....	3	8
243	9	Calcareous bastard clay grading to siltstone.	3	8
247	5	Fine sandstone, locally cross-laminated.....	13	3
260	8	Interbedded silty shale, siltstone, and fine sandstone.	24	7
275	3	Gray to dark-gray shale.....	1	6
276	9	Bone.....	1	5
278	2	Coal.....	2	11
281	1	Shaly claystone.....	1	2
282	3	Claystone, limestone inclusions and seams, 1 ft. irony claystone at base.	6	5
287	8	Flint and semiflint.....	1	0
288	8	Fine sandstone, shaly siltstone top and base.	4	8
293	4	Gray clay shale.....	7	8
301	0	Bastard clay, limestone pellets.....	4	0
305	0	Silty claystone, grading to siltstone.....	6	0
311	0	Fine sandstone, interbedded siltstone in upper half.	7	2
318	2	Gray and greenish bastard clay.....	4	10
323	0	Greenish siltstone and silty claystone.....	12	0
335	0	Interbedded fine sandstone and siltstone.	7	0
342	0	Fine to medium sandstone.....	24	6
366	6	Gray shale.....	5	6
372	0	Silty claystone, zones sandstone.....	4	4
376	4	Calcareous claystone and bastard clay.....	5	2
381	6	Gray claystone and silty claystone.....	10	8
392	3	Fine sandstone.....	2	9
395	0	Silty claystone.....	2	0
397	0	Silty to sandy shale.....	12	0
409	0	Fine sandstone.....	6	8
415	8	Interlaminated fine sandstone and dark shale.	6	10

Harlem, el. 2,398 ft., C-57250.

Upper Bakerstown, el. 2,308 ft.

Lower Bakerstown, el. 2,273 ft., C-57105.

90 GEORGES CREEK AND UPPER POTOMAC COAL BEDS, MD.

Log, hole 23-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
422 6	424 0	Dark gray to black shale.....	1 6	Mahoning, el. 2,125 ft., C-57106.
424 0	424 7	Carbonaceous shale.....	7 1	
424 7	426 8	Coal.....	2 1	
426 8	426 9½	Shale.....	1½ ½	
426 9½	427 10	Coal.....	1 1	
427 10	440 7	Silty claystone, limy pellets upper 1 ft.	12 9	
440 7	450 0	Shaly siltstone and silty shale.....	9 5	
450 0	453 3	Fine sandstone.....	3 3	
453 3	460 0	Silty claystone and siltstone.....	6 9	
460 0	465 4	Interbedded shaly siltstone and fine sandstone.....	5 4	
465 4	468 0	Fine sandstone.....	2 8	Upper Freeport, el. 2,080 ft.
468 0	470 8	Black shale.....	2 8	
470 8	470 11	Bone and shale.....	3 3	
470 11	471 7	Coal.....	6 8	
471 7	473 4	Black shale.....	2 9	
473 4	474 3	Coal.....	11 11	
474 3	475 6	Sandy shale.....	1 3	
475 6	475 7	Coal.....	1 1	
475 7	475 9	Shale.....	2 2	
475 9	476 10	Coal (pyritic).....	1 1	
476 10	478 10	Dark- to light-gray claystone.....	2 0	
478 10	495 0	Irregularly bedded fine sandstone.....	16 2	
495 0	510 0	Claystone, grading to siltstone.....	15 0	
510 0	517 9	Interbedded fine sandstone and siltstone.....	7 9	
517 9	522 4	Fragmental, siliceous tan claystone.....	4 7	
522 4	524 0	Shaly bastard clay.....	1 8	
524 0	530 0	Gray to dark-gray claystone.....	6 0	
530 0	535 0	Bastard clay and claystone.....	5 0	
535 0	536 0	Limestone.....	1 0	
536 0	538 6	Semihard clay, locally fragmental.....	2 6	
538 6	552 0	Interbedded shaly siltstone and sandstone.....	13 6	
552 0	554 0	Gray to black shale.....	2 0	Upper Kittanning, el. 1,996 ft., C-57215.
554 0	555 2½	Coal.....	1 2½	
555 2½	555 3½	Shale.....	1 1	
555 3½	555 5	Coal.....	1½ 1½	
555 5	558 8	Calcareous claystone.....	3 3	
558 8	559 2	Dirty flint clay.....	6 6	
559 2	569 3	Silty claystone and siltstone.....	10 1	
569 3	587 0	Medium-gray sandstone.....	17 9	
587 0	610 0	Hackled medium sandstone.....	23 0	
610 0	611 0	Ironstone concretion in sandstone.....	1 0	
611 0	611 2	Bony coal.....	2 2	
611 2	612 5½	Coal.....	1 3½	
612 5½	613 ½	Bony coal.....	7 7	
613 ½	614 3	Coal.....	1 2½	
614 3	614 7	Bony coal.....	4 4	
614 7	618 0	Dirty flint and semiflint.....	3 5	
618 0	628 7	Siltstone and interbedded sandstone.....	10 7	
628 7	670 0	Hackled medium to coarse sandstone.....	41 5	
670 0	676 6	Silty claystone, grading to shaly siltstone.....	6 6	
676 6	681 6	Dark-gray, silty shale.....	5 0	
681 6	681 8	Bone.....	2 2	
681 8	682 6	Shale.....	10 10	
682 6	684 0	Bony coal.....	1 6	
684 0	684 6	Shale, coal streaks.....	6 6	
684 6	687 6	Dark-gray siltstone.....	3 0	
687 6	731 0	Fine to medium quartzitic sandstone.....	43 6	
731 0	737 1	Irregularly bedded sandstone, coaly partings and hackles.....	6 1	
737 1	738 0	Dirty bone.....	11 11	Mount Savage, el. 1,813 ft.
738 0	738 5	Sandstone.....	5 5	
738 5	739 0	Dirty bone.....	7 7	
739 0	741 4	Interbedded carbonaceous, sandy shale and conglomeratic sandstone.....	2 4	
741 4	747 0	Medium-hackled, quartzitic sandstone.....	5 8	
747 0	750 0	Conglomerate and conglomeratic sandstone.....	3 0	

Log, hole 24-GC

Location: On a branch of Lostland Run, Garrett County, Md., 4.5 mi. west of Kitzmiller. Hole is 72 feet S. 20° W. of a bridge across a branch of Lostland Run. Drive from Bloomington to Deer Park railroad station, turn left 5.0 mi. (Refer to fig. 30.)

Surface elevation: 2,670 feet—by aneroid barometer.

Depth		Material	Thickness	Remarks
From—	To--			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
		Overburden.....	33	0
33	0	Silty claystone, last foot mottled red and green.....	8	0
41	0	Gray, silty claystone.....	6	8
47	8	Gray siltstone.....	2	1
49	9	Light-gray to white fine sandstone.....	12	1
61	10	Gray, micaceous medium sandstone.....	8	2
70	0	Medium-gray, silty claystone.....	2	0
72	0	Dark-gray to black claystone to shaly claystone.....	2	0
74	0	Medium-gray, slightly silty claystone.....	2	6
76	6	Carbonaceous clay, grading to black shaly claystone.....	6	3
82	9	Coal and bone (pyritic).....	4	
83	1	Medium-gray, silty claystone grading to claystone.....	5	11
89	0	Gray claystone.....	1	9
90	9	Dark-brown to black crumbly claystone.....	11	3
102	0	Gray to grayish brown claystone.....	8	0
110	0	Gray siltstone.....	9	0
119	0	White, fine, quartzitic sandstone.....	12	0
131	0	Gray claystone.....	2	0
133	0	Green, dense, massive claystone.....	11	2
144	2	Tan, fragmental, variegated, flinty claystone, scattered siderite pellets.....	9	8
153	10	Slightly silty black claystone.....	17	1
170	11	Brown to black bastard clay.....	4	1
175	0	Green, silty claystone.....	12	0
187	0	Dark-gray to black carbonaceous claystone.....	10	0
197	0	Black, shaly claystone.....	1	6
198	6	Gray, laminated, silty claystone.....	3	6
202	0	Black, clayey shale.....	1	3
203	3	Coal.....	3	3
203	6	Shale.....	7	7
204	1	Coal.....	2½	
204	3½	Bone.....	1½	
204	5	Shale.....	8	
205	1	Bone.....	4	
205	5	Black, carbonaceous claystone.....	10	7
216	0	Black, silty claystone, interlaminated sandstone.....	7	1
223	1	Coal.....	11	
224	0	Shale.....	1½	
224	1½	Coal (pyritic streaks).....	1	6½
225	8	Brown to black carbonaceous claystone.....	1	4
227	0	Dark-brown, calcareous, silty claystone.....	3	0
230	0	Black, silty claystone.....	1	0
231	0	Dark-gray calcareous siltstone.....	2	0
233	0	Light-gray bastard clay to silty claystone iron streaks.....	4	0
237	0	Light-tan, fragmental claystone, flint-clay inclusions.....	5	0
242	0	Tan and light-gray, silty claystone.....	9	0
251	0	Dark-gray, silty claystone.....	3	0
254	0	Fragmental and flinty claystone.....	3	0
257	0	Silty claystone.....	5	6
262	6	Black carbonaceous claystone.....	1	0
263	6	Fragmental claystone.....	2	6
266	0	Greenish gray, silty claystone to siltstone.....	13	7
279	7	Coal.....	1	11
281	6	Gray, shaly claystone.....	5	2
286	8	Black shale.....	6	6
287	2	Coal.....	2	1
289	3	Shale.....	1	1
289	4	Bone.....	1	1
289	5	Coal.....	8	8
290	1	Black, carbonaceous shale.....	9	9

Brush Creek, el. 2,587 ft..

Upper Freeport rider,
el. 2,467 ft.

Upper Freeport,
el. 2,447 ft., C-57805..

Upper Kittanning,
el. 2,391 ft., C-57806,
C-57807.

Log, hole 24-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
290	10	Calcareous claystone.....	9	
291	7	Dirty gray siltstone, siderite layer in middle at 294 ft.	5	5
297	0	Gray, silty claystone.....	9	0
306	0	Gray and white siltstone.....	5	0
311	0	Gray, silty claystone.....	4	0
315	0	Black shale.....		8
315	8	Bone, coaly seams (pyritic).....		7
318	3	Bluish gray, massive, silty claystone, interbedded siltstone.	33	6
349	9	White fine sandstone, floral remains; last 3 ft. siltstone, coal partings.	12	3
362	0	Dark brown to black bastard clay.....	4	6
366	6	Gray siltstone, sandstone layers.....	17	6
384	0	Interlaminated fine sandstone and siltstone.	9	6
393	6	Black, carbonaceous shale.....	6	
394	0	Coal.....	7	
394	7	Shale.....	9	
395	4	Coal.....	1	7
396	11	Shale.....	1	1
397	0	Coal.....	5	5
397	5	Black, carbonaceous bastard clay.....	6	6
397	11	Light-tan ironstone.....	1	6
399	5	Brownish black bastard clay.....	7	7
407	0	Black, carbonaceous shale.....	2	3
409	3	Dark-brown carbonaceous claystone.....	4	0
413	3	Black, carbonaceous claystone.....	5	3
418	6	Interbedded sandstone and siltstone with coaly partings.	3	8
422	2	White, fine to medium sandstone.....	43	10
466	0	Coarse sandstone and fine-gray sandstone laminations.	4	0
470	0	Conglomerate.....	4	0
474	0	Coarse sandstone, coaly partings, fine sandstone and conglomeratic zones.	30	9
504	9	Dark-gray to black, shaly claystone.....	19	3
524	0	Dark-gray siltstone with fragments of claystone in portions.	13	0
537	0	White medium sandstone.....	10	0
547	0	Black, silty, shaly claystone.....	5	6
552	6	Gray, silty claystone to siltstone.....	25	6
578	0	Fine sandstone.....	10	0
588	0	Gray siltstone.....	3	0
591	0	Fine-gray sandstone.....	2	2
593	2	Medium sandstone, numerous coal partings and seams, fragments of dark-gray siltstone.	7	10

Lower Kittanning, el. 2,276 ft., C-58902.

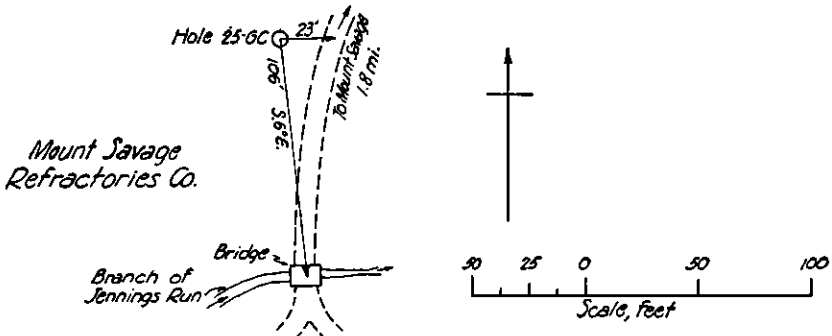
NOTE.—At the request of the landowner, this hole was not plugged with cement.

Log, hole 25-GC

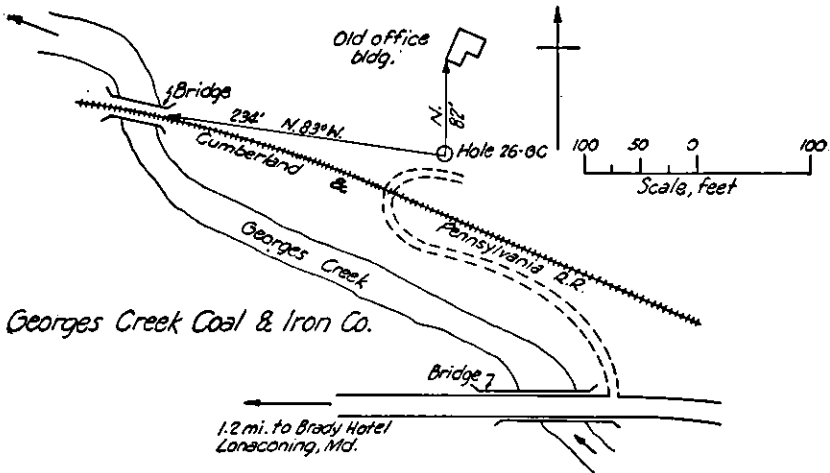
Location: On a north branch of Jennings Run in Dutch Hollow, Garrett County, Md., 1.6 mi. S. 82° W. of Mount Savage. Hole is 106 feet N. 6° W. of a bridge across a branch of Jennings Run. Drive from Frostburg to Mount Savage brick plant, then turn left 1.8 mi. up Dutch Hollow. (Refer to fig. 31.)

Surface elevation: 1,700 feet—by aneroid barometer.

<i>Ft.</i>	<i>in.</i>	<i>Ft.</i>	<i>in.</i>			
	0	41	0	Overburden.....	41	0
41	0	45	0	Silty clay, limestone pellets.....	4	0
45	0	53	0	Light-gray siltstone, limy streaks and stringers.	8	0
53	0	62	0	Shaly bastard clay.....	9	0
62	0	64	0	Argillaceous limestone.....	2	0
64	0	70	0	Shaly claystone, ironstone concretions in upper part.	6	0
70	0	71	0	Carbonaceous shale, coaly streaks at base.	1	0
71	0	92	0	Dark-gray, shaly siltstone, local sandy streaks and laminae.	21	0
92	0	102	0	Calcareous, silty clay and claystone, limy pellets.	10	0



Drive from Frostburg to Mount Savage brick plant, then turn left, 1.8 mi. up Dutch Hollow Hole 25-GC on a north branch of Jennings Run in Dutch Hollow, Allegany County, Md., 1.6 mi. S.82°W. of Mount Savage



Drive 1.2 mi. NE. on Rt. 36 from the Brady Hotel in Lonaconing Hole 26-GC on Georges Creek, Allegany County, Md., 1.2 mi. N.30°E. of Lonaconing

FIGURE 31.—Location of holes 25-GC and 26-GC.

Log, hole 25-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
102 0	114 0	Interbedded claystone, silty claystone and siltstone, calcareous stringers and pellets.	12 0	
114 0	116 0	Argillaceous limestone	2 0	
116 0	123 6	Clay and claystone, limestone inclusions	7 6	
123 6	126 0	Siltstone, 6 in. fine sandstone at top	2 6	
126 0	131 6	Argillaceous siltstone grading to claystone, calcareous lower 1½ ft.	5 6	
131 6	139 0	Silty, light-gray shale, sandy zones	7 6	
139 0	144 6	Dark-gray, silty claystone and argillaceous siltstone, plant remains	5 6	
144 6	147 6	Shaly siltstone, grading to silty shale	3 0	
147 6	149 0	Silty gray shale	1 6	
149 0	151 6	Shaly sandstone	2 6	
151 6	154 2	Dark-gray silty shale	2 8	
154 2	155 1	Coal (shale streaks)	1 11	Federal Hill, el. 1,546 ft.
155 1	170 0	Calcareous bastard clay and claystone, minor argillaceous limestone, limestone pellets.	14 11	
170 0	176 6	Claystone grading to siltstone, siderite streaks and pellets.	6 6	
176 6	193 0	Interbedded shaly siltstone and fine sandstone.	16 6	
193 0	205 0	Gray shales, plant fragments	12 0	
205 0	233 0	Dark-gray shales, marine fossils	28 0	
233 0	233 6	Coal	6 6	Harlem, el. 1,467 ft.
233 6	255 0	Argillaceous limestone grading to calcareous claystone, small limestone pellets.	21 6	
255 0	260 0	Silty, bastard, greenish clay, calcareous in upper half.	5 0	
260 0	279 0	Fine sandstone, silty in upper 3 ft., calcareous in lower 3 ft.	19 0	
279 0	285 0	Shaly siltstone, calcareous streaks, interbedded ironstone and calcareous sandstone in lower 2 ft.	6 0	
285 0	295 0	Shaly siltstone	10 0	
295 0	306 0	Silty gray shale, plant remains, coaly partings.	11 0	
306 0	310 0	Fine sandstone, shaly partings	4 0	
310 0	313 8	Gray to carbonaceous shale	3 8	
313 8	315 6	Bone coal	1 10	C-58236.
315 6	315 10	Shale	4 4	
315 10	316 0	Bone coal	2 2	Upper Bakerstown, el. 1,386 ft.
316 0	316 4	Shale	4 4	
316 4	316 10	Bone coal	6 6	
316 10	317 1	Coaly shale	3 3	
317 1	318 0	Argillaceous limestone	11 11	
318 0	322 6	Silty claystone and bastard clay, pyritic, limestone nodules.	4 6	
322 6	326 0	Silty claystone and siltstone	3 6	
326 0	329 0	Silty gray shale	3 0	
329 0	336 6	Calcareous claystone and argillaceous limestone, limestone pellets throughout.	7 6	
336 6	345 6	Silty clay and claystone, minor argillaceous siltstone.	9 0	
345 6	349 6	Silty, locally calcareous, bastard clay	4 0	
349 6	349 7	Coal and bone	1 1	
349 7	353 0	Dark-gray, shaly siltstone, plant fragments.	3 5	
353 0	367 0	Dark-gray to black shale	14 0	
367 0	367 9	Coaly shale and bone	9 9	Lower Bakerstown, el. 1,333 ft., C-58237.
367 9	369 0	Coal	1 3	
369 0	371 6	Silty, slightly calcareous clay and claystone.	2 6	
371 6	377 0	Argillaceous limestone and limy claystone.	5 6	
377 0	394 0	Gray claystone and silty claystone, limy iron stringers, 1 ft. fragmental claystone at top.	17 0	
394 0	395 6	Silty bastard clay	1 6	
395 6	400 0	Light-gray siltstone, minor silty claystone.	4 6	
400 0	404 4	Fine sandstone	4 4	
404 4	407 6	Shaly claystone	3 2	
407 6	418 0	Interbedded siltstone and fine sandstone	10 6	

