COAL BEDS IN ALLEGHENY COUNTY, PENNSYLVANIA

By

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Introduction.

The earliest record of bituminous coal mining in Pennsylvania is 1760, when, according to Captain Thomas Hutchins, a coal mine was opened on Monongahela River, opposite Fort Pitt, now Pittsburgh. From that date production grew, and Allegheny County was the largest producer of bituminous coal in Pennsylvania for many years. At the present time, the largest factor in that production, the Pittsburgh coal, is rapidly approaching exhaustion in Allegheny County. However, the county has a large reserve of "Thick Freeport" coal, and the Kittanning coals, which have hardly been touched.

In 1918 Allegheny County stood fifth in Pennsylvania as a bituminous coal producer, being excelled by Fayette, Westmoreland, Washington, and Cambria counties. The county produced 17,375,035 tons of coal, valued at $42,890,485, and distributed as follows: 15,847,003 tons, valued at $39,382,625 loaded at the mines for shipment; 1,230,084 tons, valued at $2,921,199 sold to local trade and used by employees; 296,970 tons used at the mines for steam and heat, valued at $584,994; 978 tons, valued at $1,467 made into coke at the mines.

There are about thirty coal beds in the county, most of which are only a few inches thick. The Pittsburgh and the "Thick Freeport" beds are the most valuable at the present time. The Sewickley, Redstone, and Kittanning coals are locally workable. The others are thin and only locally valuable at present.

Allegheny County is in the southwestern part of the State. It is bounded on the north by Butler County, on the east and southeast
by Westmoreland County, on the south and southwest by Washington County, and on the northwest by Beaver County. Its greatest width from north to south is 33 miles, and from east to west 34.5 miles. Its area is 746 square miles. Its population in 1920 was 1,185,808, one-half of which is in Pittsburgh. With the exception of Philadelphia County, it is the most thickly populated county in the State.

Allegheny County has most excellent transportation facilities, both by water and rail. The Allegheny, Monongahela, and Ohio rivers are navigable, and railroads radiate from Pittsburgh in all directions.

Coal was first shipped from Pittsburgh in 1803, when the Louisiana was ballasted with coal that was sold at Philadelphia for 37½ cents per bushel. The great growth of the river coal trade began with the completion of the Monongahela Navigation Company's system of locks to Brownsville in 1844. Now the Monongahela and Ohio rivers are used extensively for transporting coal by barge to the trade centers down the Ohio. This is the cheapest transportation method in the State.

The wonderful prosperity of Allegheny County as a manufacturing center is primarily due to its ideal geographic location, and to the large quantity of high-grade coal easily accessible within a short distance.

Allegheny County, being in a maturely dissected region, is hilly. The principal streams have eroded their valleys to a fairly uniform grade, and the smaller branches have cut the uplands into hundreds of narrow ridges. In areas where heavy sandstones predominate, the hillsides are steep and rugged, but where sandstone is the cap rock the tops of the hills are broad and flat. The rivers flow in broad flood plains, and remnants of old valley floors form terraces above them.

**STRUCTURE.**

There are eleven structural features in Allegheny County, each having a northeast-southwest trend, and affecting the position and mining of the coals. They are described in order from southeast to northwest.

The Murrysville anticline enters Allegheny County at Lock No. 3 on Monongahela River, extends northeast, and leaves the county about 1 mile south of Trafford City. It is a well defined fold, having rather steep dips on each flank, and an axis rising rapidly north-eastward. This structure is the source of gas in the McKeesport field.

The Duquesne syncline, lying northwest of the Murrysville anticline, enters the county midway between Peters Creek and Monongahela River, and extends northeast through Duquesne and Turtle Creek. It is a narrow basin having gentle slopes on both flanks. The axis rises gently northeastward.

The Amity anticline, lying northwest of the Duquesne syncline,
enters the county 1.5 miles east of Library, and extends northeast to Braddock and Verona. It is a well developed fold with rather high dips on its flanks in the southern part of the county, but flattens out near Monongahela River.

