THE ANNUAL REPORT

OF THE

INSPECTOR OF MINES

—OF THE—

STATE OF KENTUCKY,

FOR THE YEAR 1897.

G. W. STONE, Inspector.
C. W. LOGAN, Assistant.

FOR GENERAL DISTRIBUTION.

LOUISVILLE, KY.:
SOWLE PRINTING & ENGRAVING CO.
1898.

Note: Ky. Rock Asphalt – p. 68
Elkhorn Coal. – p. 74
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SPECIAL NOTICE.

LEXINGTON, KY., MAY 1, 1898.

To all Whom this may Concern:

From and after this date the office of the State Mine Inspector and Curator of the Geological Survey is at the State College, this city. All persons having business with the office in any way will please direct their communications accordingly. The Inspector's office has been moved from Frankfort, as directed by an act of the Legislature passed at its recent session.

Respectfully,

G. W. STONE,

Inspector of Mines.

LETTER OF TRANSMITTAL.

To His Excellency, WILLIAM O. BRADLEY,
Governor of Kentucky:

Sir: I have the honor to submit herewith my first annual report as Inspector of Mines, being the fourteenth report of this office, covering the calendar year 1897. In doing so I beg to tender you my grateful acknowledgement of the important trust committed and of the high honor you have conferred upon me.

I think it proper also to express my sincere thanks to Col. M. H. Crump, of Bowling Green; Prof. H. K. Taylor and Mr. Hywel Davies, of Louisville, and Mr. Charles Hendrie, of Lexington, for valuable contributions to my report.

I desire also to bear witness to the valuable services rendered by my former Assistant, Mr. W. U. Grider, and by my present Assistant, Mr. C. W. Logan. They have been uniformly courteous and have shown great diligence and efficiency in all their work, and the success of the office is largely due to their skill and personal efforts.

Again expressing to you the appreciation due from me for your consideration and confidence, and wishing you abundant success in all your arduous and responsible duties,

I am very truly,
Your obedient servant,
G. W. STONE,
Inspector of Mines.

AMENDMENTS SUGGESTED.

Relative to necessary amendments to the mining law I submit the following: There have been many complaints among our coal miners in different sections of the State as to the quality of the oil provided for their use by the operators. Personal observation and other sources of information have proven them to be well founded in various places. The miners must pay for their oil, the same as they pay for their powder, and for the sharpening of their picks, but as a rule they must depend upon the company store for the supply. If good oil has been purchased for their trade they can get it, but otherwise they must take the bad.

The men who are compelled to buy and use it, and constantly endure its discomforting and deleterious effects, are the proper ones to consult as to the quality of their purchase, and when they demand a better grade of oil their wishes should be made a peremptory law.

Good air to breathe is as necessary to comfort and health as good food to eat or good water to drink. In many mine the air is already impregnated with impurities sufficient to endanger the health, and even menace the lives of the under-ground workmen, and laws have been enacted to put in force regulations for their dissipations, and the infliction of such conditions upon the employees, through the smoke, soot and poisonous fumes of a low grade of oil is a positive wrong and ought not to be permitted. This matter has been fully discussed in the previous reports of this office, to which further attention is called.

The operators have it in their power to allay all these complaints and avoid the necessity for legal interference. It will be well for those coming within the scope of this discussion if they will take this as a timely warning and act accordingly.

Section 5 of the law should be amended by substituting April 1st, instead of February 10th, as the date by which the Inspector's annual report shall be made. After the most diligent effort, and in

several instances the use of threats to enforce legal penalties against delinquent operators, many of them failed to get all their reports to this office until long after February 10th. This seems to have been but a repetition of the former experiences of the office; and as a complete report can not be made on any line of statistics, or in other respects, without full reports from the operators, and as under the present law they can with impunity withhold any monthly report for sixty days after the end of the month before becoming liable to the penalty prescribed, the office is completely at their mercy, and so long as mining companies can hold back their report for December until the first of the following March the Inspector should not be required to complete his report by February 10th.

Section 8 of the law ought to be amended so as to permit the owners of lands adjoining that in which any mine is located to demand of the mine operators a correct map of any such mine upon the payment to the mining company, $5.00, the fee prescribed by law, and the mine operators should be subjected to proper penalties for a refusal to comply with such demands.

The work of the office has shown the necessity for such a law. As the law now is no one can demand a copy of any mine map except the owner, agent, lessee or superintendent of the particular mine with which these or some of these are connected.

It would be well to extend the law so as to embrace the clay mines of the State. There are a great many of them in operation, and the laborers who work in them should have the same protection accorded to others.

There is also a growing demand for statistics of all the most important mineral products, such as iron, clays, building stones, asphaltum, etc., the same as is gathered in many other States. This is the cheapest and best way to advertise our many valuable mineral resources. In fact, since all further geological research and publications have ceased in the State, these statistics have become a necessity that the world may know the vastness, variety and value of these deposits.

THE GEOLOGICAL DEPARTMENT.

The correspondence of this department during the year was very large, and came from many States of the Union as well as from foreign nations, and embraced nearly every subject connected with mineralogy.

I shall not attempt to give a detailed statement of the correspondence, as to do so would require a considerable volume and more time in its preparation than it is possible to give it, besides the great mass of it would be of no interest to the public. There were many requests for maps and for publications, especially on the line of "free distribution." I have distributed a number of these where I thought it beneficial to the State to do so. Others have been referred to the Robert Clarke Co., Cincinnati, they being the authorized agents of the State for the sale of these maps and publications. That the general public may have a better idea of the nature, value and responsibility of this department I make mention of some of the most important correspondence.

On September 4th a communication was received by His Excellency, Governor Bradley, from the Department of State at Washington, signed by the Hon. John Sherman, Secretary of State, saying that "Captain J. Cordeira Da Graca, of Brazil, has been sent to this country as a special commissioner of his government with the view to study the industries of the United States and to make a report thereon," and requesting that copies of the geological reports of this State be sent to his address in care of the Commercial Museum, Philadelphia.

A communication was also received through His Excellency, the Governor, from the Consul-General of Portugal, stationed at New York, asking for a general report on the varied mineral and manufacturing interests of the State of Kentucky.

The assistant engineer of the United States army, with office at Louisa, made written application for "all publications having any

thing to say on the geology of the Big Sandy Valley for the purpose of arriving at some conclusion as to the extent and value of the undeveloped resources of that section for use in determining the advisabili y of improving the river and its main tributary by locks."

A letter was also received from the attorneys of a great railroad company asking for all the publications bearing on the mineral resources of a number of counties in Eastern Kentucky, with the view of also determining the practicability of building a line of railway through that section of the State.

These requests, and hundreds more of less importance, required a great deal of time to answer intelligently and satisfactorily. The survey is incomplete and the inquiries cover many localities where none has ever been made. The character and amount of the correspondence indicate a very general desire for a better knowledge of Kentucky's vast mineral resources and demonstrates the great value of the geological survey and the necessity for its revival and continuation until these resources in every county in the State shall be thoroughly determined and published to the world.

Many mineral specimens were sent to the office, most of which were worthless. A number were analized by Dr. Alfred M. Peter, chemist at the State College at Lexington, whose courtesy and valuable assistance I shall always appreciate and gratefully acknowledge.

During the summer there appeared in a number of prominent newspapers of the country a sensational article from the pen of Prof. S. S. Gorby, of Franklin, Ind., formerly State Geologist of Indiana, professing to have discovered rich deposits of onyx in different counties in this State. On account of the standing of the writer and the character of correspondence, covering a large territory, growing out of the publication, I thought it well to investigate the matter. I accordingly, through Judge William J. Macy, at Munfordville, procured specimens of the stone and turned them over to the State College for analyses.

Dr. Peter wrote me his conclusions as follows:

"In the absence of Prof. Scovell I have received yours of the 27th and the specimens of the so-called onyx. I find that the material is calcite, or carbonate of lime. One of the specimens is an imperfect crystallized variety and the other is of the kind known as calcareous sinter. On account of the softness of the material it could

not be used in the place of onyx, but might possibly answer as a kind of marble if it can be obtained in sufficiently large pieces."

The stone is a beautiful one and exists in a variety of formations and colors, and while it is not onyx, and likely is too soft to stand weathering, yet there is a probability that it posseses great value for in-door uses, and future investigation may determine it to be a valuable discovery for ornamentation and utility.

There are but few maps left for distribution, and the supply of many of the publications is exhausted and many others nearly so.

SPECIAL NOTICE TO MINE OPERATORS.

In sending out the new blanks for monthly reports I failed to state that the operators could report their output in tons, if they wished to do so, instead of in bushels. I much prefer that they do this, as in all cases where bushels are reported I am under the necessity of reducing the amount to tons. Some operators have said that they keep their accounts in tons, but send in their reports in bushels on account of the new blank.

I now say to all the operators to exercise their choice in this matter, but if they are willing to report their output in tons that it will accommodate me greatly. It will save me much time that can be better employed than in spending it, in thousands of instances, in the mere division of numbers by twenty-five and writing the product in tons.

I desire that this notice shall serve as a modification of the monthly report sheet. I also insist that the reports shall be made promptly. Other States gather monthly statistics of their mineral products for publication in leading mining journals and I have the same request made of me. I have promised to furnish the same, and shall take pleasure in doing so if I can get the reports in time.

It is very important also to give full statistics as to employees and the time worked each month. A failure in these makes much correspondence necessary.

Trusting to have your cordial co-operation, and wishing you years of great prosperity,

I am very truly,

G. W. STONE,

Inspector of Mines.

GENERAL CONDITION OF THE MINES.

As a rule the larger mines, where work has not been suspended, are in very good condition. They show superior skill and diligence in their general management. Much credit for their safe and successful operation is due to the supervision of watchful and competent superintendents.

These men know thoroughly every step in coal mining, from the beginning until the product is marketed. In all their efforts their one aim is to procure good results. The best mining methods have been adopted and the best regulations have been made and enforced, that there may be safe and healthy mine conditions. I have no criticism, but only words of praise for these general managers. They reflect great credit on their calling, and much of the prominence of our mining interest is due to their efficiency.

Nor can I speak in words of less commendation of the general managers of other large mines that have experienced great hindrances during the year. It is not possible nor expected that coal mines will be in as satisfactory condition for operation for a period succeeding a long suspension as before it commenced. Good conditions can soon become bad, and it requires some time to restore them when once lost. But it is expected that all our mines that were idle so long on account of the prolonged Jellico strike will soon be in their usual good condition.

While much is due to the general manager, yet much also is due to the wide-awake, faithful mine boss. He knows all about his mine, for he has personally superintended all excavations and suggested the plans of the underground work, and has enforced the regulations concerning the same. In many things the orders of the general manager eminate from him as surely as they are put into execution by him. He is an important factor in all mine operations, and deserves a warm place in the affections of men.

I know some mines in Kentucky that have had the services of such competent officials as the two classes I have discussed for almost

a quarter of a century without having a fatality, and in many cases where fatalities have occurred they have arisen from mere careless operation on the part of the employees and not from bad mine conditions. In the very nature of the hazardous business, casualties will occur, though the most favorable conditions constantly prevail, but the best we can hope for is the continuation of the best methods, plans and regulations for mining, and then we may expect the least number of accidents.

As a rule the smaller mines are not in as good condition as the larger ones, though some of them compare favorably with the larger ones, and yet others are in much worse condition, even approaching the bad. In many instances much better conditions have been brought about under the personal direction of the officials of this office. Some mines have been found with but one place of ingress and egress, where the law required them to have two. In some the air was bad and there had to be better ventilation. In one instance a complaint came to the office signed by a certain mine man that the air in his mine was bad enough to "kill rats," and asking for an immediate supervision. This was given directly afterward, and from then (October) until now (March 16th) there has been no further complaint.

Excepting in the district where the strike so long prevailed the mines were in better condition and were putting out more coal during November and December than in any other part of the year.

Of the twelve fatal accidents eleven of them occurred under ground and one in the cage as it was ascending the shaft. The tonnage of coal produced for each death was 275,337. The tonnage for each death inside the mines was 300,368. The tonnage for each death from fall of top was 660,810. Taking the greatest average number of employees (7,740) as the correct basis there was one death to every 645 persons engaged in the mine operations.

MACHINES VS. PICKS.

There are questions affecting labor and wages, arising from the two methods of mining, that have never been satisfactorily nor finally determined, and, as a result, wherever machines are introduced there is disfavor and difficulty in adjusting wages to suit the new conditions. Pick mining is paid for by the ton. A day's time is whatever the miner chooses to make it, and his daily wages depends upon the time worked and upon his muscle, skill and effort.

Machine runners are generally paid by the day, and wherever mining machines are introduced the pick man must give up his job and seek employment in some other department of mine labor or quit entirely. Machine mining means faster and cheaper production. The same amount of coal can be produced in less time or with less labor. If it were not so mining companies could not afford the cost of machines and of power plants to operate them.

While labor in the aggregate and the daily wage scale may be affected by the installment of machines, yet their trial is no longer an experiment. Time and trial have proven their necessity and made them permanent fixtures, and all wage scales must be made upon the basis of their introduction and permanency wherever their employment is feasible.

In order to aid in the study of these questions I have prepared the following table, based upon the reports to this office for the entire year, showing the results obtained at a number of our coal minesd the intention being to show the average amount of coal produce; each day during the year by each employee of the several mines, regardless of the particular work done, making the mine boss, timberman, track layer, miner, machine helper, loader, hauler or other employee each produce to the company on board the cars the same amount of coal per day.

For instance, the reports from McHenry Coal Company, in Ohio County, where the mining was done altogether by machines, show

that the mine was operated 160.7 days during the year, with a daily average of 97.16 employees, including every department of mine labor, and producing 73,306.35 tons of coal. This means that the average production of each employee for the year was 754.49 tons, and that his daily average was 4.69 tons.

In like manner it shows that the neighboring mine of the Williams Coal Company, where the mining was done altogether by picks, the average production of every employee was 2 66 tons per day. I have also added the average number of tons of coal produced by each keg of powder consumed. The arrangement of the table is: First, name of mine; second, name of county; third, the per cent. of coal produced by machines; fourth, the average number of tons produced by each employee each day of the year worked, and fifth, the average number of tons produced by each keg of powder consumed.

MINE.	COUNTY.	Per Cent. By Machine.	Tons Per Day.	Tons Per Keg.
St. Bernard	Hopkins	80	3.46	76.89
Diamond	"	80	4.79	80.58
St. Charles	"	80	3.12	115.93
Reinecke	"	100	2.98	168.09
Central	Muhlenberg	100	3.23	58.98
Render	Ohio	100	3.43	89.81
Taylor	"	100	3.64	109.91
McHenry	"	100	4.69	137.79
Echols	"	100	4.01	180.19
DeKoven	Union	70	2.61	71.01
North Jellico	Knox	90	3.28	208.50
Rush	Boyd	16	2.15	196.23
Crabtree	Hopkins	None.	4.17	45.59
Co-operative	"	"	3.09	88.96
Williams	Ohio	"	2.66	44.08
Providence	Webster	"	3.12	63.68
Baskett	Henderson	"	3.71	31.47
Pitman	Laurel	"	3.52	49.22
Peacock	"	"	2.93	61.61
Pittsburgh	"	"	2.45	64.84
Mud River	Muhlenberg	"	3.20	47.02
East Tennessee	Whitley	"	2.59	133.35
Straight Creek	Carter	"	1.75	88.08

At this time I do not care to comment on what lessons the figures teach, but leave them for the study of others.

It is proper in this connection to say that the powder consumed by the North Jellico and Rush mines was merely estimated, and was reported in that way.

THE MONTHLY REPORTS.

The importance of prompt monthly reports from the mine operators, cannot be over estimated by those having an interest in the success of this office. The delays so often inflicted are burdensome and vexatious. While the promptness of many companies is to be commended, the indifference and neglect of many others are inexcusable.

It takes but one time to make out and forward the report, and when it can be done within three, five, ten, fifteen or twenty days, after the end of any month, there is no necessity in waiting thirty or sixty days, and even longer, and as in some cases, until a threatened prosecution compels action on the part of the delinquent operators.

In making my annual report there was necessity of several revisions of statistics, occasioned by these long delayed reports, finally coming in after hope for them had been abandoned. For instance, the August report of one company was not received until sometime in February, after all the tables had been completed, making a general revision necessary. This is but one of the many similar cases. This is too slow for this day of progress; of rapid business methods, when the whole world is speeding on fast time, and demands rapidity on all lines of business.

I beg to express to all the operators my grateful appreciation for all favors shown this office, and to assure them of my hearty co-operation, and desire that they have years of continuous prosperity ahead of them.

I shall indorse on every report the date of its reception.

As an illustration of the time the various reports are received, I think it proper in this connection to give the date that a number of the January reports (1898) were received.

DATE.	NAME.	LOCATION.
February 1.....	William Coal Co.....	.....Ohio county, (8 A. M.)
February 1.....	Mt. Morgan Coal Co.....	.....Whitley county, (11 A. M.)
February 2.....	East Tennessee Coal Co.....	Whitley county.
February 3.....	Pine Knot Coal Co.....	.....Whitley county.

DATE.	NAME.	LOCATION.
February 8	Crabtree Coal Co	Hopkins county.
February 8	W. J. Hamilton	Pulaski county.
February 9	Memphis Coal Co	Muhlenberg county.
February 9	Hillside Coal Co	Muhlenberg county.
February 9	Oakland Coal Co	Muhlenberg county.
February 9	C. C. & I. Co	Ohio county.
February 9	Pitman Coal Co	Laurel county.
February 9	Manchester Coal Co	Laurel county.
February 9	Breckenridge Cannel	Hancock county.
February 9	M. H. Enright	Hancock county.
February 9	Richmond Coal Co	Pulaski county.
February 9	Lloyd & Wright	Henderson county.
February 9	West Aberdeen Coal Co	Butler county.
February 9	New Crystal Creek Coal Co	Lee county.
February 10	Co-Operative Coal Co	Hopkins county.
February 10	Pittsburg Coal Co	Laurel county.
February 10	Sebree Coal Co	Webster county.
February 10	Eureka Coal Co	Bell county.
February 10	McGuire Coal Co	Lee county.
February 12	C. C. & I. Co	Ohio county.
February 12	Peach Orchard Coal Co	Lawrence county.
February 12	Reliance Coal Co	Lawrence county.
February 12	Hywel Davies Coal Co	Whitley county.
February 12	Pine Hill Mining Co	Rockcastle county.
February 12	Mt. Savage Mine	Carter county.
February 12	Jamestown Coal Co	Ohio county.
February 12	Haag Bros	Henderson county.
February 14	B. C. Davidson	Union county.
February 15	Whitley Coal Co	Whitley county.
February 15	Fordsville Coal Co	Ohio county.

Many more reports were received during the remainder of February and in March, but at this writing (March 14) there are over forty companies that have not as yet made their January report.

NEW AND RE-OPENED MINES.

The following are the names and location of the new mines opened during 1897, and of the idle mines that were re-opened during that year:

JAMESTOWN MINE.

Located on Green river in Ohio county. Operated by Jamestown Coal Co. F. O. Coffman, President and General Manager; W. F. Coffman, Vice President; W. S. Trunnell, Secretary.

About $2000 were expended in improvements necessary to start the plant. Mining is done with picks. The first output was in August, and the entire output for the year was 2,920 tons. The post-office of the company is at Livermore, McLean county.

OAKLAND MINE.

This mine is located near Mercer Station, in Muhlenberg county, and is operated by the Oakland Coal Co. J. W. Lam, Secretary.

This mine is a shaft about 100 feet deep. The first output was in October, and the entire output for the year was 936.20 tons.

MT. MORGAN MINE.

This mine is located near the town of Williamsburg in Whitley county, and is operated by the Mt. Morgan Coal Co.

The first coal mined was in October, and the entire output of the year was 12,180 tons.

GRANT MINE.

W. R. Grant opened a small mine near East Bernstadt, in Laurel county, in September. It seems that it was not operated in October and December. Its output for September and November, 1,490.44 tons.

SWISS MINE.

This is a new mine, located near East Bernstadt, in Laurel county, operated by the Swiss Mining Co. Its first output was in March, and its entire output for the year was 5,283.28 tons.

GREASY CREEK.

This is a new cannel coal mine, located near Eliza, P. O. in Johnson county, operated by the Greasy Creek Cannel Coal & Tramway Co. J. S. Rittenhouse, General Manager. Its output for the year was 4,005 tons.

KENTUCKY.

H. C. Thompson has opened a new mine near Pittsburg, in Laurel county, and the same is being operated by the Kentucky Coal Co. The first output was about November, and the entire output for the year was 6,400 tons.

DRY FORK.

The Eastern Kentucky Railway Co. opened a new mine near Willard in Carter county. Geo. Gibbs, Superintendent. The first output was in October and the entire output for the year was 1,043 tons.

TORCHLIGHT MINE.

Located near Walbridge in Lawrence county and operated by the Reliance Coal Co. Opened in November, and output for the year was 238.25 tons.

LILY MINE.

Post Office at Lily, in Laurel county. Operated by the Lily Coal and Coke Co. L. L. Parks, Proprietor. This mine had been idle for about two years and until re-opened during May. Its entire output for the year was 11,057.32 tons.

PINE HILL MINE.

This mine is located at Pine Hill, in Rockcastle county, and

is operated by the Pine Hill Mining Co. J. A. August, President; B. R. Hutchcroft, General Manager.

The mine had been idle since 1895. Work was resumed in August, and the entire output for the year was 9,493.40 tons.

EXHAUSTED MINES.

The mine of the Central Jellico Co. near Pleasant View in Whitley Co. was worked out in April and abandoned.

The Lost Creek Mine in Carter county was also worked out in April and abandoned.

There are a number of other mines that are about exhausted, and may have been practically abandoned by the close of the year, but my knowledge of the same is not definite enough to report further names on this list.

IDLE MINES.

Stinson mine, in Carter county, was operated in February and March, but was idle the remainder of the year.

Reynolds mine, in Ohio county, was idle all year except a few days during March.

The J. C. Steelly mine, in Whitley county, was idle all the year.

The lease on the Diamond mine, in Laurel county, expired in May and was not renewed and the mine was idle during the remainder of the year.

Spottsville mine, in Henderson county, was idle all the year.

The Alva Karnes mine, at Island, McLean county, was idle all the year.

The Mt. Vincent Coal Co. near Pineville, in Bell county, did no work during the year.

J. P. Gaddie & Co. of Knox county, did no mining during the year.

SHAFT MINES.

The following is a list of the shaft mines, together with the county where located and the depth of each shaft. In cases where the general question blank was not returned the depth stated has been estimated from the best information at hand, and in such cases is preceded by the word "about."

NAME.	COUNTY.	DEPTH.
Empire	Christian	About 75 feet.
Hawesville	Hancock	105 "
Green River	Henderson	50 "
Henderson Mine	"	180 "
Peoples	"	185 "
Lloyd & Wright	"	185 "
Pittsburg	"	135 "
Monarch	Hopkins	265 "
Reinecke	"	300 "
Island	McLean	75 "
Central	Muhlenberg	180 "
Memphis	"	About 100 "
Pierce	"	132 "
Hillside	"	About 100 "
Oakland	"	About 100 "
Greenville	"	About 75 "
Echols	Ohio	95 "
Aetnaville	"	About 75 "
Trade Water	Union	About 125 "
Davidson	"	200 "
T. L. Taylor	Webster	About 80 "
Sebree	"	175 "
Forsythe	"	80 "

MACHINE MINES.

The following contains the name of each mine, where the mining was done in whole or in part with machines, together with the county where the said mines are located, the power used, and the tonnage of coal produced.

County.	Mine.	Power.	Output, Tons.
Christian	Empire	Electricity	36,325
Hopkins	St. Bernard (6)	Air	447,651
Hopkins	Reinecke	"	146,916
Hopkins	Hecla	Electricity	39,990
Hopkins	Monarch	"	15,927
Muhlenberg	Central	"	84,000
Ohio	Render	"	93,227
Ohio	McHenry	"	73,306
Ohio	Echols	"	80,007
Ohio	Taylor	Air	138,932
Knox	North Jellico	"	104,146
Union	Ohio Valley	"	25,422
Boyd	Rush	"	30,360
Whitley	Whitley Co	"	2,700
Bell	West Pine	Electricity	1,370
Total tons in 1897			1,320,279
Total tons in 1896			957,329
Increase over 1896			362,950

The above figures show that nearly 41 per cent. of the State's output was machine mined, against only a little over 30 per cent. so

mined in 1896. The new plant of the Whitley Coal Company was completed late in December. Several Harrison machines have been installed and are run by compressed air.

The Pineville Coal Company, now operating the West Pineville mines, Nos. 1 and 2, the Walsend and the Brilliant, also, late in the year installed three machines, run by electricity. All things strongly indicate that 1898 will show yet a greater per cent. of the products to be the result of machine work.

THE YEARLY BLANK.

Desiring to get more specific information, relative to the character of our commercial mines, their equipments, manner of operations, hindrances of the year, improvements made, disposition of their product, etc., in the month of December, I mailed to the address of the several mining companies, a general question blank, requesting that they send me the information sought.

Eighty-one of the companies generously responded, most of them very promptly and fully.

Much of the matter contained in the chapter headed "Notes on the Mines," and in other articles in this report have been gleaned from these question blanks. I am persuaded that by the end of this year, when the plan shall be repeated, that all the companies will see its wisdom, and that none of them will treat it with indifference or neglect.

One of the questions asked was, "What per cent. of the coal is marketed outside of Kentucky?" The answers of these companies show that 971 061 tons of the 1897 output have been transported by our railroads into other States, and been marketed in cities beyond our borders.

The amount thus exported by the twenty-four mining companies from which no report was received, I can not say, and any estimate I might make would likely be wide of the facts. Several of the companies are the smallest in the State. From their location and output I conclude that an estimate of 80,000 tons of their output for export is reasonable and safe, making more than 1,050,000 tons, or nearly 32 per cent. of the product of 1897, that have been marketed in States and countries outside of Kentucky.

RAILROAD TRANSPORTATION.

I now give the tonnage produced by our commercial coal mines, dependent on our several railway systems, for transportation to points within and beyond the borders of our State.

1. By Louisville & Nashville Railroad.

Name of Division or Branch.	Tons
Henderson & Nashville Division	801,318
Owensboro & Nashville Division	173,734
Providence Branch	62,087
Cumberland Branch	245,621
Knoxville Branch	324,315
Total L. & N. system	1,607,075

2. By the Illinois Central Railroad.

Name of Road or Division.	Tons.
Illinois Central (Main Stem)	655,763
Same, Ohio Valley Division	120,196
Same, Owensboro & Falls of Rough	29,078
Total I. C. system	805,037

Name of Road.	Tons.
3. By Louisville, Henderson & St. Louis	130,631
4. By Chesapeake & Ohio	153,165
5. By Cincinnati, New Orleans & Texas Pacific	78,294
6. By Lexington & Eastern	22,241
7. By Ashland Coal & Iron Ry.	226,961

GENERAL STATISTICS.

OUTPUT.

(In tons of 2,000 pounds.)

The total production of coal, including cannel, of all the commercial mines in the State during 1897 is 3,304,053.38 tons. This is the largest yield ever made by the Kentucky mines, being a gain over 1896 of 120,574.42 tons, and over 1893 of 1,803.38 tons. Considering the magnitude of the strike in the Southeastern District, where the loss from 1896 amounts to more than 300,000 tons, and the many other hindrances of the year, the results obtained are as surprising as they are gratifying.

PRODUCTION BY DISTRICTS.

DISTRICT.	1896.	1897.		
	OUTPUT.	OUTPUT.	GAIN.	LOSS.
Western District.....	1,762,461.93	2,114,571.41	352,109.48	.....
Southeastern District.....	1,096,585.54	796,430.49	.....	300,155.05
Northeastern District.....	324,431.49	393.051.48	68,619.99	.....
Totals.....	3,183,478.96	3,304,053.38	420,729.47	300,155.05

Net gain over 1896, 120,574.42 tons.

PRODUCTION BY COUNTIES.

COUNTY.	1896.	1897.		
	OUTPUT.	OUTPUT.	GAIN.	LOSS.
Bell	89,533.96	80,737.13	.....	8,796.83
Boyd.	121,022.00	172,888.00	51,866.00	.....
Butler	28,443.92	30,511.60	2,067.68	.....
Breathitt	2,405.77	9,316.39	6,910.62	.....
Carter	136,066.00	132,690.61	.....	3,375.39
Christian	13,123.68	36,325.64	23,201.96	.....
Daviess	3,232.24	3,549.20	316.96	.....
Greenup	854.00	.....	.....	854.00
Hancock	17,841.60	19,901.67	2,060.67	.....
Henderson	119,539.65	121,223.72	1,684.07	.....
Hopkins	777,181.95	961,412.24	184,230.29	.....
Johnson	6,762.40	4,005.00	.....	2,757.40
Knox	217,039.83	164,882.70	.....	52,157.13
Lawrence	47,474.00	61,226.25	13,752.25	.....
Laurel	288,493.96	294,075.27	5,581.31	.....
Lee	9,847.32	12,925.24	3,077.92	.....
McLean	24,075.96	30,852.84	6,776.88	.....
Muhlenberg	256,268.19	261,783.32	5,515.13	.....
Ohio	368,094.44	460,693.06	92,598.62	.....
Pulaski	72,537.12	49,519.03	.....	23,028.09
Rockcastle	.....	9,493.40	9,493.40	.....
Union	104,121.34	117,732.32	13,610.98	.....
Webster	50,538.96	70,585.80	20,046.84	.....
Whitley	428,980.67	197,722.95	.....	231,257.72
Totals	3,183,478.96	3,304,053.38	442,790.98	322,216.56

Net gain in 1897, 120,574.42.

PRODUCTION BY MONTHS.

MONTH.	Western District.	Southeastern District.	Northeastern District.	Totals.
January	192,587.54	93,742.72	30,527.95	316,856.21
February	166,998.26	84,834.87	26,003.46	277,836.59
March	139,678.09	78,367.38	27,556.23	245,601.70
April	121,340.35	76,926.24	22,623.45	220,890.04
May	107,643.08	36,418.13	21,134.69	165,195.90
June	100,128.22	34,426.32	23,219.72	157,774.26
July	205,582.62	44,943.21	29,838.39	280,364.22
August	240,293.78	22,794.76	43,001.02	306,089.56
September	230,823.54	40,667.55	45,731.77	317,222.86
October	157,154.26	66,559.09	44,522.59	268,235.94
November	227,999.48	93,503.91	43,831.75	365,335.14
December	224,342.19	123,246.31	35,060.56	382,648.96
Totals	2,114,571.41	796,430.49	393,051.48	3,304,053.38

As will be seen from the above table the largest production was during the month of December and the lowest during the month of June.

Another very significant fact is, although the great strike in the Southeastern District covered much more time during the last half of the year than during the first half, yet the production of the last six months of the year far exceeds the amount produced during the first six months.

The tonnage of the two half-year periods is as follows:

First six months	1,384,156.70 tons.
Last six months	1,919,896.68 "
Total, 1897	3,304,053.38 "
Increase last six months	535,739.98 "

PRODUCTION OF LEADING COMPANIES.

The names and output of all mining companies producing over 100,000 tons are now given in the order of their production :

COMPANY.	No. Mines.	County.	Tons.
1. St. Bernard Coal Co	6	Hopkins	559,564.00
2. Central Coal & Iron Co	1	Muhlenberg	205,283.01
Central Coal & Iron Co	2	Ohio	
3. Ashland Coal & Iron Co	1	Boyd	189,757.00
Ashland Coal & Iron Co	1	Carter	
4. McHenry Coal Co	2	Ohio	153,313.98
5. Reinecke Coal Co	1	Hopkins	146,916.36
6. Taylor Coal Co	1	Ohio	138,932.12
7. North Jellico Coal Co	2	Knox	115,718.00
Totals	17.		1,509,484.47

The number of mines that contributed to the entire output of the year were 133, and were operated by 105 companies. The number, in a few instances, embraces two separate companies that operated the same mine in different portions of the year. The following comparisons are quite significant: One hundred and five companies, operating 133 mines, produced 3,304,053.38 tons. But seven of the companies, operating 17 of the mines, produced 1,509,484.47 tons, or nearly 46 per cent. of the entire output.

Another note-worthy fact is that these companies, with the exception of the Ashland Coal & Iron Co., did most or all of the mining with machines. The following table gives the per cent. of the output of each of said companies that was produced by machines.

St. Bernard Coal Co	80 per cent.
Central Coal & Iron Co	100 "
Ashland Coal & Iron Co	16 "
McHenry Coal Co	100 "
Reinecke Coal Co	100 "
Taylor Coal Co	100 "
North Jellico Coal Co	90 "

PRODUCTION OF LEADING MINES.

The name, location and output of the several mines producing more than 50,000 tons of coal each are now given in the order of their production.

NAME.	COUNTY.	OUTPUT.
1. Earlington No. 9	Hopkins	185,373.00
2. Reinecke	"	146,916.36
3. Rush No. 6	Boyd	145,391.00
4. Diamond	Hopkins	144,815.00
5. Taylor	Ohio	138,932.12
6. North Jellico	Knox	115,718.00
7. Central	Muhlenberg	112,055.02
8. Earlington No. 11	Hopkins	111,752.00
9. St. Charles	"	98,862.00
10. Render	Ohio	93,227.00
11. Echols	"	80,007.63
12. McHenry	"	73,306.35
13. Crabtree	Hopkins	61,691.36
14. Basket	Henderson	58,224.44
15. Peach Orchard	Lawrence	57,505.00
16. Pitman	Laurel	52,964.18
17. Providence	Webster	51,962.12
18. De Koven	Union	50,845.48
Total		1,779,548.06

Contiguous mines in the same coal vein, under the same management, and using the same tipple, like the St. Charles and Render mines, are classed as only one mine.

HOPKINS AND WHITLEY COUNTIES.

The following table shows the monthly production of Hopkins and Whitley counties; the former the first and the latter ordinarily the second in output, but this year seriously affected by the great strike.

MONTH.	HOPKINS.	WHITLEY.
January	82,558.13	40,900.49
February	71,156.53	34,080.15
March	64,980.44	24,822.52
April	58,064.53	22,249.35
May	49,048.07	569.00
June	48,712.28	.....
July	95,115.47	.....
August	106,442.03	.....
September	103,962.56	1,064.89
October	78,299.83	7,406.58
November	102,058.41	27,212.15
December	101,013.96	39,427.82
Totals	961,412.24	197,732.95

Gain in 1897 in Hopkins, 184,230.29 tons; loss in Whitley, 231,257.72 tons.

PRODUCTION OF CANNEL.

There is a growing demand for cannel coal, as indicated by frequent inquiries received at this office from various parts of the United States and Canada. The production has not been equal to the demand or expectation. It is believed, however, that the near future will see a large increase in the output of this valuable coal.

The following statement shows the tonnage of each county for the years 1896 and 1897 :

COUNTY.	1896.	1897.	GAIN.	LOSS.
Bell	33,978.15	33,807.32	.....	170.83
Carter	3,495.80	9,313.21	5,817.41	.....
Hancock	3,426.80	3,231.07	.....	195.73
Johnson	6,762.40	4,005.00	.....	2,757.40
Whitley	6,143.65	2,671.42	.....	3,472.23
Lawrence	.....	3,483.00	3,483.00	.....
Greenup	854.00	.....	.....	854.00
Totals	54,660.80	56,511.02	9,300.41	7,450 19

Gain in 1897, 1,850.22 tons.

The mines in Greenup county are not subject to inspection, and their output for 1897 is not known.

The decrease in the reported output of Johnson county, and the placing of Lawrence county in the column of the cannel producing counties of 1897, are caused by the transfer of the output of the White House Cannel Coal Co.'s mine from Johnson county to Lawrence county.

The names and post-office address of the several companies producing cannel coal are as follows:

Breckenridge Cannel Coal Co., Room 55, American National Bank Building, Louisville, Ky. The mine is located near Victoria, in Hancock county, and can be reached by railroad via Clovenport.

Whitley Coal Co., Halsey, Whitley county.

Pineville Coal Co., Pineville, Bell county.

Log Mountain Coal, Coke & Timber Co., Pineville.

White House Cannel Coal Co., Louisa, Lawrence county.

Kentucky Cannel Co., Riverton.

Lexington & Carter County Mining Co., Music, Carter county.