Log, hole 25-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
418 0	427 0	Silty to sandy dark shale, irregularly interbedded, fine sandstone, latter chiefly in upper part.	9 0	
427 0	438 0	Dark-gray to black shale, fossil fragments at base.	11 0	
438 0	443 0	Dark-gray siltstone.	5 0	
443 0	477 3	Interbedded fine, white sandstone and dark-gray, silty shale.	34 3	
477 3	481 9	Coarse conglomerate split by seam of dark conglomerate sandstone and siltstone.	4 6	
481 9	487 6	Gray shale.	5 9	
487 6	490 0	Calcareous clay and shale, marine fossils.	2 6	
490 0	493 0	Black shale, marine fossils.	3 0	
493 0	493 5	Impure coal.	5	} Brush Creek, el. 1,207 ft.
493 5	494 3	Coal.	10	
494 3	500 9	Silty claystone, limestone inclusions.	6 6	
500 9	515 0	Siltstone and argillaceous siltstone.	14 3	
515 0	535 6	Silty claystone, shaly at base.	20 6	
535 6	536 0	Claystone and green, silty clay.	6	
536 0	536 8	Limestone.	8	
536 8	540 0	Calcareous claystone and argillaceous limestone.	8 0	
540 0	547 0	Siltstone and silty claystone, limy at base.	7 0	
547 0	555 0	Calcareous claystone and argillaceous limestone.	8 0	
555 0	562 6	Siltstone to shaly siltstone.	7 6	
562 6	573 0	Medium sandstone.	10 6	
573 0	577 0	Silty to sandy gray shale.	4 0	
577 0	591 0	Micaceous medium sandstone.	14 0	
591 0	592 8	Gray, shaly, sandy siltstone.	1 8	
592 8	593 6	Black, pyritic shale.	10	
593 6	593 7	Coal.	1	
593 7	593 8	Shale.	1	
593 8	593 9	Coal.	1	} Upper Freeport, el. 1,107 ft., C-58238.
593 9	594 7	Shale.	10	
594 7	595 6	Coal.	11	
595 6	599 0	Silty, dark clay and claystone, very fine calcareous specks in lower half.	3 6	
599 0	601 6	Silty claystone, limestone inclusions.	2 6	
601 6	619 6	Gray siltstone, calcareous at top, 3 ft., fine sandstone at base.	18 0	
619 6	645 3	Gray siltstone and sandy siltstone.	25 9	
645 3	648 6	Dark-gray to black claystone.	3 3	
648 6	650 10	Plastic and semiplastic clay, local ironstone.	2 4	
650 10	657 0	Silty shale and siltstone, minor sandy streaks.	6 2	
657 0	660 11	Interbedded shale and sandstone.	3 11	
660 11	661 0	Coal.	1	} Lower Freeport, el. 1,039 ft.
661 0	664 0	Silty carbonaceous to gray claystone.	3 0	
664 0	675 0	Interbedded, silty shale and fine sandstone.	11 0	
675 0	678 0	Dark-gray to black, pyritic shale, coaly streaks at base.	3 0	
678 0	681 0	Gray, silty clay, grading to siltstone.	3 0	
681 0	687 0	Gray, silty shale and shale, plant remains.	6 0	
687 0	693 2	Limestone.	6 2	
693 2	694 3	Gray claystone.	1 1	
694 3	697 0	Irregularly bedded fine sandstone and argillaceous siltstone.	2 9	
697 0	705 6	Interbedded claystone, silty and sandy claystone, some flint and siliceous flint.	8 6	
705 6	711 0	Interbedded shaly siltstone and fine sandstone.	5 6	
711 0	736 6	Medium sandstone, shale inclusions in lower foot.	25 6	
736 6	739 6	Gray to black shale, coaly at base.	3 0	
739 6	740 4	Fine sandstone.	10	
740 4	745 6	Upper part carbonaceous claystone, lower 1 ft. fragmental claystone, locally flint clay.	5 2	
745 6	753 0	Siltstone grading to silty claystone and silty, semihard clay.	7 6	
753 0	755 6	Semihard clay.	2 6	
755 6	756 2	Dirty flint clay, 3 in. ironstone at base.	8	

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
766 2	759 6	Silty claystone, grading to siltstone.....	3 4	
759 6	771 2	Interbedded fine sandstone and silty shale.	10 8	
771 2	805 3	Medium- to coarse-hackled sandstone....	34 1	
805 3	805 6	Bony shale.....	3	} Lower Kittanning, el. 895 ft., C-58488.
805 6	807 2	Coal.....	1 8	
807 2	807 9	Black shale.....	7	
807 9	810 0	Silty claystone, brownish fine siderite pellets and some sand grains.	2 3	
810 0	810 6	Silty, semifint clay, fragmental, scattered sand grains.	6	
810 6	811 8	Semifint clay.....	1 2	
811 8	811 10	Ironstone.....	2	
811 10	812 7	Carbonaceous iron claystone.....	9	
812 7	814 7	Silty clay (root impressions).....	2 0	
814 7	822 5	Siltstone.....	7 10	
822 5	833 0	Fine to medium sandstone, streaks and partings of silty shale.	10 7	
833 0	868 0	Medium quartzitic hackled sandstone....	25 0	
858 0	868 0	Silty, gray shale, 2 ft. of siltstone at top..	10 0	
868 0	871 3	Dark-gray to black silty shale, ironstone concretions.	3 3	
871 3	871 10	Coaly shale.....	7	
871 10	872 9	Dark-gray, silty claystone, coaly streaks..	11	
872 9	873 0	Bony coal.....	3	
873 0	875 2	Dark-gray to black silty shale.....	2 2	
875 2	875 9	Coal and shale.....	7	
875 9	878 6	Shale.....	2 9	
878 6	885 0	Fine sandstone, shaly zones and partings..	6 6	

Log, hole 26-GC

Location: On Georges Creek, Allegany County, Md., 1.2 mi. N. 30° E. of Lonaconing. Hole is 234 feet. S. 83° E. of railroad bridge across Georges Creek. Drive 1.2 mi. NE. on Rt. 36 from Brady Hotel in Lonaconing.

(Refer to fig. 31.)

Surface elevation: 1,586 feet—from bench mark.

<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
0 0	18 0	Overburden.....	18 0	
18 0	18 5	Ironstone.....	0 5	
18 5	24 4	Gray, iron-stained siltstone, splits in horizontal layers, 4-in. band of ironstone at 21 ft. 5 in.	5 11	
24 4	25 4	Fine sandstone, thin, gray streaks throughout.	1 0	
25 4	26 9	Gray iron-stained siltstone, splitting fairly easily, interbedded with sandstone in upper portion.	1 5	
26 9	30 1	Dark-gray to black, shaly siltstone, iron-stained.	3 4	
30 1	38 7	Dark-gray to black shale, more or less fissility.	8 6	
38 7	40 7	Dark, brownish black to black claystone; breaks into angular pieces rather easily, thin streaks of hard black shale.	2 0	
40 7	41 3	Ironstone.....	8	
41 3	55 3	Dark-gray to black bastard clay, interbedded black-shale horizons.	14 0	
55 3	56 1	Limestone, a thin streak of gray claystone.	10	
56 1	56 8	Carbonaceous claystone.....	7	
56 8	57 1	Coal and bone.....	5	} Lonaconing, el. 1,530 ft.
57 1	57 9	Carbonaceous shaly claystone to shale..	8	
57 9	59 11	Limestone, somewhat carbonaceous at top.	2 2	
59 11	61 1	Calcareous claystone.....	1 2	
61 1	64 0	Light-gray siltstone, limy stringers.....	2 11	
64 0	69 4	Light-gray, shaly siltstone, iron stains....	5 4	
69 4	71 5	Dark-gray to black shaly siltstone, sandy, iron-stained streaks.	2 1	
71 5	72 9	Carbonaceous siltstone, shaly partings and nests of pyrite.	1 4	
72 9	78 9	Limestone, quite hard.....	6 0	

Log, hole 26-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Ft. in.</i>	
78 9	82 7	Slightly silty, gray claystone, numerous inclusions of limestone.	3 10	
82 7	86 5	Dark-gray, easily broken claystone, black horizons throughout; at 83 ft. 6 in., a very silty, light-tan, impure, fireclay streak.	3 10	
86 5	96 5	Very closely laminated siltstone, some thin sandy horizons, laminations contorted at 87 ft.	10 0	
96 5	97 0	Calcareous siltstone.	7	
97 0	110 0	Dark brownish black to black shaly siltstone, some iron stains and a few nests of pyrite.	13 0	
110 0	111 5	Fine, dense limestone.	1 5	
111 5	117 7	Gray, friable claystone, silty and shaly toward base.	6 2	
117 7	118 0	Carbonaceous shale, coaly streaks, two narrow calcareous streaks.	5	
118 0	118 6	Coal and bone.	6	Lower Hoffman, el. 1,468 ft.
118 6	120 1	Black, silty claystone, impure, silty fireclay at top, coaly surfaces shown on breaking upper part.	1 7	
120 1	122 0	Limestone, grading to calcareous claystone.	1 11	
122 0	127 8	Gray claystone, somewhat calcareous at top, abundant fragments of siderite at 123 ft., ironstone layers common.	5 8	
127 8	129 6	Calcareous claystone.	1 10	
129 6	136 0	Gray, silty claystone to shaly siltstone.	6 6	
136 0	137 0	Fine sandstone.	1 0	
137 0	138 8	Coarse-gray siltstone.	1 8	
138 8	159 2	White fine to medium sandstone.	20 6	
159 2	162 0	Light- to dark-gray, slightly silty claystone.	2 10	
162 0	169 3	Dark-gray argillaceous limestone.	7 3	
169 3	170 3	Dark-gray silty claystone, black streaks.	1 0	
170 3	179 5	Light greenish gray, silty claystone to siltstone, varying throughout in silt content, many branching iron stains.	9 2	
179 5	180 11	Greenish gray, calcareous siltstone.	1 6	
180 11	181 10	Fragmental fireclay, dark olive drab and black-mottled, silty claystone, angular fragments throughout, very silty and impure.	11	
181 10	185 0	Calcareous siltstone.	3 2	
185 0	194 0	Closely laminated siltstone.	9 0	
194 0	214 1	Medium- to dark-gray siltstone, 4 in. fine sand streak at 197 ft., 6 in.	20 1	
214 1	227 3	Closely laminated siltstone, laminations contorted.	13 2	
227 3	228 7	Dark-gray siltstone.	1 4	
228 7	229 1	Coal.	6	
229 1	229 4	Bony coal.	3	
229 4	229 8	Shaly bone.	4	
229 8	230 4	Dark-gray, carbonaceous siltstone, coaly fracture surfaces.	8	Wellersburg, el. 1,357 ft.
230 4	237 10	Limestone, top 6 in. argillaceous, remainder tan-white limestone, abundant small fragments throughout.	7 6	
237 10	243 0	Gray silty claystone, few small siderite inclusions, siltier with depth, black at bottom.	5 2	
243 0	245 0	Light-color limestone.	2 0	
245 0	248 0	Gray, slightly silty claystone.	3 0	
248 0	252 3	Impure limestone.	4 3	
252 3	254 6	Light-gray, slightly silty claystone, few calcareous streaks.	2 3	
254 6	260 0	Light-gray, laminated siltstone, sporadic limy portions increasing in frequency with depth.	5 6	
260 0	261 6	Calcareous siltstone.	1 6	
261 6	264 7	Light-color siltstone.	3 1	
264 7	268 0	Dark brownish gray, laminated siltstone, micaceous on fracture surfaces, base darker and shaly.	3 5	
268 0	268 5	Calcareous siltstone.	5	

Log, hole 26-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
268	5	Dark-gray to black shaly siltstone.....	8	0
276	5	Dark-brown to carbonaceous shale.....	8	9
277	2	Shaly bone.....	2	2
277	4	Coal.....	2	1
279	5	Dark-gray, silty claystone, quite porous texture, abundant nests of pyrite.....	2	0
281	5	Dark brownish gray claystone, calcareous in upper 1½ ft.	5	7
287	0	Calcareous bastard clay.....	1	4
288	4	Dark-gray siltstone, top foot calcareous....	6	8
295	0	Light-gray siltstone, limy in few places, coarse at base.	24	3
319	3	Dark brownish black to black shaly siltstone, in places approximates silty claystone.	4	4
323	7	Brownish gray to carbonaceous shaly siltstone, fragments of plants throughout, last 1 ft. laminated owing to sandy stringers.	9	1
332	8	Coal.....	11	
333	7	Dark-brown, carbonaceous bastard clay..	8	2
341	9	Dark-gray, coarse siltstone.....	6	6
348	3	Dark-brown to black bastard clay.....	4	7
352	10	Light-gray silty claystone and siltstone, sporadic 2 to 4 in. calcareous streaks.	11	11
364	9	Dark-gray, silty claystone, black laminations.	13	0
377	9	Fine sandstone, contorted laminations....	3	1
380	10	Calcareous coarse siltstone.....	2	3
383	1	Dark-gray to black, fossiliferous limestone.	7	9
390	10	Dark-gray siltstone.....	2	2
393	0	Dark-gray to black claystone, slickensided, silty in lower part.	7	0
400	0	Light-gray, laminated siltstone, transverse slickensides with limy films.	3	0
403	0	Dark grayish brown, closely laminated, silty claystone to siltstone.	10	7
413	7	Carbonaceous shale.....	7	
414	2	Coal.....	1	5
415	7	Dark brownish gray argillaceous limestone.	6	3
421	10	Light-gray limestone, sporadic white limy inclusions.	7	4
429	2	Cream to tan limestone, abundant inclusions.	6	10
436	0	Light-gray and white laminated coarse siltstone.	13	1
449	1	Dark-gray siltstone.....	1	4
450	5	Light greenish gray fragmental limestone.	5	0
455	6	Pink to red argillaceous limestone, scattered fragments.	6	8
462	1	Light-gray siltstone.....	20	1
482	2	Dark-gray, silty claystone.....	3	6
485	8	Light-gray siltstone, calcareous patches.	4	3
489	11	Dark-gray claystone, plant fragments.	2	6
492	5	White, laminated siltstone.....	6	0
498	5	Coal.....	2	2
498	7	Shale.....	6	6
499	1	Bone.....	1	1
499	2	Coal.....	2	10
502	0	Shale.....	4½	
502	4½	Coal.....	9	
503	1½	Shale.....	1½	
503	2	Bone.....	1	
503	3	Coal.....	1	
503	4	Calcareous siltstone.....	2	4
505	8	Gray siltstone, limy stringers	7	9
513	5	Gray, silty claystone.....	9	2
522	7	Dark- to light-gray siltstone.....	4	0
526	7	Light grayish tan, argillaceous limestone.	2	4
528	11	Black, silty claystone.....	6	4

Barton, el. 1,309 ft., C-58899.

Federal Hill, el. 1,253 ft., C-58900.

Harlem, el. 1,172 ft., C-59084.

Upper Bakerstown, el. 1,088 ft., C-59085.

Log, hole 26-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft.</i>	<i>in.</i>		<i>Ft.</i>	<i>in.</i>
535	3	Coal	8½	Lower Bakerstown, el. 1,061 ft.
535	11½	Bone	½	
536	0	Shale	1	
536	1	Coal	5	
536	6	Bony coal	5	
536	11	Coal	8	
537	7	Bone and coal	5	
538	0	Coal	5	
538	5	Carbonaceous shale, fissile	6	
544	8	Coal	3	
545	2	Black claystone, slickensided, light-gray limestone, abundant fragments	6	
547	4	Limestone, white, calcareous inclusions	2	
561	5	Claystone	14	
565	9	Bastard clay	4	
566	6	Gray, silty claystone	4	
570	9	Bastard clay	3	
571	10	Light greenish gray claystone, first few feet very crumbly, slickensided	1	
571	10	Light greenish gray siltstone	5	
577	8	Grayish white siltstone	10	
585	1	Gray- and white-laminated siltstone	7	
589	4	White medium sandstone	5	
601	9	Greenish gray to white, faintly laminated micaceous siltstone	6	
607	9	Gray limestone	12	
619	11	Gray, calcareous siltstone	6	
619	11	Dark-gray siltstone	6	
626	5	Fossiliferous limestone	4	
632	10	Black argillaceous to fossiliferous limestone	2	
637	0	Carbonaceous shale, plant remains	15	
652	10	Coal	10	
655	4	Dark-gray, calcareous clay and claystone, limestone pellets	2	
656	10	Interbedded siltstone and shaly siltstone, minor shaly claystone	6	
657	6	Gray bastard clay	8	
663	6	Limy claystone, grading to argillaceous limestone	6	
663	6	Interbedded shaly siltstone and fine sandstone	0	
677	6	Fragmental silty claystone, fragments and pellets of limestone in upper 2 ft.	14	
679	0	Silty claystone and siltstone, coaly streaks at base	1	
679	0	Silty claystone, grading to siltstone, fragmental in middle part	1	
680	0	Limestone	0	
680	0	Silty clay and claystone	2	
700	8	Limestone	5	
700	8	Ferruginous, semihard, locally fragmental clay	2	
711	4	Siltstone, fine-sandstone beds	1	
713	4	Sandstone, siltstone zones	22	
719	0	Carbonaceous claystone	8	
721	6	Coal	5	
723	0	Coal	1	
723	0	Shale	1	
745	0	Silty, calcareous claystone, limy pellets, grading to argillaceous limestone	0	
745	5	Silty gray claystone, locally calcareous	1	
753	5	Dark-gray, shaly clay	½	
754	5	Gray siltstone	1	
754	5	Silty gray shale	1	
755	5½	Irregularly interbedded, silty claystone, siltstone, and fine sandstone	1	
755	6	Silty bastard clay, grading to siltstone	2½	
756	8½	Ironstone concretions in argillaceous siltstone	4	
761	0	Fragmental, siliceous hard clay and claystone	3½	
761	0	Fragmental, silty, semihard and semiplastic clay, ferruginous stringers	12	
773	9	Interbedded silty, semihard and semiplastic clay, ferruginous stringers	2	
776	5	Interbedded siltstone and sandstone, latter increasing downward	8	
786	0		9	
786	0		7	
789	0		3	
789	0		0	
793	0		4	
793	0		0	
800	6		7	
800	6		6	
802	6		2	
802	6		0	
803	6		1	
803	6		0	
803	6		3	
803	6		2	
806	8		18	
806	8		4	

Brush Creek, el. 929 ft.

Upper Freeport,
el. 832 ft., C-69767.

100 GEORGES CREEK AND UPPER POTOMAC COAL BEDS, MD.

Log, hole 26-GC—Continued

Depth		Material	Thickness	Remarks
From—	To—			
<i>Ft. in.</i> 825 0	<i>Ft. in.</i> 890 6	Medium sandstone (6 in. shale 852 ft. to 852 ft. 6 in.), hackled near base.	<i>Ft. in.</i> 65 6	
890 6	890 7	Coal.....	1	
890 7	897 6	Fine to medium sandstone, minor siltstone at top.	6 11	
897 6	905 7	Carbonaceous siltstone, plant remains.....	8 1	
905 7	905 9½	Bone.....	2½	} Middle Kittanning, el. 680 ft.
905 9½	906 3½	Coal.....	6	
906 3½	906 7	Bone.....	3½	
906 7	906 8	Coal.....	1	
906 8	907 10	Bone and shale, coal streaks.....	1 2	
907 10	912 4	Silty dark clay and siltstone, coaly streaks.	4 6	
912 4	927 3	Interbedded and interlaminated dark siltstone and light fine to medium sandstone.	14 11	
927 3	935 3	Dark-gray to black shale with ¼-in. bony coal at base.	8 0	
935 3	944 10	Interbedded medium sandstone and dark siltstone.	9 7	
944 10	946 2	Dark shale.....	1 4	
946 2	947 6	Fragmental silty claystone and semihard clay.	1 4	
947 6	960 10	Silty semihard and semiplastic clay and clayey siltstone.	3 4	
960 10	962 4	Fragmental flint and semiflint with zones and inclusions of silty claystone and siltstone.	1 6	
962 4	963 4	Sandy, silty, gray claystone.....	1 0	
963 4	955 5	Carbonaceous, silty claystone and bastard clay, a few coaly streaks at top.	2 1	
955 5	1,011 0	Medium and fine quartzitic sandstone, hackled, coarse streaks in basal 4 ft.	55 7	
1,011 0	1,011 1	Coal streak.....	1	
1,011 1	1,011 8	Conglomerate.....	7	
1,011 8	1,018 6	Interbedded shaly siltstone and sandstone.	6 10	
1,018 6	1,022 0	Fine, irregularly bedded sandstone.....	3 6	
1,022 0	1,023 1	Coal and bone.....	1 1	} Mount Savage, el. 564 ft.
1,023 1	1,027 0	Silty gray claystone and semihard bastard clay, grading to siltstone.	3 11	
1,027 0	1,038 0	Interbedded and interlaminated siltstone and fine sandstone.	11 0	
1,038 0	1,039 7	Dark-gray to black shale.....	1 7	
1,039 7	1,040 10	Bone, coal streaks.....	1 3	
1,040 10	1,050 0	Dark-gray bastard clay and claystone, grading to siltstone.	9 2	

CHEMICAL ANALYSES OF COAL CORES

TABLE 2.—Analyses of coal cores, Georges Creek and north part of Upper Potomac Basins, Allegany and Garrett Counties, Md.