The McMurry syncline is the next structure to the northwest. It enters Allegheny County one mile west of Library, extends northeast near Broughton, and flattens out near Homestead. It is a pronounced fold in the southern part of the county, and has steep dips on its southeast flank; the dips on its west flank are gentle. The axis rises gradually northeastward.

The Nineveh syncline and Chartiers Creek cross the county line at the same point, near Boyce. The axis runs north to Rosedale, turns east at the County Home, north through Woodville and Heidelberg, and passes between Duquesne Heights and West End, thence down the Ohio to Bellevue, where as a very minor fold it again turns northeast. Its axis pursues an irregular course, has several depressions, and rises gently to the northeast. The dips are gentle and regular on both flanks.

The Wildwood anticline lies entirely in Allegheny County. Its northern end has not been mapped but the axis passes the mouth of North Fork of Pine Creek with a southwest course and plunge. One mile south of Nedsky it turns south for one mile, then almost due west. A minor spur shoots off to the southeast along Girty Run. The main axis forks in the northwest corner of Ross township. One fork of the anticline turns south and crosses Ohio River at Avalon. The other with a level crest runs west and south along Toms Run and crosses the river in Glenfield where the axis plunges very rapidly to the south, and becomes more and more obscure.

The Mount Nebo syncline, lying northwest of the Wildwood anticline, enters the county from the south at McDonald. It extends in an irregularly northeast course to Coraopolis, crosses Ohio River at the west end of Neville Island, runs northeast to Nedsky, where it turns and runs approximately due north, and leaves the county two miles northeast of Brush Creek. The axis of the trough rises about 80 feet in the first mile north of the river, passes through the Mount Nebo oil field, pitches slightly to the bottom of a shallow basin 1.5 miles southeast of Ingomar, and from this point rises gradually to the north.

The Brush Creek anticline is the most prominent fold in the northwestern part of the county. Its southern tip is at Coraopolis, from which point it extends in an irregular northeast direction near Bayne and Brush Creek, leaving the county one mile west of Mt. Pleasant Church. The axis rises rapidly northeast, and the dips on both flanks are steep.

The Sewickley syncline lies west of the Brush Creek anticline and branches off from the Mount Nebo syncline at Coraopolis. It passes through Sewickley, and thence north to Sewickley Creek just west of Hopkins Church. It is a prominent and clearly defined feature, with the axis rising rapidly northward.
The Crows Run anticline lies west of the Sewickley syncline. Its southern end is about three miles south of Glenwillard. The axis crosses Ohio River at Deadman Island near Leetsdale, and thence runs slightly east of north for several miles. The dips on both flanks are gentle.

The West Middletown syncline lies near the western boundary of the county. It enters the county from the south near Murdocksville, and leaves it on the north just east of Ambri{d}e, crossing the Ohio at Shousetown. It is a well defined trough in Washington County, but in Allegheny County is ill-defined.

The Panhandle trench is a peculiar "swamp" or small structural depression between Beadling and Hickman, in the southwestern part of the county.

**STRATIGRAPHY.**

The outcropping hard rocks of Allegheny County are the Washington, Monongahela, Conemaugh, and Allegheny formations of Carboniferous age.

Drill holes have reached below the Catskill formation of Devonian age, but no workable coal beds were recorded below the Allegheny formation.

The recent river deposits are unconsolidated silts, clays and gravels deposited on flood plains.

Glacial deposits on the old river terraces in the northern part of the county are composed of poorly stratified beds of gravel, sand, and clay from 25 to 50 feet thick. Most of the pebbles are quartz, granite, and sandstone. The Carmichaels formation consisting of clay, sand, and coarse boulders, is found on terraces along the Ohio and its tributary streams.

The Washington formation is present only in a few isolated areas in the southern part of the county. It is composed of soft shaly sandstones, shales, a few thin limestones, and two thin coal beds.

The Monongahela formation is present only in the southern part of the county. It is composed of sandstones, limestones, shales, and three workable coal beds, one being the Pittsburgh. The formation has an average thickness of 330 feet.