Greasy Creek Cannel Coal Co., Eliza, Johnson county.

The mine of the Bird Eye Jellico Coal Co., at Halsey, Whitley county, that in 1897 produced 2,671.42 tons of cannel, has been superceded by the Whitley Coal Co., a new organization that is now operating said mine, with post-office at Halsey.

The West Pineville mines, Nos. 1 and 2, formerly operated by the Breckenridge & Pineville Syndicate, have passed into the hands of the Pineville Coal Co., post-office at Pineville.

ORDER OF PRODUCTION.

The counties producing in 1896 and 1897 over 100,000 tons of coal stand in the following order.

1896.	1897.
1. Hopkins.	1. Hopkins.
2. Whitley.	2. Ohio.
3. Ohio.	3. Laurel.
4. Laurel.	4. Muhlenberg.
5. Muhlenberg.	5. Whitley.
6. Knox.	6. Boyd.
7. Carter.	7. Knox.
8. Boyd.	8. Carter.
9. Henderson.	9. Henderson.
10. Union.	10. Union.

The magnitude of the strike in the Jellico district is plainly seen in the changing of Whitley from the second to the fifth place, giving place to Ohio, that produced more coal in 1897 than was produced by Whitley in 1896, when Ohio was third in the list.

Laurel has advanced from fourth to third place; Muhlenberg, from fifth to fourth place; Boyd, from eight to sixth place; while Knox has dropped from sixth to seventh place, and Carter from seventh to eight place; Henderson and Union continue to retain their former places, ninth and tenth. Knox was materially affected also by the the Jellico strike. The North Jellico mine that put out over 70 per cent of the product of the county being constantly idle from June eighteenth to November first.

PRODUCTION BY YEARS.

The following table shows the annual production of all our commercial mines since 1887. The amounts reported previous to 1888 are officially stated to be "only approximately correct," and are therefore omitted from the table:

YEAR.	BITUMINOUS.	CANNEL.	TOTAL.
1888	2,342,058	42,835	2,384,893
1889	2,205,434	40,285	2,246,259
1890	2,483,144	49,382	2,532,526
1891	2,907,096	43,040	2,950,136
1892	2,973,455	53,842	3,027,297
1893	3,258,712	43,538	3,302,250
1894	2,899,692	57,503	2,957,195
1895	3,138,023	69,747	3,207,770
1896	3,128,818	54,660	3,182,478
1897	3,247,542	56,511	3,304,053

The production of 1897 is greater than in any year of the State's history. If the general conditions existing at the close of 1897 shall be taken as a basis for the expectations for 1898 then the year's production will far surpass all previous records.

COKE.

The production of coke is still confined to the three companies named in the previous reports of this office.

TONNAGE.

The output of each plant for the years 1896 and 1897 is as follows:

COMPANY.	COUNTY.	TONS. 1896.	TONS. 1897.
St. Bernard Coal Co....	Hopkins	17,971.40	28,229.25
Ohio Valley C. & M. Co.	Union.....	1,804.85	2,097.91
P'ville Coal & Coke Co.	Bell.....	7,392.22	1,957.70
Total..... ..		27,168.57	32,264.86
Gain in 1897			5,116.39

The plant of the Pineville Coal & Coke Co. was closed in April and was not operated any more during the year. This fact explains the great loss in the product of that plant.

The St. Bernard Coal Company still operates 104 ovens and gives employment to forty persons. Its increased product of 10,257.85 tons during the year denotes material advancement, and arguers well for the future.

The Ohio Valley C. & M. Co. operates ten ovens, and made a slight increase over their output of 1896.

Attention is now being given this important industry in the Northeastern part of the State. The Ashland Coal & Iron Co. are experimenting with their coal taken from No. 6 or the Clinton seam in Boyd county. A letter of inquiry addressed to the company asking for information as to the result of their experiments, and as to their intentions in the future regarding this line of manufacture, under date of January 15, 1898, elicited the following reply:

"We have built four coke ovens; two, eight feet in diameter, and two, ten feet in diameter. We have tested coal from No. 6 or Clinton seam of coal and find that it will coke when freed from impurities. In order to get the coal free from impurities we have been testing the coal in the Jeffrey Robinson Washer at Columbus, Ohio, and are not yet through with the test. But so far as we have gone are satisfied with results we have obtained. It is probable that in two weeks from this time we can definitely say what we will advise our company to do in regard to building a plant of coke ovens.

"The four ovens at present erected will be torn down and an entirely new plant put in, if we conclude to go into the coking business."

Under date of January 21, 1898, the company again wrote to this office saying: "The coke experiments so far appear to promise favorable results."

It is quite probable that during 1898 there will be quite an advance in this important industry in our State, and the developments of the year will be looked for with unusual interest.

EMPLOYEES.

The greatest number of employees engaged in all departments of coal mining in any part of the year was 8,611 during the month of December.

The greatest average number so employed was 7,740 during the same month.

The lowest and lowest average numbers were 5,041 and 4,466, respectively, during the month of June.

Each number for the months named, were divided among the several districts as follows:

DISTRICT.	GREATEST.	AVERAGE.	LOWEST.	LOWEST AVERAGE.
Western District.....	4,246	3,929	2,833	2,614
Southastern District	3,214	2,792	1,511	1,236
Northastern District	1,151	1,028	707	616
Totals.....	8,611	7,740	5,051	4,466

The greatest and the average number of employees for the entire State during each month of the year are now given:

MONTH.	GREATEST.	AVERAGE.
January	7,713	6,827
February	7,364	6,784
March	7,104	6,394
April	6,366	5,817
May	5,160	4,657
June	5,051	4,460
July	5,774	5,170
August	6,011	5,423
September	6,734	6,039
October	6,686	6,084
November	7,972	7,104
December	8,611	7,740

As is shown by the monthly reports, about 85 per cent. of the employees worked below ground.

BY COUNTIES.

The following table shows the employees of each county classified according to the months above named (December and June):

COUNTY.	GREATEST.	AVERAGE.	LOWEST.	LOWEST AVERAGE.
Bell	147	126	286	208
Boyd	283	278	212	186
Butler	131	115	81	71
Breathitt	30	28	21	21
Carter	475	405	273	228
Christian	92	85	37	34
Daviess	22	22		
Hancock	127	101	59	49
Henderson	243	231	179	167
Hopkins	1,408	1,382	1,118	1,095
Johnson	103	97	41	41
Knox	533	439	404	332
Laurel	868	853	744	621
Lawrence	165	145	148	128
Lee	95	75	12	12
McLean	95	74	50	38
Muhlenberg	673	650	489	467
Ohio	892	787	613	506
Pulaski	279	228	77	75
Rockcastle	67	53		
Union	384	329	143	131
Webster	179	144	64	56
Whitley	1,320	1,093		
Totals	8,611	7,740	5,051	4,466

These figures show a material decrease in the greatest number of employees when compared with 1896, when the number was reported at 9,852. But a greater average number is shown in 1897 than in 1896, when the latter was reported at 7,550.

This average increase of 140, together with more time worked than in 1896, accounts for the increased product of 1897 of more than 120,000 tons.

The following table shows the number of mines in each county, that produced coal in some part of the year, the month in which the largest output in each county was made, the largest number of employees, and output of the counties for said months.

COUNTY.	MINES.	MONTHS.	EMPLOYEES.	TONS.
Bell	5	December	147	10,835.00
Boyd	2	August	373	24,921.00
Butler	2	December	131	3,750.72
Breathitt	1	December	30	1,179.64
Carter	8	September	472	20,204.57
Christian	1	August	84	4,997.44
Daviess	1	November	20	933.72
Hancock	3	September	95	2,944.96
Hopkins	13	August	1,452	106,442.03
Henderson	5	September	222	16,624.84
Johnson	1	December	103	956.70
Knox	7	December	533	22,640.96
Lawrence	4	October	140	6,875 00
Laurel	18	October	831	39,427.90
Lee	5	December	95	1,944.00
McLean	2	December	95	5,052.52
Muhlenberg	8	November	661	29,993.28
Ohio	11	August	725	53,737.88
Pulaski	6	April	196	8,168.60
Rockcastle	1	October	76	2,534.40
Union	5	December	384	16,415.99
Webster	4	August	176	10,699.48
Whitley	20	January	1,289	40,900.49
Totals	133		8,330	432,181.12

FATALITIES AND INJURIES.

During 1897 there were fifty-eight noteworthy accidents among the coal mine employees of the State, classified as follows: Twelve fatal, twenty-seven serious, and nineteen slight. In the above enumeration, I have followed the rule adopted by my predecessor and have discarded injuries of mere minor importance of which class there were fifteen reported. Eleven of the deaths and nearly all of the non-fatal accidents occurred under ground.

As will be seen by the further reading of this chapter, five of the fatalities were the direct result of mine operations, and not of bad mine conditions. Since the danger that caused the death of five others was so patent, and so well known to the unfortunate victim of each accident, they also might properly be classed among those arising from mere mine operations.

The number, cause, and class of the several fatalities and injuries are now given:

CAUSE.	FATAL.	SERIOUS.	SLIGHT.	TOTAL.
Fall of top	5	6	5	16
Fall of coal	1	4	3	8
Motor	1			1
Cars	1	10	4	15
Cage	1			1
Explosion, coal dust and gas	2			2
Blasting	1	5	2	8
Mule kicks, etc		1	2	3
Miscellaneous		1	3	4
Total	12	27	19	58
Total 1896	6	19	46	71

No accidents of any kind were reported from the counties of Bell, Breathitt, Christian, Daviess, Hancock, Johnson and McLean, and only one of the minor class, from Butler county, but the output of these counties is small as compared to a number of others.

It is worthy of special mention that Muhlenberg county with an output of 261,783.32 ton reports but two of the fifty-eight injuries, one being a mashed finger, and the other a mule kick, and Carter county with an output of 132,690.61 tons reports but one of the fifty-eight injuries, and the party injured lost but ten days from work. (See note at the close of this chapter.)

The reported fatalities, resulting from the operations of Kentucky coal mines since 1888 are as follows:

YEAR.	FATALITIES.	YEAR.	FATALITIES.
1888	14	1893	12
1889	13	1894	10
1890	11	1895	8
1891	16	1896	6
1892	8	1897	12

It will be seen that the death rate has been greater than in any year since 1893, and has been exceeded only by the years 1888, 1889 and 1891. There may be a tendency to attribute the increase to this office as administered by the present incumbent, and knowing the liability of men unacquainted with all the facts to attach credence to plausible criticisms or mere comparisons, I deem it proper to make this explanation.

I did not take charge of the office until April 1st. Five of the twelve deaths had already taken place and four more followed by April 16, leaving but three for the remaining eight and a half months of the year. The work of the office required considerable time to acquaint myself with its varied duties, so that its business could be transacted with correctness and dispatch. Mr. W. U. Grider remained in office as my assistant until July 15. On April 12, he started on his second trip to the mines in the Southeastern District, where the work of inspection was further behind than in the Western District, and he was there pushing the field work at the time of the explosion in the Monarch mine.

Under all these facts, if any of the four deaths that took place from the first to the sixteenth of April was caused by any sort of bad mine conditions, then the blame therefor, if any, can not be charged to my administration, and I do not apprehend censure nor adverse criticism wherever the facts are fully known.

The month and date of each death and the names of the county and mine in which it occurred are now given:

No.	Name of County.	Name of Mine.	Month.	Day.
1	Webster	Sebree	February	26
2	Ohio	Render	March	2
3	Laurel	Manchester	March	8
4	Laurel	Manchester	March	8
5	Knox	North Jellico	March	29
6	Breathitt	Jackson	April	6
7	Ohio	Render	April	7
8	Hopkins	Monarch	April	16
9	Hopkins	Monarch	April	16
10	Whitley	Proctor	October	14
11	Whitley	Ky. Jellico	October	21
12	Hopkins	Reinecke	October	21

I now give in detail the special causes that led to the several deaths.

Mr. T. J. Ashby, superintendent of the mines at Sebree, made the following report of the death of Carl Humphrey on February 26th:

"Carl Humphrey, a driver, man, nineteen, found dead. Car off the track and his head crushed between the track and the prop. The coroner's jury returned a verdict that he met his death by accident due to the car leaving the track. It looked like he failed to make a switch and the mule pulled the car off the track."

A copy of the inquest has not been filed in this office.

The second death was in Render mine. David Charles, a furnace man and doorkeeper, was knocked against the coal by the motor and killed. He was a widower, and left an adult son, but no dependent family. The evidence shows conclusively that the killing was unavoidable.

Mr. Hywel Davies, the general manager, in a letter to this office of date March 3d, says: "All good records as well as bad seem destined to be broken.

"Render, after twenty-five years of existence, and shipping one

and a half million tons of coal killed its first man last evening at 5:40 o'clock." He also said: "I sent for the coroner and after reading the testimony of the motorman, and Mitchel, the inside foreman, the son did not want an inquest as he was satisfied it was unavoidable. I did not press it against his wishes."

Mr. L. W. Hunt, the coroner, went to the mine and took the evidence of the two witnesses named, and not deeming a formal inquest necessary gave to the mining company a receipt and certificate in these words:

RENDER, KY., March 3, 1897.

"Received of Central Coal & Iron Co., six dollars for a summons to hold an inquest over the body of David Charles, killed at the Render mines, March 3, 1897. After the testimony of Robert Mitchell and John Roddy had been read to D. J. Charles the son of the deceased, he did not think that an inquest was necessary. The company officers sent for me and were willing to abide by the request of the same D. J. Charles.

D. W. HUNT,
Coroner Ohio County.
Attest. B. N. PATTERSON,
JOHN JONES.

ALSO OF TIMBERING.

The third and fourth deaths occurred simultaneously in the Manchester mine. Concerning these, the mine officials made the following report to this office: "Taylor Stivers, a miner, man, March 8. Slip in roof. Head and body crushed. Died. Widow, no children.

"Jud Bailey, a miner, man, March 8. Slip in roof. Crushed about the body. Died. Widow, no children. These two men were working in the same room and were killed instantly. There was no perceptible crack in the roof. The fall came suddenly and without warning."

This mine was inspected on October 15, 1896, and was again visited on November 28th, but was not inspected because the mine was idle and no one was there. Directly after the accident, the room where the men were killed was closed, and kept closed until May 14th, when the mine was again visited by Mr. Grider with the

view of inspecting it. In his report to this office, as to the condition of the mine at that time, Mr. Grider says: "The mine was idle, had been so, I was told, since May 1st. Water had accumulated to such an extent that an inspection was impossible. I did, however, get into some rooms on Bryant entry. Among them was No. 5, in which wo men were killed by fall of top on the eighth day of March, 1897. Props are not set close enough up to the faces of working rooms. In room 5, they are sixteen feet from the face. Throughout the mine props should be kept set up to within eight feet of the faces of the workings." There has been no suggestion of failure on the part of the mining company to furnish props, and I presume there was no lack of them. It appears that the unfortunate men presumed to far on the good appearance of the top and failed to set up enough props to prevent it falling. Good and timely propping no doubt would have preserved the lives of these men. I have never known a mine to be hurt by the use of too many props. More than enough in any place is better than not enough. The man who waited one hour for the train got his ride, but the man who was one minute late was left.

The statement that "there was no perceptible crack or break in the roof" and that "the fall came suddenly and without warning," shows that it is not safe to presume too far on good appearances. A great many lives have been lost in this way. From all the facts, I do not consider that the mining company is in any way to blame; but with this fearful object lesson and the warnings of the Assistant Inspetor as to the setting of props, if such a casuality should again happen from the same cause, the mine officials might not be held blameless.

It is the duty of the mine superintendents and mine bosses to see that all reasonable regulations for the government of their mines are strictly and promptly enforced, and to discharge any employee who fails or refuses to obey them. They have the legal right to do so, and it is the surest and quickest way to enforce such rules. A mere admonition on their part is not enough They must require the enforcement of such regulations or compel the miner to quit his work. Nor can they leave it merely to the judgment of the miner as to when timbering shall be necessary and escape responsibility in that way. Ventilation, drainage and timbering are the three special safe guards enjoined by the law in order to prevent mine accidents. As nearly 60 per cent. of the deaths, and a very large per cent. of the

non-fatal accidents that have occurred in the mines since there has been State supervision, have been occassioned by falls of top, I am persuaded that far too little attention has been paid to this provision of the law. It is the special duty of the underground foreman to personally see to the necessity of timbering in all parts of the mine, and compel the miners to do it in the proper manner and at the right time.

Section 11 of the mining law gives the mine-boss (as underground superintendent) full authority to act independently of the wishes or judgment of the miner, and the employee of any mine, who, "intentionally or wilfully neglects or refuses to securely prop the roof of any working place under his control, or neglects or refuses to obey any order given by the superintendent of the mine in relation to the security of that part of the bank where he is at work, shall be liable to a fine of not less than ten, nor more than fifty dollars." Where there is power there must be proportionate responsibility. If it was not intended that the mine-boss or superintendent should exercise such supervision and require the enforcement of the legal and adopted regulations on the part of the miners, then why was the law enacted? If it is not to be enforced, then it ought to be repealed. But under the law as it now exists, it is the plain duty of the mine boss, or other person having special charge of the under-ground work to personally inspect every working place and entry that may be used in the mine operations, and determine as to the necessity of propping or other timbering and see that it is promptly done, and if he fails to do his duty in this respect then the mining company will be liable for his negligence. I do not want to be understood as indicating that the miner is to be under no responsibility, in such cases, as it is equally clear, that if he fails or refuses to set all necessary props when required to do so, that no recovery can be had for injury sustained, and he is also under special necessity of looking out for his own safety, and while he has the right to expect the watchful eye of the superintendent to warn him of the danger of his working place, still he must also watch, and he has no right to expose himself to any known or apparent danger, and recover damages for an injury thereby sustained. If the superintendent fails to inspect the working places, he cannot know where special or apparent dangers exist, and cannot, therefore, give any order as to propping, and consequently, no miner could become liable to the penalty of the law, and the law would be

wholly inoperative; but where he does his duty along these lines, with reasonable watchfulness and promptness, and accidents still occur, very clearly the mining company could not be held responsible. Mining is a hazardous business, and no system has ever been put in operation since the first coal mine was started many centuries ago, that has been free from fatalties and serious injuries. It is not now expected to find such a system, but an intelligent and faithful enforcement of existing regulations will certainly reduce the list of casualties to the lowest point ever known.

The regulation as to timbering is a legal one and it does not require any action on the part of mine officials to make it obligatory on them, but every company on its formation undertakes to faithfully carry out this legal regulation. The law does not say how thick nor how close to the working faces the posts should be set. This must be left to the conditions of each mine. Much depends on the kind of top, strength of pillar, character of bottom, etc., and herein lies the obligation on every mine foreman to study his mine conditions and observe every necessity for timbering. In this room No. 5, where these two men were killed, the props were 16 feet from the face of the room, and the inspector says that they ought to have been set within 8 feet of the face, throughout the mine.

In some mines, not operated by machines, props are needed and set to within four feet of the working faces. I invite special study of this subject as portrayed and discussed in this chapter, and desire to say that the rule herein, is not a new one, but is rather a revival of the proper interpretation of the old rule, that seems to have been much neglected.

The fifth death occurred in the North Jellico mine, Knox county, on March 29th, when W. E. Wyatt, head gin man, was instantly killed by fall of slate. He was about 35 years old, and left a wife and two children.

The report to this office shows that his death was occasioned by his own risk.

The report says: "He knew slate was about to fall, and had warned others to keep from under it, but took the risk of passing under it himself several times, and the last time it caught him." On his part the danger was well known and imminent and he had the authority to have the slate taken down or propped, but did neither, and no one can be blamed but himself. If he had carried out the

rule emphasized in this chapter no doubt he would still have been living. This is another illustration of the value of the law and of the necessity for its strict enforcement.

The sixth death was that of Hogan Hocker, on April 7th, from injuries received in the Jackson mine on April 6th. He was a miner and 52 years old. The report to this office fully explains the cause of his death.

The report says: "Deceased and his partner of the name of Isaac Harvey, had prepared two holes to be fired at the noon hour. They touched squib of both holes. First shot put out squib of second hole. Deceased returned to face of room and touched off the squib that had been put out. Before he could move it fired. Injured severely about the head."

The seventh death occurred in the Render mine in Ohio county, operated by the Central Coal and Iron Co., on April 7th, when Hollis Thomas, of color, machine helper, was killed by fall of coal. This made the second death in this mine in twenty-five years, and the second for this year. The deceased was eighteen years old and unmarried.

An inquest was duly held over the remains by a justice of the peace.

An official copy of the inquest is filed in this office and is as follows:

"RENDER, Ky., April 8, 1897.

"I, C. L. Woodward, justice of the peace of Ohio county, Kentucky, having been called to hold an inquest over the remains of Hollis Thomas, who was killed by falling coal in Render mine in Ohio county, Kentucky, this morning, caused by an unseen slip in the coal, after examining the witnesses in the case and being sufficiently advised, I decided that the said Hollis Thomas came to his death by falling coal, and it was an unavoidable accident, and I hereby exonerate the Central Coal & Iron Company, for which company said Hollis Thomas was working at the time of his death, also any and all of the officers and hands of the said company of any contributory negligence causing said death."

(Signed) C. L. WOODWARD,
J. P., O. C.

The eighth and ninth deaths occurred simultaneously in the mine of the Monarch Coal Company in Hopkins county on April 16,

when Theodore Stone and Robert Carlton lost their lives in what I conceived to be a coal dust and gas explosion. Stone left a widow but no children, and Carlton left a widow and one child.

For a full discussion as to the causes that led to this fearful accident see subsequent part of this chapter, under the head of the "Monarch Mine Explosion."

The tenth death occurred on October 14 in the Proctor mine, Whitley county, operated by the Proctor Coal Company, when James Boling, a single man, twenty-five years old, was killed by a fall of slate in room No. 5, on New-Hall entry. The slate that fell and did the injury was ten or twelve feet long, three feet wide, and five inches thick. The sworn affidavits of J. W. Ratcliff, the mine boss, and of Jerry Boling, a miner, filed in this office, show that the mining company cannot be held liable for the fatality, but they also demonstrate in a very emphatic manner, the justness and importance of the rule I have been discussing in this chapter, of requiring mine bosses to compel the miner to do the necessary propping, or quit the mine as a penalty for disobedience to such orders.

It is evident that this slate could have been taken down, and this should have been done, as further operations in that room, would have been suspended if props should have been set in the road-way. The fact that the danger was discovered and warning was given by the mine boss, showed his diligence, but they did not prevent the death of the miner, when a vigorous execution of this rule would have done so. It is to be hoped that mine managers will get a thorough understanding of their duties in this matter and will have the courage to carry them out with rigid exactness, and that mine officials will every where heartily co-operate with them.

The affidavit of Mr. Ratcliff, the mine boss, is as follows: "I was in Boling's room in the forenoon and called his attention to the piece of draw-slate being dangerous. It hung over the road-way where he could not prop and leave propped."

The affidavit of Mr. Boling is as follows:

"Jerry Boling, who was working with the deceased, James Boling, says, we had been working together about eight days in room in which James Boling met his death. I remember Mr. Ratcliff being in our room and calling our attention to keep the props near the face of room, and also calling our attention to the piece of slate being dan-

gerous. I also told Jas. Boling to pull down or prop the piece of slate before he began loading car."

The eleventh death occurred on October 22 from injuries received on October 21 by Jesse Rutherford by fall of draw-slate in the mine of the Kentucky Jellico Coal Company in Whitley county. The piece that fell and caused the death was about eight feet long, four and one-half feet wide, and four inches thick. The report of the accident says: "Accident could not have happened had Rutherford, or M. Anderson, who was working with him exercised ordinary care and pulled down the piece of slate, which Anderson says they knew was bad, and they intended to pull down same and set some timbers as soon as they had finished loading car. This, however, they failed to do although timbers were lying within a few feet of the place where accident happened."

Under these facts the mining company must be exonerated, but this is another forcible illustration of the rule advocated. The setting of one or two props at most, at a cost of only a few cents to the company, and a few minutes work by the miners before loading the car would without doubt have saved this life.

The twelfth death occurred also on October 21 in the mine of the Reinecke Coal Company, Hopkins county, when Jonah Wilson, colored laborer, lost his life under circumstances that must fully exonerate the said company from any blame whatever. The report to this office explains the accident in these words: "As cage was ascending the shaft this man dropped his dinner bucket and stooped to pick it up and lost his balance and fell and got ground up between cage and side of shaft."

NON-FATAL INJURIES.

In the following comment on the non-fatal accidents, the statements made are based on the reports of the different companies filed in this office, and no reference is made as to which class of injuries each case properly belongs, except as to those mentioned as of the minor class.

BOYD COUNTY.

At Rush mine, operated by the Ashland Coal & Iron Company, on October 16, James A. Justice was hurt in back and legs, caused by locomotive running into train of cars in the main entry. Lost 30 days from work.

On October 29, Charles Hart, machine helper, was hurt in back and head by fall of coal. Entire lost time not stated, but he was still idle on November 19. (See note at the close of this chapter).

At Clinton mine, operated by John Wurts, assignee of the Ashland Coal & Iron Company, on November 29, Walter McClellan had leg broken by fall of draw-slate. Lost time not stated.

CARTER COUNTY.

In Mt. Savage mine, operated by the Columbia Finance and Trust Company, as receivers of the Lexington & Carter County Mining Company, on July 19, John Morcum, while preparing a place for cross timbers, had two ribs broken by fall of slate. Lost ten days.

HENDERSON COUNTY.

In Green River mine, on April 15, Henry Williams was severely hurt in the head and in one wrist by a belated blast. He thought the squib had gone out and went back to the face to relight it, when the shot went off. He lost considerable time, but how much is not stated.

At Basket mine, operated by the Pittsburg Coal Company, on July 6, George Lindsey had thigh broken by car jumping the track, caused by a mule starting off too quickly.

At Davidson's mine, operated by B. C. Davidson & Sons, in October, Marcus Wathen was hurt by fall of slate. Lost one week.

HOPKINS COUNTY.

At Carbondale mine, operated by Booth & Glover, as lessees of the Carbondale Coal & Coke Company, on January 7, Anderson Brown was caught between a mine car and a prop, and his hips were so mashed that he lost forty days from work.

Also on July 17, J. S. Butler, while mining, had an arm broken by falling coal. Lost time not stated.

Also on July 17, Ash Sims, a boy 16 years old, had two fingers mashed, caused by a car jumping the track and catching his hand on rib. Lost several days.

At Reinecke mine, operated by the Reinecke Coal Company, on February 4, Carl George, a boy 20 years old and a machine helper, was badly hurt in the spine by fall of coal. The report of the accident, received at this office more than one month after the occurrence

says: "Physician says will recover, but it will take time." Have heard nothing from him since that time.

Also on December 31, B. Coffman, a machine runner, had both legs caught between a mining machine and frame, and they were badly bruised and cut. Lost time not stated.

In Crabtree mine, operated by the Crabtree Coal Mining Company, on November 22 Henry Blythe was run over by mine car and one ankle was knocked out of joint. The report of this accident made on December 21, says: "It is thought now that the ankle will get well enough for him to go to work by fifteenth of January." Nothing later has been heard from him.

In Diamond mine, operated by the St. Bernard Coal Company, on June 12, Henry Downey had small bone in right leg broken and an ankle sprained, caused by a mule taking sudden fright and dragging him about a hundred yards, with tail chain wrapped about his leg.

In the mine of the Co-operative Coal Company, at Barnsley on July 24, Arthur Wade, a boy 15 years old, while coupling cars had a hand mashed necessitating the amputation of two fingers.

Also on October 6, Thomas Green, a boy and miner, had his right shoulder broken and an arm badly cut by fall of coal. Lost over one month from work.

Also Charles Perkins, on March 15, was caught between car and top of mine, causing injury to his head and shoulder. Lost one week.

Also on April 21, Jack Davis, hand caught between car and rib and cut and bruised, and the under part of the thumb mashed off.

In Earlington mine No. 11, operated by the St. Bernard Coal Company, on September 28, Luther Hamby had a leg broken by fall of slate. Loss of time not stated.

Also Frank Wyatt, a driver, on December 13, had thumb mashed with brake.

Also Cross Childs, in mine No. 9, had arm broken by fall of slate.

During the year various minor injuries were reported to Warren Hays, Wm. Kelly, Samuel McGreggor, Charles Cross, Thomas Whitten and Frank Smith.

In Monarch mine, operated until April 16 by the Monarch Coal Company, in February, John Tranthem fell from moving car and was run over by it. Lost five days.

Also on April 16 Robert Carlton and Theodore Stone lost their lives in a coal dust and gas explosion in this mine, a full account of which is gienv in the chapter headed "The Monarch Mine Explosion."

Also in November, while the mine was being operated by Anderson & Holman, lessees of the same company, a colored boy, whose name and age were not given, had an arm broken, caused by car jumping the track and throwing him against the rib of the entry.

In Hecla mine, operated by the Hecla Coal Company, on March 1, Mr. Garret, the mine foreman, came in contact with a live wire, which touched the naked skin of his neck. He was knocked down by the current and fell against a stone and lay awhile unconscious, but soon recovered.

In the St. Charles mines, also operated by the St. Bernard Coal Company, minor injuries were received by Wm. Whitford, John C. White, Henry Fauls and John Caswell.

In Oak Hill mine, a minor injury, to George Green, was also reported.

KNOX COUNTY.

In Gray (West Jellico) mine, operated by B. F. Gray, on September 24, Wm. Goshen was painfully hurt about the back by fall of slate. On October 3 he was able to get out of bed and walk around.

Also on July 27 Daniel Taulbee was injured in the head and shoulder by fall of slate. Lost one week.

In East Jellico mine, operated by the East Jellico Coal Company, on November 8, Abe Gregory was severely burned in a powder explosion. He lost about seven weeks from work.

LEE COUNTY.

At the New Crystal Creek mine, operated by the New Crystal Creek Coal Company, Robert Birch, manager, in January, James G. Lover lost two weeks, caused by fall of coal on his foot.

Also on March 15, John Birch lost end of finger, caused by a runaway mule pulling him in contact with a cross-tie. Off work one week.

LAUREL COUNTY.

On November 15, in Lily mine, operated by the Lily Coal & Coke Company, C. M. Tate had a leg broken by fall of slate. Was up and about well on January 24, 1898.

Also on December 5, J. C. Ragan had great toe broken by fall of slate. Lost time not stated.

MUHLENBERG COUNTY.

In Central mine, operated by the Central Coal & Iron Company, on January 7, Elder Willis, a driver, had a finger mashed. Lost one month.

Also on February 3, Emmet Neal was kicked by a mule. The report to this office says: "He pushed mule and mule kicked Neal in mouth knocking out several teeth."

Minor accidents to L. Warner and W. B. Bratchen were also reported.

OHIO COUNTY.

In January in Johnson mine, operated by the Fordsville Block Coal Company, Wm. Guethers, a boy and driver, was caught between car and roof and his collar bone was broken. Lost four or five weeks.

In Render mine, operated by the Central Coal & Iron Company, on November 28, Jake Westerfield was caught between cars, and his leg was broken. Lost time not given.

In the McHenry mine, operated by the McHenry Coal Company, on January 26 Richard Swan, a boy and loader, was struck by wild car, and his leg was broken. Lost time not stated.

Also on March 24 Robert Render and Levi Render were burned about the face and hands by the premature discharge of a blast. Lost time not stated.

In Taylor mine, operated by the Taylor Coal Company, on September 14, A. L. Wright had ankle slightly mashed by fall of coal. Off work two weeks.

PULASKI COUNTY.

In Eagle Creek mine, operated by the Eagle Coal Company, in April, Geo. Flood had his hand burned by a blown out shot. Lost three weeks.

In the Indian Creek mine, operated by the Commercial Coal Company, on September 24, H. C. Yates had his hand mashed by fall of coal. Lost three weeks.

ROCKCASTLE COUNTY.

In Pine Hill mine, operated by the Pine Hill Mining Company, on August 30, Wm. Kirby was slightly hurt by fall of slate. Lost only a few days.

UNION COUNTY.

In Cumberland mine, operated by the Cumberland Coal Company, on March 5, Claud Brown, a driver, was caught between car and door, breaking one bone in thigh. Lost time not stated.

Also on October 26, Thos. Penrod, a miner, was badly burned and had one eye put out by a blast. The time lost not stated.

WHITLEY COUNTY.

In the mine, operated by the Pine-Knot Coal Company, on April 15, Thos. Morgan was injured by piece of coal from a blast, and lost eleven days.

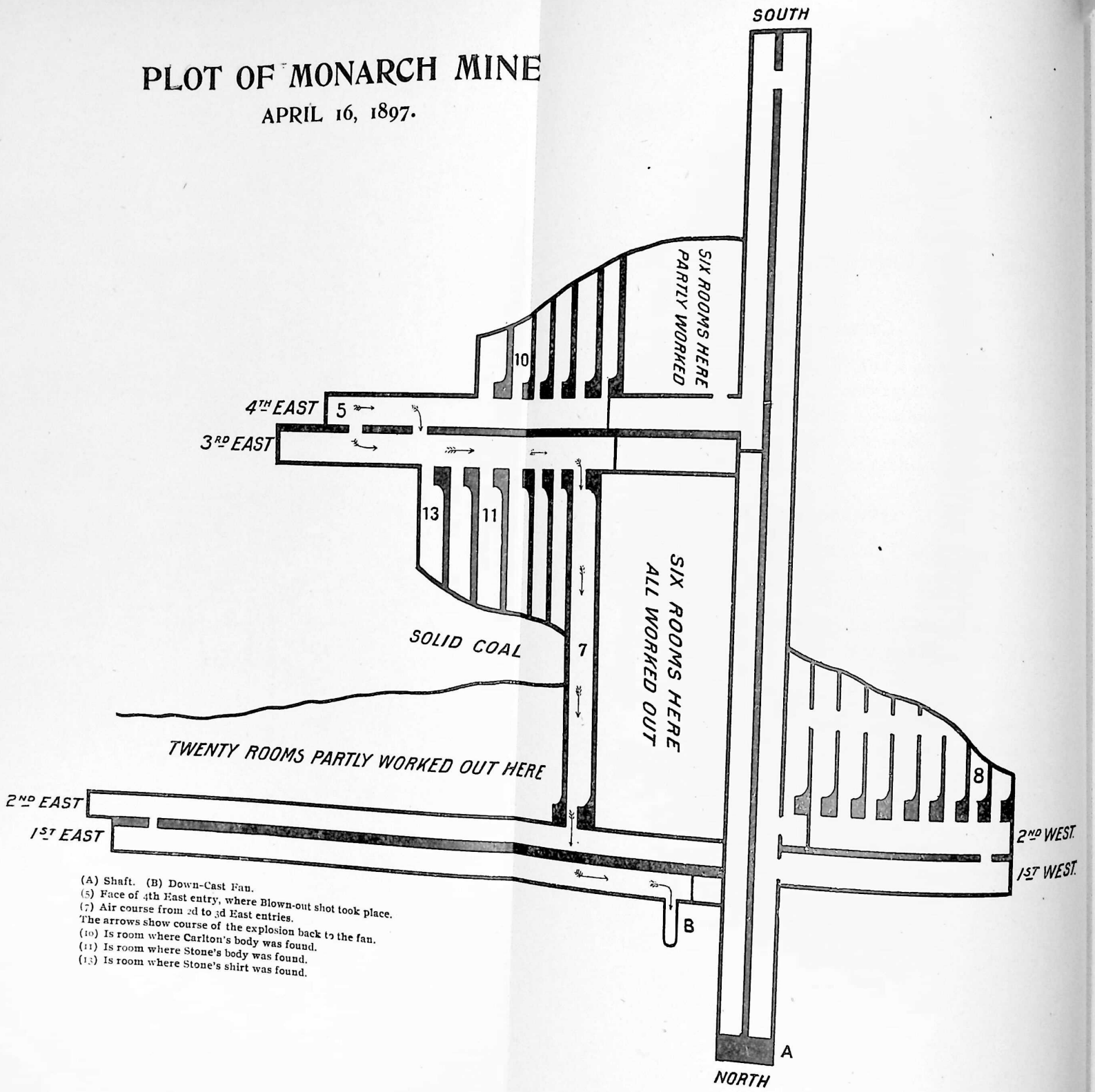
In the Dowlais mines, operated by the East Tennessee Coal Company, on December 21, Bryce Taylor had ankle broken by fall of slate. Lost time not given.