Drill hole	Lab. No.	Condi- tions ¹	Proximate, percent				Ultimate, percent					Calo- rific value, B. t. u.	Fusibility of ash			Real speci- fic grav- ity	Agglu- tating index ²	Core re- ceived, inches	Core re- jected, inches	Core ana- lyzed, inches	
			Mois- ture	Vola- tile matter	Fixed carbon	Ash	Sul- fur	Hy- dro- gen	Car- bon	Nitro- gen	Oxy- gen		Initial defor- mation temper- ature, ° F.	Softening temper- ature, ° F.	Fluid temper- ature, ° F.						
UPPER HOFFMAN COAL BED																					
10-GC (56 ft. 9 in. to 57 ft. 9 in.)	C-45050	1	1.3	20.3	58.8	19.6	1.8	4.2	69.1	1.5	3.8	12,190	2,660	2,730	2,840	1.448	8.6	12	-----	12	
		2	-----	20.5	59.7	19.8	1.8	4.1	70.0	1.5	2.8	12,340	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	25.6	74.4	-----	2.3	5.2	87.2	1.9	3.4	15,390	-----	-----	-----	-----	-----	-----	-----	-----	-----
10-GC (66 ft. to 67 ft. 2 in.)	C-45051	1	1.4	20.6	58.7	19.3	3.4	4.1	68.7	1.4	3.1	12,090	2,010	2,150	2,380	1.475	9.4	14	-----	14	
		2	-----	20.9	59.5	19.6	3.5	4.0	69.6	1.4	1.9	12,260	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	26.0	74.0	-----	4.3	5.0	86.6	1.8	2.3	15,250	-----	-----	-----	-----	-----	-----	-----	-----	-----
CLARYSVILLE COAL BED																					
10-GC (127 ft. 6 in. to 128 ft. 6 in.)	C-45052	1	1.1	18.4	58.5	22.0	5.3	3.9	65.2	1.3	2.3	11,690	2,110	2,280	2,430	1.523	-----	12	4¼	7¾	
		2	-----	18.6	59.2	22.2	5.4	3.8	65.9	1.3	1.4	11,820	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	23.9	76.1	-----	6.9	4.9	84.7	1.7	1.8	15,190	-----	-----	-----	-----	-----	-----	-----	-----	-----
11-GC (64 ft. 1 in. to 55 ft. ½ in.)	C-45451	1	.6	17.7	50.2	31.5	3.8	3.5	58.0	1.2	2.0	-----	2,200	2,330	2,530	1.595	7.9	12½	½	12	
		2	-----	17.8	50.6	31.6	3.8	3.5	58.3	1.2	1.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	26.1	73.9	-----	5.5	5.1	85.3	1.7	2.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
WELLSBURG COAL BED																					
10-GC (221 ft. 1 in. to 222 ft. 9 in.)	C-45053	1	0.9	17.5	57.1	24.5	3.5	3.8	64.5	1.2	2.5	11,410	2,260	2,450	2,680	1.521	7.5	22½	5	17½	
		2	-----	17.7	57.6	24.7	3.5	3.7	65.1	1.2	1.8	11,520	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	23.5	76.5	-----	4.6	5.0	86.5	1.6	2.3	15,300	-----	-----	-----	-----	-----	-----	-----	-----	-----
20-GC (41 ft. 8 in. to 43 ft. 8 in.)	C-54109	1	.7	17.7	69.5	12.1	4.3	4.2	76.6	1.4	1.4	13,500	2,020	2,230	2,510	1.448	10.9	24	8	16	
		2	-----	17.8	70.0	12.2	4.3	4.1	77.1	1.4	.9	13,590	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	20.3	79.7	-----	4.9	4.7	87.8	1.6	1.0	15,480	-----	-----	-----	-----	-----	-----	-----	-----	-----
21-GC (47 ft. 10 in. to 48 ft. 11 in.)	C-54682	1	1.1	19.5	64.8	14.6	5.4	4.2	72.8	1.3	1.7	13,040	2,020	2,060	2,330	1.463	10.8	12	1½	10½	
		2	-----	19.7	65.5	14.8	5.5	4.1	73.6	1.3	.7	13,180	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	23.1	76.9	-----	6.4	4.8	86.3	1.6	1.0	15,460	-----	-----	-----	-----	-----	-----	-----	-----	-----

See footnotes at end of table.

TABLE 2.—Analyses of coal cores, Georges Creek and north part of Upper Potomac Basins, Allegany and Garrett Counties, Md.—Contd.

Drill hole	Lab. No.	Condi- tions ¹	Proximate, percent				Ultimate, percent					Ca.o- rific value, B. t. u.	Fusibility of ash			Real spec- ific grav- ity	Agglu- tinat- ing index ²	Core re- ceived, inches	Core re- jected, inches	Core ana- lyzed, inches
			Mois- ture	Vola- tile matter	Fixed carbon	Ash	Sul- fur	Hy- dro- gen	Car- bon	Nitro- gen	Oxy- gen		Initia defor- mation temper- ature, ° F.	Softening temper- ature, ° F.	Fluid temper- ature, ° F.					
BARTON COAL BED																				
2-GC. (29 ft. 10 in. to 32 ft. 2 in.)	C-35240	1 2 3	2.6	15.9 16.3 19.8	64.1 65.9 80.2	17.4 17.8	2.8 2.9 3.5	4.1 3.9 4.8	70.7 72.6 88.4	1.5 1.5 1.9	3.5 1.3 1.4	12,400 12,730 15,500	2,240	2,400	2,520	1.460	10.2	28	1¼	26¼
6-GC. (179 ft. 10 in. to 181 ft.)	C-39742	1 2 3	.8	18.6 18.8 21.7	67.4 67.9 78.3	13.2 13.3												14	1	13
9-GC. (187 ft. 6 in. to 190 ft. 4 in.)	C-43267	1 2 3	1.7	16.6 16.9 20.3	64.8 65.9 79.7	16.9 17.2	1.7 1.7 2.1	4.1 4.0 4.8	71.9 73.2 88.4	1.4 1.5 1.8	4.0 2.4 2.9	12,630 12,850 15,520	2,580	2,700	2,840	1.443	7.6	34	1½	32½
18-GC. (121 ft. 7 in. to 123 ft. 7 in.)	C-52000	1 2 3	1.4	18.0 18.2 21.0	67.6 68.6 79.0	13.0 13.2	3.3 3.3 3.8	4.3 4.2 4.8	75.2 76.3 87.8	1.3 1.3 1.5	2.9 1.7 2.1	13,310 13,490 15,530	2,100	2,340	2,560	1.418	11.2	19½	1½	18
20-GC. (88 ft. 9 in. to 92 ft. 8 in.)	C-54571	1 2 3	.6	17.2 17.3 19.9	69.2 69.6 80.1	13.0 13.1	3.2 3.2 3.7	4.2 4.1 4.7	75.7 76.1 87.5	1.5 1.5 1.7	2.4 2.0 2.4	13,360 13,430 15,450	2,150	2,410	2,520	1.438	10.4	46¾	26¾	20
21-GC. (115 ft. 10 in. to 117 ft. 6 in.)	C-55005	1 2 3	1.8	17.8 18.1 20.6	68.5 69.8 79.4	11.9 12.1	2.1 2.1 2.4	4.4 4.3 4.8	76.5 77.8 88.6	1.5 1.5 1.7	3.6 2.2 2.5	13,430 13,670 15,550	2,140	2,400	2,590	1.420	9.8	20		20
26-GC. (277 ft. 4 in. to 279 ft. 5 in.)	C-58899	1 2 3	1.1	17.0 17.2 19.6	69.9 70.6 80.4	12.0 12.2	2.2 2.2 2.6	4.4 4.3 4.9	76.7 77.5 88.2	1.5 1.5 1.7	3.2 2.3 2.6	13,480 13,630 15,510	2,380	2,460	2,510	1.393	11.6	25¼		25¼

FEDERAL HILL COAL BED

2-GC (86 ft. to 87 ft. 5½ in.)	C-35625	1	0.7	17.9	64.8	16.6	6.0	3.9	70.9	1.3	1.3	12,580	1,930	2,000	2,130	1.493	10.6	15½	2½	13	
		2		18.1	65.2	16.7	6.1	3.8	71.4	1.3	.7	12,660									
		3		21.7	78.3		7.3	4.6	85.7	1.5	.9	15,210									
11-GC (240 ft. 10 in. to 242 ft. 7 in.)	C-45936	1	1.3	17.9	61.0	19.8	4.8	4.0	67.9	1.3	2.2	12,050	2,050	2,140	2,420	1.503	7.5	19¼	3¼	16	
		2		18.1	61.8	20.1	4.9	3.9	68.8	1.3	1.0	12,210									
		3		22.7	77.3		6.1	4.8	86.1	1.6	1.4	15,290									
15-GC (126 ft. to 127 ft. 6 in.)	C-49261	1	2.8	17.6	63.4	16.2	4.1	4.2	70.5	1.4	3.6	12,600	2,050	2,220	2,460	1.448	9.5	18	3	15	
		2		18.1	65.3	16.6	4.2	4.0	72.6	1.4	1.2	12,960									
		3		21.8	78.2		5.1	4.8	87.1	1.7	1.3	15,550									
20-GC (162 ft. to 163 ft. 8 in.)	C-54568	1	.5	21.0	66.3	12.2	2.9	4.3	76.9	1.5	2.2	13,640	2,140	2,320	2,520	1.426	10.5	20¼	½	20¼	
		2		21.1	66.6	12.3	2.9	4.3	77.3	1.5	1.7	13,710									
		3			75.9		3.3	4.9	88.1	1.7	2.0	15,630									
21-GC (174 ft. to 174 ft. 11 in.)	C-56004	1	.5	20.1	68.5	10.9	3.9	4.3	77.6	1.4	1.9	13,780	2,050	2,100	2,420	1.421		11	1	10	
		2		20.2	68.8	11.0	4.0	4.3	78.0	1.4	1.3	13,860									
		3		22.7	77.3		4.4	4.8	87.7	1.6	1.5	15,560									
26-GC (332 ft. 8 in. to 333 ft. 7 in.)	C-58900	1	.7	19.7	67.5	12.1	3.4	4.4	77.8	1.4	.9	13,640	2,010	2,050	2,090	1.278	10.4	12	¾	11¼	
		2		19.9	67.9	12.2	3.4	4.4	78.4	1.4	.2	13,740									
		3		22.6	77.4		3.9	5.0	89.2	1.6	.3	15,640									

HARLEM COAL BED

2-GC (165 ft. 9 in. to 167 ft. 6 in.)	C-35626	1	2.3	16.6	63.1	18.0	2.7	4.0	70.1	1.1	4.1	12,330	2,120	2,260	2,410	1.455	9.6	17		17	
		2		17.0	64.6	13.4	2.7	3.9	71.7	1.2	2.1	12,620									
		3		20.9	79.1		3.3	4.7	87.9	1.4	2.7	15,460									
6-GC (320 ft. 7 in. to 322 ft. 2 in.)	C-39743	1	1.1	17.2	67.3	14.4	1.1	4.2	74.7	1.4	3.2	13,220	2,480	2,580	2,690	1.404	9.3	19		19	
		2		17.4	68.1	14.5	1.1	4.1	76.5	1.4	2.4	13,360									
		3		20.4	79.6		1.3	4.8	89.5	1.7	2.7	15,630									
8-GC (74 ft. 8 in. to 76 ft. 1 in.)	C-42798	1	.7	17.4	67.3	14.6	1.7	4.1	75.6	1.3	2.7	13,100	2,280	2,340	2,540	1.425	9.9	16½		16½	
		2		17.5	67.8	14.7	1.8	4.0	76.1	1.3	2.1	13,190									
		3		20.6	79.4		2.1	4.6	89.3	1.5	2.5	15,460									
9-GC (315 ft. 2 in. to 316 ft. 7 in.)	C-43705	1	.9	21.0	61.9	16.2	2.4	4.2	72.8	1.3	3.1	12,840	2,100	2,180	2,620	1.443	8.0	18	4½	18½	
		2		21.2	62.4	16.4	2.5	4.1	73.5	1.3	2.2	12,960									
		3		25.3	74.7		2.9	5.0	87.8	1.5	2.8	15,500									
11-GC (322 ft. to 323 ft. 1 in.)	C-45937	1	1.1	20.7	61.0	17.2	1.7	4.1	71.7	1.3	4.0	12,490	2,260	2,290	2,540	1.444	8.1	11½	1	10½	
		2		20.9	61.7	17.4	1.8	4.0	72.5	1.3	3.0	12,630									
		3		25.3	74.7		2.1	4.8	87.7	1.5	3.9	15,280									

See footnotes at end of table.

8-GC (75 ft. 6 in. to 78 ft. 1 in.)	C-37008	1	.9	16.2	57.5	25.4	3.6	3.5	63.8	1.0	2.7	11,240	2,120	2,210	2,400	1,550	6.2	31½	4½	27	
		2		16.3	58.1	25.6	3.6	3.5	64.4	1.0	1.9	11,350									
		3		21.9	78.1		4.9	4.6	86.7	1.4	2.4	15,260									
8-GC (167 ft. to 168 ft. 4 in.)	C-43264	1	.8	15.9	62.5	20.8	1.8	3.7	69.2	1.1	3.4	12,070	2,450	2,500	2,600	1,489	6.0	16		16	
		2		16.1	63.0	20.9	1.9	3.7	69.8	1.1	2.6	12,160									
		3		20.3	79.7		2.4	4.7	88.3	1.4	3.2	15,390									
10-GC (513 ft. 6 in. to 514 ft. 8½ in.)	C-45939	1	.8	19.9	51.6	27.8	3.0	3.6	61.6	1.0	3.0	10,790	2,280	2,470	2,620	1,571	6.9	14¼		14¼	
		2		20.1	51.9	28.0	3.1	3.5	62.1	1.0	2.3	10,880									
		3		27.9	72.1		4.2	4.9	86.2	1.4	3.3	15,120									
11-GC (403 ft. 10 in. to 405 ft. 11 in.)	C-45938	1	1.3	17.9	60.5	20.3	.6	4.0	69.9	1.2	4.0	12,060	2,620	2,700	2,850	1,463	7.3	23¼	2	21¼	
		2		18.2	61.3	20.5	.6	3.9	70.8	1.3	2.9	12,220									
		3		22.9	77.1		.7	4.9	89.1	1.6	3.7	15,380									
14-GC (250 ft. 7 in. to 253 ft. 7 in.)	C-48463	1	1.4	14.7	62.6	21.3	2.6	3.8	68.0	1.2	3.1	11,850	2,180	2,350	2,520	1,503	5.0	37		37	
		2		15.0	63.4	21.6	2.6	3.7	68.9	1.2	2.0	12,020									
		3		19.1	80.9		3.3	4.7	87.9	1.5	2.6	15,330									
15-GC (296 ft. 3 in. to 399 ft.)	C-49325	1	.8	17.0	64.0	18.2	.9	4.0	72.2	1.4	3.3	12,560	2,620	2,690	2,810	1,438	9.8	32½		32½	
		2		17.1	64.6	18.3	.9	4.0	72.8	1.4	2.6	12,660									
		3		20.9	79.1		1.2	4.9	89.1	1.7	3.1	15,510									
16-GC (338 ft. 10 in. to 340 ft. 6 in.)	C-50755	1	.9	17.0	61.1	21.0	2.3	3.9	68.5	1.3	3.0	12,020	2,540	2,650	2,780	1,490	8.8	17		17	
		2		17.2	61.6	21.2	2.4	3.9	69.2	1.3	2.0	12,130									
		3		21.8	78.2		3.0	4.9	87.8	1.6	2.7	15,400									
19-GC (272 ft. to 275 ft.)	C-52995	1	1.7	14.2	60.6	23.5	3.0	3.7	65.4	1.1	3.3	11,490	2,410	2,520	2,620	1,530	6.8	33	5½	27½	
		2		14.5	61.6	23.9	3.0	3.5	66.5	1.2	1.9	11,580									
		3		19.0	81.0		4.0	4.6	87.4	1.5	2.5	15,340									
20-GC (340 ft. 3 in. to 343 ft. 9 in.)	C-54683	1	.4	17.3	60.0	22.3	3.4	3.7	67.5	1.3	1.8	11,910	2,180	2,410	2,590	1,531	6.8	43	10	33	
		2		17.4	60.2	22.4	3.4	3.6	67.8	1.3	1.5	11,950									
		3		22.4	77.6		4.4	4.7	87.4	1.7	1.8	15,410									
21-GC (339 ft. 10 in. to 343 ft. ½ in.)	C-55509	1	.9	16.1	62.5	20.5	2.3	3.9	69.5	1.0	2.8	12,120	2,540	2,640	2,750	1,497	6.9	37¼	6½	31¼	
		2		16.2	63.2	20.6	2.3	3.8	70.1	1.1	2.1	12,240									
		3		20.4	79.6		2.9	4.8	88.4	1.3	2.6	15,420									
25-GC (313 ft. 8 in. to 315 ft. 6 in.)	C-58236	1	1.0	15.9	62.5	20.6												22½		23½	
		2		16.0	63.1	20.9															
		3		20.3	79.7																
28-GC (499 ft. 2 in. to 502 ft.)	C-59085	1	.9	15.9	65.5	17.7	2.7	3.9	72.3	1.2	2.2	12,580	2,260	2,620	2,570	1,463	9.4	34½		34½	
		2		16.0	66.1	17.9	2.7	3.8	72.9	1.2	1.5	12,690									
		3		19.6	80.5		3.3	4.7	88.8	1.6	1.7	15,450									

See footnotes at end of table.

8-GC-----	C-43265	1	1.2	15.2	64.6	19.0	3.1	3.8	69.7	1.1	3.3	12,190	2,520	2,580	2,680	1.491	5.1	42	5	37
(207 ft. 8 in. to 211 ft. 2 in.)		2		15.4	65.4	19.2	3.2	3.7	70.6	1.2	2.1	12,340								
		3		19.1	80.9		3.9	4.6	87.3	1.4	2.7	15,280								
9-GC-----	C-43849	1	.8	17.6	69.2	12.4	4.8	4.1	75.9	1.3	1.5	13,400	1,990	2,020	2,170	1.447	8.6	36		36
(445 ft. 9 in. to 448 ft. 9 in.)		2		17.7	69.8	12.5	4.8	4.0	76.5	1.3	.9	13,510								
		3		20.3	79.7		5.5	4.6	87.5	1.5	.9	15,440								
12-GC-----	C-47043	1	1.2	17.5	73.0	8.3	3.2	4.3	80.4	1.4	2.4	14,110	2,030	2,090	2,350	1.392	7.7	27½		27½
(45 ft. to 47 ft. 3 in.)		2		17.7	73.9	8.4	3.2	4.2	81.3	1.5	1.4	14,280								
		3		19.3	80.7		3.5	4.6	88.8	1.6	1.5	15,580								
14-GC-----	C-48496	1	1.4	15.1	74.8	8.7	2.1	4.3	80.6	1.4	2.9	13,970	2,130	2,180	2,520	1.384	7.2	34¼	7	27¼
(290 ft. 7 in. to 293 ft. 7 in.)		2		15.3	75.9	8.8	2.2	4.2	81.8	1.5	1.5	14,170								
		3		16.8	83.2		2.4	4.6	89.7	1.6	1.7	15,540								
15-GC-----	C-49326	1	.7	13.9	46.8	38.6	5.8	2.9	50.3	.9	1.5	8,780	2,470	2,560	2,760		1.5	18	2	16
(336 ft. to 338 ft. 3 in.)		2		14.0	47.1	38.9	5.9	2.8	50.7	.9	.8	8,840								
		3		22.9	77.1		9.6	4.6	83.0	1.5	1.3	14,460								
18-GC-----	C-52996	1	.8	17.1	73.4	8.7	3.3	4.2	80.5	1.4	1.9	14,070	2,020	2,070	2,470	1.412	8.6	14½		14½
(366 ft. 10 in. to 368 ft. 1 in.)		2		17.3	74.0	8.7	3.3	4.1	81.2	1.4	1.3	14,190								
		3		18.9	81.1		3.6	4.5	89.0	1.6	1.3	15,550								
19-GC-----	C-53112	1	.3	16.1	60.4	23.2	6.7					11,650	2,000	2,140	2,340	1.584		12	5	7
(302 ft. 1 in. to 303 ft. 1 in.)		2	16.1	16.1	60.1	23.3	6.7					11,690								
		3		21.0	79.0		8.7					15,230								
19-GC-----	C-53113	1	.5	14.8	66.2	18.5	3.9	3.7	71.2	1.3	1.4	12,380	2,190	2,420	2,610	1.502	3.6	69	4½	64½
(307 ft. 7 in. to 313 ft. 4 in.)		2		14.8	66.6	18.6	3.9	3.6	71.5	1.3	1.1	12,440								
		3		18.2	81.8		4.8	4.5	87.9	1.6	1.2	15,290								
20-GC-----	C-54684	1	1.2	16.8	70.6	11.4	5.9	4.1	76.4	.9	1.3	13,460	2,050	2,100	2,380	1.467	9.9	17	3½	13½
(389 ft. to 390 ft. 4 in.)		2		17.0	71.5	11.5	5.9	4.0	77.3	.9	.4	13,630								
		3		19.2	80.8		6.7	4.6	87.4	1.1	.2	15,400								
21-GC-----	C-55742	1	.9	15.4	66.2	17.5	3.4	3.9	71.1	1.2	2.9	12,510	2,450	2,520	2,620	1.485	5.6	15½		15½
(388 ft. 10 in. to 300 ft. 2 in.)		2		15.5	66.8	17.7	3.4	3.8	71.7	1.2	2.2	12,620								
		3		18.9	81.1		4.1	4.6	87.2	1.4	2.7	15,330								
23-GC-----	C-57105	1	1.0	16.7	73.8	8.5	2.0	4.3	80.8	1.4	3.0	14,160	2,420	2,470	2,540	1.422	8.3	31½		31½
(278 ft. 2 in. to 281 ft. 1 in.)		2		16.9	74.5	8.6	2.0	4.2	81.6	1.5	2.1	14,300								
		3		18.5	81.5		2.2	4.6	89.3	1.6	2.3	15,640								
25-GC-----	C-58237	1	1.3	14.7	70.1	13.9	4.1	4.0	74.6	1.3	2.1	13,050	2,020	2,330	2,550	1.462	4.6	16		16
(367 ft. 9 in. to 369 ft.)		2		14.9	71.0	14.1	4.1	3.9	75.5	1.3	1.1	13,220								
		3		17.4	82.6		4.8	4.5	87.9	1.5	1.3	15,380								

See footnotes at end of table.

