Eastern Kentucky Coal, Coke and Timber.

ILLUSTRATED DESCRIPTION

OF THE

Log Mountain, Clear Creek Region,

(BETWEEN PINEVILLE AND MIDDLESBOROUGH,)

IN BELL COUNTY, KENTUCKY.

ANALYSES OF THE COALS AND COKES,

WITH DETAILED REPORT BY

Prof. A. R. CRANDALL, of Kentucky Geological Survey.

COURIER-JOURNAL JOB PRINTING CO.

This page in the original text is blank.

KENTUCKY STATE GEOLOGICAL SURVEY.

THE

Log Mountain, Clear Creek Region

COALS AND TIMBERS.

DETAILED REPORT BY

PROF. A. R. CRANDALL, OF KENTUCKY GEOLOGICAL SURVEY.

NOVEMBER, 1890.

This page in the original text is blank.

Office of KENTUCKY GEOLOGICAL SURVEY.

LEXINGTON, KY., November 1, 1890.

MESSRS. HULL, WYMAN & CAIRNS, PINEVILLE, KY.:

GENTLEMEN: I am permitted by the Director of the Kentucky Geological Survey to make the following brief statement of the coal and timber resources of that part of the Log Mountain and Clear Creek region which falls within the boundaries of your 26,000 acres Log Mountain lands.

In transmitting this special report, permit me to acknowledge the very generous aid extended by you to the survey in the prosecution of the work necessary for the development of the coals of the region.

Yours truly,

A. R. CRANDALL, of Kentucky Geological Survey.

COAL AND TIMBER RESOURCES OF THE LOG MOUNTAIN REGION, IN BELL COUNTY, KY.

The Log mountains of Bell county south of the Cumberland river and the Pineville Gap, like the Black mountains of upper Bell and Harlan, present a topography strongly in contrast with the Cumberland and Pine mountains on either side, by an increased height and the irregular palmate drainage which give to the former the typical ridge and spur configuration of the horizontal coal-measures generally, while the latter have the long barrier relief of monoclinal ridges. The drainage of the Log mountains is by creeks and branches which rise in the main ridge and flow into long valleys, of which these straight barriers form one side. The Yellow and Little Yellow creeks, and the Big Clear creek are the northward flowing streams in these valleys. The resources of the Log mountains are accessible by easy lines of transportation following these valleys, which, from the nature of the topography to the southward as well as the northward, are also the natural channels for interchange with East Tennessee and the South. This will be readily seen from a study of the drainage ways through this mountain region.

It is not within the province of this report to more than trace, in a general way, the distribution of economic beds. The determination in detail of variations in thickness and character of beds throughout must be left to organized agencies for their development.

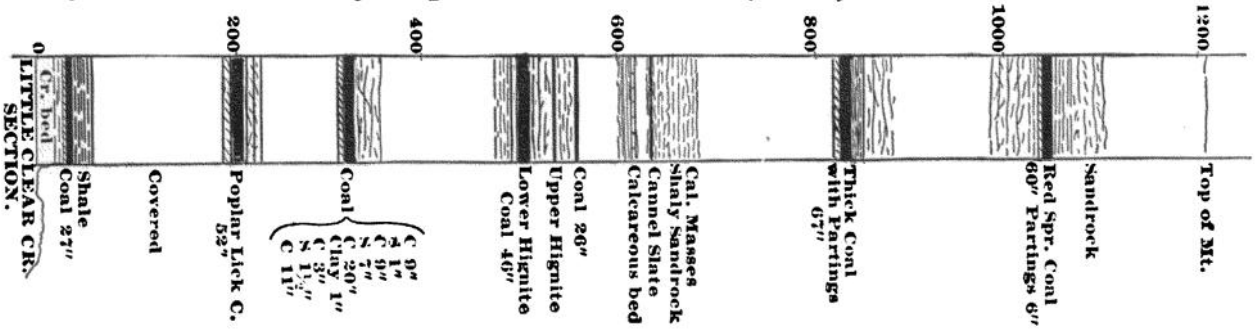
The plan of work in this region contemplated the determination of the thickness and character of the coal beds at such intervals as seemed essential, by successive openings from base to the summit; giving vertical sections as an exposition of the mineral resources of the region. The localities selected for such sections were: Near the head of Little Clear creek and near the head of Big Clear creek on Caney creek, Major branch and on Bear creek. Partial sections were also made on the waters of Stony Fork of Yellow creek. This work was most efficiently done under the immediate direction of my Assistant, Mr. G. M. Sullivan.

It should be remembered that the beds thus developed may be found thicker or thinner, or more or less valuable from special characters, at intermediate points. These local sections may, however, as experience goes, be regarded as safe indices of what will be found in the practical development, being in fact by all the practical difficulties of hurriedly making such sections, *below* the actual, by omissions and by inferior qualities near the outcrop.

The economic beds of this region are those of the coal-measures proper, dependent largely for practical value on availability and on qualities for special purposes. The question of accessibility has already been considered. The remaining question under the first head as to thickness, etc., for mining and as to adaptations for industrial purposes, under the second, may be inferred from the following descriptions:

The accompanying section for Little Clear creek will serve to show in a general way the vertical distribution of the coal seams of the whole region.

Below this on the Muddy Branch of Big Clear creek, in the Bear creek district, is found the equivalent of the Birdseye cannel coal of the adjoining cannel district of Whitley county.