A minor injury to H. Brady was also reported.

NOTE. In Rush mine, No. 6, Boyd county, Charles Helwig was injured on December 27 by premature explosion of a dynamite cartridge. He was tamping in a hole drilled in the rock at the head of No. 9, main entry. He lost sight of his right eye, and his left eye was also injured. The report of this accident did not reach this office until March 12, long after the chapter on accidents was completed, and could not therefore be included therein. This should be added to the fifty-eight, making the total noteworthy accidents number fifty-nine.

PLOT OF MONARCH MINE

APRIL 16, 1897.



(A) Shaft. (B) Down-Cast Fan.
(5) Face of 4th East entry, where Blown-out shot took place.
(7) Air course from 2d to 3d East entries.
The arrows show course of the explosion back to the fan.
(10) Is room where Carlton's body was found.
(11) Is room where Stone's body was found.
(13) Is room where Stone's shirt was found.

THE MONARCH MINE EXPLOSION.

BY G. W. STONE.

About the middle of the afternoon on April 16, 1897, there was an explosion in the mine of the Monarch Coal Company, situated in Hopkins county near Madisonville, causing the death of two men, Robert Carlton and Theordore Stone. They were the only men in the mine at the time of the casualty, except Mr. Tranthen, the mine boss, who was at the bottom of the shaft engaged in some work on the pump. He was severely shocked, but received no injury as the immediate result of the explosion, but afterwards, in his haste to recover the bodies of the dead men, he came near losing his life by suffocation in the after damp and its after effects.

That this report may be more readily understood, I accompany it with a partial plot of the mine, showing all the entries and some of the rooms where work was being done. The entries do not run due North, South, East and West as indicated by the plot, but near enough to answer every purpose for which it is intended.

During the forenoon, on the day of the explosion, mining had been carried on in the usual way in nearly all parts of the mine.

All the men but the three named left the mine about noon and had not returned. They had done the mining, drilling, charging and tamping for about 30 shots, from the second west entry to the face of the fourth east entry where the "blown-out shot" that brought about the explosion occurred. About 12:40 P. M., Carlton and Stone went down into the mine to do the shooting. They commenced firing in room 8 off second west entry and then fired every place in regular order without accident until they reached the face of the fourth east entry.

It seems that Stone must have gone to the face of the third east where one shot was fired, and after lighting the squib, came back 150 feet to room 13 off third east, when the explosion occurred. His clothes were set on fire. In his efforts to save himself he took off his shirt and threw it down in room 13, and then ran into room No. 11,

where he was completely overcome, and where his body was found severely burned.

Carlton's body was found in room 10 off fourth east, about six feet from the entry, in a sitting posture, without burns or evidences of other injury. He had been to the face of the fourth east, fired the squib, and went back into room 10 to await the blast. As the fire never reached him it is clear that he died from suffocation.

As bad as the results were in the destruction of life and property, yet it was indeed fortunate that the other employees had not returned to the mine. So terrible was the force of the explosion, and so great was the heat, smoke, soot and after-damp that followed that hundreds would have perished as quickly as did Carlton and Stone.

The arrows on the plot connecting through room 7 the face of the fourth east at 5, with the air shaft at B, show the course of the explosion. At the time, the head break-through, between the third and fourth east entries, about 30 feet from the face of the fourth east, was open, but all the others clear back to the south entry were bratticed up.

A part of the explosion extended out the fourth east far enough to blow open the second break-through, when the whole force united and swept down the third east against the air-current in one destructive volume to the air shaft.

To give a better idea of the extent of the damage done, I qoute from the report made to me by Mr. W. U. Grider, who was then my assistant in office, and who inspected the mine a few days after the casualty, I being present in the mine with him most of the time. He said:

"The course of the explosion is marked with evidences of great violence. On third east entry the track was torn up in two or three places, and a car broken to pieces, and two wheels and one axle broken. The brattices between first aud second east entries, were nearly all (if not all) blown out and dashed with great force against the left rib of the first east entry. The tracks on this entry were torn up in many places, the irons badly bent and twisted ; the fan house at the top of the air shaft 260 feet deep was wrecked."

Such disasters are of special interest to every one connected with our mining industry, and should be of vital concern to the general public. That which has happened once, under like circumstances, will most likely happen again. The wise thing to do is to ascertain

the cause and remove it. Beyond question safe under-ground conditions should be made matters of first importance in the operation of every mine. The man who works on the outside is not exposed to the dangers incident, and so common, to the inside work. With such conditions steadily maintained the values of great mining properties will be preserved, and the hazard attending their development and operation will be so reduced as to make them inviting, safe and profitable to labor, but otherwise their operation will be attended with more fatality and sorrow than of blessing to the human race.

The mine is a shaft 260 feet deep, is ventilated by a down-cast fan, and is in No. 9 vein of coal. Large areas of this vein lie at greater depths than at the Monarch Mine.

In 1887 Reinecke Mine, only two and one-half miles distant, while working in the same vien, had similar explosions, resulting in several deaths.

If this coal seam cannot be worked at so great a depth without the probable or necessary recurrence of such disasters at any time, then all further operations in it ought to be prohibited by law. If, however, safe conditions can be brought about and maintained, then it is the imperative duty of operators to bring them about, and a failure to do so, becomes criminal negligence in case lives shall be lost for the want of them. It must be admitted that great depth is a constant source of danger, with regard to mine gases. Fire-damp rarely exists in an appreciable degree in shallow mines. But the fact that a large number of mines, both in this and in other countries, have long been successfully worked at even much greater dept, is conclusive proof that this No. 9 vein can be worked with as little loss of life and as few accidents as occur in the other coal mines of our State. But this can only be done by the exercise of honest skill and diligence in the execution of proper mining methods.

An inquiry into the condition of the mine at the time of the explosion shows that it was dry and gaseous. It was infected with fire-damp and dry coal-dust. It had not been sprinkled for ten days, and then only by means of a box and perforated sprinkler that dampened only the floor of the mine. The air current that had been constantly going through the mine had no doubt absorbed all the dampness, and left the mine dry and well filled with fine particles of coal-dust.

A volume of air sufficient to expel the gas, and prevent its accu-

mulation to the danger point, would, in that length of time, necessarily make a very dry mine. It is clear that there was not gas enough in the mine, at the time, to have caused the explosion, else it would have been produced by the open lamps of fifty or more miners, who worked in all parts of the mine during the forenoon of that day. Nor could it have resulted from gas at or near the face of the fourth east entry, where the fatal shot took place, else the naked light of Carlton, when he went there and lighted the squib, would have at once caused the explosion. But the facts are, after lighting the squib he went back into room 10 and sat down to await the blast, that precipitated the explosion. A theory that the disaster was caused by standing gas, and the use of naked lights, must vanish as contrary to the facts, and to reasonable deduction therefrom.

Doubtless there was present some gas, but not enough to make the mine unsafe. On the day of the inspection (April 22) gas was escaping near the head of the main south entry in sufficient quantity for the blowers to burn when lighted, with a flame as large as that of an ordinary gas jet. Gas was also escaping in less quantity at and near the face of the fourth east entry.

From the history of the mine and from its depth and the character of the coal seam, I take it, that this is the normal condition of the mine. But it was well constructed, and by the use of good ventilating methods, the gas had not been allowed to accumulate so as alone to become an element of danger.

After investigation, thought and research, my conclusions were, that the dry coal-dust and the gas (but principally the coal-dust), were the real causes of the explosion, and this is still my opinion. In my notice to the mining company I may not have expressed myself in words to be thoroughly understood. What I then meant, and what I now mean is, that in the absence of the dry-coal dust, the "blown-out shot" (a discharge that merely blew the tamping out) would not have caused the explosion, and that, with the presence of the dry coal-dust, a like shot in any other part of the mine, would have resulted in an explosion, as readily and as effectively as the one that did occur at the face of the fourth east entry; that primarily this dry coal dust contained the real element of danger; that it was suddenly heated by the swift blaze of the shot, until gas was generated in sufficient volume to be simultaneously ignited, and hence followed the explosion, and that these conditions were continued and results

produced all the way back to the air shaft. It was all done on the principle of heating crushed coal in a retort until gas is generated, which will ignite and explode as soon as it comes in contact with a flame of fire. The expansion and force of the air current produced by the heat and ignition of the gas, necessarily sought the nearest exit, which was the air shaft. The confines of the entries acted as a retort, and the whole destructive force became like a moving furnace, creating explosive conditions and igniting the same all the way to the shaft.

It is equally true that had the coal mine been wet and the coal dust damp and heavy, that explosive conditions would not have been created, and there would have been no damage done. The remedy, therefore, for the coal-dust is water. If the floor, roof and sides of all working places, near where blasting is to be done, shall be kept well sprinkled, so as to render the coal-dust damp and heavy, then the blaze and heat of an ordinary "blown-out shot," that often occurs in every mine, and is liable to occur at any time, will not bring about explosive conditions, but will pass off without doing any injury.

An abundance of air well conducted through the entries, and to all the working faces, to expel the gas, and the proper appliances for sprinkling the mine, and the free use of water, will make all such mines safe to the laborers and a source of profit to the owners. But the ordinary box method is not sufficient, though it is much better than none when used often, as dampness will arise from a damp floor and affect the sides and roof.

The best appliances, such as power and pipes to convey the water, and hose to do the sprinkling, should be used in all our mines affected with dry coal-dust. This method of sprinkling, together with well constructed mines and well conducted air currents, will effectually do away with the risk that constantly menaces, and the fatalities and accidents, that sometimes, from these causes, take place in some of our coal mines.

From all the facts and circumstances known to me, I conclude that the calamity arose from an imperfect or bad mine condition, that is from the presence of dry coal-dust, from which as it was heated, gas was distilled and similtaneously ignited by the blaze of the "blown-out shot."

Just how far the operators were at fault in permitting this condition to exist, or whether or not under all the circumstances they

should be blamed at all, I shall not discuss, nor express an opinion, further than to say, that no occurrence of this kind had happened in a Kentucky mine since the like experiences at Reinecke mine in the months of August and October, 1887, unless the fatalities at the Tate-Slope mine at Sturgis, in January, 1895, are attributable to the same cause, which I think is highly probable, though not so regarded in the published report of that memorable accident. All apprehension of such danger seems to have passed out of the minds of the people as a thing hardly probable, until I cannot say that the failure and neglect of the operators to have at hand the best methods of sprinkling, did not also become similar neglect in the men, who, knowing of their absence, willingly worked in the mine. Such continued methods without protest and without accident easily become fixed and satisfactory conditions, having the effect and force of a binding law between operators and miners. But whatever opinion there may be entertained by any one on this question, it must henceforth, be thoroughly understood, that if the operators of such mines shall permit their mines to become filled with dry coal-dust, other explosions and fatalities will occur, then they need not expect to be held blameless before the law, nor before an interested public. Diligence and faithfulness in this matter will be expected and required on the part of all the operators of such mines.

As to what prevented the usual and intended blast, such as was made in thirty or more places before reaching the face of the fourth east entry, and caused this discharge merely to blow the tamping out, and precipitate such a disaster, is quite another question, and will likely never be known, or satifactorily settled. It may have been caused from bad tamping, or from the use of wrong material, such as coal-dust in the tamping, which would make the tamping defective, and dangerous in case of a mere blow-out, or it may have been caused by an attempt to shoot too much solid, or from both causes, or from neither. If the mining or tamping at the face of the fourth east, was different in any way from that done in the rest of the mine, I have no information to indicate it. It is proper, however, to say, that the regulations of the company did not permit shooting in more than two feet of solid; but in this case there was an attempt to shoot from more than five feet. The presumption favors the idea that the mine regulations were reasonably carried out in the other places, and the failure to do so at the face of the fourth east, was an exception to the

rule, and the fact, that an attempt to shoot from so much solid, ended in the "blown-out shot" is not a surprise to any one familiar with blasting in coal-mines.

Before closing this article, I respectfully ask a re-reading of chapter 9, in the 1895 report of the Inspector of Mines, on the subject of "Coal-Dust an Explosive Agent," where the questions at issue are learnedly discussed by Sir Frederick A. Abel and other scientific gentlemen, whose articles are inserted in that chapter. Especially do I ask a careful consideration of the theory advanced by Mr. Donald M. D. Stuart, in his conclusions as to the cause of the explosion that occurred on November 14, 1893, in one of the Camerton collieriers at Somersetshire, England.

I am persuaded that his theory is the correct one. It is certainly consistent with the facts and, therefore, very reasonable. The presence of a sufficient volume of gas at the face of the entry to have made the explosion, is disproved by the open lamp of Carlton. The disaster was not a mine fire, nor burning coal-dust. Great heaps of coal-slack and dust take fire and burn for months, as may be seen around almost every mine, but an explosion never follows, because the process is too slow and evolves too little heat. It must have been caused by the distillation of gas from the fine particles of coal-dust, and its simultaneous ignition by the blaze that was present. It must be remembered that the blaze from the discharge of so much powder as it came from a hole more thau five feet deep, must have emitted a fierce flame many yards in length, and in the concussion and intense heat that followed great quantities of gas was suddenly distilled from the fine coal-dust, which (gas) was in fact the real explosive agent that did all the damage, and these agencies and conditions were continued with increasing volume and force until the air-shaft was reached.

The principal wreckage of property which located the place of the greatest force, took place in the first and second east entries, which lie next to the air-shaft and remote from the place where the explosion originated.

I quote from the Colliery Engineer and Metal Miner, of January 1896, a comment on Mr. Stewart's lecture delivered at the Technical Schools, Derby, England, on "Coal-Dust Explosions in Mines," which I consider convincing as to the truth of the theory here presented.

The writer quotes Mr. Stuart as saying: "An experience of

about twenty years in collieries where coal-dust abounded, where shot-firing was general, and gob-fires had sometimes prevailed, had up to the year 1893, lead him to the conclusion that coal-dust was harmless in non-gaseous mines." Then in commenting on the lecture he said: "Explosions at the Camerton collieries, where for over one hundred years, no trace of gas had been found, deepened in his mind the mystery of the explosion."

A simple calculation showed that the quantity of heat generated in the explosive that was fired was utterly inadequate to procure the results observed after the explosion. It was only after many months reflection and some experiments with coal-gas, that the difficulties were removed, and he found that when coal-dust yielded up its gases under the action of heat from an explosive, chemical actions were initiated that provided a solution of the observed phenomena. Upon this basis of facts the conclusion became irresistible that a disastrous explosion, similar to what occurs in gaseous mines, had been produced by coal-dust alone; and there remained no shadow of a doubt in his mind that coal-dust was an explosive agent.

A more recent explosion at Trinsbury collieries, also non-gaseous, which he investigated, presented phenomena identical with those which he had observed at Camerton, and confirmed the conclusions at which he had arrived.

He then turned his attention to explosions in gaseous mines, and found that the phenomena in these explosions corresponded with those observed in non-gaseous mines. He expounded his theory that an explosion in a mine was characterized by numerous local explosions, each disturbance being isolated and preceded by a length of mine passage, in which the materials were practically in their normal state, or had not been subjected to violent forces.

Mr. Stuart illustrated his lecture by stereoptican views of the scenes of explosions in several collieries, showing the places where the disasters were originated, and their subsequent development through the workings. Each disaster was traced to its origin, and the developments of the explosions were shown to be characterized by numerous subsidiary explosions, which left their evidence in isolated exhibitions of explosive violence. He explained the nature of the forces in the explosive disturbances, and in the intervening spaces, and the extent and causes of disarrangement of materials in the latter, and with that qualification he remarked that the fields of dis-

aster in the Camerton and Timsbury collieries exhibited the effects of numerous distinct and violent disturbances, in which doors were shattered to fragments, iron work broken and distorted, trams broken and crumpled and their contents scattered abroad ; rails torn from their sleepers, timber fractured and knocked down, arches demolished, stone roofs ripped in thickness up to three and one-half feet, and men mutilated, each disturbance being preceded by lengths of mine passage in which the trams were uninjured and their contents undisturbed, the rails unmoved, the timber unbroken and undisturbed, the arches undamaged, the roof in its natural state, and the men not mutilated. The energies in the disturbance, and the energies in the intervening spaces, therefore, exhibited distinct modes of action.

He also reviewed two other notable explosions and showed that the ruin wrought and the extent of the mutilation of the bodies found in different localities proved his ideas.

With this evidence and numerous other facts of the same definite character, Mr. Stuart formulated the theory of intermittent subsidiary explosions, and the mystery of colliery explosions must disappear, for it was no longer necessary to suppose that there were sudden and incredible outbursts or accumalations of fire-damp at the moment of the disaster. He stated that coal-dust, always and everywhere present in the mines, was capable of giving rise to explosions, and of producing the phenomena of subsidiary local explosions.

In concluding his lecture he said : "We have now examined disasters in typical gaseous and non-gaseous mines, and have observed that in their inception, and in their development, they present an identical rationale that demands for an explanation an identical explosive agent, and as coal-dust is the only agent common to both gaseous and non-gaseous mines, it must have been the common source of the gases that produced the calamities to which he had drawn their attention."

It is not my purpose to impose burdens on operators, any further than is necessary to bring about and maintain safe mine conditions. The law undertakes that these shall be guaranteed to every miner, and he has the right to demand and expect them. The business is hazardous at best, and special dangers to which some mines are plainly liable must be dissipated and avoided, even at great cost. The question of cost must be made secondary to that of safety, and let the questions of continued operation and of profit and

loss be decided by the free will of the operators. Happily we have but few mines where as yet coal-dust or gas has become a standing menace, or a source of constant apprehension.

But unless there be diligence and faithfulness in the application of proper methods, disaster after disaster may be expected. Prevention is the only safe remedy. Cure is often impossible, as human agencies can not raise the dead, nor make the crippled whole. It is to be hoped that the sad occurrence at Monarch, will not be without its benefits to our mining industry. During all the ages of the past, in the slow progress of human events, many lives have been lost, and business enterprises dwarfed and wrecked, before the discovery and application of remedies, and of safe methods that are now known to be sure safe-guards against the repetition of such fatalities and failures as mark the past history of the world. Until very recent years, after thousands of men had fallen victims to its deadly work, the dangerous agency of coal-dust, was not known nor even considered by the scientific mining world, but now all thinkers and writers on that subject, whether agreeing to the theory of Mr. Stuart or not, unite in saying that it is a dangerous factor in mine explosions, and recommend the use of water to prevent the vivification of its latent energy and force, that necessarily develops from it when heated to a certain degree. It is not only logical but a fact, that it requires much greater heat to dry out wet or damp coal-dust, and cause it to yield up its gas, than to produce the gas from dry coal-dust with the same heat, and it is reasonable to conclude, that as water is such a quick absorbent of heat, and as a blown-out shot is so quickly over, that its heat is so neutralized and destroyed by coming in contact with the wet or damp coal-dust, that the residual heat is not sufficient to heat the dried coal-dust to the point where its gas can be generated? So it is, all branches of industry are thinking and progressing, and, we believe, profiting from the experiences of the past.

I will close this chapter by quoting an editorial found in the May number, 1897, of the Engineering and Mining Journal, headed "Precaution against Coal-Dust Explosions," it says:

"The danger of explosions in dusty coal mines—that is, in mines where the coal is of a friable nature and there is a considerable amount of fine dust from the workings constantly floating in the air, or settled in galleries where it is liable to be disturbed by air cur-

rents, is now very fully recognized, especially in England and Germany. The subject has been carefully discussed and measures of prevention proposed. It is well understood that fatal accidents may frequently be traced to coal-dust explosions, and that the finely divided particles of coal will ignite readily and spread fire almost as readily, under certain conditions, as fire damp or other combustible gases. In other words, a dusty mine may be almost as dangerous as a fiery mine, and requires many precautions in its working. Quite a number of plans have been devised to prevent accidents of this kind, and insure the safe operation of such mines.

"The most simple plan, and that which first obviously suggests itself, is some system of sprinkling with water which will cause the dust to settle and the same time dampen it so that it will not readily take fire, and will not be disturbed or put in motion by any air current likely to exist in a mine. The cheapest and most readily adopted methods is a use of a water-car or wagon, provided with sprinklers, very much after the fashion of the water-cart ordinarily used in cities. This, of course, only serves to settle a part of the dust and dampen the floor of the main road, and the next step is to provide some kind of pump which would throw a spray of water into the air, and thus catch and settle the floating dust. A spraying pump worked by gearing from an axle of the water-car has been used in several cases. In one mine in Germany the car has two reservoirs, one filled with water and the other with compressed air. When communication is opened between the two, the air pressure is sufficient to force the water out through the sprayers or perforated pipes. The objection to these devices is their slow operation and the amount of labor required. The capacity of the water-cars in a mine is necessarily limited, and freqent refilling is required.

"The most elaborate plant for this purpose which we have seen described is at the Hibernia mine, near Gelsenkirchen, in the Dortmund District in Germany. At this colliery there was an explosion in 1891, by which a number of men were killed, and the accident was clearly traced to the ignition of coal dust. A system of sprinkling was subsequently adopted under the direction of the mine inspector of the district. Water is led through pipes into every part of the mine; at a recent date the length of these pipes reached a total of 45,820 meters, or 150,290 feet. The main supply pipes are 78 millimeters in diameter; the principal branches, 52 millimeters; the gangway

branches, 26 millimeters, and the small spraying pipes 13 millimeters. All of them are of galvanized iron. The water is supplied from a reservoir placed 347 meters below the surface, which gives head enough to carry the watter wherever it is needed. The reservoir is usally kept full by the flow of water from the upper part of the shaft, but if this is not sufficient, the discharge from the main pumps which drain the lower levels can be turned into it. The reservoir is large enough to give opportunity for the water to settle, and it is also passed through a filter before entering the main conduit. The principal working levels, it may be noted, are at 430, at 520 and at 610 meters below the surface. The first cost of this system amounted to $44,700; for the second year the cost was $6,172 for maintenance and operation, and $6,716 for extension, a total of $12,888. This, it is said, may be taken as a fair average, and it amounted to the very large average of 4.36 cents per ton of coal taken out. In other German and Belgian mines there are pipe systems, but none so extensive as this.

"In our anthracite coal mines there is comparatively little dust, and consequently no need for elaborate precautions against dust explosions, but they give off vast quantities of fire damp and require immence volumes of air to render them safe. Since the anthracite has all to be blasted down, the ignition of the fire damp by shots became so common and required for its extinction such prompt and energetic measures that many years ago it became the general practice in such mines in Pennsylvania to carry water in iron pipes from a reservoir on the surface down the shaft and through the workings, and even up to the working faces, where fire hose with nozzles are always ready. In this way, and by the perfection of ventilation the occurrence of serious fires in what are probably the most fiery coal mines in the world is extremely rare and great explosions almost unknown. Indeed, the terrors which great quantities of fire damp formerly excited have disappeared, and the safe control of even the worst case of fire damp is easily accomplished.

"In our bituminous coal mines there are many cases where the methods proved efficacious elsewhere may be adopted, though there are very few where as much as 4.36 cents per ton could be afforded for this item, nor is the cost in the anthracite mines of Pennsylvania nearly so great as this, though the system can scarcely be exceeded in perfection."

MINE GASES.

Owing to the prevalence of fire damp, and other dangerous gases, in a number of our coal mines, I copy below an article recently written by Mr. John Hayes, mining engineer and inspector of mines, at Dunedin, New Zealand, clipped from the American Manufacturer. It is interesting and instructive and merits a careful reading :

"In approaching this subject it must be borne in mind that coal itself is the product of the decomposition of vegetable matter, and is composed of those elements which enter largely into the composition of vegetable organisms—i. e., carbon, hydrogen, and oxygen. In all coal mines gases of one kind or another are invariably exuded either from the coal itself or from the adjacent strata, those most commonly met with being carbonic acid (or carbon dioxide, Co_2), known to miners as 'stythe' or 'black damp,' and carburetted hydrogen (or marsh gas, CH_4), familiarily termed "fire-damp." The former (CO_2) is practically 50 per cent heavier than the atmosphere, and is therefore first met with near the floor of the mine workings. It is highly poisonous ; an atmosphere containing 10 per cent of this gas will neither support human life nor combustion. Carburetted hydrogen is only about half the weight of the atmosphere (CH_4, 0.557; specific gravity of air, 1,000), and is composed of two volumes hydrogen, 24.6 by weight, and one volume carbon, 75.4 by weight. Being so light, it naturally rises to the highest available place, and is found near the roof of the workings. In its pure state it is poisonous, and will not support combustion until mixed with about five times its own volume of air. The writer has frequently met with in large volumes, when prior to its becoming diffused with, and ultimately being carried away by, the air, lights have been extinguished as suddenly as if plunged into water, and men made unconscious just as quickly. By adding over five times the amount of air to one of gas the mixture becomes explosive, its greatest explosive proportions being reached when containing 9 4 volumes of air to 1 volume of gas. When more air is added, and the proportions are as 13 to 1, the explosive force becomes feeble. The presence of gas may, how-

ever, be detected when diluted with 30 volumes of air, or, practically, when the atmosphere contains 3 per cent. Within the last few years lamps especially constructed for testing purposes have been introduced which will detect practically ½ per cent of carburetted hydrogen in the air. Hydrogen gas in other forms is also sometimes met with in mines under certain conditions, but it is carburetted hydrogen mixed with air in suitable proportions which is the explosive agent in what is known as a 'fire-damp explosion.'

"This gas is not met with in all coal mines. Many collieries have been worked for generations without a trace being discovered; in others its exudation is fairly steady while opening out new ground, and it is gradually drained off, but in many instances its liability to be present is continuous, necessitating the utmost care and vigilance in the management and ventilation of the mine. Very great danger is to be apprehended in mines where there are unworked seams above or below, from which large bodies of CH_4 may be given off. This danger often exists, and the pent-up gases in unworked seams find relief, through fissures, falls of roof, upheavals of floor, and the subsidiary action of the strata concurrent with the excavation of the seam being operated upon, into its roadways and working-places. Within the writer's own experience gas from a lower seam than that being worked used to cause serious upheavals of floor, and to relieve this boreholes were put down at intervals, at some of which a pressure of 35 lb. per square inch was frequently registered. In some other instances holes had to be similarly bored upwards to relieve the pressure of gas on the roofs. Still another source of danger is where deserted workings containing a large accumulation of gas have to be tapped. The writer has had frequently to undertake and carry out operations of this kind without any stoppage of the ordinary work of the colliery. Much thought, preparation and care had to be exercised; the work gave rise to great anxiety, but in every instance was safely and successfully accomplished. A period of atmosphere depression is more conducive to the exudation of gas than one registering a high barometrical pressure; and any mine gas being so light in comparison with mercury, its presence may often be felt long before a diminution of atmospheric pressure is indicated by the barometer. This feature is especially noticeable in approaching deserted workings, and in such places every care should be paid in maintaining brisk ventilation.

"Assuming that in some part of a coal mine a quantity of CH_4 has accumulated, that it is mixed with air in explosive proportions and is in any way ignited, an explosion more or less violent will ensue. How far this explosion will extend depends upon existing local conditions. For instance, there may be a large body of gas extending some distance back from the point of ignition, but under such conditions that only a limited amount of it can be mixed with air. The greater body of gas will not, under these circumstances, explode, the explosion being confined to the mixture of gas with a suitable proportion of air. This actually occurred at a Lancashire colliery some years ago, the writer being in another portion of the mine at the time. The circumstances were as follows: A pair of headings had been driven for several hundred yards in length some years previous. Owing to subsequent trade depression they fell into disuse, and consequently out of repair. As the seam was naturally 'fiery,' they gradually filled with CH_4. These headings were wet. In course of time, a repairing gang was sent to put them into working order. Ventilation was restored as the work proceeded, sufficient fresh air being carried forward to meet existing requirements, and on the day in question, when the repairs had been about half completed, one of the men by some means or other ignited the gas. An explosion occurred by which a couple of men were severely burned, but the effects of the explosion were quite local, and no violent shock was experienced at any great distance from the point of ignition. The mine was damp throughout, and this, no doubt, accounts for the localization of the explosion in a forward direction. The purity of the gas—i. e., the want of air beyond the point of which repairs had been completed—prevented the explosion traveling backward from the point of ignition towards the face of the heading."

KENTUCKY ROCK ASPHALT.

BY M. H. CRUMP, M. E. & C. E.

This material consists of sharp, white sand of fine grain held together with bitumen, which constitutes from 6 to 16 per cent. It averages 8 pr ct. The bitumen, which is the real cement, and the ingredient which givest he commercial value to this natural product of Kentucky, which promises to revolutionize street paving in the cities of this country, consists of two chemical substances, petrolene, formed of 20 parts carbon and 32 parts of hydrogen, and is soluble in sulphuric ether. The other ingredient is asphaltum which is simply the oxidized product of petrolene, and consists of carbon, 20 parts, hydrogen, 32 parts and oxygen 31 parts, and is soluble in carbon di-sulphide. The Kentucky product is prepared by nature and comes from the mine or quarry ready for the crusher, where it is ground to an inpalpable powder and in this condition is heated to a temperature of 150 to 300 degrees Fahrenheit, and immediately placed upon the carefully prepared road-bed in such quantity, that when compressed with a heavy roller it shall form a cover not less than 2 inches thick. Geologically this article is abundant in Kentucky. It is found in the lower beds of the lower coal measures of Western Kentucky, and in the upper beds of the Chester sandstone which forms the top of the St. Louis limestone. There are evidently two separate horizons, ranging in thickness from a few inches to 15 feet, with an average thickness of perhaps 5 feet. It is found and developed to a limited extent in the counties of Meade, Breckenridge, Hardin, Grayson, Edmonson, Warren, Butler, Logan and possibly in Todd, Christian, Caldwell and Union. Dr. David Dale Owen, the first State Geologist of Kentucky, called attention to this material in his report of 1854, in these words :

"A remarkable feature in the geology of Edmonson county is witnessed at the mouth of Dismal creek. One hundred and fifty-five feet of pebbly sandstone and conglomerate appears here in vertical escarpment, resting on Archimedes limestone. At several places in this immediate locality coal naptha or petroleum, oozes from near the

place of one of the coals of this part of Edmonson county, which after becoming inspissated, forms a kind of consistent mineral pitch or coal-tar. On the south side of the ridge dividing Nolin from Daviess' branch coal-tar oozes from under and out of a 5½ foot vein of coal, exposed in good natural section, 45 feet above a dark grey limestone, and 60 feet under a bench of sandstone. Twenty feet above a cliff of conglomerate, and probably on the same geological horizon as the last mentioned locality, on Mr. Morris' property, in the eastern part of Edmonson county, near the head of Buffalo creek, the same material percolates from the earth. From the frequent occurrence of this material in Edmonson county, I am disposed to think that coal, suited to the production of burning, and lubricating oils and paraffine or paranaphthalene may be found by a minute survey. The crude material, when freed from adhering earthly impurities, is used by the inhabitants for greasing wagons, pitching boats, and other such purposes, since it can be collected both in the liquid and solid form."

Asphalt was first used for paving purposes in the city of Paris, and its use was discovered by accident. A calcareous material containing bitumen was being hauled along the public highway, a portion of which naturally fell to the ground and was there pressed by the wagon wheels into a compact and durable surface; this first called attention to its usefulness, and in 1854 it came in to use as a paving material, and after many failures, finally one of the chief paving materials of the civilized world. The first pavements laid from it in America were in 1870, and it only came into prominence in 1876. The amount of liquid asphalt used in the United States in 1896 was 134,000 tons, of which 125,000 tons was imported, principally from the island of Trinidad, off the coast of South America, opposite the mouth of the Orinoco. The following is the cost of the crude Trinidad laid down in New York (60 per cent pure).

Royalty to England	$ 1 40
Cost of Excavation	50
Cost to load on ship	1 00
Cost to New York (freight)	5 00
Total	$ 7 90

Selling price to contractors east of the Mississippi river $28.00 to $40.00 per ton. One ton of Trinidad makes 60 square yards of pave-

ment. The prevailing price per square yard in New York City in 1894 averaged $3.50, under specifications prohibiting use of any other asphalt. In legal proceedings before a referee in Buffalo, it was admitted that one company controlled all the foreign asphalts coming into the United States, and dictated the prices per square yard whereever the material is used. In 1895 and 1896 prices ranged from $1.75 to $2.25 under the same specifications and guaranties. In Philadelphia prices fell from $2.75 to $1.60 under the influence of competition from American asphalts, principally from California and Kentucky. The average annual repairs to these pavements when properly constructed are about 5 cents per square yard.

The first use of Kentucky Rock Asphalt appears to have been the small pavement laid in front of the Adams Express office on Jefferson street, between Fourth and Fifth in Louisville, Ky., and it has stood the test of time and heavy usage. A large quantity was next taken from the bank of Big-Clifty in Grayson county and carried to Columbus, Ohio, where several streets were laid. This, owing to the lack of homogeneity and want of experience, was not a success. Since that time more than 10 miles of this material has been successfully laid in the city of Buffalo. It is also coming into use in Louisville, where several squares have been laid under great difficulties, which have arisen from competing companies, which see that its successful introduction must cause a great come down in their arbitrary prices, and at the same time it will break up the monopoly.

A well known engineer who has had much experience in laying the foreign asphalts thus describes the method: "The refined asphalt is melted and brought to a temperature of about 300 degrees Fahrenheit. About 17 per cent. of residuum is then added to the asphalt, and the whole is thoroughly mixed. The office of the residuum oil is to soften the refined asphalt and to bring it to that consistency in which its cementing capacity is greatest. The thorough mixing of the oil and asphalt is important. Formerly this was by mechanical mixers, but it was found that it could be done most thoroughly by blowing air into the bottom of the vessel in which the mixture is heated. The air rising through the fluid mass keeps it in constant motion, thus securing the most perfect mixing of the two materials. The selected sand is dried and heated to a temperature of 320 degrees Fahrenheit, in revolving drums placed in a furnace suitable for the purpose, and all grains, pebbles, etc., above a given size, are

removed by screening. When all is ready the proper quantity of hot sand for one batch of paving material is accurately measured out, and all the materials are simultaneously poured into a mechanical mixer, after the necessary amount of pulverized limestone has been added. With two sets of interlocking blades this mechanical mixer very thoroughly incorporates the materials in about a minute.

"A typical paving mixture is as follows .

Sand, precentage by weight	.77
Pulverized limestone	.10
Asphaltic cement	.15
Total	100

"On account of the dough like nature of this mixture, a binder course is very beneficial to prevent rolling on the concrete base. This is usually about three-quarters of an inch thick, and is composed of small fragments of broken stone or gravel, which have been immersed in melted bitumen or paving cement, usually in gas tar pitch."

Kentucky rock asphalt is prepared for laying in the following manner, which is similar to that of the European material. "The rock is ground in mills especially designed for the work, which consist of a horizontal plate, to which raised lugs are attached, revolving at a high rate of speed. The rock being broken by impact, is by centrifugal force carried through a screen surrounding the mill. So sharp is the sand that these screens, though made of steel, one inch thick, are worn out in grinding about 1,000 tons of rock, and the lugs on the revolving plate have to be renewed every 24 hours. The powder after leaving the mill and passing over a second screen, is carried by elevators to revolving heaters, and thence to the street, where it is spread and compacted with tampers. The whole operation of grinding and heating is automatic. The only skill required about the plant is in the selection of the rock.

That the Kentucky material will make first class streets can be seen in the city of Louisville, where several squares have been laid in the last year under the most disadvantageous circumstances. When first laid the material is naturally soft, and readily torn by the toe calks of horses and indented by the wheels of vehicles. These marks disappear under continued traffic, but it is shown that at least twelve

months is required to produce a permanent road, and that the appearance of the street in the mean time, is in no manner conducive to popularity.

Numerous experiments were made to produce a hard pavement. Limestone was added to absorb the oils, but the result of adding this dead material was to weaken the adhesive power of the pavement. The best result was obtained by the addition of Vorwohle rock from Germany, and resulted in the following specifications being prepared by the Breckenridge Asphalt Company.