TABLE 2.—Analyses of coal cores, Georges Creek and north part of Upper Potomac Basins, Allegany and Garrett Counties, Md.—Contd.

Drill hole	Lab. No.	Condi- tions ¹	Proximate, percent			Ultimate, percent					Calo- rific value, B. t. u.	Fusibility of ash			Real spe- cific grav- ity	Agglu- tating index ¹	Core re- ceived, inches	Core re- jected, inches	Core ana- lyzed, inches
			Mois- ture	Vola- tile matter	Fixed carbon	Ash	Sul- fur	Hy- dro- gen	Car- bon	Nitro- gen		Oxy- gen	Initial defor- mation temper- ature, ° F.	Softening temper- ature, ° F.					
BRUSH CREEK COAL BED																			
1-GC (257 ft. 8 in. to 258 ft. 6 in.)	C-34396	1	0.4	18.8	57.8	23.0	4.4	3.7	66.0	1.2	1.7	11,660	2,020	2,110	2,260	1.540	9.4	6½	6½
		2		18.8	58.1	23.1	4.4	3.7	66.3	1.2	1.3	11,710							
		3		24.5	75.5		5.8	4.8	86.1	1.5	1.8	15,220							
5-GC (505 ft. to 506 ft. 1 in.)	C-38839	1	.9	17.0	68.6	13.5											14	14	
		2		17.2	69.2	13.6													
		3		19.9	80.1														
9-GC (550 ft. 10 in. to 551 ft. 7 in.)	C-43963	1	.8	18.3	52.8	28.1	5.1	3.4	59.8	.9	2.7	10,590	2,070	2,100	2,300	1.611		11	11
		2		18.5	53.2	28.3	5.2	3.3	60.3	1.0	1.9	10,630							
		3		25.8	74.2		7.2	4.7	84.0	1.3	2.8	14,890							
16-GC (506 ft. 2 in. to 507 ft. 2 in.)	C-51239	1	.5	22.0	58.4	19.1	7.7	3.9	67.8	1.2	.3	12,330	2,040	2,070	2,340	1.363		11½	1¼
		2		22.1	58.8	19.1	7.7	3.9	68.1	1.2	.0	12,380							
		3		27.4	72.6		9.5	4.8	84.2	1.4	.1	15,320							
19-GC (430 ft. 5 in. to 431 ft. 5 in.)	C-53072	1	1.1	16.0	62.5	20.4	3.7					12,170				1.518		11	½
		2		16.2	63.2	20.6	3.8					12,300							
		3		20.4	79.6		4.7					15,490							
21-GC (513 ft. 6 in. to 515 ft.)	C-55743	1	.6	21.9	62.8	14.7	5.1	4.1	73.0	1.1	2.0	13,130	2,060	2,100	2,230	1.451	7.4	18	5
		2		22.0	63.2	14.8	5.1	4.1	73.4	1.1	1.5	13,210							
		3		25.8	74.2		6.0	4.8	86.1	1.2	1.9	15,500							
MAHONING COAL BED																			
8-GC (364 ft. 10 in. to 367 ft. 11 in.)	C-45266	1	1.3	16.2	65.5	17.0	1.4	4.0	72.5	1.2	3.9	12,590	2,840	2,890	2,910+	1.444	5.9	35	2½
		2		16.5	66.3	17.2	1.4	3.9	73.5	1.2	2.8	12,760							
		3		19.9	80.1		1.7	4.7	88.8	1.4	3.4	15,420							
22-CG (218 ft. 2 in. to 221 ft.)	C-56888	1	.7	18.3	70.0	11.0	1.3	4.3	79.8	1.2	2.4	13,810	2,690	2,730	2,820	1.397	7.6	32	32
		2		18.4	70.5	11.1	1.3	4.3	80.4	1.2	1.7	13,910							
		3		20.7	79.3		1.5	4.8	90.4	1.3	2.0	15,650							

23-GC (424 ft. 7 in. to 427 ft. 10 in.)	C-57106	1	.9	16.5	67.3	15.3	2.7	4.0	73.8	1.1	3.1	12,940	2,140	2,230	2,520	1.486	9.0	39	3	36
		2		16.7	67.9	15.4	2.8	3.9	74.5	1.1	2.3	13,060								
		3		19.7	80.3		3.3	4.6	88.1	1.4	2.6	15,440								

UPPER FREEPORT COAL BED

1-GC (379 ft. 4 in. to 381 ft.)	C-34397	1	3.4	14.4	64.4	17.8	2.6	4.0	70.0	1.2	4.4	12,170	2,150	2,260	2,420	1.468	9.1	17½		17½
		2		14.9	65.7	18.4	2.7	3.8	72.5	1.2	1.4	12,600								
		3		18.3	81.7		3.3	4.6	88.8	1.5	1.8	15,440								
2-GC (522 ft. 5 in. to 529 ft. 1 in.)	C-36192	1	1.3	16.1	70.1	13.6	3.4	4.0	75.2	1.3	2.6	13,190	2,180	2,430	2,570	1.439	6.7	76	7	69
		2		15.3	71.0	13.7	3.4	3.9	76.2	1.3	1.5	13,360								
		3		17.7	82.3		4.0	4.5	88.3	1.5	1.7	15,480								
5-GC (587 ft. 3 in. to 589 ft.)	C-39344	1	1.4	15.7	58.6	24.3												20	4½	15½
		2		15.9	59.4	24.7														
		3		21.1	78.9															
8-GC (407 ft. 8 in. to 410 ft.)	C-43706	1	1.3	15.6	71.0	12.1	3.6	4.0	75.9	1.2	3.2	13,330	2,120	2,330	2,590	1.440	.6	29½	1¼	27¼
		2		15.8	71.9	12.3	3.7	3.9	76.8	1.3	2.0	13,500								
		3		18.0	82.0		4.2	4.5	87.6	1.4	2.3	15,390								
8-GC (411 ft. 3 in. to 414 ft. 6 in.)	C-43707	1	1.1	15.2	74.3	9.4	1.8	4.2	80.0	1.3	3.3	13,920	2,330	2,380	2,620	1.394	2.4	38	½	37½
		2		15.4	75.1	9.5	1.8	4.1	80.9	1.3	2.4	14,070								
		3		17.0	83.0		2.0	4.5	89.4	1.4	2.7	15,560								
9-GC (652 ft. 5 in. to 655 ft. 10 in.)	C-43955	1	.6	16.1	58.7	24.6	5.8	3.6	63.8	.9	1.3	11,350	2,100	2,280	2,490	1.567	6.2	39½	11½	28
		2		16.2	59.0	24.8	5.8	3.5	64.2	.9	.8	11,420								
		3		21.5	78.5		7.7	4.7	85.4	1.2	1.0	15,180								
10-GC (785 ft. 10 in. to 788 ft. 10 in.)	C-46320	1	1.7	18.1	60.4	19.8	4.7	3.9	67.4	1.1	3.1	12,010	2,040	2,240	2,410	1.510	5.7	31½		31½
		2		18.4	61.4	20.2	4.8	3.8	68.6	1.1	1.5	12,210								
		3		23.0	77.0		6.0	4.7	85.9	1.4	2.0	15,300								
11-GC (686 ft. 10 in. to 688 ft.)	C-46250	1	1.5	18.8	58.3	21.4	9.8	3.7	62.7	1.0	1.4	11,420	2,050	2,100	2,260	1.590	6.0	14	2	12
		2		19.1	59.1	21.8	9.9	3.6	63.6	1.1	.0	11,590								
		3		24.4	75.6		12.7	4.6	81.3	1.3	.1	14,810								
11-GC (683 ft. 10½ in. to 692 ft.)	C-46251	1	1.2	19.0	70.3	9.5	2.5	4.4	77.9	1.4	4.3	13,900	2,150	2,280	2,520	1.382	6.6	37½	2	36½
		2		19.2	71.2	9.6	2.5	4.4	78.8	1.4	3.3	14,070								
		3		21.3	78.7		2.8	4.8	87.2	1.5	3.7	15,560								
12-GC (254 ft. 8 in. to 257 ft. 1 in.)	C-47481	1	.8	17.2	60.2	21.8	5.0	3.7	66.5	1.0	2.0	11,810	2,210	2,310	2,520	1.521	6.3	30¼	7¼	22¼
		2		17.4	60.6	22.0	5.1	3.6	67.0	1.0	1.3	11,900								
		3		22.3	77.7		6.5	4.7	85.9	1.3	1.6	15,260								
14-GC (521 ft. 10 in. to 524 ft. 8 in.)	C-48770	1	1.2	15.6	73.7	9.5	3.3	4.3	79.3	1.4	2.2	13,870	2,060	2,270	2,570	1.394	7.7	33½	5½	28
		2		15.8	74.5	9.7	3.3	4.2	80.2	1.4	1.2	14,040								
		3		17.6	82.5		3.7	4.7	88.8	1.5	1.3	15,540								

See footnotes at end of table.

TABLE 2.—Analyses of coal cores, Georges Creek and north part of Upper Potomac Basins, Allegany and Garrett Counties, Md.—Contd.

Drill hole	Lab. No.	Condi- tions ¹	Proximate, percent				Ultimate, percent					Calo- rific value, B. t. u.	Fusibility of ash			Real spec- ific grav- ity	Agglu- tating index ²	Core re- ceived, inches	Core re- jected, inches	Core ana- lyzed, inches
			Mois- ture	Vola- tile matter	Fixed carbon	Ash	Sul- fur	Hy- dro- gen	Car- bon	Nitro- gen	Oxy- gen		Initial de- for- ma- tion tem- per- ature, ° F.	Soft- ening tem- per- ature, ° F.	Fluid tem- per- ature, ° F.					
UPPER FREEPORT COAL BED—Continued																				
17-GC (362 ft. to 363 ft. 1 in.)	C-50996	1 2 3	1.3 ----- -----	18.3 18.5 23.3	60.2 61.0 76.7	20.2 20.5 -----	5.7 5.7 7.2	3.9 3.8 4.8	67.5 68.4 86.1	1.0 1.0 1.3	1.7 .6 .6	12,040 12,210 15,360	2,080 ----- -----	2,240 ----- -----	2,440 ----- -----	1.507 ----- -----	7.6 ----- -----	13 ----- -----	----- ----- -----	13 ----- -----
18-GC (582 ft. 2 in. to 584 ft. 9 in.)	C-53279	1 2 3	1.3 ----- -----	13.5 13.7 26.8	37.0 37.5 73.2	48.2 48.8 -----	.5 .5 .9	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	7,300 7,390 14,450	2,910+ ----- -----	----- ----- -----	----- ----- -----	1.816 ----- -----	----- ----- -----	30½ ----- -----	20½ ----- -----	10 ----- -----
21-GC (622 ft. 8½ in. to 626 ft.)	C-55744	1 2 3	.6 ----- -----	20.4 20.5 24.3	63.5 64.0 75.7	15.5 15.5 -----	8.4 8.4 10.0	3.9 3.9 4.6	70.6 71.0 84.1	1.0 1.0 1.2	.6 .2 .1	12,790 12,860 15,220	2,060 ----- -----	2,090 ----- -----	2,170 ----- -----	1.519 ----- -----	6.1 ----- -----	35 ----- -----	----- ----- -----	35 ----- -----
22-GC (281 ft. 7½ in. to 285 ft. 8 in.)	C-56887	1 2 3	.9 ----- -----	16.5 16.6 18.6	72.0 72.7 81.4	10.6 10.7 -----	2.4 2.5 2.8	4.2 4.2 4.7	79.1 79.8 89.3	1.2 1.2 1.4	2.5 1.6 1.8	13,790 13,930 15,590	2,540 ----- -----	2,600 ----- -----	2,670 ----- -----	1.397 ----- -----	6.2 ----- -----	45¼ ----- -----	2¾ ----- -----	43 ----- -----
24-GC (223 ft. 1 in. to 225 ft. 8 in.)	C-57805	1 2 3	1.1 ----- -----	17.1 17.3 20.2	67.5 68.2 79.8	14.3 14.5 -----	3.8 3.9 4.5	4.1 4.0 4.7	74.2 75.1 87.8	1.1 1.1 1.3	2.5 1.4 1.7	13,140 13,280 15,530	2,090 ----- -----	2,200 ----- -----	2,500 ----- -----	1.441 ----- -----	10.3 ----- -----	31¼ ----- -----	1¾ ----- -----	30 ----- -----
25-GC (594 ft. 7 in. to 595 ft. 6 in.)	C-58238	1 2 3	2.7 ----- -----	16.8 17.3 20.3	65.8 67.6 79.7	14.7 15.1 -----	5.2 5.4 6.3	4.1 3.9 4.6	72.1 74.1 87.3	1.2 1.2 1.4	2.7 .3 .4	12,790 13,140 15,480	2,010 ----- -----	2,100 ----- -----	2,410 ----- -----	1.472 ----- -----	8.4 ----- -----	10¼ ----- -----	----- ----- -----	10¼ ----- -----
26-GC (754 ft. 5 in. to 756 ft. 8½ in.)	C-59767	1 2 3	.6 ----- -----	15.9 16.0 19.7	64.9 65.3 80.3	18.6 18.7 -----	6.3 6.3 7.7	3.8 3.7 4.6	69.5 69.9 86.0	1.1 1.1 1.4	.7 .3 .3	12,340 12,420 15,270	2,020 ----- -----	2,050 ----- -----	2,420 ----- -----	1.524 ----- -----	5.8 ----- -----	27½ ----- -----	½ ----- -----	27 ----- -----

LOWER FREEPORT COAL BED

1-GC----- (432 ft. 3 in. to 433 ft. 1 in.)	C-34930	1	0.9	18.3	57.2	23.6	5.3	3.6	64.4	1.0	2.1	11,410	2,040	2,080	2,350	-----	7.9	10	-----	10	
		2		18.5	57.7	23.8	5.3	3.5	65.0	1.1	1.3	11,510									
		3		24.2	75.8	-----	7.0	4.6	85.3	1.4	1.7	15,110									
20-GC----- (670 ft. 1 in. to 671 ft. 9 in.)	C-55508	1	.8	16.4	69.8	13.0	4.3	4.1	75.5	1.1	2.0	13,350	2,100	2,350	2,580	1.444	12.3	19	-----	5	14
		2		16.5	70.4	13.1	4.3	4.0	76.1	1.1	1.4	13,450									
		3		19.0	81.0	-----	4.9	4.6	87.5	1.2	1.8	15,470									

UPPER KITTANNING COAL BED

1-GC----- (474 ft. 3 in. to 476 ft. 7 in.)	C-34931	1	1.8	14.6	64.3	19.3	3.6	3.8	69.5	1.1	2.7	12,140	2,210	2,420	2,490	-----	5.3	23	-----	1	22
		2		14.9	65.5	19.6	3.7	3.6	70.8	1.1	1.2	12,370									
		3		18.5	81.5	-----	4.6	4.5	88.1	1.3	1.5	15,390									
2-GC----- (630 ft. to 632 ft. 4 in.)	C-36247	1	2.0	14.2	70.5	13.3	.7	4.1	76.2	1.3	4.4	13,140	2,890	2,910+	-----	1.417	3.0	28	-----	28	
		2		14.5	71.9	13.6	.8	3.9	77.8	1.3	2.6	13,410									
		3		16.7	83.3	-----	.9	4.5	90.0	1.5	3.1	15,510									
4-GC----- (411 ft. 11 in. to 414 ft 4 in.)	C-37903	1	3.3	15.2	69.6	11.9	1.7	4.3	75.9	1.3	4.9	13,190	2,600	2,680	2,800	1.408	9.2	30	1¾	28¾	
		2		15.7	72.0	12.3	1.7	4.1	78.5	1.4	2.0	13,640									
		3		17.9	82.1	-----	2.0	4.7	89.8	1.6	2.1	15,560									
8-GC----- (514 ft. 8 in. to 517 ft. 11½ in.)	C-43850	1	.7	16.6	67.0	15.7	3.6	4.0	73.7	1.2	1.8	12,910	2,080	2,240	2,450	1.464	6.3	39½	4¾	34¾	
		2		16.8	67.4	15.8	3.7	3.9	74.2	1.2	1.2	13,000									
		3		-----	80.1	-----	4.4	4.7	88.2	1.4	1.3	15,450									
9-GC----- (768 ft. to 769 ft. 2 in.)	C-44027	1	.8	20.3	59.3	19.6	6.8	3.8	67.5	1.0	1.3	12,150	2,040	2,090	2,270	1.540	7.5	16	3½	12½	
		2		20.5	59.8	19.7	6.9	3.7	68.1	1.0	.6	12,240									
		3		25.5	74.5	-----	8.6	4.6	84.8	1.2	.8	15,250									
10-GC----- (877 ft. 6 in. to 879 ft.)	C-46762	1	.8	18.4	61.7	19.1	4.4	3.9	69.5	1.1	2.0	12,340	2,130	2,230	2,470	1.493	9.3	16½	-----	16½	
		2		18.5	62.3	19.2	4.5	3.8	70.1	1.1	1.3	12,440									
		3		22.9	77.1	-----	5.5	4.8	86.8	1.4	1.5	15,400									
11-GC----- (791 ft. 5 in. to 793 ft. 6 in.)	C-46321	1	1.9	15.4	69.4	13.3	2.7	4.1	75.2	1.2	3.5	13,100	2,230	2,540	2,730	1.426	6.1	25¾	1¾	24½	
		2		15.6	70.9	13.5	2.7	4.0	76.6	1.2	2.0	13,350									
		3		18.1	81.9	-----	3.2	4.6	83.6	1.4	2.2	15,440									
12-GC----- (350 ft. 4 in. to 351 ft. 7 in.)	C-47482	1	1.7	22.5	60.6	15.2	4.1	4.3	72.0	1.1	3.3	12,760	2,090	2,230	2,520	1.452	7.5	14¾	1¾	13	
		2		22.9	61.6	15.5	4.1	4.2	73.2	1.1	1.9	12,980									
		3		27.1	72.9	-----	4.9	4.9	86.6	1.3	2.3	15,370									
14-GC----- (609 ft. 2 in. to 611 ft. 2 in.)	C-48995	1	1.3	14.0	69.6	15.1	4.1	3.9	73.3	1.1	2.5	12,860	2,080	2,270	2,480	1.461	2.1	24	-----	3½	20½
		2		14.2	70.5	15.3	4.1	3.8	74.2	1.2	1.4	13,020									
		3		16.7	83.3	-----	4.9	4.5	87.6	1.4	1.6	15,370									

See footnotes at end of table.

TABLE 2.—Analyses of coal cores, Georges Creek and north part of Upper Potomac Basins, Allegany and Garrett Counties, Md.—Contd.