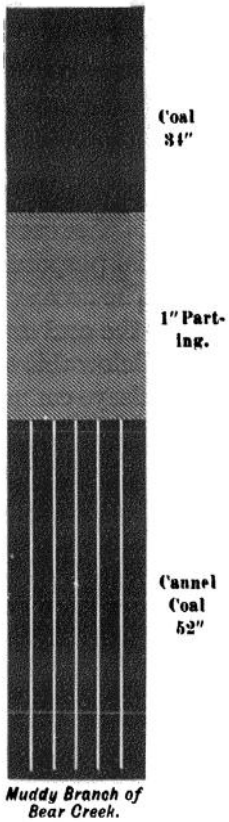


*Since printing above, Prof. Crandall has prepared a much better and more complete general section, showing the coals as opened on the Big Clear creek side or Bear creek. See page 18.

The bed section of this coal shows:

SLATE ROOF.

Coal	34 inches.
Cannel Coal	52 inches.



Muddy Branch of Bear Creek.

Analyses by Dr. Robert Peter, State Chemist, of samples cut from the whole thickness represented, as is also the case in all instances given in this report, result as follows:

	24" UPPER BENCH.	45" CANNEL COAL.
Moisture	1.70	1.00
Volatile combustible matters	32.600	51.60
Fixed carbon	62.30	40.40
Ash	3.40	7.00
Sulphur	.684	.739

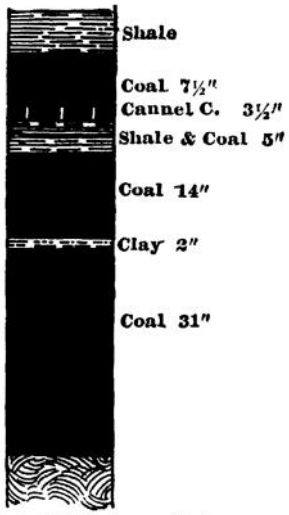
For three hundred feet above the cannel coal, only thin beds of coal have been found (18" to 31"). The horizon of the Jellico coal is included in this portion of the vertical section, and also the Mehan Station bed, as described in the Whitley county report.

Above the horizon of these beds the coal seams are, for the present, designated by local names. In general these beds are equivalents of the coals of the Upper Cumberland valley. In the Little Clear creek section, all the workable beds are shown. The scale is two hundred feet to one inch. The lower coal of this section shows fifteen feet above the creek under a sandstone ledge, nearly opposite to Polk branch. This is one of the thin beds already mentioned. It is, at some points, accompanied by one to two feet of highly bituminous slate. On Caney creek it is more prominent, but so divided by partings as to render it unsuitable for profitable mining.

It is, however, the equivalent of a workable coal in the Middlesborough region, and may prove to be a workable seam at some points in this district.

The next bed above of importance has been designated the "Poplar Lick" coal by Mr. Sullivan, from the place where first opened. The subjoined cut and the result of an analysis by Dr. Peter give the character of this bed as opened near Mart Head's on Little Clear creek:

Moisture	1.00
Volatile combustible matters	34.40
Fixed carbon	59.40
Ash	4.60
Sulphur	.682



Poplar Lick Coal, near Mart Head's, Little Clear creek.

At John Evans', one mile up the Little Clear creek, less thickness is shown, the upper portion being replaced by cannel slate. The two lower benches show thirty-nine inches of coal, with two inches of clay parting. Result of analysis as follows:

Moisture	1.20
Volatile combustible matters	35.60
Fixed carbon	58.20
Ash	5.00
Sulphur	.408

On Bear creek, this bed shows as follows: Result of an analysis of coke made from this coal is added:

Poplar Lick Coal, Bear Creek.

	COAL.	COKE.
Moisture	1.80	. . .
Volatile combustible matters	33.00	1.03
Fixed carbon	60 10	90.97
Ash	5.10	8.00
Sulphur	.656	.693

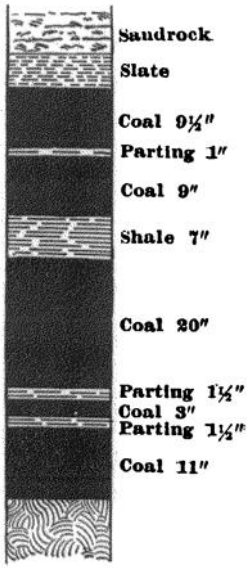
The coke from this preliminary test * is of a firm columnar structure, having all the appearances of a first-class furnace and foundry coke. From the analysis it is seen that the coking process was not fully completed. The analysis was made of coke dried at 212 Fahr.

* Preliminary coking tests of the coals of this region were made by collecting from the whole thickness of the beds coal enough to fill common kegs, which, by the courtesy of the Pineville Colliery Company, were placed in ovens at Pineville, along with the ordinary charge for forty-eight hour coke. These tests were made by Assistant Sullivan, who personally attended to every detail needful to insure trustworthy results. (Small samples of coke will be mailed on application to T. Cairns, Secretary Log Mountain Coal, Coke and Timber Company, Pineville, Ky.)

The Poplar Lick coal shows at one point on Major branch with a twenty-inch clay parting. As opened more satisfactorily near by, the bed shows in two benches of coal eighteen and thirty-five inches, separated by thirteen inches of clay. It is also exposed in workable thickness on Hignite creek, which is a part of Yellow creek drainage.