The Conemaugh formation has the most extensive outcrop in the county. It averages 625 feet thick, and is composed of grey, red and greenish shales, sandstones, limestones, and a number of coal beds, some of which are workable.

The Allegheny formation has a limited outcrop on Allegheny River, north of Pittsburgh. It is composed of massive sandstones, shales, thin limestones, and valuable beds of coal and clay. Its average thickness is 290 feet.
COAL BEDS.

The following table shows the stratigraphic relation of the coal beds and their range in thickness.

### Coal Beds in Allegheny County

<table>
<thead>
<tr>
<th>Name of bed</th>
<th>Average interval</th>
<th>Range in thickness of coal beds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wayneburg</td>
<td>90</td>
<td>0 - 3'0&quot;</td>
</tr>
<tr>
<td>Uniontown</td>
<td>130</td>
<td>0 - 1'0&quot;</td>
</tr>
<tr>
<td>Sewickley</td>
<td>40</td>
<td>0 - 3'6&quot;</td>
</tr>
<tr>
<td>Redstone</td>
<td>70</td>
<td>6&quot; - 5'0&quot;</td>
</tr>
<tr>
<td>Pittsburgh (Lower Div.)</td>
<td></td>
<td>3'6&quot; - 9'0&quot;</td>
</tr>
<tr>
<td>Little Clarksburg</td>
<td>100</td>
<td>0 - 2'0&quot;</td>
</tr>
<tr>
<td>Wellersburg</td>
<td>85</td>
<td>0 - 2'0&quot;</td>
</tr>
<tr>
<td>Duquesne</td>
<td>80</td>
<td>0 - 3'0&quot;</td>
</tr>
<tr>
<td>Harlem</td>
<td>28</td>
<td>0 - 2'0&quot;</td>
</tr>
<tr>
<td>Bakerstown</td>
<td>90</td>
<td>0 - 2'8&quot;</td>
</tr>
<tr>
<td>Brush Creek (Gallitzin)</td>
<td>120</td>
<td>0 - 2'6&quot;</td>
</tr>
<tr>
<td>Mahoning</td>
<td>50</td>
<td>0 - 2'0&quot;</td>
</tr>
<tr>
<td></td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>Upper Freeport</td>
<td></td>
<td>2' - 10'0&quot;</td>
</tr>
<tr>
<td>Lower Freeport</td>
<td></td>
<td>0 - 2'0&quot;</td>
</tr>
<tr>
<td>Upper Kittanning</td>
<td></td>
<td>6&quot; - 2'0&quot;</td>
</tr>
<tr>
<td>Middle Kittanning</td>
<td></td>
<td>0 - 2'0&quot;</td>
</tr>
<tr>
<td>Lower Kittanning</td>
<td></td>
<td>0 - 2'0&quot;</td>
</tr>
<tr>
<td>Clarion</td>
<td></td>
<td>0 - 2'6&quot;</td>
</tr>
<tr>
<td>Brookville</td>
<td></td>
<td>0 - 2'0&quot;</td>
</tr>
</tbody>
</table>

- 5 -
The greatest coal reserves in Allegheny County are in the Allegheny formation, which contains the Kittanning and Freeport groups of coal beds. This formation outcrops on Allegheny River north of Pittsburgh and on Pine Creek in the north central part of the county, but lies deep under the remainder of the county. The quality and thickness of its coals are known by private concerns that have tested their properties with core drills. Unfortunately this Survey does not have much information concerning these records and the discussion of these coals will necessarily be limited. It is hoped that eventually information will be available so that this Survey can make a more comprehensive statement concerning these coals. It is only by cooperation between private concerns and the State bureaus that general knowledge of our mineral resources can be advanced.

Brookville and Clarion Coals. These coals are known only from drill records. They are thin beds, averaging less than 1 foot each, and having a local maximum thickness of two feet. They are lacking in large parts of the county, or their horizons are marked by several feet of bituminous shale.