Drill hole	Lab. No.	Condi- tions ¹	Proximate, percent				Ultimate, percent					Calo- rific value, B. t. u.	Fusibility of ash			Real spec- ific grav- ity	Agglu- tinat- ing index ²	Core re- ceived, inches	Core re- jected, inches	Core analy- zed, inches
			Mois- ture	Vola- tile matter	Fixed carbon	Ash	Sul- fur	Hy- dro- gen	Car- bon	Nitro- gen	Oxy- gen		Initial defor- mation temper- ature, ° F.	Softening temper- ature, ° F.	Fluid temper- ature, ° F.					
UPPER KITTANNING COAL BED—Continued																				
17-GC (469 ft. 6 in. to 470 ft. 10 in.)	C-51240	1 2 3	.7	18.4 18.6 20.9	70.0 70.4 79.1	10.9 11.0	2.7 2.7 3.1	4.3 4.3 4.8	78.7 79.3 89.1	1.2 1.2 1.4	2.2 1.5 1.6	13,830 13,930 15,650	2,130	2,310	2,620	1.396	10.2	16	1	15
18-GC (663 ft. 6 in. to 665 ft. 2 in.)	C-53372	1 2 3	2.7	15.1 15.5 18.5	66.5 68.3 81.5	15.7 16.2	3.0 3.1 3.7	4.1 3.9 4.6	71.9 73.9 88.1	1.1 1.1 1.4	4.2 1.8 2.2	12,580 12,930 15,420	2,190	2,470	2,600	1.478	7.9	19½	1¼	18½
19-GC (636 ft. 1 in. to 640 ft. 4 in.)	C-53280	1 2 3	1.0	15.1 15.3 17.9	69.5 70.2 82.1	14.4 14.5	4.2 4.2 5.0	3.9 3.9 4.5	74.2 74.9 87.6	1.2 1.2 1.4	2.1 1.3 1.5	13,090 13,230 15,470	2,050	2,310	2,510	1.475	1.8	52	25	27
22-GC (375 ft. 1 in. to 359 ft. 11 in.)	C-57103	1 2 3	.8	15.6 15.7 17.7	72.5 73.1 82.3	11.1 11.2	2.9 2.9 3.3	4.2 4.1 4.6	78.4 79.1 89.1	1.2 1.2 1.3	2.2 1.5 1.7	13,730 13,840 15,590	2,100	2,280	2,540	1.443	8.7	34½	1	33½
23-GC (554 ft. to 555 ft. 2½ in.)	C-57215	1 2 3	1.0	16.3 16.4 18.7	70.8 71.6 81.3	11.9 12.0	4.6 4.7 5.3	4.2 4.1 4.6	76.5 77.3 87.8	1.1 1.1 1.3	1.7 .8 1.0	13,540 13,670 15,540	2,050	2,130	2,500	1.458	11.1	15		15
24-GC (279 ft. 7 in. to 281 ft. 6 in.)	C-57806	1 2 3	1.5	15.5 15.7 21.9	55.2 56.1 78.1	27.8 28.2	4.4 4.4 6.2	3.5 3.4 4.7	59.9 60.8 84.7	.9 .9 1.3	3.5 2.3 3.1	10,620 10,780 15,010	2,590	2,610	2,700	1.597	4.4	25	2½	22½
24-GC (287 ft. 2 in. to 290 ft. 1 in.)	C-57807	1 2 3	1.8	16.0 16.3 18.9	68.7 69.9 81.1	13.5 13.8	5.0 5.0 5.9	4.1 3.9 4.6	74.2 75.6 86.6	1.2 1.2 1.4	2.0 .5 .5	13,080 13,310 15,440	2,040	2,160	2,560	1.457	8.0	37	4¼	32¼
MIDDLE KITTANNING COAL BED																				
1-GC (624 ft. 10 in. to 626 ft. 7 in.)	C-34932	1 2 3	2.0	16.9 17.2 20.5	65.3 66.7 79.5	15.8 16.1	3.0 3.1 3.7	4.0 3.8 4.5	72.7 74.2 88.4	0.9 .9 1.1	3.6 1.9 2.3	12,670 12,930 15,420	2,380	2,550	2,730		4.6	16	2	14

4-GC (438 ft. 8 in. to 440 ft. 3 in.)	C-37904	1	2.0	13.9	62.0	22.1	1.9	3.7	67.3	1.2	3.8	11,610	2,680	2,740	2,840	1,522	2.1	19	-----	19	
		2	-----	14.2	63.3	22.5	1.9	3.5	68.7	1.2	2.2	11,860	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	18.3	81.7	-----	2.5	4.5	88.6	1.5	2.9	15,300	-----	-----	-----	-----	-----	-----	-----	-----	-----
9-GC (800 ft. 9 in. to 803 ft. 4 in.)	C-44534	1	1.0	15.4	65.1	18.5	2.7	3.9	70.3	1.0	3.6	12,300	2,460	2,550	2,740	1,481	4.2	31	2	29	
		2	-----	15.5	65.8	18.7	2.7	3.8	71.0	1.1	2.7	12,420	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	19.1	80.9	-----	3.3	4.6	87.3	1.3	3.5	15,280	-----	-----	-----	-----	-----	-----	-----	-----	-----
11-GC (824 ft. to 825 ft.)	C-46322	1	1.3	13.8	53.7	31.2	1.2	-----	-----	-----	-----	10,210	2,910+	-----	-----	1,592	-----	11	½	10½	
		2	-----	14.0	54.4	31.6	1.2	-----	-----	-----	-----	-----	10,340	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	20.4	79.6	-----	1.7	-----	-----	-----	-----	-----	15,110	-----	-----	-----	-----	-----	-----	-----	-----
14-GC (674 ft. 2 in. to 676 ft. 2 in.)	C-48906	1	1.0	16.9	62.1	20.0	3.4	3.7	68.5	.9	3.5	12,020	2,620	2,680	2,780	1,518	3.6	24	3	21	
		2	-----	17.1	62.7	20.2	3.5	3.7	69.2	1.0	2.4	12,140	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	21.4	78.6	-----	4.3	4.6	86.8	1.2	3.1	15,220	-----	-----	-----	-----	-----	-----	-----	-----	-----
16-GC (754 ft. 1 in. to 756 ft. 5 in.)	C-51610	1	1.0	15.2	58.7	25.1	2.4	3.6	64.7	1.0	3.2	11,210	2,730	2,760	2,840	1,552	4.6	27½	13½	14	
		2	-----	15.3	59.4	25.3	2.4	3.5	65.4	1.0	2.4	11,330	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	20.5	79.5	-----	3.3	4.7	87.6	1.4	3.0	15,170	-----	-----	-----	-----	-----	-----	-----	-----	-----
17-GC (544 ft. 8 in. to 548 ft. 8 in.)	C-51266	1	1.2	16.9	66.8	15.1	2.6	4.0	74.2	1.2	2.9	13,050	2,590	2,650	2,760	1,451	6.4	49½	6½	43	
		2	-----	17.1	67.6	15.3	2.7	3.9	75.1	1.2	1.8	13,200	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	20.2	79.8	-----	3.1	4.7	88.6	1.4	2.2	15,580	-----	-----	-----	-----	-----	-----	-----	-----	-----
18-GC (707 ft. to 709 ft.)	C-53373	1	.9	18.8	53.8	26.5	4.4	3.6	61.4	.8	3.3	10,960	2,220	2,470	2,600	1,601	5.3	23½	1½	22	
		2	-----	19.0	54.3	28.7	4.5	3.5	62.0	.8	2.5	11,050	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	25.9	74.1	-----	6.1	4.8	84.6	1.1	3.4	15,080	-----	-----	-----	-----	-----	-----	-----	-----	-----
19-GC (657 ft. 3 in. to 661 ft. 10 in.)	C-53371	1	.8	14.4	58.1	26.7	5.3	3.4	62.6	.9	1.1	10,970	2,220	2,420	2,520	1,616	2.1	54½	41½	18	
		2	-----	14.5	58.5	27.0	5.4	3.3	63.1	.9	.3	11,060	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	19.8	80.2	-----	7.4	4.6	86.4	1.2	.4	15,140	-----	-----	-----	-----	-----	-----	-----	-----	-----
22-GC (413 ft. to 416 ft.)	C-57104	1	1.0	14.8	68.2	16.0	1.3	3.8	74.4	.8	3.7	12,820	2,870	2,910+	2,910+	1,501	4.2	29¼	1½	27¼	
		2	-----	15.0	68.9	16.1	1.3	3.8	75.1	.8	2.9	12,950	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	17.9	82.1	-----	1.5	4.5	89.5	1.0	3.5	15,440	-----	-----	-----	-----	-----	-----	-----	-----	-----
23-GC (611 ft. to 614 ft. 3 in.)	C-57216	1	.9	19.3	66.2	13.6	4.6	4.1	75.3	1.0	1.4	13,170	2,050	2,230	2,570	1,498	5.5	36	8¾	27¼	
		2	-----	19.5	66.8	13.7	4.7	4.0	76.0	1.0	.6	13,290	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	22.6	77.4	-----	5.4	4.7	88.0	1.1	.8	15,400	-----	-----	-----	-----	-----	-----	-----	-----	-----

LOWER KITTANNING COAL BED

5-GC 10 in.) (791 ft. 6 in. to 792 ft.)	C-39345	1	1.6	17.4	56.8	24.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	16½	5	11½	
		2	-----	17.7	57.7	24.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	23.4	76.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
8-GC (613 ft. 7 in. to 616 ft. 3 in.)	C-44026	1	2.2	13.1	56.9	27.8	6.7	3.2	59.1	1.0	2.2	10,470	2,100	2,190	2,520	1,661	0.1	32½	3¾	28¾	
		2	-----	13.3	58.3	28.4	6.9	3.0	60.4	1.0	.3	10,700	-----	-----	-----	-----	-----	-----	-----	-----	-----
		3	-----	18.6	81.4	-----	9.6	4.2	84.4	1.4	.4	14,950	-----	-----	-----	-----	-----	-----	-----	-----	-----

See footnotes at end of table.

TABLE 2.—Analyses of coal cores, Georges Creek and north part of Upper Potomac Basins, Allegany and Garrett Counties, Md.—Contd.

Drill hole	Lab. No.	Condi- tions ¹	Proximate, percent			Ultimate, percent					Calo- rific value, B. t. u.	Fusibility of ash			Real spec- ific grav- ity	Agglu- tating index ²	Core re- ceived, inches	Core re- jected, inches	Core ana- lyzed, inches		
			Mois- ture	Vola- tile matter	Fixed carbon	Ash	Sul- fur	Hydro- gen	Car- bon	Nitro- gen		Oxy- gen	Initial defor- mation temper- ature, ° F.	Softening temper- ature, ° F.						Fluid temper- ature, ° F.	
8-GC. ----- (600 ft. 5 in. to 603 ft. 6 in.)	C-43954	1	1.8	15.4	68.1	14.7	3.8	4.0	74.1	1.0	2.4	12,920	2,170	2,340	2,620	1.459	6.0	37	26½	10½	
		2		15.7	69.4	14.9	3.9	3.9	75.5	1.1	.7	13,150									
		3		18.5	81.5		4.6	4.5	88.7	1.3	.9	15,450									
11-GC. ----- (864 ft. 9 in. to 865 ft. 11 in.)	C-46323	1	.8	16.9	59.9	22.4	3.4	3.8	66.4	1.0	3.0	11,620	2,620	2,730	2,850	1.537		14	2¾	11¼	
		2		17.0	60.4	22.6	3.4	3.7	67.0	1.0	2.3	11,720									
		3		22.0	78.0		4.4	4.8	86.5	1.3	3.0	15,130									
14-GC. ----- (700 ft. 1 in. to 702 ft.)	C-48997	1	1.6	14.4	71.7	12.3	1.5	4.1	76.9	1.2	4.0	13,340	2,910+			1.412	1.5	21½		21½	
		2		14.6	72.9	12.5	1.5	4.0	78.1	1.2	2.7	13,560									
		3		16.7	83.3		1.7	4.6	89.3	1.3	3.1	15,500									
14-GC. ----- (706 ft. 3 in. to 708 ft. 7 in.)	C-49039	1	.9	14.3	66.8	18.0	3.8	3.7	71.2	1.0	2.3	12,430	2,540	2,620	2,730	1.494	.5	28	12	16	
		2		14.5	67.4	18.1	3.8	3.6	71.8	1.0	1.7	12,540									
		3		17.6	82.4		4.7	4.5	87.6	1.3	1.9	15,310									
16-GC. ----- (843 ft. 2 in. to 844 ft. 4 in.)	C-52001	1	2.5	15.2	63.4	18.9	1.8	3.9	69.4	.9	5.1	12,070	2,910+			1.481	3.2	13½		13½	
		2		15.5	65.1	19.4	1.8	3.7	71.2	.9	3.0	12,390									
		3		19.3	80.7		2.3	4.6	88.3	1.1	3.7	15,360									
20-GC. ----- (849 ft. 1½ in. to 850 ft. 7 in.)	C-55746	1	.5	15.7	57.1	26.7	2.5					11,040	2,820	2,870	2,910+	1.570		15¾		15¾	
		2		15.8	57.4	26.8	2.5					11,100									
		3		21.6	78.4		3.4					15,160									
24-GC. ----- (395 ft. 4 in. to 397 ft. 5 in.)	C-58302	1	1.4	17.7	70.3	10.6	4.3	4.3	77.8	1.1	1.9	13,710	2,010	2,060	2,180	1.414	8.8	22½	1	21½	
		2		17.9	71.4	10.7	4.3	4.2	78.9	1.2	.7	13,910									
		3		20.1	79.9		4.8	4.7	88.4	1.3	.8	15,580									
25-GC. ----- (805 ft. 6 in. to 807 ft. 2 in.)	C-58468	1	1.0	19.8	66.7	12.5	6.0	4.2	75.0	1.1	1.2	13,310	2,120	2,160	2,520	1.456	8.9	16¾		16¾	
		2		20.0	67.4	12.6	6.0	4.1	75.7	1.1	.5	13,450									
		3		22.9	77.1		6.9	4.7	86.7	1.3	.4	15,390									

LOWER KITTANNING COAL BED—Continued

MOUNT SAVAGE COAL BED

1-GC. (636 ft. 4 in. to 637 ft. 4 in.)	C-34933	1	1.1	13.8	58.5	26.6	1.4	3.4	63.2	0.9	4.5	10,890	2,910+				1.7	9½		9½	
		2		14.0	59.2	26.8	1.4	3.4	63.9	.9	3.6	11,010									
		3		19.1	80.9		2.0	4.6	87.4	1.2	4.8	15,060									
3-GC. (596 ft. 6 in. to 597 ft. 10 in.)	C-37487	1	2.1	15.7	61.9	20.3	1.2	3.9	68.7	1.0	4.9	11,880	2,910+				1.500	3.2	13		13
		2		16.0	63.2	20.8	1.2	3.7	70.2	1.0	3.1	12,140									
		3		20.2	79.8		1.5	4.7	88.6	1.3	3.9	15,330									
7-GC. (779 ft. to 780 ft. 8 in.)	C-42286	1	.8	17.3	70.8	11.1	1.1	4.3	78.8	1.1	3.6	13,730	2,910+				1.402	6.8	22	1½	20½
		2		17.4	71.4	11.2	1.1	4.2	79.4	1.1	3.0	13,840									
		3		19.6	80.4		1.2	4.7	89.5	1.3	3.3	15,590									
9-GC. (922 ft. 10 in. to 924 ft. 7 in.)	C-44535	1	.8	17.6	70.8	10.8	3.5	4.1	78.1	1.0	2.5	13,760	2,010	2,250	2,530	1.435	5.5	21	4¼	16¼	
		2		17.7	71.4	10.9	3.5	4.0	78.7	1.0	1.9	13,860									
		3		19.8	80.2		3.9	4.5	88.2	1.1	2.3	15,550									
12-GC. (539 ft. to 542 ft. 8 in.)	C-47762	1	.8	16.2	50.8	22.2	1.6	3.4	57.5	.8	4.5	9,970	2,910+				1.623	2.8	41	16	25
		2		16.3	51.2	32.5	1.6	3.4	58.0	.8	3.7	10,050									
		3		24.1	75.9		2.4	5.0	85.9	1.2	5.5	14,890									
19-GC. (837 ft. 6 in. to 838 ft. 11 in.)	C-53824	1	.3	15.2	63.4	21.1	1.1	3.7	69.8	.7	3.6	12,050	2,910+				1.512	3.6	16½	4	12½
		2		15.3	63.6	21.1	1.1	3.7	70.0	.7	3.4	12,090									
		3		19.4	80.6		1.4	4.7	88.8	.9	4.2	15,330									

¹ 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
² Ratio silicon carbide to coal, 15 : 1, crushing strength in kilograms.

DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP PROSPECTS

All information available regarding operating and abandoned mines and outcrop excavations is summarized and the numbers correspond to locations shown in figure 1 and figures 4 to 13, inclusive. The elevations given were determined by aneroid barometer.

1. *Location:* North of Barrelville—operating mine.
Elevation: 1,200 feet.
Operator: John Clietes.
Coal bed: Harlem (local name, Brush Creek):
Dip: Flat.
Section of bed at mine portal:
 Coal.....25 inches.
2. *Location:* Northeast of Mount Savage—abandoned.
Elevation: 1,355 feet.
Mine: Helbig.
Operator: Al Deffenbaugh.
Coal bed: Barton (local name, Bakerstown).
3. *Location:* Northeast of Mount Savage—abandoned.
Elevation: 1,330 feet.
Mine: Helbig.
Operator: Al Deffenbaugh.
Coal bed: Barton (local name, Bakerstown).
4. *Location:* North of Barrelville—abandoned.
Elevation: 1,040 feet.
Mine: Parker No. 1 (tunnel).
Operator: C. J. Rowe Bros.
Coal bed: Lower Freeport (local name, Parker).
- 4a. *Location:* Barrelville—abandoned.
Elevation: 1,040 feet.
Mine: Parker No. 1 (tunnel).
Operator: C. J. Rowe Bros.
Coal bed: Upper Kittanning (local name, Blubaugh).
5. *Location:* Barrelville—abandoned.
Elevation: 1,020 feet.
Mine: Parker No. 1 (tunnel).
Operator: C. J. Rowe Bros.
Coal bed: Upper Kittanning (local name, Blubaugh).
6. *Location:* Barrelville—abandoned.
Mine: Parker No. 1.
Operator: C. J. Rowe Bros.
Coal bed: Upper Kittanning (local name, Blubaugh).
7. *Location:* Barrelville—operating mine.
Elevation: 1,080 feet.
Operator: Reid.
Coal bed: Lower Freeport (local name, Parker):
Section of bed:
 Coal.....30 inches.
8. *Location:* Barrelville—operating.
Elevation: 1,080 feet.
Mine: Victory.
Operator: Wm. Sherman.
Coal bed: Upper Kittanning (local name, Blubaugh):
Dip: 15°.
Section of bed:

	<i>Inches</i>
Coal.....	6
Shale.....	15
Coal.....	2
Shale.....	1
Coal.....	18½
Shale.....	1¼
Coal.....	5¾

DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued

9. *Location:* South of Barrelville—abandoned.
Mine: Bill Cliff.
Operator: Sunnyside Coal Co.
Coal bed: Upper Kittanning (local name, Blubaugh).
10. *Location:* South of Barrelville—abandoned.
Elevation: 1,145 feet.
Mine: Humbird prospect.
Operator: Sunnyside Coal Co.
Coal bed: Upper Kittanning (local name, Blubaugh).
11. *Location:* South of Barrelville—abandoned.
Mine: Old No. 2.
Operator: Waddell-Georges Creek Coal Co.
Coal bed: Upper Kittanning (local name, Blubaugh).
12. *Location:* South of Barrelville—abandoned.
Elevation: 1,280 feet.
Mine: Sunnyside No. 2.
Operator: Waddell-Georges Creek Coal Co.
Coal bed: Upper Kittanning (local name, Blubaugh).
13. *Location:* South of Barrelville—abandoned.
Mine: McMullen.
Coal bed: Upper Kittanning (local name, Blubaugh).
14. *Location:* Barrelville—abandoned.
Mine: New Parker No. 1.
Operator: Cumberland Parker Seam Coal Co.
Coal bed: Lower Freeport (local name, Parker).
15. *Location:* Southwest of Barrelville—abandoned.
Mine: Sunnyside No. 1 (tunnel).
Coal bed: Upper Kittanning (local name, Blubaugh).
- 15a. *Location:* Southwest of Barrelville—abandoned.
Mine: Sunnyside No. 1 (tunnel).
Coal bed: Upper Freeport.
- 15b. *Location:* Southwest of Barrelville—abandoned.
Mine: Sunnyside No. 1 (tunnel).
Coal bed: Lower Freeport (local name, Parker).
16. *Location:* East of Mount Savage—abandoned.
Elevation: 1,280 feet.
Mine: Little Bend.
Operator: Wm. Sherman.
Coal bed: Harlem (local name, Brush Creek).
17. *Location:* East of Mount Savage—abandoned.
Elevation: 1,160 feet.
Coal bed: Upper Bakerstown.
- 17a. *Location:* East of Mount Savage—operating.
Elevation: 1,140 feet.
Operator: Wm. Sherman.
Coal bed: Lower Bakerstown (local name, Lower Freeport).
18. *Location:* East of Mount Savage.
Elevation: 1,130 feet.
Mine: Smith.
Coal bed: Upper Bakerstown (local name, Upper Freeport).
19. *Location:* East of Mount Savage—operating.
Elevation: 1,200 feet.
Operator: Wm. Sherman.
Coal bed: Harlem (local name, Brush Creek).
20. *Location:* East of Mount Savage—abandoned.
Elevation: 1,160 feet.
Operator: Mount Savage Fuel Co.
Coal bed: Harlem.

DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued

21. *Location:* East of Mount Savage—operating.
Elevation: 1,160 feet.
Mine: Parker No. 2.
Operator: Wm. Sherman.
Coal bed: Harlem (local names, Brush Creek and Parker):
Section of bed 600 feet in by mine portal:
Coal ----- 28 inches.
22. *Location:* Mount Savage—abandoned.
Elevation: 1,190 feet.
Coal bed: Harlem:
Section of bed at mine portal:
Coal ----- 25 inches.
23. *Location:* Southwest of Mount Savage—abandoned.
Elevation: 1,280 feet.
Operator: Mount Savage Mining Co.
Coal bed: Barton (local name, Bakerstown).
24. *Location:* Southwest of Mount Savage—abandoned.
Mine: Maryland Union No. 3.
Operator: Union Mining Co.
Coal bed: Barton (local name, Bakerstown).
25. *Location:* Southwest of Mount Savage—abandoned.
Elevation: 1,320 feet.
Mine: Maryland Union No. 3.
Operator: Union Mining Co.
Coal bed: Barton (local name, Bakerstown).
26. *Location:* Mount Savage—abandoned.
Elevation: 1,345 feet.
Mine: Bandroom.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
Coal ----- 23 inches.
27. *Location:* North of Mount Savage—abandoned.
Coal bed: Barton.
28. *Location:* North of Mount Savage—abandoned.
Elevation: 1,800 feet.
Operator: William D. Williams.
Coal bed: Upper Bakerstown (local name, Upper Freeport).
29. *Location:* North of Mount Savage—operating.
Elevation: 1,840 feet.
Coal bed: Harlem.
30. *Location:* North of Mount Savage—abandoned.
Elevation: 1,520 feet.
Operator: Williams.
Coal bed: Upper Bakerstown (local name, Upper Freeport):
Section of bed:
Coal and partings ----- 60 inches.
31. *Location:* North of Mount Savage—operating.
Mine: Williams No. 2.
Coal bed: Lower Bakerstown (local name, Lower Freeport):
Section of bed:
- | | <i>Inches</i> |
|------------|---------------|
| Coal ----- | 4 |
| Bone ----- | 6 |
| Coal ----- | 26 |
32. *Location:* North of Mount Savage—operating.
Mine: Williams No. 1.
Coal bed: Lower Bakerstown (local name, Lower Freeport):
Section of bed:
- | | <i>Inches</i> |
|------------|---------------|
| Coal ----- | 4 |
| Bone ----- | 6 |
| Coal ----- | 26 |

DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued

- 33. *Location:* North of Mount Savage—abandoned.
Elevation: 1,500 feet.
Operator: Williams.
Coal bed: Upper Bakerstown (local name, Upper Freeport).
- 34. *Location:* Northwest of Mount Savage—abandoned.
Mine: Black Hills No. 2.
Operator: Union Mining Co.
Coal bed: Lower Bakerstown.
- 35. *Location:* Northwest of Mount Savage—abandoned.
Mine: Black Hills No. 3.
Operator: Union Mining Co.
Coal bed: Lower Bakerstown.
- 36. *Location:* Northwest of Mount Savage—abandoned.
Mine: Black Hills No. 4.
Operator: Union Mining Co.
Coal bed: Lower Bakerstown.
- 37. *Location:* Northwest of Mount Savage—abandoned.
Mine: Black Hills No. 5.
Operator: Union Mining Co.
Coal bed: Lower Bakerstown.
- 38. *Location:* Northwest of Mount Savage—abandoned.
Mine: Black Hills No. 6.
Operator: Union Mining Co.
Coal bed: Lower Bakerstown.
- 39. *Location:* Northwest of Mount Savage—abandoned.
Mine: Machin.
Coal bed: Harlem (local name, Brush Creek).
- 40. *Location:* Northwest of Mount Savage—strip mine.
Elevation: 1,590 feet.
Operator: William Sherman.
Coal bed: Barton (?).
- 41. *Location:* Northwest of Mount Savage—abandoned.
Mine: Black Hill—Old No. 1 or New No. 4.
Operator: Union Mining Co.
Coal bed: Lower Bakerstown (local name, Lower Freeport).
- 42. *Location:* Northwest of Mount Savage—abandoned.
Mine: Black Hill—Old (tunnel).
Operator: Union Mining Co.
Coal bed: Lower Bakerstown (local name, Lower Freeport).
Section of bed:

	<i>Inches</i>
Coal.....	3
Binder.....	4
Coal.....	26
- 43. *Location:* West of Mount Savage—abandoned.
Elevation: 1,450 feet.
Mine: McKenzie.
Coal bed: Harlem (local name, Brush Creek).
- 44. *Location:* West of Mount Savage—abandoned.
Elevation: 1,480 feet.
Mine: McKenzie.
Coal bed: Harlem (local name, Brush Creek).
- 45. *Location:* North of Frostburg—abandoned.
Elevation: 2,238 feet.
Operator: Borden Mining Co., D. A. Benson, lessee.
Coal bed: Upper Bakerstown (local name, Upper Freeport).
- 46. *Location:* Northwest of Frostburg—operating (tunnel).
Elevation: 2,475 feet.
Operator: Borden Mining Co.
Coal bed: Barton (local name, Four Foot)
Section of bed:

Coal.....	20 inches
-----------	-----------

DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP PROSPECTS—Continued

- 47. *Location:* Northwest of Frostburg—abandoned (slope tunnel).
Elevation: 2,480 feet.
Operator: Borden Mining Co.
Coal bed: Barton (local name, Four Foot).
- 48. *Location:* Northwest of Frostburg—abandoned.
Elevation: 2,825 feet.
Coal bed: Lower Kittanning—clay prospect.
- 49. *Location:* Northwest of Frostburg—abandoned.
Elevation: 2,820 feet.
Operator: Borden Mining Co.
Coal bed: Upper Freeport (local name, Split Six).
- 50. *Location:* Northwest of Frostburg—abandoned.
Elevation: 2,805 feet.
Operator: Borden Mining Co.
Coal bed: Upper Freeport (local name, Split Six).
- 51. *Location:* Northwest of Frostburg—abandoned.
Elevation: 2,610 feet.
Coal bed: Barton.
- 52. *Location:* Southeast of Eckhart Mines—abandoned.
Elevation: 1,545 feet.
Operator: Krause.
Coal bed: Upper Bakerstown (local name, Upper Freeport).
- 53. *Location:* East of Eckhart Mines—outcrop.
Elevation: 2,153 feet.
Mine: Wilburn Place.
Coal bed: Upper Kittanning (local name, Blubaugh):

<i>Section of bed:</i>	<i>Inches</i>
Coal.....	6½
Bone.....	1½
Coal.....	24
Mud.....	2½
Coal.....	9½
Shale.....	2
Coal.....	4½
Shale.....	10

- 54. *Location:* East of Eckhart Mines—abandoned.
Elevation: 1,500 feet.
Mine: Short Gap.
Operator: Stanton-Georges Creek Coal Co.
Coal bed: Upper Kittanning (local name, Blubaugh).
- 55. *Location:* East of Eckhart Mines—operating.
Elevation: 1,485 feet.
Mine: Gunstan.
Operator: Stanton-Georges Creek Coal Co.
Coal bed: Upper Kittanning (local name, Blubaugh).

<i>Section of bed:</i>	<i>Inches</i>
Coal.....	1½
Shale.....	2
Coal.....	31
Shale.....	1½
Coal.....	9
Shale.....	2
Coal.....	4¼
Shale.....	1
Bony coal.....	1¾
Coal.....	2½
Shale.....	1
Coal.....	4

- 56. *Location:* Braddock Run—abandoned.
Mine: Sullivan No. 3.
Coal bed: Upper Kittanning.

**DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued**

- 57. Location:** East of Vale Summit—abandoned.
Elevation: 1,876 feet.
Mine: Montell tunnel or Mertens.
Operator: North Maryland Coal Mining Co.
Coal bed: Upper Freeport (local name, Lower Kittanning):
- | <i>Section of bed:</i> | <i>Inches</i> |
|------------------------|---------------|
| Coal | 10½ |
| Shale | 4 |
| Coal | 13½ |
| Shale | 11 |
| Coal | 19 |
| Shale | 1 |
| Coal | 25 |
- 84
- 57a. Location:** East of Vale Summit—abandoned.
Elevation: 1,876 feet.
Mine: Montell tunnel or Mertens.
Operator: North Maryland Coal Mining Co.
Coal bed: Upper Kittanning:
- | <i>Section of bed:</i> | <i>Inches</i> |
|------------------------|---------------|
| Coal | 11 |
| Shale | 20 |
| Coal | 20 |
| Shale | 1½ |
| Coal | 8½ |
| Wild coal | 18 |
- 79
- 57b. Location:** East of Vale Summit—abandoned.
Elevation: 1,876 feet.
Mine: Montell tunnel or Mertens.
Operator: North Maryland Coal Mining Co.
Coal bed: Upper Bakerstown.
- 58. Location:** East of Vale Summit—abandoned.
Mine: Bell.
Coal bed: Harlem:
Section of bed:
- | | |
|------------|------------|
| Coal | 19 inches. |
|------------|------------|
- 59. Location:** East of Vale Summit—abandoned.
Coal bed: Upper Bakerstown:
Section of bed:
- | | |
|------------|------------|
| Coal | 27 inches. |
|------------|------------|
- 60. Location:** East of Vale Summit—abandoned.
Coal bed: Harlem:
Section of bed:
- | | |
|------------|------------|
| Coal | 19 inches. |
|------------|------------|
- 61. Location:** East of Vale Summit—abandoned.
Mine: Mertens (Dans Mountain opening).
Operator: North Maryland Coal Mining Co.
Coal bed: Upper Freeport (local name, Lower Kittanning).
- 62. Location:** East of Vale Summit—outcrop.
Coal bed: Upper Freeport:
Section of bed:
- | <i>Section of bed:</i> | <i>Inches</i> |
|-------------------------|---------------|
| Coal | 12 |
| Shale | 4 |
| Bony coal | 12 |
| Soft clay | 13 |
| Hard, silty shale | 6 |
| Coal | 15 |
| Shale | 1 |
| Coal | 24 |

DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP PROSPECTS—Continued

- 63. *Location:* East of Lonaconing—abandoned.
Elevation: 2,285 feet.
Mine: Llewellyn.
Coal bed: Upper Bakerstown.
- 64. *Location:* East of Lonaconing—abandoned.
Elevation: 2,100 feet.
Mine: Llewellyn.
Coal bed: Upper Freeport (local name, Split Six).
- 65. *Location:* East of Lonaconing—abandoned.
Elevation: 2,185 feet.
Mine: Llewellyn.
Coal bed: Upper Bakerstown.
- 66. *Location:* East of Lonaconing—abandoned.
Elevation: 2,090 feet.
Mine: Spear.
Coal bed: Upper Bakerstown.
Dip: 12° NW.
- 67. *Location:* East of Lonaconing—abandoned.
Elevation: 2,320 feet.
Coal bed: Harlem.
- 68. *Location:* East of Lonaconing—abandoned.
Elevation: 2,350 feet.
Coal bed: Harlem.
- 69. *Location:* East of Lonaconing—abandoned,
Elevation: 2,220 feet.
Coal bed: Barton (local name, Bakerstown).
- 70. *Location:* East of Lonaconing—abandoned.
Elevation: 2,320 feet.
Coal bed: Harlem.
- 71. *Location:* East of Lonaconing—abandoned.
Elevation: 2,500 feet.
Coal bed: Lower Bakerstown.
- 72. *Location:* East of Lonaconing—abandoned.
Elevation: 2,330 feet.
Coal Bed: Barton (local name, Bakerstown).
- 73. *Location:* East of Lonaconing—abandoned.
Elevation: 2,530 feet.
Coal bed: Barton.
- 74. *Location:* East of Lonaconing—abandoned.
Elevation: 2,360 feet.
Coal bed: Harlem.
- 75. *Location:* East of Lonaconing—abandoned.
Elevation: 2,420 feet.
Coal bed: Barton (local name, Bakerstown).
- 76. *Location:* Northwest of Lonaconing—abandoned.
Elevation: 2,180 feet.
Coal bed: Upper Bakerstown.
- 77. *Location:* Northwest of Lonaconing—abandoned.
Coal bed: Harlem.
- 77a. *Location:* Northwest of Lonaconing—outcrop.
Elevation: 2,500 feet.
Coal bed: Barton (local name, Bakerstown).
- 78. *Location:* Northwest of Lonaconing—operating.
Elevation: 2,560 feet.
Operator: Tom Weir.
Coal bed: Lower Bakerstown (local name, Lower Freeport):

<i>Section of bed:</i>	<i>Inches</i>
Coal.....	32
Shale.....	2
Coal.....	15

**DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued**

79. *Location:* Northwest of Lonaconing—abandoned.
Elevation: 2,555 feet.
Operator: Tom and Walter Weir.
Coal bed: Lower Bakerstown (local name, Lower Freeport).
80. *Location:* Northwest of Lonaconing—abandoned.
Elevation: 2,260 feet.
Coal bed: Upper Bakerstown.
81. *Location:* Northwest of Moscow Mills—abandoned.
Elevation: 2,400 feet.
Operator: Campbell Coal Co.
Coal bed: Barton (local name, Bakerstown).
Section of bed:
- | | |
|-----------|---------------|
| Bone..... | <i>Inches</i> |
| Coal..... | 4 |
| | 27 |
82. *Location:* Northwest of Barton—abandoned.
Elevation: 1,970 feet.
Operator: Lonaconing Coal Co.
Coal bed: Barton (local name, Bakerstown).
- 82a. *Location:* Mill Run—operating.
Elevation: 2,130 feet.
Operator: Dilbert Michaels.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
- | | |
|--------------|---------------|
| Bone..... | <i>Inches</i> |
| Coal..... | 18 |
| Clay bottom. | 31 |
83. *Location:* Bartlett Run—abandoned.
Elevation: 1,810 feet.
Operator: Arch Russel.
Coal bed: Barton (local name, Bakerstown).
84. *Location:* Bartlett Run—abandoned.
Operation: Arch Russel.
Coal bed: Barton (local name, Bakerstown).
85. *Location:* Bartlett Run—operating.
Elevation: 1,600 feet.
Operator: Clay Broadwater.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
- | | |
|-----------|---------------|
| Bone..... | <i>Inches</i> |
| Coal..... | 18 |
| | 29 |
86. *Location:* Bartlett Run—abandoned.
Elevation: 1,560 feet.
Operator: Langham, Boal, & Mullan.
Coal bed: Barton (local name, Bakerstown).
87. *Location:* Bartlett Run—operating.
Elevation: 1,395 feet.
Mine: Langham.
Operator: Moscow Georges Creek Coal Co.
Coal bed: Barton (local name, Bakerstown).
Section of bed:
- | | |
|-----------|---------------|
| Bone..... | <i>Inches</i> |
| Coal..... | 12 |
| | 28 |
88. *Location:* Bartlett Run—abandoned.
Elevation: 1,395 feet.
Coal bed: Barton (local name, Bakerstown).
89. *Location:* West of Moscow Mills—abandoned.
Operator: C. R. Green.
Coal bed: Barton (local name, Bakerstown).
90. *Location:* West of Moscow Mills—abandoned.
Operator: Maryland Coal Co.
Coal bed: Barton (local name, Bakerstown).

DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued

91. *Location:* West of Moscow Mills—abandoned.
Elevation: 1,415 feet.
Mine: Jones Lot.
Coal bed: Barton (local name, Bakerstown).
92. *Location:* West of Moscow Mills—abandoned.
Elevation: 1,365 feet.
Operator: Old Colony Coal Co.
Coal bed: Barton (local name, Bakerstown).
93. *Location:* North of Barton—abandoned.
Mine: Pecal.
Operator: Moscow Georges Creek Coal Co.
Coal bed: Barton (local name, Bakerstown).
94. *Location:* Northeast of Barton—operating.
Elevation: 1,330 feet.
Mine: Moscow No. 1.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
- | | |
|----------------|---------------|
| | <i>Inches</i> |
| Bony coal..... | 5 |
| Coal..... | 28 |
95. *Location:* Barton—abandoned.
Elevation: 1,340 feet.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
- | | |
|-----------|------------|
| | 28 inches. |
| Coal..... | |
96. *Location:* Barton—operating.
Operator: Thomas J. Clark.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
- | | |
|----------------|---------------|
| | <i>Inches</i> |
| Bony coal..... | 7 |
| Coal..... | 29 |
| Shale..... | 2 |
| Bony coal..... | 3 |
97. *Location:* Barton—operating.
Operator: Thomas J. Clark.
Coal bed: Barton (local name, Bakerstown).
98. *Location:* West of Barton—operating.
Operator: Consolidated Fuel Co.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
- | | |
|----------------|---------------|
| | <i>Inches</i> |
| Bony coal..... | 13 |
| Coal..... | 27 |
99. *Location:* South of Barton—operating.
Elevation: 1,305 feet.
Operator: Arcadia Coal Co.
Coal bed: Barton (local name, Bakerstown):
Sections of bed:
- | | | | | | | | | | | |
|-----------------|--|---------------|--------------------------|--|--|--|--|--|--|---------------|
| | | | | | | | | | | <i>Inches</i> |
| At mine portal: | | <i>Inches</i> | 1 mile inby mine portal: | | | | | | | |
| Bony coal..... | | 9 | Bony coal..... | | | | | | | 15 |
| Coal..... | | 19 | Coal..... | | | | | | | 27 |
100. *Location:* Southeast of Barton—abandoned.
Elevation: 1,400 feet.
Coal bed: Barton (local name, Bakerstown).
101. *Location:* Southeast of Barton—operating.
Elevation: 1,455 feet.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
- | | |
|-----------|---------------|
| | <i>Inches</i> |
| Bony..... | 5 |
| Coal..... | 29 |
102. *Location:* Southeast of Barton—abandoned.
Coal bed: Barton (local name, Bakerstown).

**DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued**

103.	<i>Location:</i> South of Barton—abandoned. <i>Elevation:</i> 1,455 feet. <i>Coal bed:</i> Barton (local name, Bakerstown): <i>Section of bed:</i>	<i>Inches</i>
	Bone-----	5
	Coal-----	29
104.	<i>Location:</i> Southeast of Barton—abandoned. <i>Coal bed:</i> Barton (local name, Bakerstown).	
105.	<i>Location:</i> South of Barton—abandoned. <i>Coal bed:</i> Barton (local name, Bakerstown).	
106.	<i>Location:</i> Southeast of Barton—abandoned. <i>Elevation:</i> 1,400 feet. <i>Coal bed:</i> Barton (local name, Bakerstown).	
107.	<i>Location:</i> Moores Run—abandoned. <i>Elevation:</i> 1,380 feet. <i>Operator:</i> Hoffa Bros. Coal Co. <i>Coal bed:</i> Barton (local name, Bakerstown).	
108.	<i>Location:</i> Moores Run—abandoned. <i>Operator:</i> Hoffa Bros. Coal Co. <i>Coal bed:</i> Barton (local name, Bakerstown).	
109.	<i>Location:</i> Moores Run—operating. <i>Operator:</i> Ayers Coal Co. <i>Coal bed:</i> Barton (local name, Bakerstown).	
110.	<i>Location:</i> Moores Run—abandoned. <i>Elevation:</i> 1,380 feet. <i>Operator:</i> Hoffa Coal Co. <i>Coal bed:</i> Barton (local name, Bakerstown): <i>Section of bed:</i>	
	Coal-----	29 inches.
111.	<i>Location:</i> Moores Run—operating. <i>Elevation:</i> 1,540 feet. <i>Mine:</i> Coal Chester Resurveyed. <i>Operator:</i> Porter & Hoffa Coal Co. <i>Coal bed:</i> Barton (local name, Bakerstown): <i>Section of bed:</i>	
	Coal-----	28 inches.
112.	<i>Location:</i> Moores Run—operating. <i>Elevation:</i> 1,540 feet. <i>Operator:</i> Alvie Moore. <i>Coal bed:</i> Barton (local name, Bakerstown): <i>Section of bed:</i>	
	Coal-----	28 inches.
113.	<i>Location:</i> East of Barton—abandoned. <i>Elevation:</i> 1,670 feet. <i>Operator:</i> Mease. <i>Coal bed:</i> Barton (local name, Bakerstown).	
114.	<i>Location:</i> Southeast of Barton—abandoned. <i>Elevation:</i> 1,740 feet. <i>Coal bed:</i> Barton (local name, Bakerstown).	
115.	<i>Location:</i> Southeast of Barton—abandoned. <i>Elevation:</i> 1,980 feet. <i>Coal bed:</i> Upper Bakerstown.	
116.	<i>Location:</i> Southeast of Barton—abandoned. <i>Elevation:</i> 2,300 feet. <i>Coal bed:</i> Lower Bakerstown (local name, Freeport).	
117.	<i>Location:</i> Southeast of Barton—abandoned. <i>Elevation:</i> 2,380 feet. <i>Coal bed:</i> Lower Bakerstown (local name, Freeport).	