About one-hundred and twenty-five feet above the Poplar Lick coal, on Little Clear creek, a large body of coal, somewhat broken by partings, is found. The accompanying cut represents this coal.

In the Caney and Bear creek regions this coal appears to be a thin bed, or, possibly, it is represented by several thin coals, separated by considerable thicknesses of slaty rock.



Coal, 125 feet above Poplar Lick bed, Little Clear creek.

Lower Hignite Coal, near John Evans', Little Clear creek.

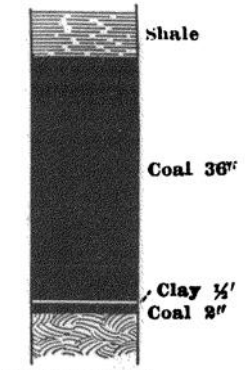
The next bed above—the "Lower Hignite" coal—is probably the most important one in the series, as will be seen from the following descriptive sections, and from analyses of the coal and coke. Samples for analysis were taken from three openings on Little Clear creek, made on Polk branch, above W. F. Partin's, and at the roadside, and on Laurel branch. A fourth opening is represented by the accompanying cut.

	Polk Branch.	Partin's.	Laurel Branch.
Moisture	2.20	2.30	4.90
Volatile combustible matters	33.40	33.90	29.54
Fixed carbon	61.60	60.40	62.36
Ash	2.80	3.40	3.20
Sulphur	.601	.629	.758

The bed as opened near John Evans' is represented by the cut.

On Caney creek this coal is thirty-eight and one-half inches at the only place where opened; this is the minimum in thickness, noted in the whole region.

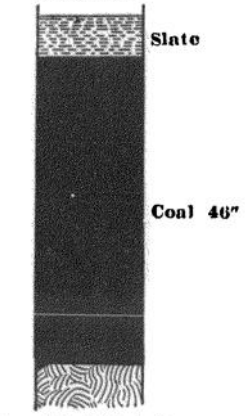
Moisture	2.40
Volatile combustible matters	33.90
Fixed carbon	60.50
Ash	3.20
Sulphur	.632



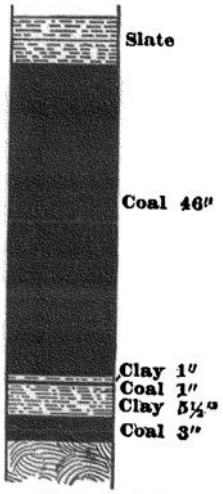
Lower Hignite Coal, Caney creek.

On Bear creek this coal is opened at a number of points. A cut of the bed-section as shown in Piney spur on the Big Clear creek side and analyses of samples from this opening and from a 46-inch face shown on Sugar Camp branch are here given:

	Piney Spur.	Sugar Camp.
Moisture	1.60	2.66
Volatile combustible matters	33.40	34.14
Fixed carbon	61.52	59.70
Ash	3.48	3.50
Sulphur	.794	.840



Lower Hignite Coal, Sugar Camp Br., Bear creek.



Lower Hignite Coal, Head of Hignite creek.

Openings made on Stony Fork near the head and on Hignite creek show forty-five and forty-six inches. (See cut.) Analyses of both are given.

	Stony Fork.	Hignite Creek.
Moisture	3.00	3.00
Volatile combustible matters	31.96	30.40
Fixed carbon	62.04	64.00
Ash	3.00	2.60
Sulphur	.478	.601

The place of this coal is a little more than half the height the hills above the main drainage. With all of the beds of this region, it appears to be wholly free from faults and from any considerable local dips. The general dip appears to be toward the Big Clear creek valley.

Coking tests were made of coal from the two Bear creek openings. Analyses in the order as above.

	Piney Spur.	Sugar Camp Br.
Volatile combustible matters	.43	.39
Fixed carbon	91.87	92.61
Ash	7.71	7.00
Sulphur	.637	.530

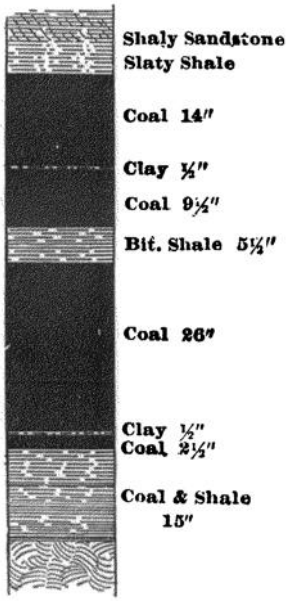
The coal for coking was necessarily obtained from near the outcrop, and shows a considerable increase of ash from the mud seams. For preliminary tests, the coke obtained is very satisfactory. It appears from a knowledge of all the conditions of the preliminary test and from an inspection of the analyses, that the fixed carbon of coke made of this coal will be from ninety-three to ninety-four per cent. The appearance of the coke warrants the assumption that on a full practical trial it will prove a superior furnace fuel.

The Upper Hignite coal is not so regular in thickness or character, nor in its place in the series as the Lower bed. It varies in height above the preceding, from six to forty-five feet; the intervening rock increasing eastward and southward from the Bear creek section, where the separation is by six feet of slaty shale with imbedded kidneys of Limonite iron ore. Here this bed is forty-two inches thick, with twenty-two inches above separated by fifteen inches of shale and four inches below separated by ten inches of slate and coal Sample for analysis was cut from the forty-two inch bench. Cut of this bed as found on Caney creek, and analysis representing the whole bed, are also here given.