1. Genuine American bituminous rock, the pavement proper will consist of a mixture of this rock from the mines of Kentucky, with bituminous limestone from the German mines at Vorwohle, or other suitable American rock, and shall be prepared and laid as follows:

Wearing surface:

2. This surface or pavement proper shall be composed of :

Genuine American bituminous rock....	75 to	65	per cent.
Vorwohle or suitable American rock...	25 to	35	"
	100	100	"

a. The lump of rock shall be thoroughly pulverized, the powder from the two sorts being thoroughly mixed in the mills and passed through a screen. Nothing whatever shall be added to or taken from the powder obtained by grinding the bituminous rock.

b. This powder shall be treated in a suitable apparatus to a temperature of 150 to 250 degrees Fahrenheit and shall be brought to the work at not less than 150 degrees Fahrenheit in suitable carts. It shall then be spread in one coat, by suitable iron rakes in such a manner as to give a uniform and regular grade, and to such a depth, that after having received its ultimate compression, it will still have a thickness of two inches.

c. The surface will then be skillfully compressed by heated rollers, of such weight as the chief engineer shall direct, and by tampers, until it shall be the required thickness of two inches, after which a small amount of hydraulic cement will be swept over the surface.

The Vorwohle is a bituminous limestone containing about 7 per cent to 10 per cent of bitumen. A similar material is now being

found in both Texas and the Indian Territory, and should probably be substituted for the foreign article in the above specifications, which were prepared by Marshall Morris, C. E., to whom I am indebted for much useful information in the preparation of this article.

Within the last year a wealthy New York company has purchased large quantities of the Kentucky rock asphalt and is now making elaborate experiments with it.

The counties of Edmonson, Grayson and Warren, together with Logan, contain sufficient material of this kind to pave the streets of America, and the location of the beds on the navigable waters of Green River, furnish the cheapest and most available source of transportation to all the cities of the great Mississippi valley with its teeming millions. It has been estimated that this rock can be quarried and placed in barges on Green River for less than $1.00 a ton and in Cincinnati, Louisville, St. Louis and Memphis for another dollar, making the cost of the raw material less than two dollars in these cities; and it can be placed in New York City for $5.00 per ton. It will be strange if a material which exists in inexhaustible quantities within less than 150 miles of the center of population of the United States, and which comes from the hand of nature so nearly what is required for a typical pavement of the best class, shall not by a little skillful treatment and business foresight, be perfected and made to supply this important demand. I consider it one of the most valuable of Kentucky's many undeveloped resources, and feel satisfied that in a very few years it will bring much money into the State.

ELKHORN COAL IN BREATHITT COUNTY.

BY CHARLES HENDRIE.

The completion of the Lexington & Eastern Railway (formerly the Kentucky Union R. R.) to Jackson, the county seat of Breathitt county, a few years since has given an impetus to the development of the coals in that territory. The principal and most important bed, and the one which is the subject of this sketch, is the "Elkhorn" or the No. 3 coal of the Kentucky State Geological Series. It is now reasonably well established that this is the equivalent bed of the "Elkhorn" coal of the Pound Gap Region, and attaining its greatest thickness on the waters of Elkhorn Creek in Pike county, an important tributary of the Big Sandy river. On the south side of the Kentucky river, opposite the little town of Jackson, an important development by the Jackson Coal Company lessees of the Kentucky Union Company is at present being made in this coal.

At this point the coal is about 585 feet above the conglomerate and about 65 feet above the bed of the river, and the dip is generally towards the southeast. Going up the North Fork about four miles and near the mouth of Quicksand Creek the coal falls to low water and becomes thinner with an increase in thickness of the slate partings. Beyond that point it rises and falls for several miles. The following are a number of bed sections taken within a radius of three miles from the mouth of the drift of the Jackson Coal Company and covering anerea of several thousand acres :

Face of the Air Entry.		Face of First Right Entry.	
Coal	2 feet 10 inches.	Coal	2 feet 9 inches.
Slate	11 "	Slate	10 "
Coal	9 "	Coal	10 "
On Town Branch of Cane Creek.		**On South Side of Town Branch.**	
Coal	3 feet 1 inches.	Coal	2 feet 10 inches.
Slate	4 "	Slate	3.5 "
Coal	4 "	Coal	6 "

The roof is a hard slate, the pavement being hard sandstone. The bed is very uniform at this point, the slate parting decreasing in

thickness towards the western boundary of the field. This coal proves to be remarkebly high grade of steam coal, as evinced by the following test made at the State College at Lexington under the supervision of Prof. Paul Anderson.

ANALYSIS OF COAL BY STATE COLLEGE, LEXINGTON.

Moisture	2.78
Volatile matter	35.65
Fixed carbon	57.64
Ash (nearly white)	3.93
	100.00

TABLE OF STEAM TESTS AND CHEMICAL

The following results were taken from the graduating thesis of Messrs. degree—Bachelor of Mechanical Engineering. The approximate chemical of Chemistry, State College of Kentucky. The ultimate chemical analyses tology, State College of Kentucky. The steam tests were made under the College of Kentucky.

CHARACTERIZATION.

Number of Steam Test.....	Commercial Name of Coal.	Company Submitting Specimen.	Locality of Mine.
1	Reinecke.....	Reinecke Coal Company.....	Madisonville, Ky.
2	Lost Creek.....	.....	Carter County....
3	Wooldridge-Jellico.	Jellico and Beattyville Company....	Newcomb, Tenn..
4	Peach Orchard	Great Western Mining & Mfg. Co...	Peach Orch'd, Ky.
5	Glen Mary.....	Shelby Kinkead & Bro.....	Glen Mary, Tenn.
6	Avent-Beattyville..	Jellico and Beattyville Company....	Beattyville, Ky..
7	Manchester	W. O. Sweeny	Altamont, Ky....
8	Kanawha Cres. Blk.	S. B'dw'y Coal & Feed Co., Lex'ton.	West Virginia....
9	Peacock.....	S. B'dw'y Coal & Feed Co., Lex'ton.	Pittsburg, Ky....
10	Worral Mount.....	Worral Mountain Mining Co.....	Reynolds, Ky....
11	No. 11 Lump.....	St. Bernard Coal Company.....	Earlington, Ky..
12	No. 9 Mixed.....	St. Bernard Coal Company.....	Earlington, Ky..
13	Elkhorn (1897)....	Jackson Coal Co. (Davis & Wynn)..	Jackson, Ky.....

ANALYSES OF KENTUCKY COALS.—1894.

J. T. Faig, U. A. Garred and N. A. Newton, presented June 7, 1894, for the analyses were completed under the direction of J. H. Kastle, Ph.D., Professor were conducted by Arthur M. Miller, A. M., Professor of Geology and Paleon- direction of F. Paul Anderson, Professor of Mechanical Engineering, State

Chemical Analysis—Approximate.					Steam Tests.		Chemical Analysis—Ultimate.			
Per Cent. of Moisture.....	Per Cent. of Volatile Carbon.	Per Cent. of Fixed Carbon.	Per Cent. of Ash.....	Per Cent. of Sulphur.....	No. pounds Water Evaporated from and at 212 deg. per pound of Coal.....	B. T. U. given to Water per pound of Coal.....	Small (gross) Calories given out by burning one gram of Coal.....	B. T. U. given out by burning one pound of Coal....	No. pounds Water Evaporated from and at 212 deg. per pound of Coal.....	Coke.....
3.08	39.37	49.53	5.05	2.94	5.06	4886.9	7119	12814.0	12.79	.....
3 99	36 45	48.70	8.04	2.50	4.78	4718.5	6946	12502.8	12.42	.....
2.11	36.18	57.69	3.42	0.59	6.10	5891.3	8054	14497.0	14.49	.....
3 36	37.05	52.82	5.55	1.22	6.15	5937.6	7493	13487.0	13.45	.....
1.53	39 53	55.27	2.38	1 28	5.89	5708.5	8142	14652.0	14.62	60.79
2.32	39.55	55.91	1.72.	0.49	6.03	5823.7	7998	14396.0	14.36	.....
2.86	39.50	52.96	2.72	1.96	5.94	5237.8	7628	13730.0	13.69	.....
1.76	36.46	55.18	6.74	0.77	7.37	7117.9	7663	13793.4	14.27	.....
2.92	36.20	55.52	4.88	0.95	6.99	6750.9	7871	14167.8	14.13	.....
6.39	39.99	49.21	3 14	2.10	4.90	4832.4	7426	13265.0	13 32	.....
6.89	36.64	50.56	3.80	2.72	5.72	5524.3	7434	13381.2	13 33	.....
6.45	33.16	50.73	7.01	2.71	5.22	5041.4	7309	13156.0	13.09	.....
2.78	35.65	57.64	3.93	0.97	8.21	.....	.....	.....	.....	61.57

As a coking coal the outlook from this new field is most encouraging, indicating a coke of the highest class.

A car load of this coal was shipped to Stonega, the large coking plant of the Virginia Coal & Iron Co., near Big Stone Cap, Va., and by the courtesy of that company was tested under various conditions with the following results.

ANALYSIS OF 72-HOUR COKE.

Moisture and volatile matter	0.93	per cent.
Carbon	92.93	"
Ash (red)	6.14	"
	100.00	
Sulphur	0.78	
Phosphorous	0.017	

A separate analysis of the top and bottom portion of the bench give the following results:

	TOP.	BOTTOM.
Moisture and volatile matter	1.57	1.35
Fixed carbon	92.18	93.15
Ash	6.25	5.50
	100.00	100.00
Sulphur	0.62	0.78

From the above analysis it will be noted that there is little difference between the two portions of the bed and that an excellent quality of coke can be obtained. It was found that the best results were obtained by the crushing of the coal prior to coking. The coal, since its introduction to the markets tributary to the L. & E. Ry., has obtained a very high reputation as a steam coal, a reputation which is being steadily increased, and as a domestic coal, it is rapidly taking its place as one of the best.

WHAT SHALL WE BURN?

BY H. K. TAYLOR, A. M.

(PRINCIPAL LOUISVILLE TRAINING SCHOOL.)

To us living in apartments made tropical amidst the howling blasts of a searching blizzard, possibly smacks of the inapropos, not to say of the ridiculous, to indulge in the interrogation of the above caption. But nature under the developing hand of invention is always responding to the immediate and prospective wants of civilization.

The law of reproduction is as invitable for the maintenance of inert as of living species, if we proceed upon the hypothe is of the indefinite perpetuity of mundane things.

The plant sprouts, develops, matures, and dies but to furnish material for the growth of other vegetation.

The bodies of animals of this generation fertilize the soil for producing and the maintenance of the next. Individually "we live as we die," and generically life is predicated upon death. Consumption necessarily involves reproduction. In some cases the processes of nature are rapid enough to meet the wants of man.

Vegetable and animal matter usually decay in a winter's time and afford suitable fertilization for the crops of the approaching spring and summer.

But even here the art of man is sometimes called in to hasten the process. The decay of the bone is too slow, not to say too wasteful, to serve the purposes of agriculture, hence the valuable phosphates are obtained in useful form by grinding the bones in order to facilitate immediate assimilation. Evaporation lifts the veil of vapor from the face of earth and the cool currents of the upper strata of air weaves it into a thin mantle of cloud, from whose saturated folds are wrung copious showers that replenish the rivulets, rivers, and lakes that under the touch of Boreas become the looking-glasses of the Winter King that may be sawed and cut into huge rectangles and stored away in northern ice-houses.

Nature here is too slow for her human child, the creature of genius.

While the fervid glow of our August sun beats upon the parched earth, and the hot blood throbs in the congested arteries of sweltering humanity, the processes of evaporation and congealation is effected in an hour or so, and the welcome ice-wagons roll with deafening noise from door to door and unload their smoking challenges to the fury of the dog-day sun.

But even in this triumph of art man is dependent upon the constant reproduction of the material used, viz: water. If water were the product of a thousand years, ice manufactory would be relegated to the unerring but tardy processes of nature, whereas each little village may, under the kind favor of nature and the illustrious genius of man, and the surpassing excellence of American institutions enjoy the inexpressible luxuries of an ice factory and a police judge.

Each flame of combustion is but disengaging and uniting elements that contribute to the water supply of the earth.

The woody tissue, the solid coal, the liquid air, and lambent gas when in combustion furnish a new supply of vapor that under condensation becomes water.

Water is the most ready and the most universal of reproduction of all physical articles.

At the present rate of consumption there is evidently a limit to the supply of coal, gas, oil, and all other articles of fuel that require time for reproduction far greater than the progress of civilization can allow. It has been estimated that England's coal supply will fail in less than 100 years. Coal will require from ten to twenty centuries for reproduction even if climatic and vegetable conditions were now favorable.

With the increase of the world's population, if not in numbers, surely in the progress of arts and manufactures requiring increased fuel supplies, it is not too imaginative to predict a limit to those supplies.

It will not do to say thst electricity will supply all thermal requisites, for the very production of electricity requires fuel supplies that must in time be exhausted, or if not fuel supplies, expensive machinery that must have a limit to the material of which it is made.

Water is to be the coming fuel of the world. Men, instead of

building coal houses will cut lakes and dig cisterns. A man's horse-pond will become his coal-house and the "enemy" of fire will become its progenitor.

By hydrostatic and hydraulic power effected with minimum supplies of water this fluid will be transported to the place of consumption, and here now is the problem for genius to solve. How shall water be safely, economically and profitably decomposed so as to furnish the elements of combustion? It is well known that water contains two parts by volume of hydrogen and one of oxygen. These furnish the best heat producers known. The problem is how to separate water into these two elements at the moment and place of combustion. Already certain chemical methods are known, but they are too expensive, dangerous, or meagre in results to serve the purposes of combustion.

There will come a time when instead of filling a lamp with kerosene, water will be employed, and a small lamp will take the place of the belching furnace.

Water jets will hang instead of gas jets, and the kitchen reservoir will serve both for a depository of fuel and materials for the lavatory.

It is known that a pure oxygen and hydrogen flame is nearly colorless. This can be overcome for lighting purposes by using *hoods*, of material that becomes incandescent, as the modern Welsbach burner, or *calcium* can be used as in the Drummond light, a light that can be seen a hundred miles.

The difficulty of preventing freezing to our new fuel supply will be avoided by producing the constituent gases in protected places and conveying them in tubes to the place of consumption.

These gases can not, on account of their explosive qualities, be mixed except at the point of combustion, and the double tubes will be necessary as in the oxhydrogen blow-pipe. Smoke consumers will be curiosities of the dark ages, as only watery vapor will be the product of combustion, and this product will furnish nature the material for reproducing a fuel supply in the rains that shall follow.

The revenue of the laundry will be largely lessened by the absence of troublesome soot, the inimical polluter of spotless linen. The puff and roar of the engine will be supplanted by the noiseless combustion of the lambient jets of oxygen and hydrogen, and instead of hods of soot-producing coal and the odor of sulphur

there will be a tank away in the cellar filled with the agent and emblem of purity, and the vapor resulting from combustion will be as odorless as the Elysian air of Mount Olympus. The dangers of conflagrations will be reduced to a minimum and the luxury of a steam or a furnace-heated apartment will be one of the hardships left only as a legacy to memory by the puny achievements of this the boasted century of the world's history.

THE CLAYS AND BUILDING STONES OF KENTUCKY

BY M. H. CRUMP, M. E. & C. E.

Among the economic features of Kentucky no one of her natural resources is entitled to more attention than its clays. But owing to a general lack of information on this subject they have received comparatively little attention. The State abounds in all kinds, and the future is destined to rival the States of Ohio and New Jersey in the industrial development of its superior pottery and other clays. They are found in all of its geological formations, beginning with the Cretaceous of Western Kentucky, where superior beds of brick, fire-clay and pottery clays are found in inexhaustible quantities. In the Chester and coal-measure formations excellent vitrified brick and fire-brick clays abound. There is probably no State in the Union which contains higher grade or more varied assortment of common and pressed brick clays.

The last United States Report on the Mineral Resources of the Union shows that the clay industries excel all the others except coal. The annual production amounts to $170,000,000, and the price per ton of the raw product ranges from $1.32 to $8.15 per ton. A similar report shows that the products are used as follows:

First—Building materials, including common and pressed brick, hollow and glazed brick, roofing tiles, flue linings, door-knobs, terra-cotta lumber and hollow tile.

Second—Refractory materials, such as fire-brick, gas retorts, zinc retorts, together with other metallurgical aparatus, glass pots and chemists' and assayers' utensils.

Third—Pottery, consisting of common stone-ware, plain or yellow earthen-ware, granite or iron-stone and white mixtures containing porclain.

Fourth—Ornamental wares, such as encaustic tiles for floors, hearths and mantels, ornamental pottery and ornamental terra-cotta.

Fifth—Miscellaneous, such as common sewer-pipe, drain-pipe and drain-tile, flower-pots, garden border edging, telegraph insu-

lators, well tubing, acid receivers, water filters and coolers, together with lamp stand and many other uses. It is largely used for luting in furnace work, in weighting and sizing paper, in making alum; and in the form of yellow and red ocherous earth it is largely used as a paint. The last five years has seen a large development of clay ballast for railroads, as well as for highway purposes.

The great clay-producing States rank as follow :

Ohio, with an annual production (exclusive of brick clays), of $11,000,000; Illinois, $8,500,000; Pennsylvania, 7,500,000; New York, $5,000,000; New Jersey, $4,000,000; Indiana, $3,000,000. Kentucky stands eighteenth, with less than $1,000,000, whereas her natural resources in this line should cause her to be ranked among the first.

The clay products of Kentucky in 1894 were as follows :

Common building brick, $418,886, or an average of $4.96 per thousand; pressed and ornamental brick, $50,700; fire-brick, $87,800; vitrified paving brick, $51,389. The cost of brick in the United States varied from $4.74 per thousand in South Carolina to $8.41 in Idaho. Vitrified brick cost $5.12 in Tennessee and $25 in Connecticut; average in the United States is $8.12.

More than 369,000 tons of kaolin, or china clay, were consumed in the Union, worth more than $800,000; 38,000 tons of ball and fire-clay, together with ground flint and feldspar, worth more than $500,000, were used for pottery purposes. All of this material, except the felspar, abounds in Kentucky and only awaits development, which can be brought about only by keeping these facts constantly before the eyes of the investing public in an official manner.

Fire-clay, not excelled by the best German and British varieties, is found in Carter county, where it is now being mined and carried to Louisville for manufacture. Excellent varieties of similar clay are found in the counties of Ballard, Muhlenberg, Grayson, Edmonson, Hickman, Graves, Calloway, Fulton, Bell, Boyd, and in fact in every county of both the Eastern and Western coal fields. The majority of these clays contain notable quantities of silica and alumina, with minimum amounts of iron, magnesia and the alkalies, soda and potash, hence their highly refractory character. The clay from the Grahn Station mine, Carter county, on the C. & O. Ry., is well known for its purity, and received much attention from the foreign experts at the World's Columbian Exposition, where it was splendidly

shown. It has no superior in this country and probably none abroad. Its refractory nature depends both on the absence of impurities and the almost chemical correctness with which its ingredients are brought together. It thus closely approximates a typically perfect fire-clay. The flint clay shows the following analysis: Silica, 49.75 per cent.; alumina, 35.16 per cent.; oxide of iron, 30 per cent.; lime, 54 per cent.; magnesia, 15 per cent.; potash and soda, 7 per cent.; water, 14.03 per cent.

For several years the brick made from this clay has been subjected to the severest practical tests. It is used in making all the varieties of locomotive tiles used by the leading railroads, together with cupola linings, glass furnace blocks, grate and boiler tiles and stove linings.

Vitrified brick clay is frequently found closely associated with the former and in many cases at remote distances from it. It is found in many sections of the State, but has been developed in only a few places; principally at Cloverport and in Grayson county, near Millwood Station, eighty miles from Louisville on the Illinois Central Railroad. Here an eleven-foot vein is being worked in a very successful manner by the Louisville Sewer Works Company, Louisville, Ky. The bed of clay is overlaid by an eighteen-inch coal seam, which furnishes the necessary fuel, and over this there is a bed of slaty shale which furnishes a fair roof. It has been worked for the last six years by the above-named company. The clay is very compact and hard, so much so that much dynamite is required in blasting. The brick made from it compare favorably with any made in the United States. An average of sixty tons of clay is being shipped daily to Louisville, where it is made into paving brick.

In the adjoining county, Edmonson, two beds of excellent vitrified brick clay are found. One eight feet thick, the other six feet. Neither have as yet been developed, but the lock and dam now under process of construction at the mouth of Bear Creek, on Green River, will bring them in reach of slack water navigation.

Pottery clay is confined principally to the tertiary deposits, which are found only in the Purchase. Experiments made at the Rookwood Pottery and the Decorative Art Factory, Cincinnati, conclusively show that a paying industry may be built up in this State by using these clays, which equal the finest foreign material for the purpose of making regular table ware, such as cups, saucers, plates,

bowls, pitchers and the like ; articles which always command a ready sale and find a constant market. A manufacturer of long experience in this line says : "The practical experience I have had with the Calloway county clays, as well as that from other districts, has taught me their peculiarities, and I can freely say that from their great plasticity they are the most easily and cheaply worked, and from their binding qualities entail less loss in the kiln than any other I have ever met with. The Russell clay, with the addition of some flint, makes a beautiful ivory ware, almost exactly resembling that made by the celebrated English firm, Copeland & Sons, for the table and toilet sets. Good pottery clays are found in the counties of Calloway, Graves, Marshall, Hickman, Fulton, Butler, Edmonson, Grayson, Ohio and Madison."

Probably the best developed mine is that at Pryorsburg, on the Illinois Central Railroad, one and one-half miles from the former station and about six miles from Mayfield, Graves county. The section shows more than forty feet, and the bottom has not been reached. The clay is excellent, and is largely shipped for the manufacture of art or encaustic tiles and other ornamental articles. The writer had some experience with it in connection with the World's Fair, where it was made into tiles and also used by an art potter in making every description of delicate ware. This clay was selected for this purpose after a careful examination of all the clays on the grounds and chosen entirely on its merits. Its composition shows : Silica, 56.40 per cent.; alumina, 30 per cent.; lime, 4 per cent.; magnesium, trace ; oxide of iron, trace ; potash, 3.06 per cent.; soda, 2.01 per cent.; moisture, 7.33 per cent. (Robert Peter). It is shipped as ball clay for queensware and art tiles.

Glass-pot clays, which compare favorably with the best German variety of the same class, are found in many counties of the State, particularly in the Purchase counties of Ballard, Marshall, McCracken, Carlisle, Hickman, Fulton and Calloway. The percentage of injurious ingredients is considerably less than in the foreign clays, and there seems to be no doubt that they will replace the imported clays as soon as they are made known to the glass-making industry, which industry has made rapid strides in this country in thelast decade. Analyses of these clays may be obtained from the volume of the Kentucky Geological Survey.

Building and dimension stone of excellent quality is found in almost every section of the State, with the exception of the Purchase. Every geologic horizon except the cretaceous, abound in many varieties, the greater number of which have been tested by absolute experience and that more infallible test, "the corroding tooth of time." From the lower silurian comes the bird's-eye limestone, out of which the Capitol is constructed; the upper silurian furnishes the material for hundreds of structures in the city of Louisville as well as for the numerous villages and towns of the Bluegrass country. The Devonian supplies the excellent freestones that abound along the line of the C. & O. east of Lexington, which so closely resembles the well-known Buena Vista of Ohio. The Subcarboniferous, which covers so much of Southern and Western Kentucky, contains the famous St. Louis beds, which not only make possible the Mammoth Cave, but furnish the more important White oolitic limestone, known as Bowling Green Stone. This famous building material, which in composition, structure and durability, so nearly resembles the celebrated Portland limestone, from which St. Paul's, London, is built, is found in many counties of the State; possibly not less than a dozen. It is more developed near Bowling Green than elsewhere; hence its name. It is here worked from beds running as high as twenty-two feet in thickness, with a purity of 98 per cent. of calcium carbonate. It is extensively used in the construction of Government buildings and other permanent structures.

The Stratfield oolite, which lies some fifty feet below the former stone, is of a dark gray color, very durable, and splits like a chestnut rail; hence can be quarried at such small expense that it can be placed in buildings at a less price than brick at $7 per thousand. For flagging, curbing and dimension stone it has no equal in any region. It is rapidly coming into notice; several large buildings have recently been constructed of it, notably, a $40,000 Methodist church at Bowling Green. Architects and practical stone men say that for durability, beauty and economy it has no superior in the land.

THE JELLICO STRIKE, 1897.—NOTES ON ITS CAUSES AND EFFECTS.

BY HYWEL DAVIES.

The Jellico district is unique in its labor conditions, in its geographical relation to the trade, as well as in the well known superiority of its domestic coal compared with other Southern coals. The district saddles the dividing line of two States and links the branch termini of two representative Southern lines (the Southern and L. & N.), which carry its product into seven States.

From 1884 (when the first coal was mined by the Wooldridge Co., in Tennessee and the East Tennessee Coal Co., in Kentucky) until 1892 prices, f. o. b. cars at Jellico remained very uniform, and a very liberal mining scale was paid ranging from 75 cents to 85 cnets per ton over a 1½ inch screen. New mines were developed every year, yet during this period the supply was not in excess of the demand. Slowly but surely the new developments, aided by still newer developments in Alabama, West Virginia, Tennessee and Southwestern Kentucky, changed the relation of supply and demand; then prices fell. The panic of 1893 and 1894 helped the "down grade" condition of things until John McBride called out the miners on the historical National strike of 1894.

After a three months' "shut-down" the Jellico mines resumed work on a basis that revolutionized old conditions. Although it netted a 10 per cent. reduction in costs to the operators the miners readily accepted the changed conditions as soon as the National strike was over, because the screen was changed from 1½ to 1¼ inch, and the company handled all cars in rooms instead of the miner.

The miners claimed that these two concessions were worth 10 cents per ton to them. The price of mining fell from 75, 80 and 85 cents to 60, 65 and 75 cents, this, with a 10 per cent reduction in day labor, seemed sufficient justification to the operators to indorse the changed conditions, although they went entirely out of their competitive districts to secure this changed basis for a scale.

During 1895–96, and until April 30, 1897, the district operated under the scale of 1894 without change, although the Jackson, "Ohio," district (patterned after in 1894) reduced its scale during this period, first to 60 cents, then to 55 cents and finally to 51 cents, but readjusted its scale on a 56 cent basis in September, 1897, as the result of the last National strike. The Jellico wage scale remained the same for three years, yet Jellico coal, f. o. b. cars in Jellico, sold at an average reduction of 5 cents per ton each year, so that the difference in selling price between Jenuary, 1894, and January 1897, averaged 15 cents less per ton on the output of the mines. In addition to this the mines had lost largely in steam trade, owing to the inroads of Alabama coal into West Tennessee, Georgia and Northern Alabama; West Virginia coal into Eastern Kentucky; and Pocahontas into the Carolinas; while the developments north of the Jellico district on the Cumberland Branch of the L. & N. and south on the Queen & Crescent at Harriman, sandwiched the district by coals that were marketed 25 cents per ton below cost of production at Jellico.

This competition reduced the working time of the mines 10 per cent each year since 1894, and the situation became so acute during the fiscal year ending April 30, 1897, that the necessity for an adjustment of the labor scale was too apparent to any one familiar with the conditions. At a meeting of all Jellico operators, held during the spring of 1897, the following policy was agreed upon:

"That we adjust our labor scale to conform to our surrounding competitive conditions, *i. e.*, to frame a scale based on similar conditions and prices existing in the Laurel district north of Jellico and the Coal Creek district south, with equitable differentials for unlike conditons."

This was the spirit that governed the first joint conferences in May and June, and which sent a joint committee of six through all competitive districts at the operators' expense to ascertain their true conditions, and which the committee certified to be as follows on June 18, 1897:

COMPARATIVE

CLASSIFICATION.	Jellico, May, 1894, '95, '96, '97.	Jellico, October, 1897, Settlement.	Ashland, June, 1897.	Wellston and Jackson, O., June, 1897.
Mining price per ton	60 to 65c.	57 to 62c.	50c. over Screen or 33⅓c. R. o. M.	51c.
Height of coal.....	33 to 54 ins.	33 to 54 ins.	3 to 4 feet.	28 in. to 4 ft.
Area of screen	72 feet square.	72 square feet.	105 sq. ft.	72 sq. ft.
Distance bet. bars...	1¼ inches.	1¼ inches.	1½ inches.	1¼ inches.
Slate entries per yd.	$2.15	$1.90	$1.00	$1.52
Rock entries per yd.	3.05	2.65	1.25	.....
Bottom, per yard ...	$2.65 bottom and top.....	$2.40 bottom and top.....	30c.	68c. rock.
Airways and breakthroughs.....	87½c.	80 cents.	50c.	$1.01
Brushing top in rooms.....	43c.	.....	No comp.	.....
Turning rooms.....	$2.00 to $2.50	$2.00 to $2.50	$1.20 room.	$1.01 per yd.
Spike team drivers..	17½c.	16c.	$1.10*	.. ..
Single team drivers.	Boys, 10¼c. Men, 15¼c.	14c.	80c., boys.	$1.12½
Trappers.....	4½ to 6½c.	5c.	.....	50c.
Track-layers.	15¼ and 19¼c.	14 and 17½c.	$1.30	$1.46½
Gin men and Push'rs	10 and 15c.	13c.	1.07	1.21½
Water bailers and pumpers	$1.25 per day to 15¼c..	14c.	1.25	$1.50 pump'r
Drum men	13 and 15¼c.	13 and 15c.	.....	.....
Chute men.....	13c.	13c.	1.00	$1.21½
Outside labor.....	11 and 12½c.	10c.	1.00	.....
Blacksmiths.....	$1.50 to $2.00	15 and 17½c.	2.00	1.75
Carpenters.....	$1.50 and $1.75	$1.25 to $1.50	1.65	.....
Tracks laid by.....	Company.	Company.	Miners.	Company.
Cars handled in rooms by.. ...	Company.	Miners.	Company.	Company.
Props delivered at...	Mouth of Mine.	Mouth of Mine.	.....	Face of room
Pay day.....	First Saturday after 10th....	First Saturday after 10th.....	First Sat. after first Mon.	10th and 25th mo.
Fuel delivered	Lump, $1.50; Nut, $1.00..	Lump, $1.50; Nut, $1.00 .	$1.30	7c. lump 6c. nut.†
Powder, per keg....	$1.75 to $2.25	$1.75 to $2.25	1.60	$1.50
Oil, per gallon.....	50 to 75c.	50 to 75c.	50c.	40c.
Blacksm'ng, per mo.	40c.	40c.	50c.	56c.
Days work.....	10 hours.	10 hours.	10 hours.	9 hours.‡

§Black Jack, four to six inches, cleaned without pay.

WAGE SCALES.

Pittsburgh, Victoria and Peacock, Ky., June, 1897.	Pitman and Laurel, Ky., June, 1897.	Coalton, O., June, 1897.	Enterprise Coal Co., Greenwood, Ky. June, 1897.	Pittsburg, Pa., Settlement, June 21, 1897	Coal Creek, Tenn., June, 1897.
50 and 52½c	62½c.	56c.	72c.	65c. for thin vein to 56c for Ohio	40c. R. o. M. free from dirt
2 ft. 8 to 3 ft. 5 in.	30 to 40 in.§	26 to 38 ins.	24 to 40 in. with 6 to 12 inch bone coal cleaned without pay	.....	.....
48 sq. ft.	48 sq. ft.	72 sq. ft.	48 sq. ft.	.....	.....
1¼ inches.	1¼ inches.	1¼ ins.	1¼ inches.	1½ inches.	.....
$1.40	$1.75	$1.27½	.....	.....	.....
.....	.....	.....	$2.25	82c. to $1.24	$1.25
.....	76 and 80c.	76¼c.	.....	.....	12 to 24 in. fire clay to be handeled without pay.
No pay.	45c.	.....	75c.	41c.	80c.
.....	.....	.....	Nothing.	.....	.....
.....	$2.00 room.	76¼c per yd.	Nothing.	$2.06	$2.30 to $2.50
$1.25	$1.60	$1.21½	.....	.....	1.50 to 1.80
1.10	1.40	1.21½	$1.60	$1.65 to $1.85	1.00 to 1.40
45c.	50c.	50c.	.....	.....	45 to 50c.
$1.25	$1.60	$1.40–$1.60	1.40	.....	$1.35 to $2.00
1.10	1.40	$1.21½	1.40	.....	1.00 to 1.35
90c.	1.35	$1.00-$1.21½	1.50	.....	$1.20
.....	.....	.....	.....	.....	.....
$1.05	1.35	$1.21½	.....	.....	$1.00 to $1.25
.....	.....	.....	1.10	.....	.....
1.50	1.80	$1.60	.....	.....	$1.50
.....	.....	.....	.....	.....	.....
Company.	Company.	Company.	Miners.	.....	Miners.
Miners.	Miners.	Company.	Miners.	.....	Loads comp'ny empties miners.
.....	.....	Face of room	.....	.....	.....
Weekly.	Monthly.	10th and 25th mo.	First Sat. after 15th.	.....	Some monthly, bi-mo'ly and irregular
$1.10 for R. o. M.	$1.50	7c. lump, 6c. nut.	6c. not delivered...	.....	$1.30 to $2.00
$1.75	2.00	$1.50	$2.25	.....	1.75 to 2.25
60c.	60c.	40c.	80c.	.....	60 to 75c.
40c.	40c.	.....	50c.	.....	40 to 50c.
.....	.....	9 hrs. Sat. 8.	.....	.0103c. per $	.....

Jellico district pays by the hour.
§Paid in fourths—one-fourth and full time if cleaned up by 3 P. M.
†No charges for nut when living in company houses except haulage.
‡Saturday, eight hours.

The Jellico district has been recognized as a "union district" since 1889 and annual conventions have been held to fix the scale for each year. The joint Board of Conciliation and Arbitration appointed at the annual conventions adjusted all differences during the year, so that with the exception of the National strike of 1894 and 1897 the Jellico district has been remarkably free from petty or serious strikes since 1889. While the district has been considered "union" yet the proportion of non-union men employed has always ranged from 25 to 90 per cent. according to the popularity of the labor organization or leaders. It was generally understood when the mines closed in May that the number of union men in good standing barely exceeded 10 per cent of the men employed. Although the union men were the minority, yet they were the active speakers in each community, and it was easy to get themselves appointed or elected delegates to the annual joint convention because the non-union men were not antagonistic, but simply indifferent to the orgnization.

Freedom from disputes, the absence of anything in the nature of persecution of the labor leaders and a strict adherence to the annual contracts removed agitation and almost destroyed the orgnanization. The old adage that Satan finds some mischief still for idle hands to do was verified during this peaceful period, as the absence of an outside enemy roused internal jealousies and bickerings, so that old leaders were removed and old associations sundered by their withdrawal from the United Mine Workers of America and affiliating exclusively with the Knights of Labor, an organization that is more of a federation for allied industries than one conducted exclusively for one trade like the Brotherhood of Locomotive Engineers or United Mine Workers of America.

An organization that is a conglomeration of trades cannot bring to bear for the benefit of the individual trades the same influences for good as a special organization can for its special trade.

The K. of L. could not furnish from its executive board the same mining sense, mining intelligence and mining experience that is at the comand of the United Mine Workers of America. To the credit of the latter it can be said that no representative of their executive board ever spent over three days in Jellico at any one time adjusting a dispute or settling a strike, *and they never failed to adjust when they came;* for the simple reason that they always found a disposition to reason the matter fairly, and they met this disposition in an equally

broad-minded and equitable spirit. *This is what the Jellico miners failed to do in the joint conferences of 1897.*

Their recognized leader stated at the outset of the strike that they could not consider *any* proposition for a reduction, *regardless of surrounding conditions*, and in all conferences he ignored environments on the plea of a "living wage." A reference to the preceding tabulated wages paid in competitive districts clearly indicates who paid and who were willing to pay the best "living wage." After months of futile conferences and investigations it was suggested that the scale committee adjourn for two weeks to enable the miners' committee to secure the presence and counsel of one of their "National leaders," and it was generally understood that Mr. J. R. Sovereign would attend the adjourned meeting of the joint scale committee. Instead of doing so, Mr. Sovereign merely sent a message instructing the men to stand firm and accept nothing but last year's scale, etc. When this was read or communicated to the operators' committee they immediately adjourned, and further conferences with the K. of L. were broken off, as the only opportunity to get the miners' committee to look at the situation from a business point of view seemed to be gone. The K. of L. delegates missed their opportunity as an organization because they failed to bring business and mining sense into conference with the operators, who pledged themselves at the very first meeting *to ask or demand nothing that did not already exist in the surrounding competitive districts.*

The operators did not take decisive steps to ignore the K. of L. as a factor in making the annual settlement until it was clearly evident that they (the K. of L.) expected the operators to pay a premium scale of wages. The operators were not opposed to "unionism" and "equality," but rebelled against "unionism" and "inequality."