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DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued

118. *Location:* East of Westernport—abandoned.
Elevation: 2,235 feet.
Coal bed: Lower Bakerstown (local name, Freeport).
119. *Location:* East of Westernport—abandoned.
Elevation: 2,170 feet.
Coal bed: Barton (local name, Bakerstown).
120. *Location:* East of Westernport—abandoned.
Elevation: 2,135 feet.
Coal bed: Barton (local name, Bakerstown).
121. *Location:* Stony Run—abandoned.
Elevation: 1,675 feet.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
- | | |
|-----------|------------|
| Coal..... | 26 inches. |
|-----------|------------|
122. *Location:* Stony Run—abandoned.
Elevation: 1,625 feet.
Coal bed: Harlem.
123. *Location:* Stony Run—abandoned.
Elevation: 1,555 feet.
Coal bed: Barton (local name, Bakerstown).
124. *Location:* Stony Run—abandoned.
Elevation: 1,320 feet.
Coal bed: Upper Kittanning (local name, Brookville).
- 124a. *Location:* East of Westernport—operating.
Elevation: 1,400 feet.
Operator: Austin Duckworth.
Coal bed: Upper Freeport (local name, Split Six):
Section of bed:
- | | <i>Inches</i> |
|------------|---------------|
| Coal..... | 20 |
| Shale..... | 2 |
| Coal..... | 2 |
| Shale..... | 12 |
| Coal..... | 10 |
| Shale..... | 1 |
| Coal..... | 20 |
125. *Location:* East of Westernport—abandoned.
Elevation: 1,590 feet.
Mine: Aden.
Operator: Clyde Martz.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
- | | <i>Inches</i> |
|--------------------|---------------|
| Bone and coal..... | 24 |
| Coal..... | 20 |
126. *Location:* South of Barton—operating.
Operator: Campbell Coal Co.
Coal bed: Barton (local name, Bakerstown).
127. *Location:* South of Barton—operating.
Operator: Campbell Coal Co.
Coal bed: Barton (local name, Bakerstown).
128. *Location:* South of Barton—abandoned.
Coal bed: Lower Bakerstown (local name, Freeport).
129. *Location:* South of Barton—abandoned.
Elevation: 1,170 feet.
Coal bed: Lower Bakerstown (local name, Freeport).
130. *Location:* South of Barton—abandoned.
Mine: Hampshire Freeport.
Coal bed: Lower Bakerstown (local name, Freeport).

**DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued**

- 130a.** *Location:* South of Barton—abandoned.
Mine: Reynolds.
Coal bed: Lower Bakerstown (local name, Freeport).
- 130b.** *Location:* South of Barton—abandoned.
Mine: Althouse.
Coal bed: Lower Bakerstown (local name, Freeport).
- 131.** *Location:* South of Barton—abandoned.
Mine: Hampshire No. 2.
Operator: Campbell Coal Co.
Coal bed: Barton (local name, Bakerstown).
- 132.** *Location:* South of Barton—abandoned.
Mine: Hampshire.
Operator: Campbell Coal Co.
Coal bed: Barton (local name, Bakerstown).
- 133.** *Location:* South of Barton—abandoned.
Elevation: 1,390 feet.
Mine: Hampshire No. 3.
Operator: Campbell Coal Co.
Coal bed: Barton (local name, Bakerstown).
Section of bed:
- | | |
|----------------|---------------|
| | <i>Inches</i> |
| Bony coal..... | 17 |
| Coal..... | 30 |
- 134.** *Location:* South of Barton—abandoned.
Elevation: 1,150 feet.
Mine: Hampshire.
Operator: Campbell Coal Co.
Coal bed: Lower Bakerstown (local name, Freeport):
Section of bed:
- | | |
|----------------|---------------|
| | <i>Inches</i> |
| Coal..... | 4 |
| Bony coal..... | 4¼ |
| Coal..... | 4¾ |
| Bony coal..... | 2 |
| Coal..... | 31¾ |
- 135.** *Location:* Southwest of Barton—abandoned.
Mine: Donald.
Operator: Campbell Coal Co.
Coal bed: Barton (local name, Bakerstown).
- 136.** *Location:* Southwest of Barton—abandoned.
Elevation: 1,540 feet.
Mine: Donald.
Operator: Campbell Coal Co.
Coal bed: Barton (local name, Bakerstown).
- 137.** *Location:* Mill Run—abandoned.
Coal bed: Barton (local name, Bakerstown).
- 138.** *Location:* Mill Run—operating.
Elevation: 1,380 feet.
Mine: Barton Georges Creek No. 2.
Operator: Morrison estate.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
- | | |
|------------------------|---------------|
| | <i>Inches</i> |
| Bony coal..... | 20 |
| Bony coal, banded..... | 3 |
| Coal..... | 28 |
- 139.** *Location:* Mill Run—abandoned.
Coal bed: Barton (local name, Bakerstown).

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DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP PROSPECTS—Continued

140. *Location:* Mill Run—operating.
Elevation: 1,390 feet.
Operator: Campbell Coal Co.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
 Coal----- 30 inches.
141. *Location:* Mill Run—operating.
Operator: J. O. J. Greene.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
 Bone and coal----- Inches
 Coal----- 20
 Coal----- 26
142. *Location:* Mill Run.
Operator: J. O. J. Greene.
Coal bed: Barton (local name, Bakerstown).
143. *Location:* Mill Run.
Operator: J. O. J. Greene.
Coal bed: Barton (local name, Bakerstown).
144. *Location:* Mill Run.
Operator: J. O. J. Greene.
Coal bed: Barton (local name, Bakerstown).
145. *Location:* Mill Run.
Coal bed: Barton (local name, Bakerstown).
146. *Location:* Mill Run.
Operator: Arch Michaels.
Coal bed: Barton (local name, Bakerstown).
147. *Location:* Mill Run.
Elevation: 1,510 feet.
Operator: Arch Michaels.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
 Bone and coal----- Inches
 Coal----- 20
 Coal----- 29
148. *Location:* Mill Run—operating.
Operator: Harry Deshong.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
 Bone and coal----- Inches
 Coal----- 20
 Coal----- 27
149. *Location:* Mill Run—operating.
Elevation: 1,560 feet.
Operator: Arch Michaels.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
 Bone and coal----- Inches
 Coal----- 19
 Coal----- 29
150. *Location:* Mill Run—abandoned.
Elevation: 1,590 feet.
Coal bed: Barton (local name, Bakerstown).
151. *Location:* Northwest of Franklin—abandoned.
Elevation: 1,450 feet.
Operator: Campbell Coal Co.
Coal bed: Barton (local name, Bakerstown).
152. *Location:* Northwest of Franklin—abandoned.
Operator: Burtner Coal Co.
Coal bed: Barton (local name, Bakerstown).
153. *Location:* Northwest of Franklin—abandoned.
Elevation: 1,465 feet.
Operator: Burtner Coal Co.
Coal bed: Barton (local name, Bakerstown).

**DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued**

154. *Location:* Northwest of Franklin—abandoned.
Operator: Burtner Coal Co.
Coal bed: Barton (local name, Bakerstown).
155. *Location:* Northwest of Franklin—abandoned.
Operator: Burtner Coal Co.
Coal bed: Barton (local name, Bakerstown).
156. *Location:* Northwest of Franklin—abandoned.
Elevation: 1,530 feet.
Operator: Burtner Coal Co.
Coal bed: Barton (local name, Bakerstown).
157. *Location:* West of Franklin—abandoned.
Elevation: 1,580 feet.
Operator: Potomac Fuel Co.
Coal bed: Barton (local name, Bakerstown).
158. *Location:* West of Franklin—abandoned.
Elevation: 1,595 feet.
Operator: Piedmont & Georges Creek Coal Co.
Coal bed: Barton (local name, Bakerstown).
159. *Location:* West of Franklin—abandoned.
Elevation: 1,565 feet.
Mine: Washington No. 5.
Operator: Piedmont & Georges Creek Coal Co.
Coal bed: Barton (local name, Bakerstown).
160. *Location:* West of Franklin—abandoned May 31, 1932.
Mine: Washington No. 5.
Operator: Piedmont & Georges Creek Coal Co.
Coal bed: Barton (local name, Bakerstown).
161. *Location:* West of Franklin—abandoned.
Elevation: 1,490 feet.
Mine: Washington No. 5.
Operator: Piedmont & Georges Creek Coal Co.
Coal bed: Barton (local name, Bakerstown).
162. *Location:* West of Franklin—abandoned.
Mine: Washington No. 5.
Operator: Piedmont & Georges Creek Coal Co.
Coal bed: Barton (local name, Bakerstown).
163. *Location:* West of Franklin—abandoned.
Operator: Franklin Coal Co.
Coal bed: Barton (local name, Bakerstown).
164. *Location:* West of Franklin—abandoned.
Operator: Franklin Coal Co.
Coal bed: Barton (local name, Bakerstown).
165. *Location:* West of Franklin—abandoned.
Elevation: 1,430 feet.
Operator: Franklin Coal Co.
Coal bed: Barton (local name, Bakerstown).
166. *Location:* Franklin—abandoned.
Mine: Washington No. 6.
Coal bed: Upper Freeport (local name, Lower Kittanning).
167. *Location:* Franklin—abandoned.
Mine: Washington No. 1.
Operator: Piedmont & Georges Creek Coal Co.
Coal bed: Upper Freeport (local name, Lower Kittanning).

<i>Section of bed:</i>	<i>Inches</i>
Coal.....	32
Shale.....	10½
Coal.....	3½
Bone.....	1½
Coal.....	17

DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP PROSPECTS—Continued

- 168. *Location:* Franklin—abandoned.
Elevation: 1,040 feet.
Operator: Alleghany Coal Co.
Coal bed: Upper Freeport (local name, Lower Kittanning).
- 169. *Location:* Franklin—abandoned.
Operator: Westernport Coal Co.
Coal bed: Upper Freeport (local name, Split Six).
- 170. *Location:* Franklin—abandoned.
Operator: Dailey Coal Co.
Coal bed: Barton (local name, Bakerstown).
- 171. *Location:* Franklin—abandoned.
Elevation: 1,430 feet.
Operator: Dailey Coal Co.
Coal bed: Barton (local name, Bakerstown).
- 171a. *Location:* Franklin—abandoned.
Coal bed: Mahoning (local name, Clean Six).
- 172. *Location:* Franklin—abandoned.
Elevation: 1,025 feet.
Operator: Barton Georges Creek Coal Co.
Coal bed: Upper Freeport (local name, Split Six):
Section of bed:

	<i>Inches</i>
Coal-----	24
Shale-----	14
Coal-----	30
- 173. *Location:* Westernport—abandoned.
Elevation: 990 feet.
Mine: Mud.
Coal bed: Middle Kittanning.
- 174. *Location:* East of Westernport—outcrop.
Elevation: 945 feet.
Coal bed: Mount Savage.
- 175. *Location:* Westernport—abandoned.
Elevation: 1,081 feet.
Operator: Chaney, Miller & Greene.
Coal bed: Mahoning (local name, Six Foot).
- 176. *Location:* Westernport—outcrop.
Elevation: 1,325 feet.
Coal bed: Lower Bakerstown (local name, Freeport).
- 177. *Location:* Westernport—abandoned.
Elevation: 1,470 feet.
Coal bed: Barton (local name, Bakerstown).
- 178. *Location:* Westernport—abandoned.
Coal bed: Barton (local name, Bakerstown).
- 179. *Location:* Luke—abandoned.
Elevation: 1,079 feet.
Coal bed: Upper Freeport (local name, Split Six).
- 180. *Location:* Luke—abandoned.
Mine: Spangler.
Coal bed: Mahoning (local name, Six Foot).
- 181. *Location:* Luke—abandoned.
Elevation: 1,120 feet.
Mine: Merril.
Coal bed: Mahoning (local name, Six Foot).
- 182. *Location:* Luke—abandoned.
Mine: Old Opening B.
Coal bed: Mahoning (local name, Six Foot).

**DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued**

183. *Location:* Luke—abandoned.
Elevation: 967 feet.
Mine: Devon No. 2.
Operator: West Virginia Pulp & Paper Co.
Coal bed: Middle Kittanning (local name, Brookville).
185. *Location:* Luke—abandoned.
Elevation: 974 feet.
Mine: Devon No. 2.
Operator: West Virginia Pulp & Paper Co.
Coal bed: Middle Kittanning (local name, Brookville).
186. *Location:* Luke—abandoned.
Elevation: 1,138 feet.
Mine: Devon.
Operator: West Virginia Pulp & Paper Co.
Coal bed: Mahoning (local name, Six Foot).
187. *Location:* Luke—abandoned.
Elevation: 1,284 feet.
Operator: West Virginia Pulp & Paper Co.
Coal bed: Lower Bakerstown (local name, Freeport):
Section of bed:
- | | |
|-----------------|---------------|
| | <i>Inches</i> |
| Bony coal ----- | 8 |
| Coal ----- | 32 |
188. *Location:* Luke—abandoned.
Elevation: 1,300 feet.
Operator: West Virginia Pulp & Paper Co.
Coal bed: Upper Bakerstown:
Section of bed:
- | | |
|------------------|---------------|
| | <i>Inches</i> |
| Coal ----- | 24 |
| Gray shale ----- | 8 |
| Coal ----- | 21 |
189. *Location:* West of Westernport—abandoned.
Operator: R. C. Roberts.
Coal bed: Barton (local name, Bakerstown).
190. *Location:* West of Westernport—abandoned.
Elevation: 1,490 feet.
Operator: R. C. Roberts.
Coal bed: Barton (local name, Bakerstown).
191. *Location:* East of Bloomington—abandoned.
Mine: Buxton No. 17.
Operator: Davis Coal & Coke Co.
Coal bed: Mahoning (local name, Upper Freeport).
192. *Location:* West of Westernport—abandoned.
Operator: R. C. Roberts.
Coal bed: Barton (local name, Bakerstown).
193. *Location:* West of Westernport—abandoned.
Elevation: 1,520 feet.
Mine: Ross No. 1.
Coal bed: Barton (local name, Bakerstown).
194. *Location:* North of Savage River—abandoned.
Mine: No. 6.
Operator: Davis Coal & Coke Co.
Coal bed: Mahoning (local name, Six Foot).
195. *Location:* North of Savage River—abandoned.
Mine: No. 7.
Operator: Davis Coal & Coke Co.
Coal bed: Mahoning (local name, Six Foot).

DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP PROSPECTS—Continued

196. *Location:* South of Savage River—abandoned.
Elevation: 1,130 feet.
Mine: Black Bear.
Operator: Carol Pattison.
Coal bed: Mahoning (local name, Six Foot):
Section of bed:
- | | <i>Inches</i> |
|------------------------|---------------|
| Coal..... | 12 |
| Slate, dark, hard..... | 15 |
| Coal..... | 36 |
197. *Location:* Northwest of Bloomington—abandoned.
Elevation: 1,100 feet.
Mine: No. 1.
Operator: Bloomington Coal Co.
Coal bed: Mahoning (local name, Six Foot):
Section of bed:
- | | <i>Inches</i> |
|-----------------|---------------|
| Coal..... | 9 |
| Bony coal..... | 7 |
| Soft coal..... | 22 |
| Bony slate..... | 2 |
| Soft coal..... | 26 |
198. *Location:* Northwest of Bloomington—abandoned.
Mine: No. 2.
Operator: Bloomington Coal Co.
Coal bed: Mahoning (local name, Six Foot).
199. *Location:* Northwest of Bloomington—abandoned.
Mine: No. 2½.
Operator: Bloomington Coal Co.
Coal bed: Mahoning (local name, Six Foot).
200. *Location:* Northwest of Bloomington—abandoned.
Mine: No. 3.
Operator: Bloomington Coal Co.
Coal bed: Mahoning (local name, Six Foot).
201. *Location:* West of Bloomington—abandoned.
Elevation: 1,565 feet.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
- | | |
|-----------|------------|
| Coal..... | 30 inches. |
|-----------|------------|
202. *Location:* West of Bloomington—abandoned.
Elevation: 1,565 feet.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
- | | |
|-----------|------------|
| Coal..... | 30 inches. |
|-----------|------------|
203. *Location:* West of Bloomington—abandoned.
Operator: Charles Pattison.
Coal bed: Upper Bakerstown (local name, Freeport).
204. *Location:* West of Bloomington—abandoned.
Operator: Bloomington Coal Co.
Coal bed: Mahoning (local name, Six Foot).
205. *Location:* West of Bloomington—abandoned.
Mine: No. 4.
Operator: Bloomington Coal Co.
Coal bed: Mahoning (local name, Six Foot).
206. *Location:* West of Bloomington—abandoned.
Mine: No. 4.
Operator: Bloomington Coal Co.
Coal bed: Mahoning (local name, Six Foot).
207. *Location:* West of Bloomington—abandoned.
Mine: No. 5.
Operator: Bloomington Coal Co.
Coal bed: Mahoning (local name, Six Foot).

**DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued**

- 208.** *Location:* West of Bloomington—abandoned.
Elevation: 1,145 feet.
Mine: No. 6.
Operator: Bloomington Coal Co.
Coal bed: Mahoning (local name, Six Foot).
- 209.** *Location:* West of Bloomington—operating.
Elevation: 1,100 feet.
Operator: Charles Pattison.
Coal bed: Upper Freeport (local name, Split Six):
Section of bed:
- | | <i>Inches</i> |
|------------------------------|---------------|
| Bony coal | 12 |
| Coal pyrite striations | 18 |
| Mother coal | 1/2 |
| Coal | 3 |
| Shale | 3 |
| Coal pyrite striations | 17 |
| Shale | 1/2 |
| Coal pyrite striations | 15 1/2 |
- 210.** *Location:* West of Bloomington—abandoned.
Elevation: 1,145 feet.
Mine: No. 7.
Operator: Bloomington Coal Co.
Coal bed: Mahoning (local name, Six Foot):
Section of bed:
- | | <i>Inches</i> |
|------------|---------------|
| Coal | 8 |
| Bone | 8 1/2 |
| Coal | 22 |
| Bone | 2 1/2 |
| Coal | 22 |
- 211.** *Location:* West of Bloomington—abandoned.
Operator: Charles Pattison.
Coal bed: Mahoning (local name, Six Foot).
- 212.** *Location:* West of Bloomington—abandoned.
Mine: Pattison No. 3.
Operator: Charles Pattison.
Coal bed: Upper Freeport (local name, Split Six).
- 213.** *Location:* West of Bloomington—operating.
Elevation: 1,720 feet.
Operator: Charles Pattison.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
- | | | | |
|-----------------------------|------------|---------------------------|------------|
| 150 feet in by mine portal: | | <i>Average thickness:</i> | |
| Coal | 72 inches. | Coal | 35 inches. |
- 214.** *Location:* West of Bloomington—operating.
Operator: Charles Pattison.
Coal bed: Barton (local name, Bakerstown):
Section of bed:
- | | |
|------------|------------|
| Coal | 27 inches. |
|------------|------------|
- 216.** *Location:* North of Savage River—abandoned.
Elevation: 1,685 feet.
Coal bed: Upper Freeport (local name, Split Six):
Section of bed:
- | | |
|------------|--|
| Coal | 72 inches (approx.), with 1-inch binder. |
|------------|--|
- 217.** *Location:* Aaron Run—abandoned.
Elevation: 1,790 feet.
Operator: Grove.
Coal bed: Lower Bakerstown (local name, Freeport).