	Bear Creek.	Caney Creek.
Moisture	2.00	2.50
Volatile combustible matters	32.80	32.16
Fixed carbon	59.50	57.54
Ash	5.70	7.80
Sulphur	.986	.556

Analysis of Coke made from 42-inch bench, Bear creek, gives the following result:

Moisture (air dried)	.60
Volatile combustible matters	.10
Fixed carbon	87.58
Ash	11.62
Sulphur	.909



Upper Hignite Coal Caney creek.

Upper Hignite Coal, Hignite creek.

The first test of this coal, aside from the composition, indicates that it is not a coking coal.

An opening of this coal formerly made by the American Association (limited), on Hignite creek, shows as in the illustration of the bed section at that point. An analysis of sample from the 36-inch bench was made as follows:

Moisture	2.50
Volatile combustible matters	29.70
Fixed carbon	62.80
Ash	5.00
Sulphur	.554

Three very thin partings occur in this bench not shown in the cut.

The coal shown in the Little Clear creek section, 340 feet above the Lower Hignite seam, as opened at the head of Polk Branch, has the following bed section:

Shale roof		
Coal	4½″	
Bit. sand-rock		5″
Coal	7½″	
Bit. Shale		2 75″
Coal	14½″	
Clay		2″
Coal	3″	
Clay		2″
Coal	8″	
Parting		.25″
Coal	26″	

Sample of analysis from all but upper four and one-half inches:

Moisture	2.20
Volatile combustible matters	32 80
Fixed carbon	54.60
Ash	10.40
Sulphur	.408

In the other sections, this coal is too much divided by partings to be of any special value for mining.

About 450 feet above the Lower Hignite coal, near the tops of the spur ridges, another very valuable coal was opened, which I have designated the "Red Spring" coal. On Little Clear creek, opposite to and half a mile below W. F. Partin's, this bed shows as follows:

Sample from whole face of coal, near outcrop:

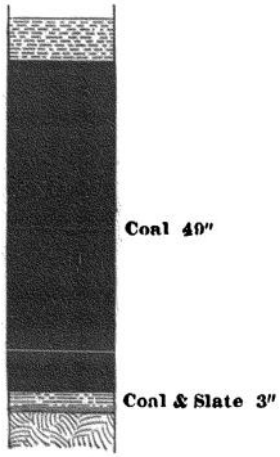
Moisture	3 40
Volatile combustible matters	31.60
Fixed carbon	58.24
Ash	7.00
Sulphur	.601

On Polk branch this bed was opened with the following section:

Coal . . . . 10″	
Clay and Coal 5″	
Coal . . . . 48″	
Clay . . . .5″	
Coal . . . . 1″	
Clay . . . . .5″	
Coal . . . . 2″	

Sample from 48-inch face.

Moisture	3.40
Volatile combustible matters	32.40
Fixed carbon	59.20
Ash	5.00
Sulphur	.563



Red Spring Coal, Little Clear creek.

Red Spring Coal, Head of Hignite creek.

At the head of Hignite creek, this bed opened at the Red Spring shows as in cut. Sample for analysis from 39-inch bench.

Moisture	2.20
Volatile combustible matters	34.20
Fixed carbon	60.40
Ash	3.20
Sulphur	.576

On Bear creek the bed section is as follows:

Coal	13"	Moisture	2.60
Shale	5"	Volatile combustible matters	33.20
Coal	10"	Fixed carbon	60.20
Parting	1"	Ash	4.00
Coal	32"	Sulphur	.670
Coal and shale	6"		

The preliminary coking test of coal from the Bear creek opening gives a result scarcely less favorable than that of the Lower Hignite coal, as will be seen from the coke and the analysis here given. The coal was taken too near the outcrop for best results, as in the preceding instances.

Volatile combustible matters	.34
Fixed carbon	91.16
Ash	8.50
Sulphur	.416

The tailings of three more beds above the Red Spring coal have been noted at a number of points, but time has not been taken to make excavations to show thickness and character.

TIMBER RESOURCES.

The timber growth of this region differs little from that of Eastern Kentucky generally, except in the size and the number of trees on any given area. It is found, in general, that the timber in Eastern Kentucky is heavy in proportion to the height of the hills. This region, with its mountain ridges, is no exception to this observation. As in the Black mountains, of the upper valley, the slopes of the ridges are heavily wooded in all exposures; more abundantly on the northern and western slopes, but with less contrast in this respect than is usually found in the lower hill regions.

The plan of investigation, not yet fully carried out for this region, includes careful counts, on measured areas, of the trees of all kinds, at such elevations and on such exposures as will determine the percentage of species, and show the effect of varying conditions on the size and distribution of the species which make up the aborescent flora of the region. At the present time the data at hand is too incomplete for such an exposition. From counts made at many points of trees, one foot or more in diameter, an estimate of fifteen thousand feet per acre appears to be fully warranted. This estimate would include White Oak, Yellow Poplar, Chestnut Oak (Tan-bark Oak), Maple, Chestnut, Red Oak, Beech, Buckeye, Basswood (Linn), Hickory, Cucumber, Ash, Locust, Mountain Birch, Black Walnut and Cherry, named in something like the order of relative prominence. Most of the local estimates based on notes already at hand exceed this considerably—some plots having nearly twice that amount of merchantable timber.