The strike thus developed into the dual object of equalization of labor scale and the right to make that scale with the employes of each mine regardless of the K. of L. The K. of L. seemed more disturbed over the latter object than the first, and it was current talk in the district in the latter part of September that if the operators would recognize the organization and make some slight reduction in rent and stores settlement could be made, but it was "too late to lock the stable after the horse had gone.

Mr. Sovereign's communication ruined that opportunity.

Four months had been spent in trying to make a settlement with the K. of L. committee, and when they failed to bring unbiased intelligence to the joint conference it was clear that there was nothing left but individual settlements. The operators posted the following scale at their respective mines in the month of September:

There shall be five grades of coal, as follows:

No. 1, Under 2½ feet	72
No. 2, 2½ feet to 2 feet 9 inches	67
No. 3, 2 feet 9 inches to 3½ feet	62
No. 4, 3½ feet to 4½ feet	57
No. 5, 4½ feet and over	52

Per ton of 2,000 lbs. weigh. box coal

SCREENS.

Screens shall not exceed 72 feet superficial area, with one and one-quarter inches space between the bars. Pitch of screen to be so regulated from time to time as the necessity arises, so that the coal will run over them. When screens are constructed in two sections they shall be made as even as the construction of such screens will permit.

MEASUREMENTS.

Only coal shall be measured, and not impurities. When the mining seam is slate or impurities, such as will injure the coal, it shall not be measured or loaded.

TRACKS.

Company shall lay all tracks.

CARS.

Miners shall handle all cars.

YARDAGE.

The standard price for slate entries shall be $1.90 per yard, but when both top and bottom are blasted the price shall be $2.30 per yard; solid rock entries, $2.65; rock top and slate bottom, $3.05. Entries, air-ways and all narrow work in coal, when used for entries or air-ways, shall be 80 cents per yard, but when the slate parting occurs in the coal and neither top nor bottom is blasted, the price shall be $1.15 in entries and air-ways when the slate is loaded out and does

not exceed nine inches; over nine inches and up to eighteen inches in entries and rooms, 4 cents per ton extra on the coal shall be paid.

ROOM TURNING.

$2.00 in high coal.
$2.25 in medium coal.
$2.50 in low coal.
$3.75 for double rooms in all coal.

TIMBERING.

All timber shall be placed convenient to the mouth of the mine, but miners must select their timbers and place convenient to the track and number them; then the driver shall bring them at his earliest convenience after being notified, but it mu t be distinctly understood that a miner must not under any circumstances continue to work if delay of delivery endanger shis safety.

PICK SHARPENING.

Forty cents per month, but if mine does not run over one-fourth month, 10 cents; one-half month, 20 cents; three-fourths month, 30 cents.

LABOR.

Single drivers	$1 40
Spike team (two or three mules)	1 60
Head trackman	1 75
Assistant trackman	1 40
Tippers and trimmers	1 30
Couplers (50 cents, boys)	1 00
Blacksmith	1 75
Pick sharpener	1 50
Trappers	50
Water bailer	1 40
Drum man	1 50
Knuckle man (boy, $1)	1 30
Furnace man (digs his own coal)	1 50
Furnase man	1 10
Outside labor	1 00
Gin men and muckers	1 30

All other labor not specified, 11 per cent. reduction.

HOUSE FUEL.

Lump coal shall be $1.50 per two-horse wagon load; nut coal, $1 per two-horse wagon load. When an employe does not buy coal he shall pay 50 cents per month in the spring and summer months and $1 per month in fall and winter. When coal is thrown off of railroad cars the price shall be $2 per month in winter, $1 in spring and fall and 50 cents per month in summer. No coal shall be picked up around the tip-house or taken off of the the railroad cars or mine cars.

DEATHS.

In case of death of an employe, or member of his family, the following rule shall prevail:

Death by accident in or around the mine, the mine shall lay idle until after the funeral. Death of a grown person from natural causes, the mine shall lay idle on the afternoon of the funeral. On the death of a child or minor the work will not lay idle, but those wishing to attend the funeral may lay off to do so.

PAY-DAY.

Pay-day shall be on the first Saturday after the 10th of each month, for all work done in the preceding month, less charges. Any employee desiring to leave the employ of the company shall receive his money at once, or not later than five days after his notice is given. This scale being based upon prevailing conditions and prices at Coal Creek, no change will be made in the scale until a change is made in the Coal Creek scale by a majority of the mines at Coal Creek.

Signed:

Standard Coal and Coke Company, Newcomb, Tenn.,
By James C. Brooks, Supt.

Wooldridge Jellico Coal Company,
By Joseph R. Wooldridge, Gen. Mngr.

Falls Branch Coal Company,
By Powhattan Wooldridge, Pres.

Indian Mountain Coal Company,
By J. R. Livingston, Gen. Mngr.

Proctor Coal Company,
By A. Gatliff, Pres.

B. G. Jellico Coal Company,
By W. T. Jameson, Pres.
East Tennessee Coal Company,
By W. T. Lewis, Gen. Mngr.
Hywel Davies Coal Company,
By William Jones, Supt.
Jellico Coal Mining Company,
By J. L. Williams, Gen. Mngr.
Mt. Morgan Coal Company,
By J. P. Mahan, Pres.
Bird Eye Jellico Coal Company,
By Ben W. Robinson, Gen. Mngr.
Kentucky Jellico Coal Company,
By H. B. Taylor, Gen. Mngr.

As soon as this notice was posted two or three mines arranged to put men to work, and all of the companies, with one or two exceptions, placed guards to protect their properties, but to the credit of the miners it can be said there was not a single case of disturbance or intimidation, but every effort was made to show that they were law-abiding citizens. No matter what the verdict of the world at large is regarding Jellico the district has one claim to consideration, viz: Its strikes are "rests." No one ever saw a mob of miners bent to injure or destroy any property in the Jellico district. Its disagreements have always been settled by committees until the last strike, and when it was understood that the companies, after 3½ months of conferences, would not settle with a joint committee, the change was accepted peaceably.

The Proctor Coal Co. resumed work in September with about 25 men. The Standard mines at Newcomb worked about 10 men and Mt. Morgan Coal Co., at Williamsburg was able to start up its new mine with almost a full force in October. Mt. Ash mines followed.

All these worked practically on the basis of the posted scale.

On the 27th of October the Wooldridge Co., at Newcomb Tennessee settled, with the following amendments to the contract:

CARS.

"*Miners shall handle all cars*" in rooms. A car shall be considered in the room when it is clear of the entry.

CUT.

"A cut of 25 cents per month off of each miner and laborer shall be paid through the office and placed to the credit of the check weighman fund."

ARBITRATION.

"There shall be a board of arbitration and conciliation to adjust all disputes arising under this agreement, composed of three on each side, with power to select an umpire, and their decision shall be final and binding on all parties to this agreement and those they represent, but under no circumstances shall work stop.

"This contract shall remain in force until August 1, 1899; provided, however, that on July 15th the committee representing the miners and laborers shall meet the operators of the Wooldridge Jellico Coal Co. for the purpose of arranging a contract to supersede this; but should said committee and operators fail to agree before the date named for the expiration of this contract all matters in dispute shall be submitted to arbitration and said arbitrators shall make a contract that shall be binding on all parties, and pending said arbitration this contract shall remain in full force."

The reference in the posted scale to Coal Creek conditions was omitted from the Wooldridge contract. Settlements at the other idle mines soon followed, so that the entire district, with the exception of the Kensee and the Bird Eye Mines, resumed work on the 1st of November.

Kensee mines settled November 4th, with the following amendment to the handling of cars.

CARS.

"Miners shall handle all cars," or, "80 cents per yard will be paid for brushing top over the mainways in all new rooms, so as to clear 4½ feet above the rail. Mules to handle all cars in such rooms, and the price of mining shall be 5 cents per ton less than the scale for coal of the same class where miners handle their own cars."

This contract also embodies the Wooldridge arbitration clause and omits reference to Coal Creek.

Bird Eye has since resumed work with Harrison's compressed air machines and to this date have operated with day labor only.

The operations of this plant will be watched with interest as well as the operations of the Link Belt electric machines installed at Falls Branch Mines. Both are outcomes of the great strike and one, if not both, may solve the problem of existence that confronts the Jellico operators, even though the present scale will reduce cost about 11½ cents per ton of weigh-box coal. Every coal that competes with Jellico has from 10 to 25 cents per ton less freight to pay, excepting the Pineville and Middlesborough district, and this differential is almost more than Jellico can overcome to command a share of the steam trade. Some day the entire district will be owned and controlled by one company, and if that company will take advantage of concentration, be enterprising enough to equip the mines with the most progressive methods of mining and be diplomatic enough with the railroads I have no doubt that both the L. & N. and Southern Railway will lend a more willing ear to the plea of a uniform freight rate and thus "raise" what is equivalent to a blockade of Jellico coal for steam uses.

The strike of 1897 buried joint conferences for the time being, but out of that grave the principle of arbitration has been raised, let us hope, to live as the governing factor in the settlement of all labor disputes for years to come.

Another factor that ought to be a balm for future trouble is the amended contract of the Proctor Coal Co., made November 1st, when the principle of "Profit Sharing" was recgonized (after giving the grades and prices of coal) thus:

"These prices are based on average price of lump, $1.50, and run-of-mines, 90 cents, minimum. Should the average price for these grades increase above the minimum the miners are to have one-third of such increase."

While the operators gained equalization and the miners lost recognition of their "union," yet no fiat against "union" men has been issued.

Both operators and miners have gained by the arbitration clause, and the miners of Proctor have taken a step in advance in the solution of all strikes—profit sharing; while Kensee solved the pushing question to the betterment of the miners' physical well being.

Were not the results worth the fight? even though the district lost the sale of 300,000 tons of coal, which was a loss of $265,000 in wages to the miners, $150,000 in store sales and $15,000 in

men to the operators. But coal was sold at a heavy loss below the miller which in most cases absorbed the rents and more profits, so that in the aggregate the losses to the operators did not reach 10 per cent. of the loss in wages to the miners except that the losses that may accrue from the keenness of the settlement is an unknown factor. In any case both operators and miners will naturally suffer if there be any losses on this account.

SCALE OF RATES AND REGULATIONS ADOPTED BY THE OPERATORS AND MINERS OF MIDDLE RIVER.

Marydale, B.C., Nov. 4, 1897.

This contract, made this day between the Elgin Coal Company and its employees, represented by the undersigned committee, witnesseth:

First. It is agreed that there shall be five grades of coal, as follows:

No. 1, Under 2½ feet	7c
No. 2, 2½ feet to 3 feet 9 inches	6c
No. 3, 3 feet 9 inches to 3½ feet	5c
No. 4, 3½ feet to 4½ feet	3c
No. 5, 4½ feet and over	2c

Per ton of 2,000 lbs. weigh-box coal.

SCREENS.

Screens shall not exceed 72 feet superficial area, with 1¼ inches space between the bars. Pitch of screens to be so regulated from time to time as the necessity arises, so that the coal will run over them.

MEASUREMENTS.

It is understood that only coal shall be measured, and not impurities. The mining seam and sand band shall not be considered impurities if measured. Bone coal, when measured, shall be loaded the same as coal, but if not measured shall not be loaded at all.

TRACKS.

Company shall lay all tracks.

CARS.

Miners shall handle all cars;

OR,

60 cents per yard will be paid for brushing top over the roadways in all new rooms, so as to clear 4½ feet above the rail. Mules to handle all cars in such rooms, and the price of mining shall be 6 cents per ton less than the scale for coal of the same class where miners handle their own cars.

YARDAGE.

The standard price for slate entries shall be $1.90 per yard, but when both top and bottom are blasted the price shall be $2.40 per yard; solid rock entries, $2.65; rock top and slate bottom, $3.05. Entries, air-ways and all narrow work in coal, when used for entries or air-ways, shall be 80 cents per yard.

ROOM TURNING.

Turning rooms shall be:
$2.00 in high coal.
$2.25 in medium coal.
$2.50 in low coal.
$3 75 for double rooms in all coal, when ordered.

TIMBER.

All timber shall be placed convenient to the mouth of the mine, but miners must select their timbers and place convenient to the track and number them, then the driver shall bring them at his earliest convenience after being notified, but it must be distinctly understood that a miner must not under any circumstances continue to work if delay of delivery endangers his safety.

PICK SHARPENING.

Forty cents per month, but if mines does not run over one-fourth month, 10 cents; one-half month, 20 cents; three-fourths month, 30 cents.

LABOR.

Single drivers, per hour	14
Spike team (2 or 3 mules)	16
Head trackman	17½
Assistant trackman	14
Tippers and trimmers	13
Couplers (boys, 5c)	10
Blacksmith	17½
Pick sharpener	15
Trappers	5
Water bailer	14
Drum man	15
Knuckle man (boys, 10c)	13
Furnace man (digs his own coal)	15
Furnace man	11
Outside labor	10
Gin men and muckers	13

All other labor not specified, 11 per cent. reduction.

HOUSE FUEL.

Lump coal shall be $1.50 per two-horse wagon load; nut coal, $1.00 per two-horse wagon load. When an employe does not buy coal he shall pay 50 cents per month in the spring and summer months and $1.00 per month in fall and winter. No coal shall be picked up around the tip house or taken off the railroad cars or mine cars.

DEATHS.

In case of death in family of an employe, or upon the death of an employe, the following rules shall prevail: Death by accident in or around the mine, such mine shall lay idle until after the funeral. Death of a grown person from natural causes, the mine will lay idle on the afternoon of the funeral. On the death of a child or minor, the works will not lay idle, but those wishing to attend the funeral may lay off to do so.

PAY-DAY.

Pay-day shall be on the first Saturday after the 10th of each month, for all work done in the preceding month, less charges. Any employe desiring to quit the employ of the company shall receive his money at once or not later than five days after his notice is given.

ARBITRATION.

There shall be a board of arbitration and conciliation to adjust all disputes arising under this agreement, composed of three on each side, with power to select an umpire, and their decision shall be final and binding on all parties to this agreement and those they represent, but under no circumstances shall work stop.

This contract shall remain in force until August 1, 1898; provided, however, that on July 15th the committee representing the miners and laborers shall meet the officers of the company for the purpose of arranging a contract to supercede this, but should said committee and operators fail to agree before the date named for the expiration of this contract all matters in dispute shall be submitted to arbitration, and said arbitrators shall make a contract that shall be binding on all parties, and pending said arbitration this contract shall remain in full force.

For the

Hywel Davies Coal Co.,
Hywel Davies, Gen. Mgr.

For the employes:

Henry Mornin,
John Rudolph,
James Morant,
Committee.

BANK RULES.

1. The whistle shall blow at 5:45 o'clock every day the mine runs.

2. All day hands must report for duty on top of the incline and chute when the run starts at 6:30 A. M.

3. Miners absent, without notice to the bank boss, for three consecutive days shall forfeit their working place.

4. Miners loading slate or impurities, to be suspended two days for first, one week for second, and discharged for the third offense.

5. A square turn to all miners in rooms and narrow work under ordinary conditions. Cars lost through miner's absence, shall not be given back to him. Any miner failing to get his turn through the fault of driver shall, on report and proof, recover such turn or turns. Drivers wilfully making an unfair distribution of

cars shall be removed; and any miner securing an unfair distribution, by false statements or otherwise, shall be removed. Half turn to boys between 12 and 16.

6. No miner shall work in rooms without a set of numbers, and no helper in narrow work not approved by bank boss.

7. Employes are liable to be discharged for

(a) Disorderly conduct.

(b) Gambling and shooting on company's premises.

(c) Taking coal, tools, timber, etc., without permission.

(d) Firing before the run stops without permission of bank boss.

(e) Committing a nuisance in entries, airways and necks of any rooms.

Ratified this 4th day of November, 1897.

Hywel Davies Coal Co.,
By Hywel Davies, Gen. Mgr.

Henry Mornin,
John Rudolph,
John Morant,
Committee.

MINING PROSPECTS.

BY G. W. STONE.

A noted writer, more than a quarter of a century ago, said that: "Coal has been one of the essential elements in modern civilization; in fact, the progress of the civilization of a country is now recorded by the amount of coal obtainable and employed by the inhabitants in a given time."

The observations and experiences of the succeeding years have marked the declaration with all the force of a truism. The fires of the forge, furnace and factory indicate the volume and rapidity or decline of the business enterprises of this age as much as they did during the periods of the past. There have been occasional disturbances that have brought about conditions in apparent conflict with this theory, but they have been local or temporary, and every passing hindrance, as normal conditions have been resumed, only testify to its general correctness.

An element so abundant in nature, and of such universal and vital importance to the comforts of home and the development and expansion of all manufacturing and trade interests, ought to receive attention from governments and people in proportion to its real value as relates to the safety and prosperity of the citizen.

The coal measures were formed long ages ago, persuant to natural processes conceived in the Divine mind, and left stored away in the earth for man's uses in every department of home and mercantile life, during the succeeding ages, and their excavation is attended with great expense and liability of much personal injury and loss of life.

In every coal territory civil government, ever watchful for the safety and highest prosperity of its subjects, has enacted laws prescribing legal regulations looking to the individual health and safety of employes engaged in the business. Every citizen has a sacred property right in the life and material good of his neighbor, and every infliction on his neighbor is felt in some way and in some degree by himself, and any business extra hazardous, though of great magnitude,

will come with extra cost to consumers and operators alike unless the risks to accident and the costs incidental to its production be reduced to the minimum point.

These ends are the objects intended by the law, and the experiences of the past show that wise and well executed laws and regulations for the government of our coal mines have yielded rich returns on the cost of their enactment and execution. Inability or aversion to expense is often the incentive to many operators to delay or ignore altogether the inauguration of safe and healthful mine conditions, and numerous fatalities and injuries and many dependent widows and children have been the results of such risks and delays. It is here that the law interposes and makes regulations for the safety and comfort of the employes of this hazardous business.

In the supervision of such great interests it is well to acquaint the people with the vastness of our mining resources and of the prospects and possibilities of the future.

Kentucky has many superior advantages for profitable investment and labor but little known or appreciated by the outside world. Unfortunately there has never been a geological survey of the entire State, and in much of the territory gone over the work has been far from complete. But enough has been done to tell with reasonable certainty the varied kinds, qualities and extent of her natural resources.

It is not possible in the compass of this article to give the details of important subjects on which volumes have been written, and I shall make only some general statements and give fair approximations about the matters under discussion.

Our State is bordered with more than seven hundred miles of navigable rivers. Numerous other rivers and railways traverse the different sections, bringing nearly every part within easy reach of important manufacturing and commercial cities that furnish a ready market for all her natural products.

The State contains about 41,000 square miles of territory. Nearly 16,000 square miles of it is underlaid with workable veins of coal of excellent quality, and which is extensively used in the homes and factories of the people. Often two or more veins lie beneath the same surface, separated by natural strata of sufficient thickness to insure the safe working of each vein. Many of these veins will make very good coke and some produce the richest of cannel.

Only a small per cent. of these coals have been mined, although numerous mines have been in operation for years, producing in recent years an annual product of near 3,200,000 tons. This yield is far short of the actual capacity of these mines, and is but little in comparison to the possibilities of the entire field. As to what the output in the future will be, that is mere speculation, but much, as in the past, will depend upon the demand and the general and local environments of the industry. During these years there have been frequent strikes and other hindrances in different sections that have retarded and sometimes entirely suspended operations and materially lessened the annual output, and unless there shall be changed conditions a repetition of these disturbances, to some extent, may be expected every year.

These strikes may generally be traceable to the low selling price of coal and the lack of uniformity in the different wage scales under like conditions. If higher prices could be maintained the mining companies could readily accede to the demands of the miners and still realize a fair return on their investments. But at the prevailing prices many operators have not been able to stand the expense and losses of the business and have gone down under the strain and given way to new companies or ceased work entirely. The demands for the coal have been greatly limited and prices have been depressed by the steady influx of coal into all our trade centers from large competitive coal fields located in every State surrounding our borders and in close proximity to all our coal consuming districts. But this condition is more or less common to all the great coal fields of the different States, which fact only serves to intensify and make more permanent the present disadvantages of the trade.

The low price of coal is the prolific source of low wages and strikes among coal miners. It is gratifying to be able to state that for many years the largest coal-producing section of the State has been practcially free from these strikes or other material disturbances, and that these troubles, when existing in other sections of the State, have been attended with but little violence. It has been seldom necessary to call in the officers of the law to preserve the public peace or protect the property of the mining companies. Notwithstanding the many hindrances named, the mining companies, as a rule, have withstood every adverse circumstance and have paid to their employes wages

that were satisfactory, and many of them have made fair returns on their investments, and new companies are forming and old ones reorganizing each year to take part in this important industry. The scale of wages adopted at different mines vary according to local difficulties or advantages, such as the character, location and thickness of the coal seam worked, and the demand for and the selling price of the product and the methods used in its excavation and handling. In many mines the slow pick and the mule have been taken out and power plants of compressed air or electricity have been installed in their stead to mine the coal with fast-cutting machines and haul the same by motor in large train-loads to the the tip; and the usual dark entries are lighted up in every direction with lights from the electric plant, making the underground work and travel easy and safe.

All the economic lessons of these new and improved appliances, as compared with the former ones, have not yet been learned, but enough has been ascertained to know that they have come to stay, and it is believed that they will soon supplant the old methods in all the larger mines. The expense of such machines and plants, however, is too great to install in a large number of mines that are small, and they will continue business in the old ways and still find the common market for their output.

The miners are generally averse to the introduction of these labor-saving machines and look upon them as a curtailment of their fields of labor, but they are compelled to give place to them just like the farm laborers have had to surrender the reaping-hook and scythe for the modern reaper. The watchword among mine operators is, "Progress," and and when an experiment has been tried and found to pay, like all other investors of pluck and enterprise, they are quick to embrace it. Their chief advantages consist in better and faster mining; not in more profit to the ton actually mined, but in more tons mined in any given time at the same cost per ton, and perhaps obtain a better grade of coal, that is more lump and less slack and waste. In this way contracts can be undertaken and emergencies can be met not available under the old slow methods, and profits can be multiplied according to the increased demand and output, on which the miner has no rightful claims, and but for which no operator could afford the outlay necessary to the establishment and maintainance of such costly appliances.

The prospect of the coal trade of our State is like that confronting the general trade of the country. Perhaps for many years to come, like every other industry, it will have its own sharp competitions and hindrances, and the cost and selling prices of its product will fluctuate according to the inexorable laws of supply and demand and the activities and inertness of the general business of the country; and so long as invested capital is confronted with such competitions and small margins for profit, and is subjected to so many disturbing agencies and losses, so long must it with rigid exactness control every item in the cost of its own products in order that it may continue to exist.

Operators have often been accused of oppressing the miners by the use of unfair advantages, and this sometimes may have been done with reckless indifference to their rights, but as a rule these hardships have not been imposed from choice or avarice, but have been necessitated by environments that the operators have been powerless to control, and while the miners have often suffered in consequence of such conditions, still invested capital has also suffered with them.

There have been suggestions looking to the formation of great coal trusts to govern the amount and selling price of the output and arrange satisfactory scales for the miners and other laborers connected with the business, but such a creation is hardly among the probabilities. If all men dealt by the "Golden Rule" such an enterprise would be an inestimable blessing to humanity, distributing alike to the necessities of all, and giving to every man connected with the industry work, wages and bread, but taking man as he is in nature and in trade such monopolies are not likely to merit the friendship or favor of anybody, but may expect the fiercest and most universal opposition, such as will cripple their efficiency and imperil their existence and compel their disintegration.

To all appearances our coal operators will have to continue, as heretofore, to be merely great factors in promoting the industries and commerce of a great people and still be subject to the vicissitudes of time and chance and circumstance, and the miners must make the most out of the business possible after an intelligent and faithful effort to get a fair return for their labor. But little, and generally nothing, but harm has come to them by the strike method. The operators have been hindered in their business and been made to

suffer loss in many ways, and have become less able to accede to the demands of the miners, and the latter, after prolonged, stubborn resistance and great suffering, are compelled to resume work (if they work at all) worse off than when they quit, and with but little or no permanent advantages gained for the future.

It is much to the interest of the whole mining world, as well as to all the consumers of the product, that some plan of arbitration be devised to speedily adjust and settle all these complaints and differences; and yet after all has been done that can be done it must still be left with mining companies, as with investors in every other branch of business, whether or not they will operate their mines, and every miner must remain a free man to work or not work at any stated price according to his own free choice, without harm or interference from any source whatever. A rule that says: "I cannot or will not work" at any given price and a determination that no one else shall do so is in itself unjust and contrary to the spirit and purpose of our free institutions, and must not be fostered, but discountenanced as dangerous to the existence of law and order in the State and to the vested right of capital, and it should be looked upon as it really is, as an unlawful interference with the liberty of the individual citizen who wants to labor and who must be allowed to do so without hindrance or intimidation from any source whatever.

The just rule is to let both the operator and laborer have a fair chance to live and get gain according to the relative values of investments and labor and subject to the environments of the business, whether favorable or unfavorable.

In the very nature of things there can never be a scarcity of investments in enterprises that are protected from violence and that pay dividends, thus making ways for the laborer to live and to feed his family. But idle-invested capital is always a source of loss, and the operation of any business at a loss as between the receipts and the expenditures is foolish and suicidal, and need not be expected by any labor community.

On the other hand, it is well to remember that the labor of coal mining is hard and unclean and is attended with great discomforts and dangers to human life and health and safety. Then the expected income of such labor is limited to a mere living in the humbler walks of life and does not admit of laying up for a "rainy day" or to transmit to one's children. Such labor blesses the human race

in a thousound ways, and in turn it deserves the most grateful appreciation and honor from all people and the most liberal pay that is possible for the operators to give it. If capital shall live and grow it must foster and feed the hand that gives it impetus and thrift.

As to our mining possibilities, no doubt the trade will be awake to every emergency and keep pace with every increasing demand, and as our coal supply is sufficient to meet the wants of millions more of people for generations yet to come, the industry will still remain a promising field for the investment of capital and the employment of labor.

NOTES ON THE MINES.

The first round of mine visitation for the year was not completed until July 2d. Up to that date only two or three mines had received the second visit. Ordinarily but little work of this kind is ever done or expected during the severest of the winter. Then the facts that my predecessor was going out of office and I was to take charge of the same on April 1st rendered it necessary for my former assistant, Mr. Grider, to remain in the office for some days, and he did no work among the mines from March 20th to April 12th, and preparatory to his vacating the office, which he did on July 15th, he did no field work after July 2d.

My present assistant, Mr. C. W. Logan, did not qualify until August 17th. It was then impossible to do two-thirds of the year's work in only four and one-half months' time. He started on the second round of visitation on August 23d and remained actively in the field most of the time until the close of the year, and with some help on my part the mines received the second inspection, and those in the Western district and some of those in the Northeastern district received the third inspection.

It is well to note that the second visit to the mines in the Northeastern district was not made until late in October and early in November, and that a third inspection was not then due them or possible before the end of the year, and on account of the prolonged strike in the Southeastern district the majority of those mines were not entitled to a third inspection.

As is often the case many of the mines were found idle and were not inspected when vitited unless the suspension was merely temporary.

The number of inspections and visitations made during the year were 274, and were divided among Mr. Grider, Mr. Logan and myself as follows:

Grider	87
Stone	46
Logan	141
Total	274

Up to March 20th Mr. Grider made thirty-five visitations, and from April 12th to July 2d he made the remaining fifty-two.

I have arranged tables for each county, showing the total output, the average number of employes and the days, of ten hours each, worked at each mine during the year. I have not been able to get complete statistics from a few of the mines, but in all such cases that fact and the particular defects are specially stated in the notes made as to the condition of the said mines.

The notes made as to the condition of the several mines are taken principally from the statements contained in the inspecttion notices served on the mining companies. Some of these are in the present tense, as if they were written in the mines on the day of inspection, and others are in the past tense, as if they were written in the office some time after the date of inspection, but referring to the then past condition of the mines.

NORTHEASTERN DISTRICT.

Output of coal in 1897, 393,051.48 tons, against 324,431.49 tons produced in 1896. Gain in 1897, 68,619.99 tons.

BOYD COUNTY.

The total output of coal in 1897 is 172,888 tons as against 121,022 tons produced in 1896, making an increase in 1897 of 51,866 tons, and which were the product of two mines, the Rush No. 6, owned and operated by the Ashland Coal & Iron Railway Co., and the Clinton, or No. 8, also owned by the said A. C. & I Ry. Co., but operated by John Wurts (lessee).

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS.	OUTPUT.
Rush No. 6	119,485.00	232.50	291	145,391.00
Clinton No. 8	1,537.00	29.16	269	27,497.00
Totals	121,022.00			172,888.00

Increase in 1897 is 51,866 tons.

RUSH MINE No. 6.

At Rush. P. O. Rush.

Transportation by the Chesapeake & Ohio Railroad (the Ashland Coal & Iron Railway from Denton to Ashland is used by the C. & O).

Officers of the A. C. & I. Ry. Co.: Douglas Putnam, President; John C. Peeples, Vice-President; Robt. Peeples, Secretary and Treasurer; E. C. Means, Superintendent; James Heron, Superintendent of Mines, and Arch Morris, Mine Boss. Head office, Ashland.

Inspected on June 9th by assistant. General conditions were good. At one place on Simpson entry the water was over the track. Orders were given by Mr. Heron, superintendent, for immediate drainage into a sump near by.

In Helwig entry No. 3 there were thirty men drawing stumps and pillars. The air necessarily was much scattered.

There were twenty men working in the McKnight entry, and a volume of 4,320 cubic feet of air per minute was flowing through it.

In Seasor entry there were eighteen men and 4,200 cubic feet of air carried well up to the working faces.

Little Helwig and Simpson entries, with twenty-two and thirty men respectively, were ventilated with a volume of 9,000 cubic feet of air per minute.

Inspected on October 25th by assistant. "An ample volume of air was entering the mine for the number of persons employed under ground, which was fairly well conducted to the working faces. The mine was also in good condition in other respects."

The notable improvements at this mine during the year were the installment of five mining machines at a cost of $4,000. Sixteen per cent. of the output was mined with machines. The vein worked is No. 7, and is four feet thick.

The mine was in operation during every month in the year, from twenty-seven days each in July and September, to twenty-one days in December.

There was no strike or other disturbance to hinder the operations. The mine is ventilated by a furnace and the coal is mostly marketed at Ashland.

This mine was worked a greater number of days (291) than any other mine in the State. It was idle but twenty-two working days during the year, including all legal holidays.

CLINTON MINE No. 8.

At Clinton. P. O. Ashland.

Transportation the same as for Rush Mine No. 6.

Operated by John Wurts, lessee of the Ashland Coal & Iron Ry. Co.

The names of the other mine officials not furnished the office, though requested. The mine was opened in 1896 and will probably be exhausted in 1899. Mining is done altogether by picks. The vein worked is four feet thick. The mine is ventilated by a furnace and the coal is mostly marketed at Ashland. The mine was in operation during every month in the year from twenty-one to twenty-five days each month except during December, when only four days' work was done. The reason for the latter month's short time has not been given.

Altogether the mine was operated 269 days during the year, the second longest period of all the mines in the State; Rush being the first.

But little work was done during June, and when visited by assistant on June 9th the mine was closed and had been idle for some weeks and no inspection was made.

Inspected October 30th by assistant.

The conditions of the mine at that time are shown by following quotations from the the inspection notice served on the operator:

"Propping only fairly good. Some of the roof, especially in room 4 on right off first cross entry, very treacherous and should be closely watched. Drainage reasonably good. Some pillars between rooms are too thin; others thicker than necessary. An abundance of air (9,312 cubic feet per minute) was entering the mine, but not well conducted. The door on north end of first cross entry is not in good condition and should be repaired. There should also be doors in necks of rooms on left off first cross entry to keep the current near working faces."

BREATHITT COUNTY.

The total output of coal in 1897 is 9,316.39 tons, as against 2,405.77 tons produced in 1896.

It is all the product of the Jackson mine, operated by Davis & Wynn and located at Jackson, at the terminus of the Lexington & Eastern Railroad. The mine is ventilated by a furnace, and the mining is done with picks and the coal is marketed at Lexington. The vein worked is the Elkhorn, and is fifty-one inches thick, including a slate parting of 10 inches, or consists of top coal 34 inches, slate 10 inches and bottom coal 9 inches. The material improvements for the year were the erection of 10 new dwelling houses.

The mine was operated during every month of the year from 13 to 20 days each, the average number of employes each day being 25 to 33 and the number of days worked being 210. R. T. Davis is President; Geo. Wynn, General Manager, and R. D. Davis, Secretary.

Inspected May 7th by assistant. Very little timbering or propping has been done, but the top was good and no dangerous top was discovered. Five rooms on the left of the main entry had been driven more than 60 feet deep, and the air current had not been caused to flow into them, otherwise the ventilation and mine conditions were good.

Inspected September 8th. The mine was found to be in general good condition. Dry, well ventilated and well propped.

Again inspected November 20th and found to be in a safe and satisfactory condition generally.

CARTER COUNTY.

The output of coal in 1897, including 9,313.21 tons of cannel, 132,691.11 tons, against 135,997 tons produced in 1896, and divided among the several mines as follows:

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS.	OUTPUT.
Grant No. 7	47,338.00	108.66	201.00	44,366.00
Mt. Savage	34,674.88	63.08	237.00	32,656.82
Lost Creek	3,331.20	6.50	65.00	1,196.00
Kentucky Cannel Co	6,911.40	89.75	232.25	11,624.47
Star Furnace	6,663.00	26.70	165.25	5,742.00
Straight Creek	37,078.52	79.50	245.00	34,097.80
Stinson		40.50	36.00	1,964.52
Willard Mine		11.25	73.00	1,043.00
Totals	135,997.00			132,690.61

Decrease in 1897, 3,305.89 tons.

There is a difference between the total output of 1896, as shown on page 42 of the annual report, and the aggregate totals given as the output of each mine. The latter is 69 tons less than the former, and is adopted as correct.

GRANT MINE.

At Grant. P. O. Rush.

Transportation over the Chesapeake & Ohio Railroad and the Ashland Coal & Iron Railway.

Operated by the Ashland Coal & Iron Railway Co. Officers and mine officials the same as for Rush Mine No. 6.

The mine is ventilated by a furnace. Sixteen per cent. of the mining is done by machines.

Notable improvements for the year were the building of one trestle and one railroad track at a cost of about $1,000. No work was done during the months of April, May and June.

Visited on June 9th by W. U. Grider. The mine had been idle since March 20th, and no inspection was made.

Inspected October 26th by C. W. Logan, and the mine was found to be in general good condition.

Mt. Savage Mine.

Near Mt. Savage. P. O. Music.

Transportation over the Chesapeake & Ohio Railroad.

Operated by Columbia Finance & Trust Co., as receiver for the Lexington & Carter County Mining Co., W. W. Hill, Secretary. Office Louisville, Ky. T. McGlore, Superintendent of Mines.

No report was made as to mine improvements. The general question blank, sent to the mine the same as to all other mines in the State, was never answered.

Work was done during all the year from 13 to 25 days each month.

The writer has understood that the property of this company, the Lexington & Carter County Mining Co., has been sold under a decree of the U. S. Circuit Court to satisfy lien debts against the same, but he has not been advised as to the particulars, nor does he know of any change in the management.

Inspected by Grider June 8th.

In his report to the office as to the conditions of the mine he said: "Except in two rooms, where there was a little too much water, the drainage was good. No lack of timbering was noted on the entries. The working rooms are very well propped. On first right entry there were six rooms more than 60 feet deep, through which the air had not been caused to flow. Elsewhere, there was a sufficient current of air passing within 60 feet of all advancing faces.

Inspected by Logan October 9th.

In his report of inspection he says: "The props in the mine are only fairly well up, and the draw-slate is very treacherous and should be carefully attended to. Drainage is fairly good, but some water on roadway of second and third rooms off first right entry should be bailed out. A volume of 10,034 cubic feet of air per minute was entering the mine for the 50 persons under ground, which was fairly well distributed to the

working faces (except on first right entry there should be a break through in first room, also a door on neck of fourth right room)."

Lost Creek.

This mine was worked out in April and abandoned.

Bog Head Mine.