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DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP PROSPECTS—Continued

218. *Location:* Aaron Run—operating.
Elevation: 1,810 feet.
Operator: Elias Grove.
Coal bed: Lower Bakerstown (local name, Freeport):
Section of bed:
 Coal..... 31 inches.
219. *Location:* Aaron Run—operating.
Elevation: 1,905 feet.
Mine: Wilson.
Coal bed: Lower Bakerstown (local name, Freeport):
Section of bed:
 600 feet in by mine portal on right rib: *Inches*
 Coal..... 1½
 Gray coal..... 1½
 Coal..... 2
 Gray coal and sulfur..... 4½
 Coal..... 3½
 Pyrite..... ¼
 Coal..... 22¾
 Mud..... ¼
220. *Location:* Aaron Run—operating.
Elevation: 2,020 feet.
Operator: Ben Herman.
Coal bed: Lower Bakerstown (local name, Freeport):
Section of bed:
 Coal..... 38 inches.
221. *Location:* Aaron Run—abandoned.
Elevation: 1,940 feet.
Operator: Grove Coal Co.
Coal bed: Lower Bakerstown (local name, Freeport).
222. *Location:* Aaron Run—abandoned.
Elevation: 1,960 feet.
Operator: Grove Coal Co.
Coal bed: Lower Bakerstown (local name, Freeport).
223. *Location:* Aaron Run—abandoned.
Elevation: 2,000 feet.
Coal bed: Lower Bakerstown (local name, Freeport):
Dip: 7° S.
Section of bed:
 At mine portal: *Inches*
 Bone..... 2
 Shale..... 2
 Coal..... 8
 Bone..... 6
 Coal..... 36
224. *Location:* West of Barnum—operating.
Operator: J. W. Tasker & Sharpless.
Coal bed: Barton (local name, Bakerstown).
225. *Location:* West of Barnum—abandoned.
Elevation: 1,660 feet.
Mine: Monroe No. 3.
Coal bed: Barton (local names, Elclick or Four Foot).
226. *Location:* West of Barnum—abandoned.
Elevation: 1,425 feet.
Mine: Monroe No. 2.
Coal bed: Lower Bakerstown (local name, Freeport):
Section of bed: *Inches*
 Bone shale..... 6
 Coal..... 32

**DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued**

- 227.** *Location:* West of Barnum—abandoned.
Elevation: 1,230 feet.
Mine: Monroe No. 1.
Coal bed: Upper Freeport (local name, Split Six):
- | <i>Section of bed:</i> | <i>Inches</i> |
|------------------------|---------------|
| Coal..... | 25 |
| Shale..... | 13 |
| Coal..... | 10 |
| Shale..... | 1 |
| Coal..... | 8 |
- 228.** Same as 227.
229. Same as 227.
- 230.** *Location:* West of Barnum—abandoned.
Mine: Monroe No. 3—secondary opening.
Coal bed: Barton (local name, Four Foot).
- 231.** *Location:* North of Vindex—operating.
Operator: Dewy Pough.
Coal bed: Lower Bakerstown (local name, Freeport):
Dip: 7° SE.
- | <i>Section of bed:</i> | <i>Inches</i> |
|------------------------|---------------|
| Clay roof: | |
| Shale..... | 8 |
| Coal..... | 38 |
- 232.** *Location:* North of Vindex—abandoned.
Operator: Ajax Coal Co.
Coal bed: Upper Bakerstown (local name, Upper Freeport).
- 233.** *Location:* North of Vindex—operating.
Elevation: 2,550 feet.
Operator: H. H. Dishong (Ajax Coal Co.).
Coal bed: Lower Bakerstown (local name, Freeport):
Dip: 8° S., 55° E.
- | <i>Section of bed:</i> | <i>Inches</i> |
|-----------------------------|---------------|
| 200 feet inby slope portal: | |
| Bone..... | 3 |
| Coal..... | 1 |
| Bone..... | 12 |
| Coal..... | 39 |
- 234.** *Location:* North of Vindex—operating.
Elevation: 2,400 feet.
Operator: Elias Harvey.
Coal bed: Upper Freeport (local name, Split Six):
- | <i>Section of bed:</i> | <i>Inches</i> |
|------------------------|---------------|
| Bone..... | 3 |
| Coal..... | 21 |
| Shale..... | 6 |
| Bone..... | 12 |
| Coal..... | 27 |
- 235.** *Location:* North of Vindex—operating.
Elevation: 2,500 feet.
Mine: Harvey.
Operator: Charles Harvey.
Coal bed: Lower Bakerstown (local name, Freeport):
- | <i>Section of bed:</i> | <i>Inches</i> |
|---|---------------|
| 525 feet north, 275 feet west of mine portal: | |
| Coal..... | 5 |
| Bony coal..... | 3¼ |
| Coal..... | 7½ |
| Bony coal..... | 1½ |
| Coal..... | 2 |
| Bony coal..... | 12¼ |
| Coal..... | 36¾ |

**DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued**

- 236.** *Location:* North of Vindex—abandoned.
Elevation: 2,475 feet.
Mine: Harvey.
Coal bed: Lower Bakerstown (local name, Freeport).
- 237.** *Location:* North of Vindex—abandoned.
Elevation: 2,380 feet.
Operator: Stanley Virts.
Coal bed: Upper Bakerstown.
- 238.** *Location:* North of Vindex—operating.
Elevation: 2,345 feet.
Operator: Stanley Virts.
Coal bed: Lower Bakerstown (local name, Freeport):
- | | |
|------------------------|---------------|
| <i>Section of bed:</i> | <i>Inches</i> |
| Coal and bone..... | 2 |
| Bone..... | 6 |
| Coal..... | 42 |
- 239.** *Location:* North of Vindex—operating.
Elevation: 2,270 feet.
Operator: Stanley Virts.
Coal bed: Lower Bakerstown (local name, Freeport):
- | | |
|------------------------|---------------|
| <i>Section of bed:</i> | <i>Inches</i> |
| Bone..... | 5 |
| Coal..... | 8 |
| Bone..... | 6 |
| Coal..... | 41 |
- 240.** *Location:* North of Vindex—abandoned.
Elevation: 2,460 feet.
Operator: Roland Duckworth.
Coal bed: Barton (local name, Bakerstown).
- 241.** *Location:* North of Vindex—operating.
Elevation: 2,305 feet.
Operator: Roland Duckworth.
Coal bed: Lower Bakerstown (local name, Freeport):
- | | |
|----------------------------|---------------|
| <i>Section of bed:</i> | <i>Inches</i> |
| 150 feet inby mine portal: | |
| Bone..... | 12 |
| Shale..... | 1½ |
| Bone..... | 1½ |
| Coal..... | 45 |
- 242.** *Location:* North of Vindex—abandoned.
Elevation: 2,360 feet.
Operator: Ralph Harvey.
Coal bed: Lower Bakerstown (local name, Freeport).
- 243.** *Location:* North of Vindex—abandoned.
Elevation: 2,390 feet.
Operator: Ralph Harvey.
Coal bed: Lower Bakerstown (local name, Freeport).
- 244.** *Location:* North of Vindex—operating.
Elevation: 2,430 feet.
Operator: Earl Paugh (Pritts).
Coal bed: Lower Bakerstown (local name, Freeport):
- | | |
|------------------------|------------|
| <i>Section of bed:</i> | |
| Coal..... | 36 inches. |
- 245.** *Location:* North of Vindex—abandoned.
Elevation: 2,480 feet.
Operator: Pritts.
Coal bed: Lower Bakerstown (local name, Freeport).

**DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued**

246. *Location:* North of Vindex—operating.
Elevation: 2,540 feet.
Operator: Jim Harvey.
Coal bed: Lower Bakerstown (local name, Freeport):
Section of bed:
 Coal..... 42 inches.
247. *Location:* North of Vindex—operating.
Elevation: 2,520 feet.
Mine: Turner drift.
Operator: Fazenbaker.
Coal bed: Upper Freeport (local name, Split Six):
Dip: 5° S., 55° W.
Section of bed:

	<i>Inches</i>
Coal.....	14
Shale.....	10
Coal.....	20
Shale.....	18
Coal.....	38
248. *Location:* North of Vindex—abandoned.
Elevation: 2,726 feet.
Mine: Sharpless drift (open trench, 1946).
Coal bed: Upper Freeport (local name, Lower Kittanning):
Section of bed:

	<i>Inches</i>
Coal.....	24
Shale.....	24
Coal.....	12
Shale.....	16
Coal.....	46
249. *Location:* North of Vindex—abandoned.
Elevation: 2,730 feet.
Operator: Sharpless.
Coal bed: Lower Bakerstown (local name, Freeport):
Dip: 10° SE.
Section of bed:
 100 feet in by slope portal:

	<i>Inches</i>
Bone.....	4
Coal.....	26
250. *Location:* North of Vindex—abandoned.
Mine: Tasker drift.
Coal bed: Upper Kittanning (local name, Clarion).
251. *Location:* North of Vindex—abandoned.
Elevation: 2,847 feet.
Coal bed: Middle Kittanning.
252. *Location:* North of Vindex—abandoned.
Elevation: 2,525 feet.
Coal bed: Upper Kittanning (local name, Clarion).
253. *Location:* North of Vindex—abandoned.
Elevation: 2,703 feet.
Mine: Sharpless drift.
Coal bed: Lower Bakerstown (local name, Freeport).
254. *Location:* Northwest of Vindex—abandoned.
Operator: George T. Bowers.
Coal bed: Upper Freeport (local name, Lower Kittanning).
- 254a. *Location:* West of Vindex—abandoned.
Coal bed: Lower Bakerstown.
255. *Location:* West of Vindex—operating.
Elevation: 2,280 feet.
Mine: Manor No. 1.
Operator: Johnstown Coal & Coke Co.
Coal bed: Upper Freeport (local name, B).

DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP PROSPECTS—Continued

256. *Location:* West of Vindex—operating.
Elevation: 2,260 feet.
Mine: Manor No. 3.
Operator: Johnstown Coal & Coke Co.
Coal bed: Upper Freeport (local name, B).
- 256a. *Location:* West of Vindex—abandoned.
Coal bed: Mahoning (local name, Upper Kittanning):
Section of bed:
- | | |
|-----------|---------------|
| Bone..... | <i>Inches</i> |
| Coal..... | 5 |
| Coal..... | 33 |
257. *Location:* West of Vindex—abandoned.
Elevation: 2,000 feet.
Operator: Johnstown Coal & Coke Co.
Coal bed: Upper Kittanning (local name, Clarion):
Section of bed:
- | | |
|------------|------------------|
| Coal..... | <i>Inches</i> |
| Shale..... | 30 $\frac{1}{4}$ |
| Coal..... | 2 |
| Coal..... | 13 $\frac{3}{4}$ |
258. *Location:* West of Vindex—abandoned.
Elevation: 2,140 feet.
Mine: Chaffee Coal Co.
Operator: Johnstown Coal & Coke Co.
Coal bed: Upper Freeport (local name, Lower Kittanning).
259. *Location:* East of Vindex—not working.
Elevation: 1,680 feet.
Mine: Standard.
Operator: Earl Pritts.
Coal bed: Upper Kittanning (local name, Clarion):
Dip: 7° E.
Section of bed:
- | | |
|------------|-----------------|
| Coal..... | <i>Inches</i> |
| Shale..... | 34 |
| Coal..... | 1 $\frac{1}{2}$ |
| Coal..... | 12 |
260. *Location:* East of Vindex—operating.
Elevation: 1,756 feet.
Mine: Earl No. 2.
Operator: Earl Pritts.
Coal bed: Upper Freeport (local name, Lower Kittanning):
Section of bed:
- | | |
|------------|------------------|
| Bone..... | <i>Inches</i> |
| Shale..... | 2 $\frac{1}{2}$ |
| Coal..... | 1 $\frac{1}{4}$ |
| Coal..... | 14 $\frac{1}{2}$ |
| Shale..... | 18 |
| Coal..... | 18 $\frac{1}{4}$ |
| Shale..... | 1 $\frac{1}{2}$ |
| Coal..... | 3 $\frac{1}{2}$ |
| Clay..... | $\frac{1}{2}$ |
| Coal..... | 21 |
261. *Location:* East of Vindex—operating.
Elevation: 1,750 feet.
Mine: Earl No. 2.
Operator: Earl Pritts.
Coal bed: Upper Freeport (local name, Lower Kittanning).
262. *Location:* North of Kitzmiller—abandoned.
Elevation: 1,640 feet.
Mine: Louise.
Operator: Potomac Valley Coal Co.

**DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued**

<i>Coal bed:</i> Upper Freeport (local name, Lower Kittanning):		
<i>Section of bed:</i>		<i>Inches</i>
	Bony coal	14
	Shale	22
	Coal	26
	Shale	4
	Coal	17
263.	<i>Location:</i> North of Kitzmiller—operating.	
	<i>Elevation:</i> 1,860 feet.	
	<i>Mine:</i> Milton No. 1.	
	<i>Operator:</i> Nethkin Coal Co.	
<i>Coal bed:</i> Lower Bakerstown (local name, Upper Freeport):		
<i>Section of bed:</i>		<i>Inches</i>
	Coal	12
	Bone	4
	Coal	30
264.	<i>Location:</i> North of Kitzmiller—abandoned.	
	<i>Elevation:</i> 1,890 feet.	
	<i>Mine:</i> Pewee.	
	<i>Operator:</i> Pritts Bros. Coal Co.	
<i>Coal bed:</i> Lower Bakerstown (local name, Upper Freeport).		
265.	<i>Location:</i> North of Kitzmiller—abandoned.	
	<i>Elevation:</i> 1,900 feet.	
	<i>Mine:</i> Pewee.	
	<i>Operator:</i> Pritts Bros. Coal Co.	
<i>Coal bed:</i> Lower Bakerstown (local name, Upper Freeport).		
266.	<i>Location:</i> North of Kitzmiller—outcrop.	
<i>Coal bed:</i> Upper Freeport (local name, Lower Kittanning).		
267.	<i>Location:</i> North of Kitzmiller—operating.	
	<i>Elevation:</i> 1,910 feet.	
	<i>Mine:</i> Pewee.	
	<i>Operator:</i> Pritts Bros. Coal Co.	
<i>Coal bed:</i> Lower Bakerstown (local name, Upper Freeport).		
268.	<i>Location:</i> North of Kitzmiller—outcrop.	
<i>Coal bed:</i> Middle Kittanning (local name, Brookville):		
<i>Section of bed:</i>		
	Coal	10 inches.
269.	<i>Location:</i> North of Kitzmiller—operating.	
	<i>Elevation:</i> 1,960 feet.	
	<i>Operator:</i> Hamill Coal Co.	
<i>Coal bed:</i> Lower Bakerstown (local name, Upper Freeport).		
270.	<i>Location:</i> North of Kitzmiller—operating.	
	<i>Elevation:</i> 1,755 feet.	
	<i>Mine:</i> Hamill No. 1.	
	<i>Operator:</i> McNitt Coal Co.	
<i>Coal bed:</i> Upper Freeport (local name, Lower Kittanning):		
<i>Section of bed:</i>		<i>Inches</i>
	Coal	16
	Shale	21
	Coal	16
	Shale	4
	Coal	8
271.	<i>Location:</i> North of Kitzmiller—outcrop.	
	<i>Elevation:</i> 1,690 feet.	
	<i>Operator:</i> Hamill Coal Co.	
<i>Coal bed:</i> Upper Kittanning (local name, Clarion):		
<i>Section of bed:</i>		
	Coal	32 inches.

**DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued**

- 272.** *Location:* North of Kitzmiller—abandoned.
Mine: Hamill No. 2.
Operator: Jenkins Bros.
Coal bed: Upper Freeport (local name, Lower Kittanning).
- 273.** *Location:* North of Kitzmiller—abandoned.
Elevation: 1,780 feet.
Mine: Hamill No. 3.
Operator: Jenkins Bros.
Coal bed: Upper Freeport (local name, Lower Kittanning).
- 274.** *Location:* Kitzmiller—abandoned.
Mine: Hamill No. 4.
Operator: Ray Blackburn.
Coal bed: Upper Freeport (local name, Lower Kittanning).
- 274a.** *Location:* Kitzmiller—operating.
Elevation: 2,000 feet.
Operator: Barick Coal Co.
Coal bed: Lower Bakerstown (local name, Freeport).
Dip: 2° E.
Section of bed:
- | | |
|----------------------------|---------------|
| 200 feet inby mine portal: | <i>Inches</i> |
| Shale..... | 4 |
| Coal..... | 2 |
| Shale..... | 4 |
| Bone..... | 2 |
| Coal..... | 34 |
- 275.** *Location:* West of Kitzmiller—operating.
Elevation: 1,795 feet.
Operator: L. B. Sharpless.
Coal bed: Upper Freeport (local name, Lower Kittanning).
- 276.** *Location:* West of Kitzmiller—operating.
Elevation: 1,825 feet.
Operator: Harvey (Bray Coal Co.).
Coal bed: Upper Freeport (local name, Lower Kittanning):
- 277.** *Location:* West of Kitzmiller—operating.
Elevation: 1,840 feet.
Mine: Blain Mining Co.
Coal bed: Upper Freeport (local name, Lower Kittanning).
- 278.** *Location:* West of Kitzmiller—abandoned.
Elevation: 2,320 feet.
Operator: Dick Bray.
Coal bed: Upper Bakerstown (local name, Freeport):
Section of bed:
- | | |
|-----------|------------|
| Coal..... | 18 inches. |
|-----------|------------|
- 279.** *Location:* West of Kitzmiller—operating.
Mine: Wolfden Coal Co.
Operator: H. A. Marshall.
Coal bed: Upper Freeport (local name, Lower Kittanning).
- 280.** *Location:* West of Kitzmiller—operating.
Mine: Wolfden Coal Co.
Operator: H. A. Marshall.
Coal bed: Upper Freeport (local name, Lower Kittanning).
- 281.** *Location:* Southwest of Kitzmiller—operating.
Elevation: 1,890 feet.
Mine: Wolfden Coal Co.
Operator: H. A. Marshall.

**DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP
PROSPECTS—Continued**

<i>Coal bed:</i> Upper Freeport (local name, Lower Kittanning):	
<i>Section of bed:</i>	
3,000 feet inby mine portal:	<i>Inches</i>
Coal.....	12
Shale.....	18
Coal.....	9
Shale.....	1½
Coal.....	18
Shale.....	1
Coal.....	16
282. <i>Location:</i> Southwest of Kitzmiller—abandoned.	
<i>Elevation:</i> 1,960 feet.	
<i>Mine:</i> Wolfden Coal Co.	
<i>Operator:</i> H. A. Marshall Coal Co.	
<i>Coal bed:</i> Mahoning (local name, Upper Kittanning).	
<i>Section of bed:</i>	<i>Inches</i>
Coal.....	3½
Shale.....	½
Coal.....	31
Bone.....	2
283. <i>Location:</i> Southwest of Kitzmiller—operating.	
<i>Mine:</i> Wolfden Coal Co.	
<i>Operator:</i> H. A. Marshall.	
<i>Coal bed:</i> Mahoning (local name, Upper Kittanning).	
284. <i>Location:</i> Southwest of Kitzmiller—operating.	
<i>Mine:</i> James De Marco.	
<i>Coal bed:</i> Lower Kittanning:	
<i>Section of bed:</i>	<i>Inches</i>
Bone.....	2
Shale.....	2½
Bone.....	5½
Coal.....	9
Shale.....	3
Coal.....	41½
285. <i>Location:</i> Southwest of Kitzmiller—abandoned.	
<i>Mine:</i> Dodson No. 1.	
<i>Coal bed:</i> Upper Freeport (local name, Lower Kittanning).	
286. <i>Location:</i> Southwest of Kitzmiller—abandoned.	
<i>Mine:</i> Dodson Coal Co.	
<i>Coal bed:</i> Mahoning (local name, Upper Kittanning).	
287. <i>Location:</i> Southwest of Kitzmiller—abandoned.	
<i>Mine:</i> Dodson No. 3.	
<i>Coal bed:</i> Upper Freeport (local name, Lower Kittanning).	
288. <i>Location:</i> Southwest of Kitzmiller—abandoned.	
<i>Mine:</i> Dodson No. 5.	
<i>Coal bed:</i> Upper Freeport (local name, Lower Kittanning).	
289. <i>Location:</i> Lostland Run—operating.	
<i>Elevation:</i> 2,650 feet.	
<i>Operator:</i> Elsie Collins.	
<i>Coal bed:</i> Lower Bakerstown.	
290. <i>Location:</i> Lostland Run—operating.	
<i>Elevation:</i> 2,640 feet.	
<i>Operator:</i> Hefling.	
<i>Coal bed:</i> Lower Bakerstown.	

DESCRIPTION OF OPERATING AND ABANDONED MINES AND OUTCROP PROSPECTS—Continued

291. *Location:* Lostland Run—operating.
Elevation: 2,700 feet.
Operator: William Paul.
Coal bed: Lower Bakerstown:
Section of bed:
- | | <i>Inches</i> |
|------------------|---------------|
| Coal..... | 4 |
| Bony shale..... | 11 |
| Coal..... | 20 |
| Cannel coal..... | 2 |
| Coal..... | 8 |
292. *Location:* Lostland Run—abandoned.
Elevation. 2,700 feet.
Operator: William Paul.
Coal bed: Lower Bakerstown.
293. *Location:* Lostland Run—operating.
Elevation: 2,720 feet.
Operator: George Tasker.
Coal bed: Lower Bakerstown:
Dip: 5° SE.
Section of bed:
- | | <i>Inches</i> |
|--|---------------|
| <i>Left rib 150 feet inby mine portal:</i> | |
| Coal..... | 3 |
| Coaly shale..... | 13 |
| Coal..... | 20 |
| Cannel coal..... | 1 |
| Coal..... | 9 |
294. *Location:* Lostland Run—abandoned.
Operator: Albert Biggs and C. P. Martin.
Coal bed: Lower Bakerstown.
295. *Location:* Lostland Run—abandoned.
Operator: George Ouphold.
Coal bed: Lower Bakerstown.