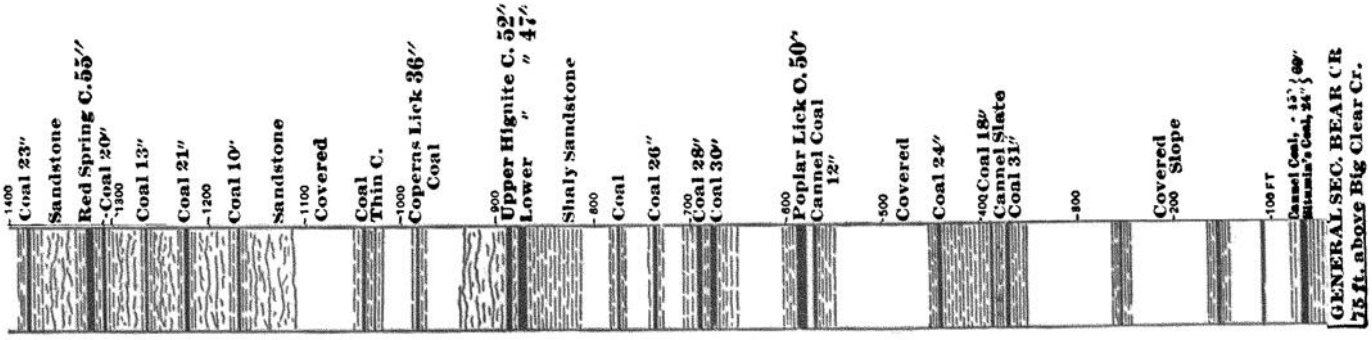
The cleared lands of this region are mostly in the valleys, close to the main creeks. A few cleared farms of limited acreage, on the ridges, are the exception to this. A fair estimate of the proportion of virgin forest in the Log mountain region would be at least ninety per cent.

Very respectfully,

A. R. CRANDALL,

Assistant Kentucky Geological Survey.

☞ Forest fires that injure standing timber are positively unknown in this region, probably owing to the absence of trees containing pitch.



BEAR CREEK SECTION. BIG CLEAR CREEK.

The most important of these veins are now "timbered up" in permanent shape. Our Secretary and General Manager, Mr. T. Cairns, will take pleasure in furnishing guides to parties wishing to examine same personally. Starting from Pineville, the trip can be made in twelve hours, including plenty of time for examination, returning to Pineville same night.

LOG MOUNTAIN COAL, COKE AND TIMBER COMPANY.

ANALYSES OF COKE FROM THE LOG MOUNTAIN COALS.

(LOG MOUNTAIN COAL, COKE AND TIMBER COMPANY) BY PROF. R. PETER, STATE CHEMIST, OCTOBER 27, 1890.
(SAMPLES DRIED AT 212° FAHRENHEIT.)

LOCAL NAMES OF VEINS.	"POPLAR LICK."	LOWER HIGNITE, No. 1.	LOWER HIGNITE, No. 2.	"RED SPRING"	MR. JOHN FULTON'S REPORT ON AN AVERAGE OF SEVEN TESTS OF THE "POPLAR LICK" AND "LOWER HIGNITE"
SECTION MEASURE.	COAL, 17½ IN. PARTING, 5½ IN. COAL 32½ IN.	COAL, 46 IN. PARTING, 1 IN.	COAL, 47 IN. PARTING, 1½ IN.	COAL, 1 IN. PARTING, 3 IN. COAL, 39 IN.	
Fixed carbon	90.97	91.87	92.61	91.16	91.56
Ash	8.00	7.71	7.00	8.50	6.36
Sulphur	.693	.637	.530	.416	0.61
Volatile matter	1.03	.43	.39	.34	1.04

Samples for coking were cut from the whole face of the veins, driven only far enough to obtain clean and firm coal. Still better results would doubtless be obtained in practical operations, raising the percentage of carbon to 93 or 94 per cent., and slightly reducing the percentage of ash. (See Prof. Crandall's remarks on this point on page 13.)

See report on chemical and physical properties of this coke, by Mr. John Fulton, manager of the Cambria Iron and Steel Works, at Johnstown, Pa., on the following page.

E. Y. TOWNSEND, President.
POWELL STACKHOUSE, Vice-President.

JNO. FULTON, General Manager,
JOHNSTOWN, PA.

OFFICE: NO. 218 SOUTH FOURTH ST.
PHILADELPHIA.

IRON AND STEEL WORKS

OF THE

CAMBRIA IRON COMPANY.

JOHNSTOWN, PA., November 22, 1890.

HULL, WYMAN & CAIRNS, PINEVILLE, KY.:

DEAR SIRS: I send you herewith a detailed report of the samples of coke we received from you from Pineville, Ky.

Pineville has made a very important impression on the manufacturing world in regard to the purity of its coke. The same can be said of yours, but it is not quite as good (from the coking of it) as it might be. In your communication, you have not given me the exact locality any more than showing me a number of seams of Log Mountain coal from which coke can be made. It is well established now, that all the coal beds of a series in the same geological belt have very much the same properties, both chemical and physical, so that if you have one good coking seam, the bed below it or above it would likely produce the same good quality of coke. Of course, there are some modifications in this general principle, but nothing to seriously disturb you there.

In coking your coal, you require to begin slowly and then finish up with an intense heat, giving your coke the full forty-eight hours in the bee-hive oven, and making the best quality at seventy-two hours.