Near Grayson. P. O. Grayson.

Transportation by Eastern Kentucky Railway.

Operated by the Kentucky Cannel Co., W. T. Grant, President; B. M. Allison, Secretary and Treasurer; S. G. Bates, Assistant Treasurer; I. P. Shelly, Jr., Contractor; James Pettrey, Mine Boss.

The mine was opened in 1894 and will probably be exhausted by 1903. The improvements for the year are a new furnace and 15 new buggies, or mine cars. Of the 11,624.97 tons produced in 1897 there were 8,314.71 tons of cannel. The mine was operated during every month of the year from 17 to 22.5 days each.

Inspected June 14th by Grider.

No fire in the furnace and mine was idle, and ventilation could not be determined, but did not appear to be bad. The working places were dry enough, but the entries were quite wet in several places. The rooms were fairly well propped.

Inspected by Logan October 27th.

No fire was in the furnace by which Keffer entry was ventilated, but there were only five men employed, but the air was good. Air was also good in Messer entry, where only five men were also employed. The latter entry has no artificial ventilation as yet. Drainage and timbering in each mine were fairly good.

Strait Creek Mine.

Near Denton. P. O. Mt. Sterling.

Transportation by the Chesapeake & Ohio Railroad.

Operated by the Strait Coal Co. M. M. Cassidy, President; W. T. Tibbs, Secretary and Treasurer; Kent Prichard, Superintendent; Robert Stamper, Mine Boss.

The mine is ventilated by a furnace and run by picks, and the coal is mostly marked at Lexington, Winchester and Mt. Sterling.

A portion of the mine was flooded with water during nine months of the year, caused by a break in the roof while stumps and pillars were being drawn, and causing about $4,000 in damages to the company.

There was a strike of one month during parts of July and August, but work was resumed without any change in the mining rates.

There were fifteen days during the year when coal could not be shipped for the want of cars, though the car service was reported by the company as better than usual. Work was done from 18 to 26 days during each month except in September, when only four days' work was done. The notable improvements for the year were the opening of a new section at a cost of about $1,000.

The mine was opened in 1881 and will last yet 40 years or more.

Inspected June 11th by Grider.

In his report he says: "A break to the surface off main entry has caused the mine to fill with water to such an extent that there are but six men now employed in it. The rooms in which these men are employed were in fairly good condition. A ditch was being driven from the outside to the head of the main entry for drainage."

Inspected October 28th by Logan.

At that time there was no furnace nor other artificial ventilation, but preparations were being made to build one immediately, and which has since been done. Drainage and timbering were satisfactory. Props were well up to the working faces. There was some very dangerous top in one room pointed out to the mine boss. The air near head of Howe entry was quite heavy. With a door on main entry the ventilation could be readily improved. In the other entries, drawing pillars and stumps were the principle work, and the conditions were fairly good.

Star Furnace Mine.

Near Kilgore. P. O. Rush.

Transportation by the Chesapeake & Ohio Railroad and by the Ashland Coal & Iron Railway Co.

Operated by Star Furnace Coal Co. J. W. Logan, President and Treasurer.

The mine was operated from 10 to 24½ days during every month in the year, except April and June, when it was idle. No report of improvements or hindrances has been made.

Visited June 9th by Grider.

The mine had been closed since June 1st and no inspection was made.

No. 1 mine, inspected by Logan October 25. There was no artificial ventilation, but as the work was from daylight to daylight the natural current traversed the mine near the workings, which is mostly pillar work, and kept the air good.

No. 2 mine was about worked out. There were only three men engaged in the mine drawing the work back and the conditions were reasonable good.

Stinson Mine.

This is also the property of the Lexington & Carter County Mining Co., and is controlled by the same management as the Mt. Savage mine, near which the former is located, and it also has the same transportation facilities.

The mine was idle all the year except in February and March. No reason has been given to this office by the mining company why work was suspended. The two months output was 1,964.52 tons, of which 998.50 tons were cannel. The mine was visited on June 8th by Grider, but was found idle and no inspection was made.

Willard Mine.

Near Willard. P. O. Willard.

This is the old Dry Fork mine, now owned and operated by the Eastern Kentucky Railway Co. Geo. Gibbs, Superintendent of the mine and Geo. Duncan, Mine Boss.

It was first opened in 1889, but after some work was abandoned, and it remained idle for several years and until it was

re-opened late in 1897. Its first output was in October, and its complete output for the year is 1,043 tons. The mine is ventilated by a furnace, which with some other repairs cost $700. The vein worked is three feet thick. The mine was visited on November 1st by Logan, but as all the workings were new only a formal inspection could be made.

JOHNSON COUNTY.

The entire coal output of the county is the product of the new cannel coal mine, operated by the Greasy Creek Cannel Coal Co. J. S. Rittenhouse, General Manager, P. O. Eliza; James Ray, Mine Boss.

The mine was first opened in the spring and summer of 1897, and the first mining done was in July. From about July 1st to the end of the year the mine was steadily operated during 180 days of ten hours each by a daily average of 72.66 employes, and 4,000 tons of cannel coal were produced.

The mine will probably last 20 years before being exhausted, but in the meantime there will have to be several new openings. It is located on the Chesapeake & Ohio Railroad and the coal is marketed in Chicago. The vein worked is No. 4 and consists of 20 inches of cannel and 20 inches of soft coal. The new mining plant is very extensive and its erection, including about seven miles of tramway, cost $30,000.

During September there was a lack of railroad cars for shipment of the output, that the company estimates its loss at $1,000.

The mine of the White House Cannel Coal Co. has heretofore been reported as being in Johnson county, but is now changed to Lawrence. I have not been able to satisfactorily determine its true location. Some of the reports from the mines say that it is in Johnson, and others say it is in Lawrence; and as the one witness is so mixed on the question I must be excused for the mistake if I have made any. I wrote a personal letter to the company and requested that the correct facts be given me, but I received no answer.

LAWRENCE COUNTY.

Output of coal for 1897, including 3,483 tons of cannel, is 61,226.25 tons, as against 47,474 tons produced in 1896, making an increase of 10,031 tons as the product of the Peach Orchard Coal Co.'s mines alone.

In addition thereto the product of the White House mine, heretofore credited to Johnson county, and the product of the new Torch Light mine help to swell the increase over 1896 to 13,752.25 tons. The product of the three mines is as follows:

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS.	OUTPUT.
Peach Orchard (2).....	47,474.00	111.58	182.00	57,505.00
Torch Light.....	.....	8.50	43.00	238.25
White House.....	.....	19.41	236.00	3,483.00
Totals.....	47,474.00	.....	.....	61,226.25

Increase in 1897 is 13,752.25 tons.

Mining was done from eight to 21 days during every month of the year.

ANNIE AND ELIZABETH MINES.

At Peach Orchard. P. O. Peach Orchard.

Transportation by the Chesapeake & Ohio Railroad.

Operated by the Peach Orchard Coal Co. John C. Welty, President; H. P. Scott, Secretary and Treasurer; H. H. Keys, General Manager; John Wallace, Superintendent; Jesse Small, Mine Boss. The company is incorporated. The vein worked is No. 3 and is six feet thick. The mining is done with picks, and in the Elizabeth mine is confined to the drawing of pillars and stumps. The company has 11 machines, but for some time has not been mining with them.

The only hindrance for the year was the lack of transportation for fifteen days during March and February, when there was a washout on that division of the railroad, so that cars could not be obtained.

Elizabeth Mine.

This mine was opened in 1887 and will be exhausted in a few months. Ventilated by a furnace. Inspected June 10th by Grider.

The work was confined to pulling pillars and stumps in the seventh right and ninth left entries, at which about 30 men were employed.

Considering the stage of the work the conditions were good. No dangerous unsupported top was discovered. The ventilation was good and the drainage fair.

Inspected November 3rd by Logan.

Considering the character of the work, and that the mine will soon be worked out and abandoned, the general conditions were good.

Annie Mine.

This mine was first opened in 1887, and at the usual rate of output will last ten years longer before becoming exhausted. Also has a furnace. Inspected June 10th by Grider.

The mine was idle and there was no fire in the furnace, but the furnace is a good one, and the arrangements for conducting the air through the mine were fairly good. Drainage was fair. Timbering and propping generally good, but in some rooms the props were not set close enough to the working faces.

Inspected November 3rd by Logan. Drainage not good. Propping fairly good. Top treacherous and needs a close watch. No lack of timbering was observed. An ample volume of air was entering the mine, fairly well conducted to the faces. Mr. Wallace's attention was called to a place where a break through should be made.

The eighth and ninth right entries were found to be more than 60 feet ahead of the ventilating current, but the defects were satisfactorily explained by Mr. Wallace, who gave assurances that the door would be hung at once.

Torch Light Mine.

Near Walbridge. P. O. Walbridge.

Transportation over the Chesapeake & Ohio Railroad and the Big Sandy Division.

Operated by the Reliance Coal Co. James Booth, President; W. S. Booth, Secretary, and J. K. Hill, General Manager. The mine was first opened in November, 1897.

The improvements made necessary to start the mine cost about $1,600.

LEE COUNTY.

The output of coal in 1897, 12,925.24 tons, against 9,847.32 tons produced in 1896, is the product of the three mines, as follows:

MINE.	1896.	1897.		
	Output.	Av. Emp.	Days.	Output.
Avent	707.00	49.33	79.50	6,016.00
Beattyville	3,311.32	9.70	134.00	3,039.39
Crystal Creek	5,829.00	14.66	194.00	3,869.85
Totals	9,847.32			12,925.24

Increase in 1897, 3,077.92 tons.

The Avent, or Eureka, mine shut down in April and was not opened again until in October under the management of the McGuire Coal Co.

Avent Mine.

Near Beattyville. P. O. Beattyville.

Transportation by the Beattyville & Cumberland Gap Railroad to the Lexington & Eastern.

Operated by the McGuire Coal Co., which is incorporated. Walker Johnson, President; Logan Thomas, Secretary; Walker Jameson, General Manager, and Wm. Goosey, Mine Boss. The mine was operated in January, February and April by the Eureka Coal Co., and was then closed until again opened in October under its present management. The mine has furnace ventilation and the mining is done with picks. About one-third of the time during the fall months, no cars could be gotten to ship out the product, and this fact seriously hindered operations and caused considerable loss both to the company and to the employes, who have nothing to do when the mine is idle. The mine is worked from a new opening made in 1897 at a cost of $600.

The mine was visited May 8th by Mr. Grider, but was closed up.

Inspected November 19th and found to be in very good condition. If more men should be worked to left of main entry, or after the rooms then being worked shall be driven much further, then a door or strong curtain must be placed across main entry, so as to force the air to the faces of said rooms, and from thence to the head of the main entry, and across to the entries and rooms on the right on its way to the furnace.

New Beattyville Mine.

Near Beattyville. P. O. Beattyville.

Transportation over the Beattyville & Cumberland Gap Railroad to the Lexington & Eastern.

Operated by the new Beattyville Coal Co., a corporation. D. Eldridge, President and General Manager; Geo. W. McCreary, Secretary; Joseph Jackson, Mine Boss.

The two old mines, Nos. 1 and 2, are about exhausted. No. 3, the new mine, was opened in 1897 at a cost of $2,000, and will probably last 20 years. The mine is ventilated by a furnace. The vein worked is from two and one-half to three feet thick and dips to the south and west.

There was a strike among the employes from 1st of May until July 15th, caused by the price of mining. As to how the matter was settled no information has been given.

Visited May the 8th by Grider, but the mine was idle and no general inspection was made. Inspected in September and again in November. But little work was being done in the two old mines. They were practically worked out and soon, if not already, will be abandoned and all the work be confined to the new mine.

An entry was fast being driven so as to connect with furnace of old mine No. 2, in order to use it to ventilate the new mine. This will give ample ventilation and is very much needed in the further progress of the work, as up to that time there was nothing but natural ventilation, though the connection with the old works and other openings were such as to produce good air, the mine being yet very small. But it is well to shut off the old works and let the inside air be pure from the new opening. Other conditions good.

New Crystal Creek Mine.

Near Beattyville. P. O. Beattyville.

Transportation by Beattyville & Cumberland Gap Railroad to the Lexington & Eastern.

Operated by New Crystal Creek Coal Co. R. Birch, Manager.

Work was done during every month in the year from six to twenty-two days each.

Inspected May 8th by Grider. Only four men were then employed in the mine. General conditions were found to be reasonably good.

Inspected in September and November. Much of the mine was very wet; too much so for work. Drainage was carried on by siphon. The mine was practically without artificial ventilation. The furnace was a very poor one, almost the same as none. There was no arrangement by doors or curtains to conduct the air anywhere. Conditions in November were somewhat improved, still the furnace was not yet sufficient, and the doors and brattice work were still lacking. The mine is a small one, and the air was not bad and will probably soon be exhausted, and will not stand much expense, else the investment will be turned into a positive loss. Still better conditions are promised and will be expected by the time for the next visitation.

SOUTHEASTERN DISTRICT.

Output of coal for 1897, 796,430.49 tons, against 1,096,585.54 tons produced in 1896. The loss, as compared to 1896, of 300,155,05 tons, is attributable to the strike in the Jellico District and to a similar strike in Pulaski county and in Western Whitley.

BELL COUNTY.

Output of coal in 1897, 80,737.13 tons against 89,533.96 tons produced in 1897, the product of the mine, as follows :

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS.	OUTPUT.
Bennett's Fork	797.25	15.16	218.00	11,507.40
Four Mile	1,726.00			150.00
Mary Hull	28,749.67	73.50	233.00	33,378.87
Mt. Vincent	5,160.00			
Straight Creek A	18,442.21	37.50	69.00	6,283.53
West Pineville	34,658.83	104.50	115.00	29,417.33
Totals	89,533.96			80,737.13

Loss in 1897, 8,796.83 tons.

BENNETT'S FORK MINE.

Near Middlesborough. P. O. Middlesborough.

Transportation by the Knoxville, Cumberland Gap & Louisville and Cumberland Valley Branch of the L. & N. Railroad.

Operated by the Bennett's Fork Coal Co. J. F. Grant, President ; George Luke, Secretary ; Hugh Drummond, Superintendent.

The mine is ventilated by a furnace ; the vein worked is four feet thick ; the mining is done with picks, and 75 per cent. of the output is marketed outside of Kentucky.

Work was carried on during each month of the year from thirteen to twenty-five days each. No hindrances nor improvements were reported for the year. Inspected by assistant May 13th.

Very little timbering was done on the entries, but no dangerous untimbered top was noticed. The rooms were very well propped. A better and higher stack was needed over the air shaft to give the furnace sufficient ventilating power. There were two open break-throughs on main right entry. The first right entry was more than 60 feet ahead of the air. Rooms one and two on first left entry were more than 60 feet deep and needed break-throughs. The drainage was good.

Inspected October 5th by assistant.

Drainage fairly good. Props are not set close enough to the working faces. The attention of the mine boss is called to some very loose slate on first cross right entry. The ventilation is not very good, because the present furnace is insufficient, but Mr. Drummond showed me where he intended to build a new furnace in the near future. There should be a door or curtain on main entry between first left cross entry and first right cross entry. The second break-through, from face of main entry, should be stopped to force the air near the face.

Four Mile Mine.

At Four Mile. P. O. Middlesborough.

Transportation by the Cumberland Valley Branch of the L. & N. Railroad.

This mine was operated none of the year except about fifteen days in January. Operated in 1898 from January 1st, by the Eureka Coal Co., composed of J. B. Robinson, W. O. Park, C. L. Whitsit and D. P. Whitsit, the latter being the general manager.

Mary Hull Mine.

At Chenoa. P. O. Pineville.

Transportation by the Cumberland River & Tennessee Railroad to connection with the Cumberland Valley Branch of the L. & N. Railroad.

Operated by the Log Mountain Coal, Coke & Timber Co. F. A. Hull, President; H. P. Wyman, Vice-President; T. Cairnes, Secretary and Treasurer; J. R. Justice, Mine Boss.

Mining is done with picks, and about 90 per cent. of the output is marketed outside of Kentucky. Ventilation by furnace. There

was a fire in the shaft in June that caused a suspension of work and the water to accumulate at the head of the workings, causing damages estimated at $500. The special improvement during the year was a new opening made at a cost of $1,600.

Inspected by Assistant April 15th.

Timbering and propping good. Too much water had accumulated on face of Main entry, but elsewhere the working places were dry. With 82 men in the mine, there were flowing into it 12,880 cubic feet of air per minute, but most of it was lost before reaching the men, so that the ventilation was not as good as it should have been.

Inspected by Assistant October 3d.

Propping fairly well up to the working faces. Drainage and timbering only fairly good. There should be some timbering done in Main entry, near 14th cross entry, also the three cross bars on 15th cross entry, that Mr. Jamison's attention was called to, should be replaced by new ones. This mine has only one opening and must have another.

An ample supply of air was entering the mine for the 50 persons employed under ground, but it was not well conducted. There should be a door on Main cross entry, between the 1st break-through, from the face and the 16th entry, also there should be a door on the 16th entry, between mouth and air-course, to force the air through to Main entry. The first break-through, from face of first room off 15th cross entry, should be left open, but the others closed, so as to put a stronger current to the working face. On 15th cross entry there should be a break-through between rooms four and five. This coal yields Fire-Damp, and work must not be carried further from the current than is allowed by Sec. 10 of the Mining law.

Many of the pillars in the mine have been left entirely too thin, and there is much danger of a creep on the Main slope, and a second outlet is an immediate necessity, though very expensive.

The company is to be commended for its promptness in carrying out the instructions contained in the inspection notice. Under date of October 21st the company wrote the office as follows: "We have yours of the 19th inst., enclosing Mr. Logan's report on the condition of our mine. We had followed Mr. Logan's suggestions in the minor cases, and our engineer is now making surveys to determine the best point for the second outlet, as required by law."

The general question blank sent to the company was returned to

the office on January 28, 1898, and it says that the new opening was then made.

Straight Creek A Mine.

Near Pineville. P. O. Pineville.

Transportation by the West Virginia, Pineville & Tennessee Railroad (two miles) to connection with the Cumberland Valley Branch of the L. & N. Railroad.

Operated during January, February and March by the Pineville Coal & Coke Co. Work was then suspended, and the mine remained idle until work was resumed in December by the present management. S. E. Hobbs, General Manager; James Dixon, Mine Boss.

Inspected by Assistant February 19th.

Ventilation and propping generally good. Drainage on 3d Right entry good. Also good on 4th Right entry as far as room 18. Beyond that point this entry, also the 5th Right and Left entries, were completely drowned out.

West Pineville Mines.

Near West Pineville. P. O. Pineville.

Transportation by the Cumberland Valley Branch of the L. & N. Railroad. Operated during most of the year by the Breckinridge & Pineville Syndicate, Ltd. Robert Holmyard, General Manager.

Operated at present by the Pineville Coal Co., Ltd. Robert Holmyard, General Manager; E. Starling, Assistant Manager.

When visited on April 14th & 17th the mine was idle. The mining was done mostly by machines, and the miners were dissatisfied with the new wage scale. Very little work was done from January until August. The improvements made in this mine during the year are so extensive and valuable as to deserve special mention. In answer to inquiries sent out from this office to the company it has been learned that the improvements are substantially as now named: In connection with the Walsend, or No. 2 mine, a new haulway, new T rails, new trolley line for electric motor, and electric power installed to run a five-ton motor and the mining machines. A new lieway in the mine has been prepared, where the mules collect the coal and from where the motor takes it to the incline. The mine has been thoroughly surveyed and the incline put in much better condition.

The mine is also equipped with three Link Belt Coal Cutting

machines, which are doing the work satisfactorily. Also, one Emery grinder run by Electric power for sharpening machine bits. One house has been built for the motor, also, a new dwelling house for the drumman. The mine has a capacity of from 400 to 600 tons per day.

At No. 1, or Brilliant mine, located on the level of Stewart's Branch, directly opposite the No. 2 tipple, an opening has been made in the Pineville seam, and been driven, since first started, eighteen months ago, a distance of 3,000 feet. This mine now has a capacity of 250 tons per day. The plant connected with the mine includes new tipple, new weigh-house and double horizontal hoisting engine.

The power plant is contained in two new buildings, one containing hoister and two boilers, each of 100 horse power, and pump; the other contains one high-speed engine, one 150 horse-power Dynamo, for generating Electric power for machines and motor, one switch-board, one 50 horse-power engine to run saw-mill.

Another building contains one new saw-mill plant complete, with circular and cut-off saws for cutting up mine timbers and timbers for repairs and new houses. Also, three new mine cottages have been built, with 25 more in contemplation.

The company contemplates installing the Electric Coal Cutters in the No. 1, or Brilliant mine, during the coming year.

These and many other matters have cost a large sum of money, estimated at $70,000, and it is but reasonable to predict great success for the new management.

No. 2. Inspected by Assistant October 2d.

Propping and timbering fairly good. Drainage not very good on 5th Right and Main entries. Same can be ditched into a sump on Left cross entry where a siphon will convey the water to the outside.

There is an ample volume of air entering the mine for the number of persons employed under ground, but it is not properly conducted to the working faces. The room near the head of the 3rd Left cross entry should be pushed so the break-through could be made, and the air be carried near the face of this entry, which is more than 60 feet ahead of the air. The last break-through into head room off 4th Right entry is nearly stopped with slack, etc. This and the air-way should be kept clear. The curtains, especially those on the 3d-4th and 5th rooms to the left, off 5th Right entry, are in bad condition. This is easily remedied. There should be a break-through between the Brown room and the adjoining one off 5th

Right entry. There is no ventilation in the workings off 6th Right entry, as no break-throughs are made between the rooms on the Left. This must be done and curtains be put in the necks of the rooms to force the current near head of entry. There should be a break-through between first room on left, off 6th Left air-course, into old room, off air-course, off 5th Left entry.

No. 1 Mine. Inspected October 2d by Assistant.

Drainage very good. Propping, generally, neglected in working places. Ventilation fairly good. There should be curtains in necks of rooms near head of 2d Left cross entry, except first room from the face, which is broken through to carry the air up near the face of the entry, which is more than 60 feet ahead of the air.

This mine was idle when the Assistant was on his first round of inspection for the year.

KNOX COUNTY.

Output of coal in 1897, 164,882.70 tons, against 217,039.83 tons produced in 1896. The product of the mines are as follows:

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS.	OUTPUT.
Ely Blue Gem	216.15	6.89	91.00	697.20
North Jellico	186,134.32	245.22	143.75	115,718.00
West Jellico	15,915.36	43.41	214.00	19,442.00
Whitsett	14,126.00	77.25	233.00	25,958.46
Webb, or Hemphill	648.00	11.00	133.00	3,067.04
Totals	217,039.83			164,882.70

Loss in 1897, 52,157.13 tons.

ELY BLUE GEM AND BRIER HILL MINES.

Near Flat Lick. P. O. Flat Lick.

Transportation by the Cumberland Valley Branch of the L. & N. Railroad.

Operated by the Ely Blue Gem Mining Co. J. P. Davis, President; E. T. Griffith, General Manager; G. Williams, Mine Boss.

The vein worked is the Jellico, and is three feet thick. The mine was opened in 1896 and will last until about 1901.

Blue Gem, inspected by Assistant February 24th.

The entry is rather too wet, but the rooms are very well drained. There are six miners employed, but no artificial ventilation, but such must be produced, and it can be easily done in the way pointed out to Mr. Williams.

Brier Hill, inspected by Assistant September 29th.

Drainage and timbering very good. No loose, dangerous slate was noticed. Propping fairly good. The furnace was cold. As there were only three men employed in the mine the ventilation was fairly good.

North Jellico Mines (2).

Near Gray's Station. P. O. Gray.

Transportation by the Cumberland Valley Branch of the L. & N. Railroad.

Operated by the North Jellico Coal Co. J. B. Speed, President; I. P. Bernard, Vice-President; C. S. Nield, General Manager; W. A. Jones, Secretary and Treasurer; Alex. Frost, Mine Boss. Office 415 West Jefferson Street, Louisville, Kentucky.

The vein worked is the Jellico, 46 inches thick. Ventilation by furnace, and the mining is done mostly by machines.

This mine had a serious strike, which suspended operations from June 18th to November 1st. But for this long suspension its production would probably have been second, or probably first, in the entire State instead of standing in the sixth place. No improvements were reported.

Inspected by Assistant April 16th.

The mine was idle and both furnaces were "banked." They have ample ventilating power. Drainage was good. No neglect to timber the entries nor prop the rooms was observed.

Visited September 28th by Assistant. Mine was closed down on account of the strike, and no inspection was made.

West Jellico Mine.

Near Gray's Station. P. O. Gray.

Transportation by the Cumberland Valley Branch of the L. & N. Railroad.

Operated during the year by B. F. Gray, under the name of the West Jellico Coal Co.

The name is since changed to North Point Jellico Coal Co.; B. F. Gray, owner and general manager.

The vein worked is the Jellico, and 42 inches thick. Mining is done with picks, and ventilation is by means of a furnace.

Inspected by Assistant on April 16th.

The Main entry was too wet and muddy near the mouth, otherwise the drainage was good. The support of the top was insufficient. Not enough pillars were being left and not enough props set to render the mine safe.

With about 40 persons employed in the mine, there were flowing into it 11,550 cubic feet of air per minute, but it was not well conducted through the mine. Most of the working faces were more than 60 feet in advance of the air. This condition was caused chiefly from a failure to close the rear break-throughs.

Inspected by Assistant September 30th.

No dangerous, untimbered top was discovered on entries. Props were not close enough to working faces. Drainage only fairly good. The mine has but one opening or place of ingress and egress, and must have another according to Sec. 9 of the Mining law.

An ample volume of air was entering the mine for the 60 persons employed under-ground, but it was not well conducted to the working faces. With a break-through between room 16 off Main entry and 1st room to the left off South West cross entry, and a curtain on Main entry below neck of room 16, it would force the current through to the workings on South West cross entry. There must be a curtain on South West cross entry above neck of room 2 on left side to force the air up to the head of the entry, and if room 3 is driven far enough the curtain should go above it instead of above room 2.

There should be a door or good curtain on Main entry near where break-through from 1st right room off South West cross entry opens into Main entry. There should be a break-through between rooms 6 and 7 from face on right of Main entry. The 6th room from

the head of the South West entry is about 80 feet ahead of the air, and it should have a break-through.

WHITSETT MINE.

Near Artemus. P. O. Artemus.

Transportation by the Cumberland Valley Branch of the L. & N. Railroad.

Operated by the East Jellico Coal Co. G. D. Jackson, President; D. P. Whitsett, Vice-President; F. G. Tice, Secretary; J. B. Hangford, General Manager; J. W. McBrayer, Mine Boss.

Furnace ventilation. Mining done with picks. Vein worked, the Dean, 7 feet thick. No serious hindrances reported.

Improvements: One new opening made and one new furnace built, all at a cost of $2,000.

Inspected by Assistant February 20th.

Working rooms well propped. There was too much water on the entries, but some well-directed drainage work was being done, and the working places were being left reasonably dry. With 54 persons in the mine there were flowing through it 7,325 cubic feet of air per minute, and well conducted to all the working places.

Inspected by Assistant October 1st.

Propping and timbering fairly good. The ventilation is not what it should be, but is not bad.

The officials of the mine have recently taken charge and are pushing the work as rapidly as possible to get the mine in general good condition. Preparation is being made to build a new furnace and a siphon is being laid to conduct the water to the outside.

WEBB MINE.

Near Artemus. P. O. Artemus.

Transportation by the Cumberland Valley Branch of the L. & N. Railroad.

Operated until about May 1st by Webb Bros., but on June 23d the managment passed into the hands of J. W. Hemphill, who is still operating the mine. The general question blank sent to Mr. Hemphill was not returned.

Inspected by Assistant February 20th.

There were no men in the mine and no fire in the furnace. With a fire in the furnace the ventilation would be fair. No bad

top was noted. At the mouth of the first left entry, and in rooms on the left of it, there was too much water.

Inspected October 1st by Assistant.

Drainage and propping were good. Ventilation fairly good. Instructions were given to place a curtain on Main entry near the head to force the current across to the workings on the furnace side of the entry.

LAUREL COUNTY.

Output of coal in 1897, 294,075.27 tons, against 288,493.96 tons produced in 1887. The product of the mines is as follows:

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS	OUTPUT.
Daisy	4,116.00	30.40	169.00	6,637.00
Diamond	30,144.87	88.00	35.70	6,625.20
East Altamont	.....	9.10	170.00	4,381.76
Laurel	43,078.60	91.08	178.00	43,452.88
Manchester	19,517.71	42.92	146.80	17,159.70
New Standard	6,820.00	60.08	163.75	15,180.00
Old Standard	1,457.00	.....	.....	.....
Peacock	32,857.78	67.82	169.50	33,636.96
Pitman	51,528.48	92.33	162.75	52,964.13
Piftsburg	53,096.72	82.33	212.00	42,776.70
Star	7,449.60	26.75	187.00	9,557.28
Thompson	5,712.00	28.25	100.00	7,791.00
Victoria	32,715.20	83.00	149.25	29,681.62
Lily	.....	64.78	.....	11,057.32
Kentucky Coal Co	.....	.....	.....	6,400.00
W. R. Grant	.....	37.00	.....	1,490.44
Swiss	.....	18.00	160.00	5,283.28
Totals	288,493.96	.....	.....	294,075.27

Gain in 1897, 5,581.31 tons.

Daisy Mine.

Near East Bernstadt. P. O. East Bernstadt.

Transportation by the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the East Bernstadt Coal Company.

The general question blank sent to the company was not returned, and information therein sought has not been received.

Visited by Assistant May 10th. The mine was closed and no inspection was made. No work was done during the months of June and August, and very little done from May 1st to September 1st.

Inspected by Assistant October 12th.

Drainage and propping fairly good. Ventilation fairly good, but will be made much better when the air-way is cut direct to the furnace. There are two open break-throughs near head of second left cross entry, and she second one from face should be closed, to force the current up near the face of the entry.

Diamond Mine.

Near Altamont. P. O. Altamont.

Transportation by the Altamont & Manchester Railroad to connection with the Knoxville Branch of the Louisville & Nashville Railroad.

Operated until May 18th by the Diamond Coal Company. J. C. McKee, President; H. C. Thompson, General Manager; W. H. Thompson, Superintendent.

The lease of the company expired on that date and was not renewed, and the mine was not operated any more during the year.

Inspected May 14th by Assistant.

East Altamont Mine.

Near Altamont. P. O. Altamont.

Transportation by the Altamont & Manchester Railroad to connection with the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by Green Bros., under the name of the East Altamont Coal Company. Robert Green, President; C. L. Green, Secretary; I. F. Green, General Manager.

There was a strike among the employees from May 1st to August 1st, and there were other smaller hindrances.

During the year a new tipple was built and a new screen put in, the two at a cost of $600. The mine has furnace ventilation, and mining is done with picks. No work was done during May and August.

Visited by Assistant on May 14th. The mine had been idle for some days and water had accumulated to such an extent that an inspection was impracticable. A cloud-burst caused the mine to be flooded for about twenty days.

Inspected by Assistant October 14th. Drainage and timbering fairly good. Props fairly well up to the working faces. No mode for artificial ventilation has been provided, but the air is not bad, owing to the small number of men under ground.

Laurel Mine.

Near Pittsburg. P. O. Pittsburg.

Transportation by the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the Laurel Coal Company. George Givens, President; J. W. Bastin, Secretary and General Manager; D. W. Raurke, Mine Boss.

The mine has furnace ventilation and is worked with picks. There was a strike among the emyloyees from August 1st to September 6th. An increase in the price for mining was demanded, but work was resumed at the old rates. During the strike incendiaries set fire to the tip-house, and it was completely destroyed, together with a lot of machinery, screens, scales, etc., causing a loss to the company of about $2,000. There were no improvements reported.

Inspected by Assistant May 11th.

From the mouth of Main entry to the inner end of the lie-way there was too much water. Elsewhere the drainage was fairly good. There were some broken cross-timbers over the left track of the lie-way on Main entry, and in a number of rooms props were not set close enough to the working faces.

Ventilation was good, except in the first 14 rooms on the right of the seventh Right entry, where the air was not flowing within 60 feet of the working faces.

Inspected by Assistant October 9th.

Props were not set close enough to face of workings. Two cross-timbers, over first lie-way on Main entry, were cracked and broken and needed replacing with new ones. Drainage fairly good, except on fourth Right cross entry, which is nearly done. An ample volume of air (10,240 cubic feet per minute) was entering the mine for the 75 persons employed, which was fairly well distributed. There should be a break-through between rooms 2 and 3 (on the right of fourth Right entry) from the head. The seventh Right entry air course should be driven so it would be kept within 60 feet of the face of the Main entry.

MANCHESTER MINE.

Near Altamont. P. O. Altamont.

Transportation by the Altamont & Manchester Railroad to connection with the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the Manchester Coal Company. John W. Harris, Treasurer and General Manager; C. R. Coleman, Sales Agent; Charles Bawyer, Mine Boss.

The mining is done with picks, and ventilation is provided by a furnace.

There were two strikes among the employees of this mine during the year; the first from May 1st to June 20th, and the latter from August 3d to September 22d. Work was resumed at old rates. No violence.

Inspected by Assistant May 14th. The mine was idle and had been so since May 1st. Water had risen in the mine to such an extent that an inspection was impossible. Examination, however, was made of room 5, on Bryant's entry, where two men were killed by fall of top on March 8th, an account of which is given in the chapter on "Fatalities and Injuries," and where the defects in the conditions of the mine are fully discussed.

Inspected by Assistant October 13th.

Props set too far from working faces. Drainage not very good. A sufficient amount of air was entering the mine for the 35 persons inside, but it was only fairly well conducted to working faces. There should be a door on third Left cross entry near the mouth of the first Right cross entry to force the current through the air course

following the first Right cross entry off third entry. The second room from face on left side of first Left cross entry off second Left entry should have a break-through to force the air current near the head workings.

New Standard Mine.

Near Altamont. P. O. Altamont.

Transportation by the Altamont & Manchester Railroad to connection with the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the Standard Coal Company. Jasper Pearl, President; J. W. Thompson, General Manager; W. W. Reese, Mine Boss. Work is confined to the new mine.

This is a pick mine, and has furnace ventilation. The furnace was built during the year at a cost of $100.

There was a strike among the employees from August 2d to September 20th. An increase of wages was demanded, but work was resumed at the old rates.

Visited by Assistant May 14th.

The mine had been idle for some days and water had accumulated to such an extent that an inspection was impracticable.

Inspected by Assistant October 13th. Drainage and timbering fairly good. Props not close enough to face of rooms. No artificial means of ventilation has been provided, but a furnace is to be built; the shaft being now dug.

Peacock Mine.

Near Pittsburgh. P. O. Pittsburgh.

Transportation by the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the Peacock Coal Company. C. D. Anderson, President; G. F. Anderson, Secretary and General Manager; W. C. Welch, Mine Boss.

There was a strike among the employees during August, and no work was done. The cause and manner of settlement not reported. At another time two weeks' work was lost on account of too much water.

Inspected by Assistant on May 11th. Ventilation and timbering were good. The mine was wet, but the water was being well controlled.

Inspected by Assistant October 8th.

An abundance of air was entering the mine for the number of persons employed under ground, and it was well conducted to the working faces. Other conditions were also good.

Pitman Mine (No. 2).

Near Pittsburgh. P. O. Pittsburgh.

Transportation by the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the Pitman Coal Company. W. A. Pugh, President; S. V. Rawland, General Manager; William McNeil, Superintendent.

The general question blank sent to the company was not returned, and information therein sought has not been obtained. The names of the company's officials are taken from the 1896 report, and are presumed to be correct.

Pitman No. 1 inspected by Assistant May 12th. About the middle of the Main entry the road is too wet; elsewhere the drainage is good. No lack of timbering on entries or of propping is observed.

The mine is well ventilated by an ample volume of air, except in the rooms on the right of the third Left entry. To correct the defect a curtain is needed between the last two rooms.

Inspected by Assistant October 11th.

Props, especially in the rooms off fourth Left entry, too far from the working faces. Drainage fairly good, except on Main entry near 3d Left entry. Volume of air abundant and fairly well conducted. The three last break-throughs, near head of 4th Left entry, are open, and the 2d and 3d should be closed to force the air to near head of entry.

No. 2 inspected by Assistant May 12th.