Kittanning Coals. These beds, lying under deep cover in practically all the county, are known only from drill records. They are thin wherever they have been identified. The Lower Kittanning is the most promising bed, but averages only about 1 foot thick where found. Locally it is 2 feet 6 inches thick and may be workable. The Middle and Upper Kittanning coals are thin and insignificant.

Upper Freeport Coal. The question as to whether a thick coal at the top of the Allegheny formation in the northeastern part of Allegheny County is the Upper Freeport, or a combination of the Upper and Lower Freeport, has long been discussed by coal men. It is hoped that the detailed geological work to be done by this Survey in that region will solve the problem. For convenience, the "Thick Freeport" coal will be discussed here under the heading of Upper Freeport.

The Upper Freeport coal outcrops in the northeast corner of the county on Allegheny River, and in the north central part of the county on Pine Creek. The coal ranges from 2 to 10 feet thick. Where thickest there is commonly 2 feet of cannell coal at the top. A shale and bone parting varying from 1\frac{1}{2} inches to 2 feet thick is usually present in the bed about 2 feet from the top. When this parting exceeds 14 inches, the upper bench is not mined, and the parting is left as the roof. Two binders of bony coal are invariably present, one about 5 inches, and the other about 12 inches from the bottom. Often the upper binder is used as a floor, and the two thin benches of coal underlying it are not mined.

The area of Thick Freeport coal in Allegheny County is confined to the eastern half of Richland township, the northern half of Hampton township, all of West Deer township except the northeast corner; most of Indiana township, the eastern half of O'Hara township, all of Harmar and Springdale townships, and the greater part of Frazer township; all of Plum township and the northeast part of Penn township. The dividing line between the "Thick" and "Thin Freeport" coal in Frazer township runs north 35° W. from Tarentum.
The bed is mined extensively at the following points in the area: Creighton, Frazer township, drift; Glassmere, Frazer township, slope, 50 feet; Russellton, West Deer township, shaft, 226 feet; north of Russellton, shaft, 210 feet; 1 mile south of Cumerville, shaft, 110 feet; 1 mile west of Cumerville, shaft, 110 feet; Bairdstown, shaft, 210 feet; Indiana, Indiana township, shaft, 197 feet; Harwick, Springdale township, shaft, 220 feet. On the east side of Allegheny River in Allegheny County the "Thick Freeport" is mined at Renton, Plum township, shaft, 520 feet; Unity, Penn township, shaft, 298 feet; Barking, Plum township, shaft, 120 feet; Logan’s Ferry, shaft, 168 feet.

The "Thick Freeport" is a friable coal, composed of alternating bright lustrous and dull resinous bands. The lower part of the bed is "blocky", the middle part is the "stick" variety, and locally the top of the bed is cammeloid coal. The coal breaks out in fair sized lumps. It averages about 33 per cent volatile matter, 56 per cent fixed carbon, 8 per cent ash, and 1.5 per cent sulphur.

Conemaugh Coals. The Conemaugh formation contains seven or more coal beds of irregular occurrence called in ascending order, Mahoning, Brush Creek (Gallitzin), Bakerstown, Harlem, Duquesne, Wellsburg, and Little Clarksburg.

**Mahoning Coal.** This bed averages about 8 inches, and has a local maximum thickness of 2 feet. It has never been mined.

**Brush Creek Coal.** This bed is persistent, but thin in Allegheny County. It averages about 1 foot thick where present, and has a maximum thickness of 2 feet 6 inches. It has been mined in the northern part of the county for house coal.

**Bakerstown Coal.** The Bakerstown coal received its name from Bakerstown, Richland township, where the coal is 2 feet 8 inches thick, including two thin shale partings. It has been mined for house coal in this vicinity. The bed is very lenticular, but will average 18 inches thick in the northern part of the county; in the southern part of the county it is very thin or entirely lacking.

**Harlem Coal.** This bed is unimportant in the county, having a maximum thickness of 2 feet 9 inches, and an average thickness of 20 inches. It has not been mined.