Very respectfully,

JNO. FULTON,
Mining Engineer.

REPORT OF JOHN FULTON, ESQ., OF CAMBRIA IRON COMP'Y, JOHNSTOWN, PA., ON HULL, WYMAN & CAIRNS' LOG MOUNTAIN COKE.

JOHNSTOWN, PA., November 22, 1890.

HULL, WYMAN & CAIRNS, PINEVILLE, KY.:

DEAR SIRS: The small box containing sample of coke made from coal in the Log Mountain, Pineville, Region of Kentucky, for physical and chemical examination, received.

It is assumed that this is a fair average sample of your coke. It is evident, from the appearance of this coke, as well as from the slight excess of volume of volatile matter remaining in it, that the operation of coking has not been as complete as could be desired. This would also affect the physical structure of the coke by a slight reduction of its hardness and in its value in blast furnace operations.

It is also submitted that by careful mining of this coal for coke making, that some reduction can be made in the percentage of ash, although it now contains a small excess over one-half of the Connellsville Standard.

The following table shows the chemical properties of the Standard Connellsville coke, the celebrated "Cumberland Valley Colliery Company's Pineville coke" and your Log Mountain coke, for general comparison:

	CONNELLSVILLE STANDARD COKE, PENNSYLVANIA.	CUMBERLAND VALLEY COLLIERY COMPANY'S PINEVILLE COKE, KENTUCKY.	HULL, WYMAN & CAIRNS' LOG MOUNTAIN COKE, PINEVILLE, KENTUCKY.
Fixed carbon	87.46	94.66	91.56
Moisture	0.49	1.14	0.43
Ash	11.32	3.78	6.36
Sulphur	0.69	0.59	0.61
Phosphorus	0.029	0.007	0.013
Volatile matter	0.011	0.41	1.04

From the preceding table, it will be seen that with equal care in the operation of mining and coking, your Pineville coke should approximate very closely to its neighbor, the thoroughly tested and valuable " Cumberland Valley Colliery Company's Pineville coke."

In purity it is superior to the Standard Connellsville, and is equal to the celebrated English Durham coke.

Its sulphur and phosphorus are quite low, assuring its desirableness for all metallurgical uses.

To assure accuracy, seven tests have been made of the physical properties of your coke. The average of these is given in the table. The table will exhibit its relationship to the Connellsville Standard. It is slightly below the standard in hardness of body, but this divergence is so small that it would produce little difference in the practical work in blast furnaces or similar uses.

On well established general principles, coke for metallurgical uses should possess hardness of body with well-developed cell structure, so as to insure exemption from combustion in the upper region of a blast furnace, and to retain its utmost calorific energy in the lower or reducing region of the furnace.

The hardness of the body of the coke prevents its dissolution in the upper section of the furnace, where not only a waste of fuel would result, but a serious disturbance of the orderly working of the furnace would follow.

Well-developed cellular structure in coke assures calorific energy in its combustion.

While your Pineville coke is somewhat under the Connellsville in this respect, yet, from its slender columnar structure, characteristic of Kentucky cokes, a full compensation is afforded for its diminutive cells.

The capacity of this coke for bearing the heaviest furnace burdens will be seen in the table. It excels the Cumberland Valley Colliery Company's Pineville coke in this property, and approaches very near the Connellsville Standard.

The following table exhibits the physical properties of the Connellsville, Cumberland Valley Colliery Company's Pineville coke and your Log Mountain coke, and is given for general comparison :

	Connellsville Standard Coke, Pennsylvania.	Cumberland Valley Colliery Company's Pineville Coke, Kentucky.	Hull, Wyman & Cairns' Log Mountain Coke, Pineville, Kentucky.
Grammes in one cubic inch, dry	15.47	14.10	13.31
Grammes in one cubic inch, wet	23.67	22.24	19.90
Pounds in one cubic foot, dry	58.98	53.73	50.71
Pounds in one cubic foot, wet	87.34	84.73	75.82
Percentage by volume—coke	49.96	50.37	59.80
—cells	50.04	49.63	40.20
Height of furnace charge supported without crushing	120 feet.	91 feet.	109 feet.
Order in cellular space	1.	1.5	1.5
Hardness	3.5	3.0	3.0
Specific gravity	1.89	1.71	1.37

The physical properties of this Pineville coke can be much improved by a mild heat in the coke oven with a gradual increase of heat rising up to the utmost heat that can be secured in the ultimate heating.

With care in mining the coal and coking, this coke should afford a very superior fuel for blast furnace and for all metallurgical purposes.

The exemption of dangerous impurities in this coke assures its value for Bessemer works. Its sulphur and phosphorus are noticeably low in content.