Ventilation good. Drainage fairly good, and rooms tolerably well propped.

Inspected by Assistant October 11th.

The work was mostly drawing pillars and stumps and the conditions were good.

Pittsburgh Mine.

Near Pittsburgh. P. O. Pittsburgh.

Transportation by the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the Pittsburgh Coal Company. James D. Smith, President; W. B. Neal, Secretary; C. S. O. Tinstman, General Manager; A. L. Delph, Mine Boss.

Ventilation is produced by a furnace, and the mining done with picks. No improvements were reported.

There was a strike among the employees from August 1st to September 13th. They made a demand for higher prices for mining coal, for yardage and day labor, but resumed work at the old prices.

Inspected by Assistant May 13th.

The air had not been caused to flow through the rooms on the right of 3d Right entry, though they were more than 60 feet deep. But for this the ventilation was good. No dangerous neglect to support top on entries or in rooms. The drainage was good, having been made so since the date of the last inspection.

Inspected by Assistant October 11th.

Some very loose slabs of slate on Main entry were shown to Mr. Delph. Props too far from working faces. Timbering fairly good, except 3d Right entry stump.

There was a volume of 9,880 cubic feet of air per minute entering the mine for the 85 persons employed, fairly well conducted. There should be a brattice on break-through of air course near door on left of Main entry. There should be a break-through to air course near head of Main entry and the latter ones should be closed to carry the current near head of entry.

Star Mine.

Near East Bernstadt. P. O. East Bernstadt.

Transportation by the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the Star Coal Company. W. B. Miller, President and Secretary; G. W. Harrison, Superintendent.

There was a three weeks' strike in January. Trestle was injured.

Inspected by Assistant May 10th.

Too much water in and near mouth of Main entry. Elsewhere the drainage was good. The ventilation was good, except at the face of the 3d Right entry, which was more than 60 feet ahead of the air. No dangerous condition of top was observed.

Inspected by Assistant October 14th.

Props generally too far from working faces. Drainage is not good. The mouth of the mine is too wet and muddy. On 3d Left entry there is some very loose, dangerous slate. An ample supply of air is entering the mine for the 28 persons employed under ground, but it is not very well conducted. There should be a door on Main entry above 3d Left entry. The room necks on right, off 3d Left cross entry, should be curtained except the one at the head. There should be a door near mouth of 3d Right cross entry and the room necks, except the head one should be curtained to force the current to the face.

Thompson Mine.

Near Altamont. P. O. Altamont.

Operated by the Thompson Coal Company. W. H. Thompson, Manager; A. T. Wilson, Mine Boss.

There was a strike among the employees from August 1st to September 14th on account of disagreement as to the price of mining, but how settled not stated. This company did no mining until late in May.

Visited by Assistant May 10th. Mine was idle and no inspection was made.

Inspected by Assistant October 13th. Propping fairly good. Drainage not good. Ventilation not good because the basket is insufficient. There should be a furnace. There should be a breakthrough in room 5 within 60 feet of the face. All the room necks should be curtained except 1st room from face. Some curtains are in a torn, bad condition and should be replaced with new ones.

Victoria Mines.

Near Pittsburgh. P. O. Pittsburgh.

Transportation by the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the Victoria Coal Company. L. Baxter, President; E. J. Cornel, Secretary; J. J. Hughes, Treasurer.

The names of the officials are taken from the 1896 report. The general question blank sent to the company was not returned.

Mines 1 and 2 inspected by Assistant May 13th. The mine was badly flooded with water from a heavy rain on the night of the 12th,

and a thorough inspection was impossible. As far as could be seen the ventilation and support of top were reasonably good. A deeper ditch is needed in Mine No. 1 and a larger pump in Mine No. 2.

Inspected by Assistant October 12th.

No. 1. Drainage not good. The entries are entirely too wet and muddy, but the working places are dry enough. Props are too far from working faces. Ventilation fairly good.

Mine No. 2, October 12th. Props not very well up to face of workings. Drainage not good. Ample volume of air in the mine, but not well conducted. There should be a curtain on Main entry near 3d Right cross entry. There should be a door or curtain on mouth of 2d Left cross entry to force the air up near head of entry, which is more than 60 feet ahead of air. The curtain on Main entry must be replaced to force the air through 3d Right entry air course.

Swiss Mine.

Near East Bernstadt. P. O. East Bernstadt.

Transportation by the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the Swiss Mining Company. Richard Unest, Manager. This company commenced operations in March.

Inspected by Assistant October 12th.

Props are not set close enough to working faces. Some top on Main entry was very loose. Drainage fairly good. Ventilation good. This mine has but one outlet, and another must be provided according to section 9 of the Mining law.

Grant Mine.

At East Bernstadt. P. O. East Bernstadt.

Transportation by the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by W. R. Grant. Work was first commenced in this mine in September, but no more work was done afterwards, except in November.

Inspected by assistant October 10th.

Some very loose slate on Main entry. Some timbering was badly needed on Main No. 2 entry. Propping fairly good. The mine is worked from daylight to daylight and the air is good. No artificial ventilation.

Lily Mine.

At Lily. P. O. Lily.

Transportation by the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the Lily Coal & Coke Company. L. L. Parks, Proprietor; F. G. Gilbert, Mine Boss.

This mine was re-opened in May. Among the improvements are a new tip-house, new air shaft and new furnace.

Inspected by Assistant October 8th.

Timbering and propping fairly good. Drainage not very good, though the siphon was conducting the water fairly well. Some dangerous top was noticed on entries, especially on Main entry, to which the attention of Mr. Gilbert was directed. The ventilation was not very good, because the fan is located too far from the workings. But another shaft was being sunk near 2d Left entry, which, when completed, it is believed will make the ventilation good.

Kentucky Mine.

Near Pittsburgh. P. O. Pittsburgh.

Transportation by the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the Kentucky Coal Company. H. C. Thompson, General Manager; R. M. Jackson, Secretary and Treasurer; James Lucy, Mine Boss.

This mine was not opened until about November, and a new opening has been made at a cost of $1,000. A narrow-gauge railroad has been built (so as to connect the mine with the Louisville & Nashville Railroad) at a cost of $5,000. The output for the time operated is very good.

Visited by Assistant October 9th. No coal had yet been mined, but preparations for mining were being made.

PULASKI COUNTY.

Output of coal in 1897, 49,519.03 tons, against 72,537.12 tons produced in 1896. The product of the mines is as follows:

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS.	OUTPUT.
Alpine	17,245.00	47.80	46.00	5,975.00
Barren Fork	26,781.88	77.00	70.70	15,965.00
Enterprise	8,431.24	38.00	242.90	11,037.00
Cogar Creek	9,918.00	32.27	156.00	12,438.00
Indian Creek	10,161.00	35.83	69.75	4,104.03
Totals	72,537.12			49,519.03

Loss in 1897, 23,018.09 tons.

ALPINE MINES.

Near Alpine. P. O. Alpine.

Transportation by the Cincinnati, New Orleans and Texas Pacific Railroad.

Operated by the Richmond Coal Co. Theodore Richmond, President; A. S. Glover, Vice-President and Treasurer; E. A. Foster, Superintendent; J. M. Ramsey, Mine Boss.

The mine is ventilated by a fan and mining is done with picks. The company was included in the general strike and work was entirely suspended from May 1st until late in December.

Inspected by Assistant March 3d.

General conditions good. Fourth Right Entry was more than 60 feet ahead of the air. Drainage was better than at the time of the last inspection, but in several places the entries were still too wet. No. 2 mine was idle.

BARREN FORK MINE.

At Barren Fork. P. O. Flat Rock.

Transportation by the Cincinnati, New Orleans and Texas Pacific Railroad.

Operated by the Eagle Coal Co. J. T. Slade, President; W. L. Carter, Secretary and General Manager.

The mine is worked with picks and ventilated by a fan. Repairs were made on the mining plant and on houses at a cost of $1,000.

There was a strike among the employees from May 1st until near the end of the year, during which time no work was done. No violence.

Inspected March 5th. The mine was idle and no fire in the furnace, Too much water in several places on the entires, but conditions generally were reasonably good.

Enterprise Mine.

Near Greenwood. P. O. Greenwood.

Transportation by the Cincinnati, New Orleans and Texas Pacific Railroad.

Orperated by the Enterprise Coal Co. J. H. Chew, General Manager. The general question blank sent to the company was not returned.

Visited by Assistant March 3rd.

The tunnel had fallen in at the West end so that all work reached by the tunnel was shut off. There were three small openings to the right from the East end of the tunnel, in each of which eight men were employed, but none were at work on that day. The openings were very wet.

Inspected October 9th. The mine was found in good condition except some blank-damp from the old works, and this was fast being shut off and driven out.

Indian Creek Mines.

Near Cumberland Falls Station. P. O. Parker's Lake.

Transportation by the Cincinnati, New Orleans and Texas Pacific Railroad.

Operated by the Commercial Coal Co. J. C. Parker, President; J. J. Strunk, Secretary.

No work was done until July. The general question blank sent to the company was not returned.

Inspected March 5th by Assistant.

Mine No. 1, found to be in good condition generally except there was too much water on the Main entry between the sump and the mouth of the 3d Right entry. There should be a ditch to lead this water to the sump, which is reached by a siphon.

No. 2, inspected March 5th. Main entry much too wet. Ditching needed. The air-way was nearly closed by fallen slate, so that the ventilation was not good, but a new air-way was being opened which will make the conditions good. The Main entry was closed by a fall of slate, but a pass way has been made around it. This passway is closely timbered, but the timbers are too small and too weak.

No. 1, inspected October 6th. The mine was working and in fair condition. Some of it a little wet. A little better ventilation needed, which can be easily provided. Furnace all right.

No. 2, inspected October 6th. Excepting a little necessary drainage the mine was in good condition.

Cogar Creek Mine.

Near Flat Rock. P. O. Flat Rock.

Transportation by the Cincinnati, New Orleans & Texas Pacific Railroad.

Operated by W. J. Hamilton. The general question blank sent, asking for specific information, was not returned.

Inspected by Assistant March 5th.

The Main entry was much too wet. The water stood over the track in two places. A shallow ditch along Main entry would give good drainage. The working places were dry enough. Timbering and propping fairly good.

Inspected October 6th. Much of the mine was too wet. Ventilation not good. There was no proper arrangement of doors and curtains to conduct the air and no power to propel it. When the new entry shall be completed conditions can be much improved. The air will have to be split at the intake or at the mouth of the Main entry so that the workings on each side can receive plenty of air.

Rockcastle County.

The only mine in operation in this county is the one at Pine Hill, operated by the Pine Hill Mining Co. J. A. August, President; S. P. Kerr, Vice-President; J. A. August, Jr., Secretary and Treasurer; B. R. Hutchcroft, General Manager; J. L. Frost, Mine Boss. The P. O. of the company is Pine Hill. Output of coal for 1897 is 9,493.40 tons.

This mine was first opened several years ago, but was idle for about two years and until re-opened by the present company in the spring and summer of 1897. The first coal produced was in the month of August.

I have not been able to get as full description of the plant as I desired, but my information is that it is well equipped with every needed facility, and promises to be very productive and profitable.

WHITLEY COUNTY.

Output of coal in 1897, 197,722.95 tons, against 428,980.67 tons produced in 1896. The product of the mines is as follows:

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS.	OUTPUT.
Bird Eye Jellico	52,705.30	74.00	66.90	16,046.90
Central Jellico	39,372.86	152.50	33.05	10,457.00
Dowlais	58,288.00	134.00	73.00	25,337.00
Kensee	62,440.00	117.50	46.85	22,478.00
Kentucky Jellico	6,617.43	27.25	100.85	6,632.25
Mountain Ash	56,270.00	118.00	59.00	24,791.00
Proctor	55,417.00	118.12	81.00	32,147.00
Grinstead	47,933.00	116.83	61.00	18,678.00
Strunk	30,789.10	93.40	78.55	13,930.00
Tow Wad	18,747.98	94.40	64.66	15,045.80
The Steeley	400.00			
Mt. Morgan		111.66	60.00	12,180.00
Totals	428,980.67			197,722.95

Loss in 1897, 231,257.72 tons.

BIRD EYE JELLICO.

At Halsey. P. O. Halsey.

Transportation by the Jellico, Bird Eye & Northern Railroad to Louisville & Nashville connection at Jellico.

The mines of the Bird Eye Jellico Coal Company have passed into the hands of the Whitley Coal Company, John B. Atkinson, President; Benjamin W. Robinson, General Manager and Treasurer. The new management did not, however, commence operations until some time in December, 1897. The mine was affected by the strike, and operations were suspended from April 1st until in December.

Dean mine inspected February 12th.

Conditions generally good.

Vanderpool mine inspected February 12th. Drainage good, except at one place on 3d Left entry where the water stood over the track. All other conditions reasonably good.

Mine No. 3 inspected February 12th. The mine was very wet, but the water was so controlled that the working places, which were confined to the second Right entry, were dry. The water was not allowed to stand in pools. Propping, timbering and ventilation good.

Mine No. 1 inspected February 13th. The mine was idle and no men were in it, and there was no fire in the furnace. The arrangements for conducting the air were reasonably good. The furnace has good ventilating power. The rooms were well drained, but the entries were sloppy.

Central Jellico Mine.

At Pleasant View. P. O. Pleasant View.

Operated by the Central Jellico Coal Company. This mine was worked out in April and abandoned.

Dowlais Mines.

At Dowlais. P. O. Jellico, Tenn.

Transportation by the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the East Tennessee Coal Company. E. J. Davis, President; G. C. Richmond, Secretary; W. T. Lewis, General Manager. Head office, Knoxville, Tenn.

The general question blank sent to the company was not returned and the names of the officials are taken from the report of 1896. Work in these mines was suspended for one half of the year, caused by the strike.

Inspected by Assistant February 15th. The old mine was idle and the conditions were so unfavorable for an inspection that a thorough one was not attempted. Entries quite wet, but the ventilation was better than at date of last inspection.

The new mine was also idle, and conditions were reasonably good.

KENSEE MINES. (2).

At Kensee. P. O. Kensee.

Transportation by the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the Hywel Davies Coal Company. Bannen Coleman, President; Hywel Davies, General Manager; William Jones, Superintendent.

The mine is ventilated by a furnace and the mining is done with picks. The vein worked is the Jellico, which varies in thickness from 33 to 42 inches. The mines were opened in 1884, and there are yet 800 acres of Jellico and 1,500 acres of Blue Gem coal territory to be mined.

There was a strike among the employees of this company and operations were suspended from May 1st to November 1st. The causes and effects of the strike throughout the district are clearly and forcibly presented in another chapter, under head of the "Jellico Strike," in an article written by Mr. Hywel Davies, the General Manager named above.

Inspected by A sistant February 9th.

Old Mine. But few men in the mine. Working places were dry and well propped, and the ventilation good.

New Mine. A short distance on first and second Left entries water stood over the track. Elsewhere the drainage was good. With 141 persons in the mine, there were 15,730 cubic feet of air per minute flowing through it. A check curtain was needed on first Left entry between rooms 24 and 25 to hold the air in rooms from No. 7 to No. 25. On 2d Left entry a curtain was needed between rooms 17 and 18 to cause the air to flow through rooms 17 to 20, and rooms 1 to 9, inclusive, were a little more than 60 feet ahead of the air.

KENTUCKY JELLICO MINE.

Near Halsey. P. O. Halsey.

Transportation by the Jellico, Bird Eye & Northern Railroad to connection with the Louisville & Nashville at Jellico.

Operated by the Kentucky Jellico Coal Company. E. B. Taylor, President and General Manager; M. A. Taylor, Secretary; T. J. Bruce, Mine Boss.

This mine is operated with picks and has furnace ventilation. There was a strike among the employees that suspended operations from April 6th to September 10th.

Inspected by Assistant February 13th. The mine was found to be in a general good condition.

Inspected by Assistant October 7th.

Drainage and timbering fairly good. Props not well up to the working faces. Ample volume of air, but not well conducted to the working faces. With a break-through between the first room on the right off Main cross entry and 4th Left entry, and with a curtain or door on 3d Left cross entry between the break-through and the Main entry, to force the air into the workings through the first right room off 3d Left cross entry, the ventilation would be greatly improved.

Mountain Ash Mines.

At Mountain Ash. P. O. Mountain Ash.

Transportation by the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the Jellico Coal Mining Company. E. J. Davis, President; Charles Ducloux, Vice President; Arthur Groves, Secretary; J. L. Williams, General Manager.

This mine has furnace ventilation and is worked with picks. Fifty per cent of its output was sold outside of Kentucky.

There was a strike among the employees that suspended operations from May 1st to near November 1st.

Mine No. 3. Inspected by Assistant February 5th. By the making of a few minor changes to aid in the ventilation the mine conditions would be reasonably good.

Mine No. 4. The top in room No. 4 on 1st right off B entry and in the two working places on Butcher entry is bad, but well propped. Ventilation good, except some break-throughs, doors, etc., are needed to take the air to some of the working faces.

Proctor Mines.

At Red Ash. P. O. Red Ash.

Transportation by connection at Jellico with the Knoxville Branch of the Louisville & Nashville Railroad north and by the Southern Railway south.

Operated by the Proctor Coal Company. A. Gatliff, President; J. W. Siler, Vice-President; H. F. Finley, Secretary and Treasurer; Philip Francis, Superintendent; J. W. Ratcliffe, Mine Boss.

There was a strike among the employees of this mine from May 1st to September 10th, during which time no mining was done.

Inspected February 10th by Assistant.

North Main Mine. Work was confined to entries 12 and 15 off Main entry. Rather too much water on entry 15 and entirely too much on Main entry, but the working places were dry enough. On No. 12 entry there was some loose slate resting on a gob wall and extending over the entry which ought to be taken down or propped more securely. Ventilation is good, except entry No. 15, which is more than 60 feet ahead of air.

Mine No. 1. Timbering and propping good. Ventilation good except the face of Thornburg entry is more than 60 feet ahead of the air. A door in the neck of room 16 will bring the air up. Too much water at the head of Hall entry.

Mine No. 6. But three men each in Smelty and Logan entries. These entries and working places were in fair condition. First right off 1st left cross entry off Main, also Wood's entry was too wet and sloppy. On other entries drainage was fairly good.

Grinstead Mine No. 1. Drainage good except at room 10 on Davies entry and near the middle of Williams entry, where water stood over the track. Timbering, propping and ventilation reasonably good.

Grinstead Mine No. 2. At room No. 15 on Pickett entry there was a piece of slate that ought to have been taken down. Timbering and propping good. Ventilation good, except one break-through should be closed and two break-throughs should be made and three doors should be hung in certain parts of the mine.

Inspected by Assistant October 6th.

Proctor Mine. An ample volume of air was entering the mine for the 25 persons employed under ground. The condition of the mine was good in other respects, except a little water had accumulated during the recent suspension.

Strunk Mine.

Near Strunk Lane. P. O. Strunk.

Transportation by the Cincinnati, New Orleans & Texas Pacific Railroad.

Operated by the Pine Knot Coal Company. A. McDonald, President and General Manager; W. H. Julian, Treasurer; W. B. Shropshire, Superintendent.

The general question blank sent to the company was not returned, and the names of the officials are taken from the 1896 report.

Visited by Assistant March 4th. Miners were on a strike, mines idle and no inspection was made. The strike continued for over seven months.

Tow Wad Mines.

Near Pine Knot. P. O. Pine Knot.

Transportation by the Cincinnati, New Orleans & Texas Pacific Railroad. Operated by Bryant Bros., composed of L. E. and D. E. Bryant; John Fewell, Mine Boss.

There was a strike among the employees of this mine from May 1st to November 24th, during which time no work was done.

Inspected by Assistant March 4th.

Drift No. 3. Heavy rains had caused water to accumulate in the mine. Natural ventilation depended on, although there was a fire basket in the mine.

Drift No. 4. No artificial ventilation. The mine was very wet, but could be easily and well drained by a shallow ditch along Main entry.

Tunnel Drift. Ten men employed inside. No artificial ventilation.

Mt. Morgan Coal Company.

Near Williamsburg. P. O. Williamsburg.

Transportation by the Knoxville Branch of the Louisville & Nashville Railroad.

Operated by the Mt. Morgan Coal Company.

This is a new company and a new mine. The first coal was mined in October. I have endeavored to get a complete description of the plant, but have not been able to do so. My information is that the company has made extensive and costly improvements, and the mine promises to be very productive and profitable.

WESTERN DISTRICT.

Output of coal, including cannel, 1897, 2,114,571.41 tons, against 1,762,461.93 produced in 1896.

Gain in 1897, 352,109.48 tons.

BUTLER COUNTY.

Output of coal 1897, 30,511.60 tons, against 28,443.92 tons produced in 1896. The product of two mines, is as follows:

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS.	OUTPUT.
Aberdeen	17,827.68	54.66	224.00	18,405.32
West Aberdeen	10,616.24	33.83	194.00	12,106 28
Totals	28,443.92			30,511.60

Gain over 1896, 2,067.68 tons.

ABERDEEN MINE.

At Aberdeen. P. O. Morgantown.

Transportation by Green River. Operated by the Aberdeen Coal and Mining Co. I. B. Wilford, President; J. D. Render, Secretary and Superintendent.

This mine was opened in 1890 and will last probably for 50 years. It is ventilated by a furnace. The vein worked is No. 3 and has an average thickness of three feet. There were no special improvements reported for the year. There were no strikes or other hindrances. The mining is done by picks and the coal is mostly marketed at Bowling Green.

Visited May 28th by Grider. The mine was idle and there was no fire in the furnace, but the ventilating power of the furnace was found to be sufficient. Drainage and other conditions reasonably good.

Visited again by Grider on June 22d. The mine was again idle with no fire in the furnace. The general conditions were found to be good.

Inspected December 16th by Logan. Ventilation fairly good. Face of Main entry was more than 60 feet ahead of the air current, but a break-through near the face was nearly completed. The second break-through from face of 3d Left entry into old rooms should be closed. The second break-through from face of 2d Left entry should be bratticed so as to force the ventilating current to face of workings. Other conditions were good.

West Aberdeen.

At Aberdeen. P. O. Morgantown.

Transportation by Green River. Operated by the West Aberdeen Coal Co. Jas. F. Philips, President; E. P. Aspley, Secretary; Grafton Forsythe, Treasurer; A. A. Mann, Superintendent.

The mine was opened in 1894 and will last probably 50 years. It is ventilated by a furnace and the mining is done by picks. The vein worked is No. 3 and has an average thickness of three feet eight inches.

There were no strikes or other disturbances reported for the year.

During the year the following improvements were made: New air shaft, five dwelling houses, three buggies and some minor matters; all at a cost of over $3,000.

Christian County.

Output of coal for 1897, 36,325.64 tons, against 13,123.68 tons produced in 1896, making a gain in 1897 of 23,201.96 tons. It is all the product of one mine, the New Empire.

New Empire.

Near Empire. P. O. Empire.

Transportation by the St. Louis & Nashville Division of the L. & N. Railroad.

Operated by the Empire Coal and Mining Co. W. T. Rutland, Manager. The general question blank sent to the company was never returned and this office has no information as to disturbances or improvements during the year.

The mine was operated during every month of the year from eight to 21.75 days, each or 184 days in all. by a daily average of 61.16 employees. The mine is a shaft and is ventilated by a fan.

Inspected April 29th by Grider. His report of inspection says: "This mine is in good condition. There is an ample volume of air well conducted through it, giving good ventilation. No dangerous unsupported top was observed on entries or rooms. The water in the mine is well controlled."

Inspected August 30th by Logan. His report of inspection says: "The timbering and drainage are good. The props are fairly well up to faces of workings. There is an ample supply of air entering

the mine, but it is not well distributed. In 1st West entry off North the last three break-throughs are open. The second break-through from head Main North entry is also open."

Directions were given to close these break-throughs which it was believed would make the ventilation excellent.

Inspected November 23d by Assistant. Timbering and drainage fairly good. Props are sufficient. Ventilation reasonably good. 1st West entry on South side, also 1st West entry on the North side, more than 60 feet ahead of the air current. Room 7 on the same entry needs a break-through. Also, 1st West entry on North side was more than 60 feet ahead of the air current.

Daviess County.

The output of coal for 1897, 3,549.20 tons, against 3,232.24 tons produced in 1896, making a gain of 316.96 tons for the year, and all the product of one mine, the New Holland.

New Holland Mine.

At Mattingly. P. O. Owensboro.

Transportation by the Louisville, Henderson & St. Louis Railroad. Owned, operated and managed by D. Stewart Miller, Jr., in the name of the New Holland Coal Co. Earnest Brooks, Mine Boss.

The mine is in No. 9 vein and has an average thickness of four feet and six inches.

It is ventilated by a furnace and the mining is done with picks. The mine was idle all the year until in July, and was operated only 69.75 days during the remainder of the year.

A new boiler was added and a slope built from the drift to the Railroad, the two costing $500.

Visited in May, but the mine was idle and had not been running any part of the year. Inspected September 6th by Assistant. Timbering and drainage fairly good. Ventilation not good. There should be a break-through from Main air way off Main entry to first room off first entry, and the work was being done. With a good double curtain on Main entry to force the air through this break-through when completed, and some work on the furnace about which instructions were given, no doubt the ventilation will be good.

Inspected December 3, 1897, by the Assistant. In his report of the condition of the mine, he says: "Some very needed repairs have been made on the furnace and the ventilation will be good when the air course is broken through. However, the air at present is not bad owing to the number under-ground being small. Other conditions were good except the props were not set close enough to the face of the workings."

HANCOCK COUNTY.

The output of coal in 1897, 19,901.67 tons, against 17,841.60 tons produced in 1896, and is the product of three mines, as follows:

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS.	OUTPUT.
Breckinridge	3,426.80	18.75	263.00	3,231.07
Hawesville	2,930.40	21.46	.....	9,245.44
Falcon	11,484.40	26.25	158.00	7,425.16
Totals	17,841.60	.....	.....	19,901.67

Gain over 1896, 2,060.07 tons.

FALCON MINE.

Near Falcon Station. P. O. Adair.

Transportation by the Louisville, Henderson & St. Louis Railroad. Operated until January 18, 1898, by Egan Bros., but since that time the mine has been owned and operated by M. H. Euright. P. O. Owensboro. Charles W. Pettit, Secretary; Audy Egan, Mine Boss. Improvement for the year was the digging of a water ditch to drain the mine at a cost of $250. Mining is done with picks.

The mine was inspected in May, and found to be in reasonably good condition.

Inspected September 7th by Logan. No dangerous top was noticed. Timbering and propping very good. Drainage was not good, though the rooms were not wet. Ventilation was not as good as it ought to have been. Instructions were given to brattice certain places pointed out to Mr. Egan.

Inspected by Assistant December 4th. Mine was idle. No fire in the furnace and no correct estimate of the air current could be obtained, but it was thought that a good fire would give good ventilation to the mine. All other conditions being reasonably good.

HAWESVILLE MINE.

Near Hawesville. P. O. Hawesville.

Transportation by the Louisville, Henderson & St. Louis Railroad. Operated by the Falcon Coal Co. R. B. Pierce, President and General Manager; N. B. Chambers, Secretary; Ord Gillians, Mine Boss.

The mining is done with picks, and the vein worked is from 3.5 to 5 feet thick. The mine is a shaft 105 feet deep, and was opened in 1895 and is ventilated by a fan.

During the year the main hindrance was a loss of 60 days during the spring months on account of dull trade.

Two new pumps and a 56-horse power boiler were installed at a cost of $1,000. No report was given of the days worked during June, September, October and November.

Visited in May, but the mine had been flooded with water, and was not yet in a proper condition for work, though some work was being done. It was being drained as fast as possible. Inspected September 7th by Assistant. Timbering fairly good. Drainage was not good, but good plans to drain the mine were to be put into execution at once. Instructions were given to put a curtain across Richard Matney entry near where it crosses the Main North entry, also to put a door across Main entry and turn the current up the Matney entry.

Inspected December 4th by Assistant. Drainage not good. Propping and timbering good. Fan was not running, and the ventilation could not be determined, but the appearance of the curtains, stoppings, etc., indicated that, with the fan running, the ventilation would be good. Only one outlet to the mine, and instructions were given to provide another pursuant to Sec. 9 of the Mining law.

BRECKINRIDGE MINE.

At Victoria. P. O. Cloverport.

Transportation by Louisville, Henderson & St. Louis Railroad. Operated by the Breckinridge Cannel Coal Company, Limited; H.

V. Harris, General Manager, P. O. Room 55, American National Bank Building, Louisville; David Duncan, Superintendent; Wm. Hinsey, Mine Boss.

This mine produces exclusively cannel coal. It is marketed mostly in cities in New England. The mine was first opened about 1855, and a new opening will likely be necessary by December, 1898. The vein worked is about 1.5 feet.

Inspected July 2d by Grider. Work was much scattered. There were not as many as six men in any drift except one, No. 6. That was the only one subject to inspection. Main entry was very wet and sloppy. Better drainage was necessary, either by ditches to the outside or to sumps on the inside. The ventilation in the mine was not good. There was scarcely any current passing through it. An air shaft had been sunk, but connection had not been made with it, and no furnace had been put in. Instructions were given to drive an air-way to the shaft as soon as possible, and to put in a furnace, and to keep a fire in it at all times when men are working in the mine; also to place curtains and doors so as to cause the air current to flow within 60 feet of the faces of all advancing entries and rooms.

Visited September 7th by Logan. Not more than five men were being worked in any drift, and no inspection was made.

Visited again December 4th. The same conditions existed as in September, and no inspection was made.

HENDERSON COUNTY.

Output of coal for 1897, 121,223.72 tons, against 119,539.65 tons produced in 1896, and is the product of the following mines:

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS.	OUTPUT.
Corydon	3,669.28	5.91	200.00	4,087.20
Henderson	14,740.16	21.25	202.00	14,408.60
Peoples	5,137.96	11.63	165.00	4,725.24
Basket	54,047.25	99.66	147.50	58,224.44
Rankin	39,104.04	64.00	181.00	39,778.16
Spottsville	2,840.96	.....	.....	.....
Totals	119,539.65	.....	.....	121,223.72

Gain over 1896, 1,684.07 tons.

Corydon Mine.

At Corydon. P. O. Corydon.

Transportation by the Ohio Valley Branch of the Illinois Central Railroad.

Operated by Lloyd & Wright, W. H. Lloyd, President and Manager; John Wright, Secretary and Superintendent; W. H. Lloyd, Mine Boss. The mine is a shaft 185 feet deep, and was first opened in 1885, and will last probably for 60 years. Mining is done with picks, and ventilation is by a steam jet. Some repairs were made on the cage-shaft and the air-shaft.

Visited by Grider June 30th. The mine was idle, and when working only five men were employed, and no inspection was made.

Visited September 3d by Assistant. Found only three men working in the mine, and no inspection was made.

Visited again by Assistant November 29th. Only five men were employed and no inspection was made.

Henderson Mine.

At Henderson. P. O. Henderson.

Operated by the Henderson Mining & Manufacturing Company, a corporation. C. W. Wilson, President; A. B. Sights, Secretary; W. H. Lee, Superintendent; Q. Bohn, Mine Boss. The mine is a shaft 180 feet deep, and is ventilated by a fan. The vein worked is No. 9 and is 4 feet and 6 inches thick, and the mining is done with picks. The product of the mine is sold to the local trade. Inspected March 16th by Grider. "With 22 men in the mine, there were 2,865 cubic feet of air per minute entering the mine, which was very well kept up to the faces of the working places, so that the ventilation was good. The rooms are fairly well propped and the drainage is good." Inspected June 29th by Grider. The supply of air is sufficient and fairly well conducted to the faces of the rooms, so that the ventilation is reasonably good. The drainage is also good, and no dangerous unsupported top was noted on entries or in rooms.

Inspected August 31st by Assistant. Timbering and drainage good. The props were fairly well up to the faces of the workings. Ample volume of air is entering the mine and fairly well conducted on the entries, but not to the faces of some of the rooms, because some of the break-throughs that ought to be kept open were almost stopped with refuse of the mine.

Inspected November 26th by the Assistant.

The mine has but one outlet. Directions were given to provide another as required by section 9 of the Mining law. Other conditions good except rooms 15 and 16 of cross entry air-course, and the 2d and 3d rooms off Main cross entry are more than 60 feet ahead of the air current, and directions were given to make the necessary break-throughs.

PEOPLES MINE.

Near Henderson. P. O. Henderson.

Transportation by the Louisville & Nashville Railroad. Owned and operated by F. Haag & Bros. F. Haag, General Manager; Miss Cora Quinn, Secretary; Peter Bexin, Mine Boss.

The mine is a shaft 185 feet deep. Mining is done with picks. Vein worked is No. 9 and is 4 feet thick. Ventilated by fan. On October 9th the tip-house, engine-house machinery, etc., were destroyed by fire. Loss, $2,000. Mine was idle two months before again ready for operation.

The special improvements for the year were a new engine-house, new drum and ropes, new tipple, fan and screens. The shaft was also re-timbered.

Inspected March 15th by Grider. "The shaft was in a very unsafe condition. In several places the lining is bulging and in other places it is rotten. The underground conditions were about the same as they were when inspected on December 19, 1896.

Inspected August 31st by Assistant. In his report of the inspection he says: "There were several loose pieces of slate on Main entry that the mine boss was shown and instructed to pull down. Timbering and drainage fairly good. The ventilation was not very good. Although the mine was idle on the day of inspection, I discovered that the current could not properly be conducted, from the fact that the break-throughs that should have been open were in each instance almost entirely stopped with mine refuse."

Visited November 25th by Assistant. The mine was idle, but was being repaired from the damages occasioned by the fire.

BASKET MINE.

At Basket. P. O. Basket.

Transportation by Louisville, Henderson & St. Louis Railroad.

Operated by the Pittsburgh Coal Company. Thomas C. Blair, Superintendent; S. W. Rowe, Mine Boss.

The mine is a shaft 135 feet deep, is ventilated by a fan, and the mining is done with picks. The vein worked is No. 9 and is four and one-half feet thick. There were no strikes or other hindrances, except the work was frequently suspended for the want of cars to ship the coal to market.

Visited March 16th by Grider. Mine was idle, and had been idle ever since March 12th. Some repairs were being made at the top of the shaft, so it was inconvenient to use the cage, and the mine was not inspected.

Inspected by Logan September 4th. In his report of the inspection he says: "Timbering and drainage good. Props fairly well up to face of workings. Some very loose slate on cross entries off Main north. There was a volume of 12,000 cubic feet of air per minute entering the mine, which is not very well conducted to face of workings. The curtain on Main Left entry is torn considerably and allows too much air to pass down the entry instead of being forced to face of workings. Mr. Rowe was instructed to put up a new curtain there.

"This mine is worked on the block system, and the air scatters entirely too much. Mr. Rowe was advised to work his entries on the double entry system, as there is not much additional expense and it makes the conveyance of air easier."

Inspected by Assistant November 26th. An abundance of air is entering the mine for the number of persons working under ground, but it is not well distributed, but no doubt will be greatly improved when certain break-throughs, that Mr. Rowe pointed out, are completed. He was advised to keep the curtains in good repair. It is difficult to properly ventilate the mine so long as it is worked on the present system. Props are not sufficient. Mr. Rowe's attention was called to some bad top on Main South and Cut-off entries. Drainage good.

Rankin Mine.

Near Spottsville. P. O. Spottsville.

Transportation by the Louisville, Henderson & St. Louis Railroad and by Green river.

Operated by the Green River Coal & Mining Company. Gwat Rankin, President; Rankin Eastin, Secretary and Treasurer; Thomas Lowrey, Sr., Mine Boss.

The mine is a shaft 50 feet deep, is ventilated by a fan, and mining is done with picks. The vein worked is 4 feet thick. Seventy-five per cent of the coal is marketed outside of Kentucky. There were no strikes or other hindrances during the year. A vibrating screen was put in at a cost of $800.

Inspected by Assistant September 4th. Timbering and drainage fairly good. Props well up to face of workings. Ventilation was fairly good under the circumstances, but will be made better when the pillar is cut through to the air-shaft. Two or three yards more will complete it, and also complete the air-shaft and man-way.

Inspected by Assistant November 27th. "Drainage and timbering good. Props not sufficient. Ventilation insufficient. The air way to the fan shaft is not open, but should be, as this also serves as the second outlet or way of ingress and egress. Instructions were given to open this air way and the work was being done, and assurances were given that it would be completed in a few days. Think this will make the air good. The mine boss, Mr. Lowrey, was also shown where to place two check curtains, and he was advised to put them up."