**Duquesne Coal.** This bed is generally thin, but very persistent in Allegheny County. It probably is thickest at Murdocksville, where it is over 3 feet. It is an excellent blacksmithing coal and has been mined. The bed has been opened east of Perrysville, where the coal is reported to be 6 feet thick, 3 feet 4 inches of which is good clean coal. It has also been opened at many places in Franklin and Marshall townships, where it ranges from 1 to 5 feet thick.

**Little Clarksburg Coal.** This thin but persistent bed averages less than 12 inches but has a maximum thickness of 2 feet 6 inches in the extreme southwest corner of the county. It is 2 feet thick at Bayne.
Pittsburgh Coal. The Pittsburgh coal is the most important bed in Allegheny County, its type locality. Generally the bed is double, consisting of a roof division and a lower division, separated by a clay parting 1 inch to 3 feet thick and containing thin bands of coal. The roof division ranges from 2 inches to 8 feet thick, increasing in thickness northward. Occasionally it is a single bench, but commonly it contains two or more benches of coal, separated by clay. The coal of the upper division invariably is poor, because of the large percentage of ash.

The lower division of the Pittsburgh bed is $3\frac{1}{2}$ to 9 feet thick, and has three persistent shale and bone partings; which divide it into four distinct benches, the "upper of breast," the "bearing-in," the "brick," and the "lower bottom" coal.

The "upper" bench averages about 4 feet of good clean "stick" coal. Locally it has a thin bone parting.

The "bearing-in" bench, 2 to 4 inches thick, is separated from the other benches by thin bone partings. The coal is soft, and falls to slack when mined.

The "brick" bench, ranging from a few inches to three feet thick, is characterized by cleavage planes which break the coal into brick-shaped blocks. The coal is excellent.

The "lower bottom" bench is thin and dirty. Locally it is worthless, and is left in the mine for bottom.

The Pittsburgh coal contains 57 to 65 per cent fixed carbon, 20 to 35 per cent volatile matter, 4 to 14 per cent ash, and the sulphur is usually under 1 per cent.

Only about 250 acres of Pittsburgh coal remain in Allegheny County between Ohio and Allegheny rivers. In that district the roof division has a maximum thickness of 6 feet, including partings; the main clay averages 8 inches; the lower division averages 5 feet, and is separated into three benches by very thin partings.

An enormous quantity of excellent steam and gas coal has been taken from the Pittsburgh bed between Yougkiogheny and Allegheny rivers. In that district the roof division ranges from a few inches to 4 feet thick; the main clay is 12 inches thick. The lower division has an average thickness of 5 feet 6 inches, and is divided into three benches.

Between Monongahela and Youghiogheny rivers the roof division averages about 3 feet and is much parted. The main clay is 11 inches thick; the lower division averages 6 feet thick, and is divided into three benches.

In the area south of Ohio River and west of Monongahela river the roof division is about 3 feet thick, where present, and has many clay partings. However, it has good quality locally, and is mined
and shipped. It has also been opened separately in several locali-
ties. The main clay averages 2 feet thick. The lower division is
always over 5 feet thick and is divided by thin partings of clay or
shale into four or five benches. In the deepest part of the Pan-
handle trench between Beadling and Hickman, the Pittsburgh bed was
over 10 feet thick but thinned rapidly to both sides.

Redstone Coal. This bed, lying 60 to 70 feet above the
Pittsburgh coal, is thickest in the southeastern part of the county,
and is mined at several localities in Elizabeth, Jefferson, Lincoln
and Portvue townships. The bed is extremely irregular, ranging from
a few inches to 5 feet thick. The coal is clean, but rather high in
ash and sulphur.

Sewickley Coal. This coal, lying about 110 feet above the
Pittsburgh coal, is 3 feet 6 inches thick at South Pittsburgh, where
it is mined. It averages less than 6 inches thick in the county.

The Uniontown, Waynesburg, Waynesburg "A" and "B" coals, and
the little Washington coals are either too thin or too dirty to have
commercial value. The Washington bed is locally 8 feet thick, but
only 3 feet of coal at the bottom of the bed is clean enough to be
mined. The acreage of this bed is so limited that the quantity of
coal is very small.