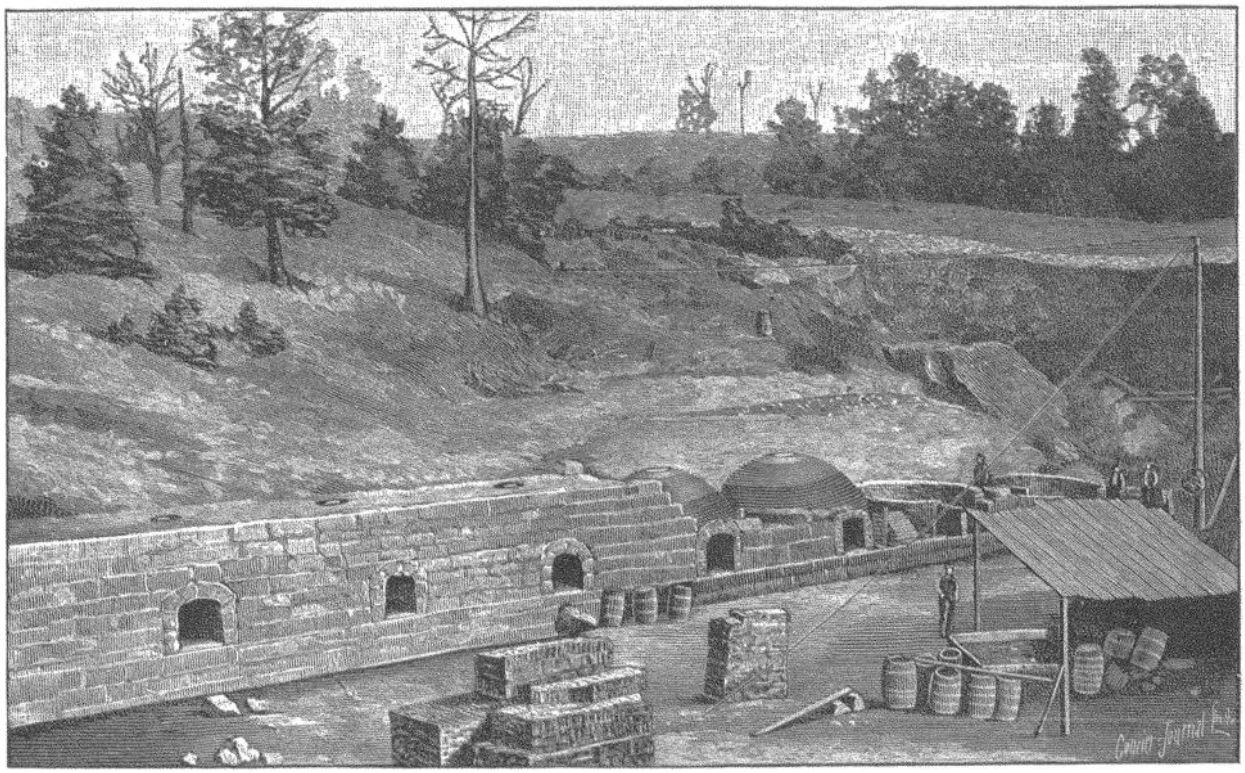
The best coke from the Pineville, Ky., coals will be found by affording ample time in the oven, at least forty-eight hours, and if very best results are desired they will be secured by seventy-two hours in the oven.

Under these conditions there can be no doubt of the superior value of this coke for blast furnace purposes, for melting iron in cupolas in Bessemer and other works, and for all metallurgical purposes requiring coke fuel.

Very respectfully, JNO. FULTON,
Mining Engineer.

*In a recent letter Mr. Fulton says: "You appear to have a valuable property for the manufacture of coke, which is the peer and, in fact, is superior to the Standard Connellsville."

See foot note on page 8.



COKE OVENS UNDER CONSTRUCTION AT PINEVILLE KY.

MARKET FOR PINEVILLE COKE.

While our "prospective" railroad facilities, and, in fact, the lines already under construction, will give us a very wide market, we can not now obtain competitive rates, except to the West and North-west and to some portions of Tennessee and Alabama.

When our future market is being considered, it must be borne in mind that the recently ascertained center of population of the United States is a point only about one hundred miles north of us (say one hundred miles south of Cincinnati). At present we can control largely the trade of the States of Indiana, Illinois, Missouri and Iowa.

For example take St. Louis, Mo. There are three blast furnaces at St. Louis, the "Jupiter," "Missouri" and "St. Louis" companies, with five furnace stacks and a total annual consumption of about 200,000 tons of coke. Add to this, 50,000 to 100,000 tons per year as the consumption of that immediate vicinity, for foundry and other metallurgical purposes, and it will be seen that it will tax the capacity of five hundred coke ovens* to take care of this locality alone.

The St. Louis furnace companies tell us that they are now paying $3.20 per ton freight on their coke from Connellsville. The Louisville & Nashville railroad quote us a rate of $2.25 from Pineville to St. Louis. We are in easy competitive distance from the great manufacturing cities of Indianapolis, South Bend, Fort Wayne, Logansport, Terre Haute and Evansville, Indiana, as well as many of the large cities of the other States named. We are even now given a rate of $2.10 to several Alabama points, including Florence and Sheffield, these two towns using over 200,000 tons per year of Pocahontas, Va., coke.

Pocahontas is over one hundred miles further north from these points than Pineville. We will very soon have still more direct connection and much lower rates to Alabama, North Carolina and Tennessee points. Without

* The capacity of the ordinary "Bee Hive" coke ovens is about five tons of coal each, with a resultant, say three tons of coke (every forty-eight hours), making annual capacity about five hundred tons per oven.

going further into details, we venture the assertion that the product of 5,000 ovens could be readily marketed at the present time. The Watts Iron & Steel Syndicate, of London, England, have now nearly completed at Middlesborough, Ky. (adjoining the 26,000 acres herein described), two blast furnaces with a total annual capacity of over 100,000 tons of pig iron, and a probable annual consumption of 125,000 tons of coke, or the product of 250 ovens.

The local and near-by demand for our coke will be very large.

Many noted experts agree that this region (about Cumberland Gap) will surely be the scene of a very large iron and steel development, owing to the great quantity and rare quality of the coking coal and limestone and the variety and extent of the iron ore deposits of the vicinity. Ours is the nearest coking coal to the great deposits of Bessemer ore in western North Carolina (say seventy-five to one hundred miles distant).

It is undoubtedly a fact that pig iron and basic steel can be made here at considerably less cost than elsewhere in the United States.

Respectfully,

LOG MOUNTAIN COAL, COKE AND TIMBER COMPANY.

ANALYSES OF LOG MOUNTAIN COALS.

(Hull, Wyman & Cairns' 26,000 Acres Tract, Bell county, Ky.) by PROF. R. PETER, State Chemist, October 27, 1890.

Showing the variation in thickness and characteristics of the principal veins opened at different points, several miles apart, proving their existence and continuity over the whole territory. (*See map annexed.*)

	"Poplar Lick." Little Clear Creek, Near Martin Head's. 52½ In.	Poplar Lick. Big Clear Creek (Bear Branch.) 49½ In.	Lower Hignite. Little Clear Creek near W. F. Partin's. 47 In.	Lower Hignite. Little Clear Creek, Polk Branch. 47 In.	Lower Hignite. Little Clear Creek, (showing birds-eye cleavage.) 45½ In.	Lower Hignite. Yellow Creek, Head of Hignite. 46 In.	Lower Hignite. Big Clear Creek, Piney Spur Bear Branch. 47 In.	Lower Hignite. Big Clear Creek. Sugar Camp Branch. Bear Creek. 46 In.
Moisture	1.00	1.80	2.30	2.20	1.60	3.00	1.60	2.66
Volatile Combustible Matter	34.40	33 00	33.90	33.40	33.40	30.40	33.40	34.14
Fixed Carbon	59.40	60.10	60.40	61.60	61.52	64.00	61.52	59.70
Ash	4.60	5.10	3.40	2.80	3.48	2.60	3.48	3.50
Sulphur	.682	.656	.629	.601	.794	.601	.794	.840

	"Red Spring." Little Clear Creek, below W. F. Partin's 49 In.	Red Spring. Little Clear Creek. Polk Branch. 58 In.	Red Spring. Big Clear Creek. Bear Branch. 55 In.	Red Spring. Yellow Creek, Head of Hignite. 50 In.	Upper Hignite. Little Clear Creek. Polk Branch. 59 In.	Upper Hignite. Big Clear Creek. Bear Branch. 52 In.	Upper Hignite. Yellow Creek. Head of Hignite. 66 In.	Cannel Coal. Big Clear Creek. Bear Branch. 45 In.
Moisture	3.40	3.40	2.60	2.20	2.20	2.00	2.50	1.00
Volatile Combustible Matter	31.60	32.40	33.20	34.20	32.80	32.80	29.70	51.60
Fixed Carbon	58.24	59.20	60.20	60.40	54.60	59.50	62.80	40.40
Ash	7.00	5.00	4.00	3.20	10.40	5.70	5.00	7.00
Sulphur	.601	.562	.670	.576	.408	.986	.554	.737

NOTE.—In PROF. CRANDALL'S preliminary report (August, 1890), after making his barometrical calculations, he said: "My impression is that the 'Red Spring' bed is the same as Bennett's Fork main seam, while the 'Poplar Lick' bed is the same as the big Sugan coal of Bennett's Fork." (Middlesborough side owned by the American Association Limited.)

ESTIMATE OF QUANTITIES OF TIMBER OF EACH SPECIES.

Yellow Poplar	Feet per Acre,	2,000
White Oak	" "	3,000
Chestnut Oak	" "	2,000
Red Oak	" "	2,000
Chestnut	" "	3,000
Hard Maple	" "	1,500
Ash, Hickory, Cherry, Black Walnut, Cucumber and Basswood	" "	1,500
TOTAL		15,000

A very large area will overrun this estimate one hundred per cent. This is intended as a safe estimate of the average of the whole 26,000 acres—less the cleared land, estimated by Prof. Crandall at ten (10) per cent. The preponderance of Tan-bark and other Oaks will be noted.

See foot note, page 17.

THE LOG MOUNTAIN

Coal, Coke and Timber Company

OF PINEVILLE, KY.

INCORPORATED MAY 26, 1891.

Capital Stock, - $2,000,000 00.

(OWNER OF 26,000 ACRES HEREIN DESCRIBED.)

PRESIDENT,
F. A. HULL,
DANBURY, CONN.

SEC'Y AND GEN'L MANAGER,
THOMAS CAIRNS,
PINEVILLE, KY.

VICE-PRESIDENT,
H. P. WYMAN,
GRAND RAPIDS, MICH.

TREASURER,
DWIGHT CUTLER, Jr.,
GRAND HAVEN, MICH.

DIRECTORS:

D. CUTLER, D. CUTLER, JR., H. P. WYMAN, L. J. CODY, Sault Ste. Marie, T. CAIRNS,
J. PLATT UNDERWOOD, Chicago, F. A. HULL.

The Log Mountain Coal, Coke and Timber Co.

CAPITAL, $2.000.000 (INCORPORATED MAY 26th, 1891.)

F. A. HULL, President. H. P. WYMAN, Vice-Preident. T. CAIRNS, Sec'y & Gen'l M'g'r. DWIGHT CUTLER, JR., Treasurer.