HOPKINS COUNTY.

Output of coal for 1897, 961,412.24 tons, against 777,181.95 tons produced in 1896, and is the product of several mines, as follows :

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS.	OUTPUT.
St. Bernard	231,839 24	339.17	249.00	297,125.00
Diamond	117,177.00	155.25	220.00	163,577.00
St. Charles	92,241 24	163.66	192.25	98,863 00
Monarch	43,279.76	69.25	238.50	46,100.60
Reinecke	115,375.56	188.83	260.25	146,916.36
Crabtree	64,961.30	106.41	139.00	61,691.36
Carbondale	24,287.17	71.83	140.00	44,374.36
Hecla	39,526.16	72.50	160.50	47,165.48
Co-operative	30,497.60	90.66	164.70	46,082.40
Oak Hill	17,146.28	34.37	135.45	9,516.68
J. L. M. Robertson	850.64			
Totals	777,181.95			961,412.24

Gain in 1897, 184,230.29 tons.

HECLA MINE.

Near Earlington. P. O. Earlington.

Transportation by the St. Louis & Nashville Division of the Louisville & Nashville Railroad.

Operated by the Hecla Coal Company ; J. F. Ford, President ; J. T. Alexander, Secretary ; W. I. Garrett, Mine Boss. The mine is ventilated by a fan run by electricity, and mining is done principally by machines. The vein worked is No. 9, which has an average thickness of five feet in this mine. About 80 per cent. of the output is marketed outside of Kentucky.

During the year one new Jeffery Breast Chain mining machine was installed at a cost of about $1,000.

There were no strikes or other hindrances during the year.

Inspected May 10th. The mine is in a very safe condition, and is thoroughly ventilated by a volume of 30,000 cubic feet of air per minute, well distributed throughout the mine. The top is generally excellent, and the pillars are exceptionally thick. But little propping is needed.

Inspected August 27th by Assistant. "The drainage is good except at a certain place on Main West entry. Timbering very good. Props were fairly well up to face of workings. There are 60 persons employed under ground, and a volume of 12,600 cubic feet of air per minute is entering the mine, which is fairly well conducted, except in a few rooms in 2d South entry off Main West, where the working faces are more than 60 feet ahead of the air."

Inspected by Assistant November 17th. Drainage fairly good. Propping only fairly good. No loose, unsupported slate was discovered. Ventilation is reasonably good. There should be a breakthrough in room 33 off first West entry.

EARLINGTON NO. 9.

At Earlington. P. O. Earlington.

Transportation by the St. Louis & Nashville Division of the Louisville & Nashville Railroad.

Operated by the St. Bernard Coal Company; John B. Atkinson, President; Geo. C. Atkinson, Secretary; Wm. Day, Mine Boss.

This mining company has the distinction of producing more coal than any other company in the State. Its six mines, all in Hopkins county, in 1897, yielded 559,565 tons.

This mine, No. 9, is the first in the entire State as to output. Its output of 185,373 tons is combined with that of Earlington Mine No. 11, 111,752 tons, the two amounts composing the 297,125 tons mentioned at the head of this article as the product of the St. Bernard Mine.

This mine is ventilated by a fan. About 80 per cent. of the output is mined with machines and about 44 per cent. of the same is marketed outside of the State of Kentucky. The vein worked is No. 9 and is five feet thick. There were no disturbances of any kind nor special improvements reported for the year.

Inspected April 23d. The mine is found well drained, well propped, well bratticed and well ventilated; in fact, in good condition generally.

Inspected August 25th by Assistant. There is an ample supply of air entering the mine for the 70 persons employed, and the workings are fairly well ventilated. Mr. White's attention is called to some very loose slate on 1st West entry. The drainage is good. The timbering is very good.

Inspected November 17th by Assistant. Drainage good. Props are well up to working faces, except in rooms 11 and 12 off 2d West entry. Some timbering is needed on 2d West entry near the head. Ventilation good: however, there should be a break-through between the 3d West entry and the air-course opposite room No. 35. One place where the brattice is down should be closed.

Earlington No. 11.

At Earlington. P. O. Earlington.

Transportation by the St. Louis & Nashville Division of the L. & N. Railroad.

Also operated by the St. Bernard Coal Co. J. Evans, Mine Boss.

The vein worked is No. 11 and 6.5 feet thick. Furnace ventilation. The coal is mined and marketed in the same manner and places indicated in the notes relative to Mine No. 9. There were no disturbances nor special mine improvements reported for the year.

Inspected May 5th. The mine is in a good, safe condition and has good ventilation.

Inspected August 27th by Assistant. There are 65 men employed under-ground. The ventilation is very good, except near the faces of rooms 19, 20 and 21 off the sixth East entry, where the workis more than 60 feet ahead of the air. The drainage is good. The props are well up to face of workings.

Inspected November 18th by Assistant. Propping fairly good. The mine is in reasonably good condition in other respects, except at faces of 2d and 4th East entries, which are more than 60 feet ahead of the ventilating current.

Diamond (2).

Near Morton's Gap. P. O. Morton's Gap.

Transportation by the St. Louis & Nashville Division of the L. & N. Railroad.

Operated by the St. Bernard Coal Co. Head office at Earlington. James Blanks, Mine Boss.

The output of 163,577 tons includes about 17,000 tons produced by the old Diamond mine, located near by, and the average of 155.25 employees includes those working in the latter mine. There were no hindrances or special improvements reported to this office for the year.

Inspected May 6th. The whole mine is in splendid condition

Inspected August 28th by Assistant. This mine is well drained and timbered. Props are well up to face of workings. Ventilation good. There is a volume of 19,228 cubic feet of air per minute entering the mine, which is well conducted to the working faces.

Inspected November 19th by Assistant. Drainage good. Timbering satisfactory. Propping sufficient. An abundance of air is entering the mine for the number of persons employed, which is fairly well conducted to the working faces. Rooms 5 and 6 off 2d North entry are more than 60 feet ahead of the air current; however, the current will travel near the faces when the break-through between rooms 4 and 5 off 3d North entry shall be made.

Old Diamond.

But few men have been working in this mine during the year. It will soon be exhausted and abandoned.

Inspected May 6th. There were 33 men working in 17 rooms. Main entry very wet and muddy. Other conditions reasonably good.

Inspected August 28th. There are only 20 persons employed under ground. The ventilation is fairly good considering that all the work, except in seven rooms, is drawing stumps and pillars. A measurement of air taken between rooms 6 and 7, show a volume of 4,920 cubic feet per minute. The drainage and timbering are good and the props well up to the face of the workings.

Inspected November 19th. The mine is about exhausted. The work is confined to drawing pillars and stumps. Conditions are good as could be expected.

St. Charles Mines.

At St. Charles. P. O. St. Charles.

Transportation by the Illinois Central Railroad Company. Operated by the St. Bernard Coal Company. George Fauls, Mine Boss. Head office at Earlington, Ky.

These mines are known as old and new, or No. 1 and No. 2.

Inspected May 7th. With only 45 men under ground there is a volume of 12,000 cubic feet of air per minute entering the mine, which is well distributed to the working faces. Roof generally good. Mine well propped. Other conditions good.

Inspected August 24th. All conditions were generally good.

Inspected November 20th by Assistant. Drainage and propping good. The workings were fairly well ventilated.

St. Charles No. 2.

Inspected May 7th. Ventilation up to the legal requirement, but an increase is recommended. Roof generally good and rooms propped to within 4 to 8 feet of the working faces. Other conditions also good.

Inspected August 24th. A new furnace has been built, which greatly improves the ventilation of the mine. Conditions generally are good.

Inspected November 20th by Assistant. Ventilation good. No immediate lack of timbering was observed.

Co-operative.

At Barnesley. P. O. Barnesley.

Transportation by the St. Louis & Nashville Division of the Louisville & Nashville Railroad.

Operated by the Co-operative Mining & Manufacturing Company. John Jennings, President; Alfred H. Jones, Secretary; James H. Green, Mine Boss.

The vein worked is No. 9 and 4.5 thick, and mining is done with picks. About 75 per cent. of the coal is marketed outside of Kentucky. The mine was opened in 1886, and is ventilated by a furnace. There were no strikes or other hindrances during the year, nor any special improvements reported.

Inspected May 18th. There were 16,000 cubic feet of air per minute entering the mine, and it was well distributed to the working faces. There was a small squeeze on Main entry now checked, and black-damp is often bad, caused by the adjoining old works, which drain across this entry. All other conditions are good.

Inspected August 30th. The mine conditions relative to the squeeze and black-damp are much improved. A pass way has been

cut around the squeeze, and a drain had been cut so as to protect the Main entry from the old works. There was too much water on Main entry, near and just beyond the furnace. All other conditions are good.

Inspected November 18th by Assistant. Props are sufficient, and drainage good. A very loose slab of slate on 3d West entry is shown to Mr. Green, and he is instructed to take it down. Ventilation fairly good. There should be a check curtain on 3d West entry, between rooms 28 and 29, to force the air into the working places. The faces of the 3d and 4th West entries are more than 60 feet ahead of the ventilating current, and break-throughs should be made.

Crabtree Mine.

At Crabtree. P. O. Ilsley.

Transportation by the Illinois Central Railway. Operated by the Crabtree Coal & Mining Company. A. Howell, President; R. M. Soloman, Secretary and Treasurer; John Harlan, Mine Boss. Main office at Ilsley.

The vein worked is No. 9 and 5 feet thick. The mining is done with picks. About 60 per cent. the product is marketed outside of Kentucky. The mine is ventilated by a furnace. There were no strikes or other disturbance during the year and no special improvements reported.

Inspected May 10th. The mine is in a good, safe condition in every respect and well ventilated.

Inspected August 25th. All conditions continue good.

Inspected November 22d by Assistant. Drainage and timbering fairly good. Props are not close enough to working faces. An abundance of air (14,735 cubic feet per minute) is entering the mine for the 90 persons employed under ground, and it is well conducted to the faces of the workings. Room 15 off 1st East entry is more than 60 feet in advance of the air current, and it should have a break-through.

Carbondale Mine.

Near Hamby Station. P. O. Hamby.

Transportation by the Illinois Central Railroad.

Operated by Booth & Glover, lessees of the Carbondale Coal & Coke Co. W. E. Booth, General Manager; John Palmer, Mine Boss

The mine has furnace ventilation and is worked with picks. The vein worked is No. 9 and five feet thick. The coal is all marketed in the State. There was a strike from 1st to 10th of October, but it was amicably settled.

There were no improvements during the year except on the switch and track inside of the mine. The company reports much time lost in their mine operations for the want of cars to ship the product.

Inspected May 10th. Mine is very wet as the result of the heavy spring rains, and better drainage is needed. There is sufficient air entering the mine, but it is not well conducted to all parts of the mine. Two break-throughs on air-course pointed out to the mine foreman are open and must be stopped in order to carry the air to the working faces. In two or three places the pillars between rooms had been mined clear through and in other places they had been left too thin and too narrow at the base. A continuation of these things would soon endanger the safety of the mine, and the practice must be abandoned. Several rooms near the out-crop had fallen in because of bad top that could not be held by ordinary pillars and props. In a number of places the props are not set close enough to the working faces. They should be kept from 4 to 8 feet of the face on account of the treacherous top in many places. On the whole the condition of the mine could be much improved.

Inspected August 24th. The intake of air is abundant, but not well distributed. The ventilation could be much improved by placing a curtain on the air-course running parallel with Main entry between rooms 1 and 2 and two rear break-throughs between said rooms should be closed in order to carry the air to the working faces. Another curtain should be placed across the Main entry just ahead of the 2d Left entry to force the air up to face of the 2d Left and into the rooms off the said entry. On the return air-course there should be a curtain at neck of room 44 and another curtain should be placed across said air-way, at a place agreed upon, between room 44 and the furnace so as to force the air to the faces of the rooms between No. 43 and the furnace.

Inspected November 22d by Assistant. Drainage and timbering reasonably good. Props are not close enough to the working faces. There is an ample volume of air (9,700 cubic feet per minute) for the number of persons working under-ground, but it is only fairly well

conducted. Stamps entry and 1st and 2d North entries are more than 60 feet ahead of the air, and should have break-throughs near the face and the rear break-throughs closed. Room 53 off 1st West entry and the first two working rooms off 1st North entry are more than 60 feet in advance of the air current.

Oak Hill Mine.

Near Nortonville. P. O. Nortonville.

Transportation by the St. Louis & Nashville Division of the L. & N. Railroad.

Operated until about May 1st by the Woodstock Coal Co. S. Platt, Secretary. The mine then became idle and remained so until opertations were resumed in the month of August under the present management, under the name of the Oak Hill Coal Mining Co. Q. T. Stull, President; W. T. Stull, Secretary; George Horsefield, Mine Boss.

The vein worked is No. 9 and is five feet thick and the mining is done with picks. Ventilation by furnace. About 80 per cent. of the output is marketed outside of this State.

Visited April 29th by Grider. The mine is idle and flooded with water, and no inpection could be made.

Visited August 26th, but mining had not been regularly resumed and the mine was idle. Repairs were being made.

Inspected on November 19th by Assistant. Props are not set close enough to the working faces. Drainage only fairly good. The attention of Mr. Horsefield, the mine boss, is called to some very loose slate on Main entry. Ventilation is not very good. There should be a door on Main entry between where the open break-throughs of the air-course are, in order to force the current across through the working rooms near the face of the West entry air-course. There should also be a curtain on 1st West entry below the last open break-through to force the ventilating current to traverse the working rooms on the left of this entry. The furnace must be cleaned out.

Reinecke Mine.

Near Madisonville. P. O. Madisonville.

Transportation by the St. Louis & Nashville Division of the L. & N. Railroad.

Operated by the Reinecke Coal Co. Conrad Reinecke, President; I. Bailey, Secretary and General Manager; Louis Foger, Superintendent. This mine ranks first in the Western District as to the number of days worked (260.25), and it is exceeded by only two mines in the entire state (Rush and Clinton), and as to its output of 146,916.36 tons it stands second in the entire State, being exceeded only by No. 9 mine at Earlington.

The mine is a shaft 300 feet deep and it is ventilated by two fans. The mining is done with machines. The vein worked is No. 11 and it is from 6.5 to 7.5 feet thick. About 85 per cent of the output is marketed out of the State. There were no strikes or other hindrances during the year. The special improvements were the installment of eight new Jeffrey Chain Cutting Machines at a cost of $8,000 and the building of a new tip house at the cost of $7,500.

Inspected April 21st by Grider. The mine was found in general good condition.

Inspected August 23d. The mine was in splendid condition in every department and in every way.

Inspected by Assistant November 16th. Timbering and propping good. Drainage fairly good. An abundance of air (21,637 cubic feet per minute) is entering the mine for the number of persons employed under-ground and it is well conducted to the working faces. As there are two break-throughs open near the head of the 6th West entry, the second one from the face should be closed to force the current up near the face of the entry.

MONARCH MINE.

Near Madisonville. P. O. Madisonville.

Transportation by the St. Louis & Nashville Division of the L. & N. Railroad.

Operated until April 16th by the Monarch Coal Co. Chesley Williams, President; C. E. Morton, Secretary and Treasurer; R. S. Dulin, Superintendent.

About May 17th the mine was leased to the present management, Anderson and Holloman, who are still operating it. J. Trathen is the Mine Boss. It is a shaft 265 feet deep and is ventilated by a fan. About 50 per cent. of the output is mined with machines and about 90 per cent. of the same is marketed outside of Kentucky. On

April 16th there was an explosion in this mine in which two men lost their lives. An account of the disaster is given in the chapter headed the "Monarch Mine Explosion."

A mining machine plant, run by electricity, has been installed by the present management at a cost of $4,000. Better appliances for sprinkling the mine have been provided than were in the mine at the time of the explosion.

Inspected by Grider on April 22d. This was directly after the explosion, and the mine had not been put in a condition for operation and was badly wrecked.

Inspected by Assistant August 23d. In his report of the inspection he says: "This mine is dusty and yields fire-damp." The mine is idle, though it is fairly well dampened and the fan is running, showing an intake of 10,830 cubic feet of air per minute fairly well distributed. The only noticible existence of gas was at the face of Main entry. A very loose piece of slate was noticed on 1st East entry. Also the top in room 8 off 2d West entry was so bad Mr. Trathen was instructed to haul the coal through into room No. 7 by putting a switch through the break-through. Timbering very good. Props in rooms fairly well up. Drainage good.

Inspected by Assistant November 23d. Props are not set close enough to working faces. Drainage and timbering good. An abundance of air was entering the mine for the number of persons employed inside, and it is fairly well conducted to the face of the workings. The last two break-throughs between 1st and 2d, and 3d and 4th East entries are open, and the second one from the faces should be closed. There ought to be a check curtain on second West entry between rooms 28 and 29 to force the current into the working faces.

M'LEAN COUNTY.

Output of coal in 1897, 30,852.84 tons, against 24,075.96 tons produced in 1896. The product of two mines is as follows:

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS.	OUTPUT.
Island	14,563.00	26.45	164.00	14,245.24
Field	8,152.96	30.63	176.00	16,607.60
Alva Karnes	1,360.00			
Totals	24,075.96			30,852.84

Gain in 1897, 6,776.88 tons.

ISLAND MINE.

Near Island. P. O. Island.

Transportation over the Owensboro & Russellville Division of the L. & N. Railroad.

Operated by the Island Coal Co. M. Stanley, Superintendent; B. V. McKinney, Manager; Wm. Astzler, Mine Boss.

The mine is a shaft 75 feet deep. Mining is done with picks. The vein worked is No. 9 and is four feet thick. Eighty per cent. of the product is marketed outside of the State. There was a strike during the entire month of October. Opertations were much hindered by lack of railroad cars. There were no special improvements reported.

Visited by Assistant March 19th. The mine is idle and had been so since the 16th, on account of a broken pump. Water had accumulated to such an extent in the mine that an inspection is impracticable.

Inspected by Assistant June 18th. The working faces are dry enough, but the entries leading to them are much too wet. Better drainage should be maintained. Props are not set close enough to the faces of the working rooms. They should be kept to within eight feet of all advancing room faces.

The curtains throughout the mine are in bad condition, resulting in poor ventilation at the working faces. They should at once be put in good order.

Inspected September 8th by Assistant. Timbering and drainage fairly good. Props are not set close enough to face of workings. The ventilation is not sufficient. The dependence for air is exhaust-steam and a small furnace. The steam comes from a discharge pipe of a water pump. The curtains are in a bad condition and some are entirely away. Mr. Stanley is informed that he must attend to this at once, and he says he will do so. He also states that a fan will be built in the near future.

Inspected November 4th. The general mine conditions about the same as at the date of the former inspection. Much water still in the mine and means of ventilation not yet improved.

Field Mine.

Near Island. P. O. Island.

Transportation by the Owensboro & Russellville Division of the L. & N. Railroad.

Operated by the Field Coal Co. C. L. Field, President; W. O. Holbrook, R. Holbrook and John B. Foster are the other mine officials. Ninety-five per cent. of the coal is marketed outside of Kentucky. Ventilation by furnace and mining done by picks. Vein worked No. 9, which is 4½ feet thick. There was a strike during all of October. Advance in wages were demanded. My information is that work was resumed at the old price. There were no special improvements reported.

Inspected by Assistant March 19th. The mine is running and 21 men are at work in it, but there is no fire in the furnace. With a fire in the furnace, the ventilation would be reasonably good and the fire should always be kept up while work is being done in the mine. Props are not set close enough to faces of some of the rooms. This is specially true of the last rooms on the First and Second Right entries. Props should be kept to within six to eight feet of the faces of all working rooms. The mine is quite wet, but the water in it is being fairly well controlled.

Visited June 18th by Assistant. The mine is idle and there is no fire in the furnace, and the conditions for an inspection are not

favorable. No perceptible change has been made in the conditions of the mine since the inspection on March 19th.

Inspected September 8th by Assistant. There is some very loose, bad top at the face of the second South entry and air-course. Mr. Kelly is told to timber the same at once. Drainage and timbering fairly good. Props are not set close enough to face of workings. There is sufficient air for the 18 persons employed, but it is not well conducted. The curtains are very badly torn and allow too much air to pass through them, and instructions were given to replace them with new ones.

Inspected November 4th. Conditions were about the same as in September at date of former inspection.

MUHLENBERG COUNTY.

Output of coal in 1897, 261,678.02 tons, against 256,268.19 tons produced in 1896, and is the product of the following mines:

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS.	OUTPUT.
Central	81,703.00	182.16	190.50	112,055.02
Powderly	34.002.84	53.58	108.00	23,935.40
Hillside	36,491.36	55.58	121.80	31,779.96
Memphis	43,315.16	105.54	108.50	39,431.06
Sterling	2,861.63	19.00	117.00	4,769.76
Mud River	20,971.64	65.75	117.10	24,641.84
Pierce	35,599.74	68.92	121.75	23,982.68
Paradise	1,322.72	.....	.....	251.40
Oakland	.....	8.66	38.00	936.20
Totals	256,268.19	.....	.....	261,783.32

Gain in 1897, 5,515.13 tons.

CENTRAL MINE.

At Central City. P. O. Central City.

Transportation by the Illinois Central Railroad and by the Owensboro and Nashville Division of the Louisville & Nashville Railroad.

Operated by the Central Coal & Iron Company. Bannen Coleman, President; R. R. Hathaway, Vice-President; S. Coleman, Secretary; Hywel Davies, General Manager.

The mine is a shaft 180 feet deep and is ventilated by a fan. The vein worked is No. 9 and is nearly 5 feet thick. The mine is equipped with an electric plant, whch furnishes the power for hauling the coal to the tipple and to operate six Chain Breast machines. There were no hindrances reported. The special improvements of the year were the introduction of three new mining machines at a cost of $3,500. About 75 per cent. of the output was mined with machines, and about 60 per cent. of the same was marketed outside of Kentucky.

This company has 5,000 acres of coal lands in connection with this mine, and it will require hundreds of years to exhaust the same at the present rate of mining.

Inspected by Assistant on May 22d. No neglect of top is discovered on entries or in rooms. The drainage is good. A measurement taken on Main entry between the 8th and 9th South entries showed a volume of 14,480 cubic feet of air per minute passing into the mine, which is ample for the number of persons working under ground, and it is well distributed except in the 10th South entry, where 42 men are at work and only a volume of 3,502 cubic feet of air per minute is passing through it. The conclusion of tne Assistant was that there must be some obstruction that prevented the free passage of the air current.

Immediately on getting the inspection notice, which pointed out the defect, the obstruction was discovered and removed. It was a fall in the last break-through of the last 9th South entry. As soon as this was cleared away the volume of air ran up to 6,000 cubic feet of air per minute, which was abundant for that part of the mine.

Inspected by Assistant August 23d. The entries are well timbered, and rooms fairly well propped, and drainage is good. Abun-

dance of air for the 86 persons employed is entering the mine, though there are two curtains on 9th North entry that are considerably torn and allow too much air to escape down the entry instead of being forced through the workings on the East of said entry. There is a very loose slab of slate on Main South air-course near the head, extending from the face of a room that is being turned out to and over the Main way. The attention of the mine boss was called to the same.

Inspected by Assistant December 9th. Ventilation is good. There should be a break-through between rooms 21 and 22 off 9th North entry. Other conditions are also good.

Powderly Mine.

At Powderly. P. O. Powderly.

Transportation by the Illinois Central Railroad.

Operated by the Green River Coal Company. Lewis Reno, President; E. D. Martin, Vice-President; I. J. Kahn, General Manager; C. H. Hamilton, Superintendent. Head office at Greenville, Ky.

The general question blank sent to this company was never returned, and the names of the officials are taken from last year's report.

No special hindrances or improvements for the year have been reported.

Visited June 18th by Assistant. The mine was found idle and had been idle for several days, and there was no fire in the furnace, and no steam to lower and hoist persons into and out of the mine. The notice of the Assistant adds: "This is the second visit I have made to this mine this year without an inspection. I have reasons to believe that the conditions of the mine are not as good as they should be."

Inspected September 11th by Assistant. In his notice of the inspection made he says: "No loose or dangerous top was noticed. Drainage and propping fairly good. The mine was idle at the time of the inspection, therefore I could not give it as thorough an inspection as I would like to have done. But I am sure the ventilation is insufficient, from the fact that the Main air-way to the furnace is filled up with slate, etc., which is being cleaned up. With new curtains where I showed Mr. Miller and that air-way cleaned up I am quite sure it will improve the circulation."

Inspected December 10th by Assistant.

An ample volume of air is entering the mine for the number of persons inside, which is fairly well distributed to the workings. There should be a check-curtain on 2d West entry between the 20th and 21st rooms, also one on 5th North entry between rooms 7 and 8. The second break-through, from the face between 2d West entry and air-course, is open and should be closed so as to force the current near the face of the entry.

HILLSIDE MINE.

At Hillside. P. O. Mercer Station.

Transportation by the Illinois Central Railroad.

Operated by the Hillside Coal Company. J. W. Lam (Secretary) and Wm. Eades; Mr. Russell, Mine Boss.

The general question blank sent to this company was not returned, and I have no report as to hindrances or improvements for the year.

Inspected by Assistant March 18th. A second outlet has not yet been provided, but a shaft for a second outlet was under contract, and the same was to be sunk as soon as practicable. With 53 persons employed in the mine there was a very well distributed current of 13,530 cubic feet of air per minute flowing through it. No dangerous neglect to timber or prop was discovered. The drainage was good.

Inspected by Assistant September 11th. Drainage and propping fairly good. The mine was not running, therefore, a satisfactory inspection could not be made, but it was believed from the system of brattices, etc., observed that the ventilation was sufficient for the number of persons employed. The second outlet was to be made by connection with the Oakland mine, and instructions were given to attend to this at once.

Inspected by Assistant December 9th. The mine was again idle and a proper inspection as to ventilation could not be made. There should be a check curtain on 2nd North entry, between rooms 32 and 33, to force the current into the working places. Also, there ought to be a break-through between rooms 20 and 21 off 3rd West entry. Props are not set close enough to the working faces. Drainage and timbering good.

This mine as yet has but one outlet. Another must be provided at once, according to section 9 of the Mining law.

Memphis Mine.

At Bevier. P. O. Bevier.

Transportation by the Owensboro & Nashville Division of the L. & N. Railroad.

Operated by W. H. Moore and J. W. Moores, Lessees of the Memphis Coal and Mining Company. J. W. Moores, Superintendent.

The general question blank sent to the company was not returned, and the office has no report as to special hindrances or improvements for the year, nor as to other matters desired. The names of the officials are taken from the 1896 report.

Inspected by Assistant May 24th. No lack of timbering was noted on the entries. In a number of working rooms props were set too far back from the faces of the rooms, but no bad top was discovered in them. There were about 100 men employed in the mine, and there was a volume of 14,230 cubic feet of air per minute, well conducted through it, giving good ventilation. The drainage was good.

Inspected by Assistant September 10th. No lack of necessary timbering was noted on entries. No loose, dangerous top was discovered. In rooms, however, the props were not set close enough to the working faces. Drainage was quite satisfactory. There was an ample volume of air entering the mine for the 100 persons employed, and which was well conducted to all parts of the mine where work was being done.

Inspected December 8th by Assistant. No immediate lack of timbering was observed. Props were not close enough to working faces. Drainage good.

Silver Creek Mine.

Near Central City. P. O. Central City.

Transportation by the Owensboro & Nashville Division of the L. & N. Railroad.

Operated until June by George E. Briges & Co., and after that time, by the the Gold Standard Coal Company. B. V. McKenney, Owner and General Manager; R. B. Eastin, Mine Boss.

No work was done during February, April and May and no report was made for December. The general question blank sent to the company was returned on December 20th. It states that there was a squeeze on Main entry December 1st and it is presumed that no

work was done during that month. The mine is located in No. 11 vein and is ventilated by a furnace and mining is done with picks. About 80 per cent. of the output is marketed outside of the State. The squeeze mentioned damaged the company about $300. The improvements for the year were a new nut screen and re-timbering the air shaft.

Visited by Assistant on May 24th. The mine was idle and no work had been done for about two months and no inspection was made.

Inspected September 16th by Assistant. No loose, dangerous top was noticed on the entries. Timbering and drainage just reasonably good. Props were not set close enough to the working faces. The ventilation was not very good. The furnace is situated too far from the workings and the capacity of the furnace is not sufficient to convey much current to the present working faces. A new furnace is necessary and the company promises to build one in the near future. This will make the ventilation good.

Inspected November 3d. Conditions were about the same as at date of the last inspection.

Visited on December 11th by Assistant. The mine was idle on account of the squeeze on Main entry. Repairs were being rushed, and it was thought that operations could be resumed within two or three weeks.

Mud River Mine.

At Mud River. P. O. Mud River.

Transportation by the Owensboro & Nashville Division of the L. & N. Railroad.

Operated by the Mud River Coal, Coke & Iron Co. John C. Gordon, President; A. G. Hunter, Vice-President; E. S. Rundle, Secretary and Manager.

About 75 per cent. of the output is marketed outside of the State. The mine is ventilated by a furnace and mining is done with picks. There were no hindrances nor special improvements reported for the year.

Inspected May 26th by Assistant. The mine was idle and had not been running for several days and there was no fire in the furnace. With a fire the ventilation would no doubt be reasonably good.

The drainage was good. No dangerous or unsupported top was discovered.

Inspected by Assistant September 9th. No lack of necessary timbering was noticed on the entries and propping and drainage were fairly good. The mine was idle. The furnace was examined and found to be in apparent good condition. The arrangement of the brattices, doors, curtains, openings, etc., indicate that with a good fire in the furnace the ventilation of the mine would be sufficient for the number of men employed under-ground.

Inspected December 7th by Assistant. The mine was not running and the furnace was cold. Think it would give better ventilation if the furnace was closer to the working places. All other conditions appear to be good.

Pierce Mine.

At Drakesboro. P. O. Drakesboro.

Transportation by the Owensboro and Nashville Division of the Louisville & Nashville Railroad. Operated by the Black Diamond Coal & Mining Company. James T. Pierce, President, General Manager and Treasurer; H. W. Butteroff, Vice-President; W. W. Bridges, Secretary.

This mine is a shaft 132 feet deep and is No. 9 vein of coal, which is 5 feet thick, and has ventilation by a fan. Mining is done with picks and about 50 per cent. of the product is marketed outside of Kentucky.

There was a strike during the month of October. The miners demanded an advance of 3 cents per ton and settlement was made at 2.5 cents advance. No special improvements for the year have been reported.

Inspected May 25th by Assistant. Where men were employed the drainage was good. No lack of timbering was noted on the entries. In some rooms the props were not set close enough to the working faces. The supply of air going through the mine was ample, but the doors and curtains in the mine were not in good condition.

Inspected by Assistant September 9th. No loose top or lack of timbering was noticed on the entries. Drainage fairly good. Props well up to face of workings. The mine was idle and the fan was not running and the ventilation could not be determined. It was thought

that the fan was not sufficient in its condition to thoroughly ventilate the mine, but better conditions were being made.

Inspected December 8th by Assistant. Drainage not very good. Ventilation is fairly good except where six men are at work on 3rd North entry off Main East entry, but the air will be readily improved when the rooms are connected with others that are now being driven towards them. It was suggested that two of the men be taken out until said connections should be made. On 1st North entry air-course there should be a check curtain between 1st and 2d rooms to force the current into the second room, also the break-throughs between said rooms should be stopped.

On 2d North entry there should be a check curtain between the fourth and fifth working rooms to force the air to the working faces.

The old room necks off 1st East entry off 1st North entry should be closed.

Oakland Mine.

Near Mercer Station. P. O. Mercer Station.

Transportation by the Illinois Central Railroad.

Operated by the Oakland Coal Co. J. W. Lam, Secretary. This is a new mine, opened late in 1897, the first output being in the month of October.

Visited by Assistant December 9th. Only five men were working in the mine at the time. The mining consisted of running one Main entry East which had been advanced about 105 feet with a pair of North entries broken off about 25 feet deep, also a pair of switch entries broken off about 25 to 30 feet deep. No artificial means of ventilation had been provided, but a fan is to be put in.

Paradise Mine.

This mine is on Green River and is operated by Mr. J. Wm. Jones, who claims that it is not subject to State supervision because not more than five men are employed inside the mine. He sent in but two reports during the year, which showed that but little mining was being done and that his claim was correct, and no more attention was given it.

OHIO COUNTY.

The output of coal, in 1897, amounts to 460,592.51 tons, against 368,094.44 tons produced in 1896, and which is the product of several mines, as follows :

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS.	OUTPUT.
Echols	63,252.32	107.00	186.40	80,007.63
McHenry	50,378.56	97.16	169.70	73,306.35
Render	102,945.88	132.66	205.05	93,227.99
Williams	37,749.76	88.08	160.00	37,552.81
Taylor	80,223.56	151.75	251.00	138,932.12
Ætna Colliery	16,489.08	36.75	116.50	13,976.80
Thompson	13,877.32	15.00	177.00	15,101.00
Fordsville	3,177.96	15.92	208.00	5,603.36
Reynolds	8.00	5.00	.....	65.00
Jamestown	.....	10.60	.....	2,920.00
Totals	368,094.44	.....	.....	460,693.06

Gain over 1896, 92,598.62 tons.

ECHOLS MINE.

At Echols. P. O. Echols.

Transportation by the Illinois Central Railroad.

Operated by the McHenry Coal Company. W. G. Duncan, President; H. McH. Eskridge, Secretary; C. W. Taylor, General Manager; A. G. White, Mine Manager; Robert Duncan, Mine Boss. Head office, 456 West Main Street, Louisville, Kentucky.

The mine is a shaft, 95 feet deep, and is ventilated by a furnace. The mining is done with machines. The vein worked is No. 9 and is about 5 feet thick. About 25 per cent. of the output is marketed outside of the State of Kentucky. Operations were greatly hindered during much of the year by the lack of cars to ship the product. The

special improvements were the introduction of one new mining machine and the sinking of a new air shaft and the building of a new furnace, all at a cost of about $2,500.

Inspected by Assistant May 21st. No dangerous neglect to timber the entries was noted. Rooms fairly well propped, though, in some places, props are not close enough to the working faces. The mine is fairly well drained. The ventilation was reasonably good, though some repairing of doors and rooms was needed.

Inspected by Assistant September 17th. The drainage and timbering fairly good. No loose, dangerous top was noticed on the entries. In room 17 off Main North entry some very loose, dangerous top was shown to Mr. Duncan. Props were not close enough to face of workings. The ventilation was as not good as it should be. The fan was insufficient for a mine of this size.

Mr. White, the Mine Superintendent, stated that he would have another air shaft opened immediately near room 17, about 50 feet off 3d South entry, which may be used for furnace or fan, as should thereafter be determined. There should be a break-through between rooms 18 and 19 off 4th North entry. Room 23 off 3d North entry was working more than 60 feet ahead of the air. There should be a curtain on 3d South entry across the mouth of room 11 to force the current up the entry. There should, also, be a curtain on 4th South entry, near room 22, to force the air through the break-through into the other rooms.

Inspected by Assistant December 11th. Props are not close enough to face of workings. Drainage and timbering good. Ventilation reasonably good considering the insufficiency of the present furnace; however, when the 2nd room off 4th North entry is broken into the air-course off 5th North entry, the ventilation will be improved on same. There should be a curtain between rooms 30 and 31 off 4th North entry to force the current to the working faces. The 2d break-through between Main entry and air-course should be closed.

McHenry Mine.

At McHenry. P. O. McHenry.

Transportation by the Illinois Central Railroad.

Operated by the McHenry Coal Company. Head office, 456 West Main Street, Louisville, Kentucky. (The names of the officials are

given in connection with the notes on Echols Mine.) O. C. Roll is Mine Boss.

The mining is done with machines. About 25 per cent. of the output is marketed outside of Kentucky. The vein worked is No. 9 and is near 5 feet thick. Ventilation by a fan. Operations were greatly hindered much of the time because cars could not be obtained to ship the product to market.

Two new mining machines were installed during the year, also a new tipple was built; all costing about $3,000.

Inspected May 21st by Assistant. No dangerous neglect to timber on entries or to prop in rooms was noticed. The drainage was good. There was an ample current of air flowing through the mine, and it was kept well up to the faces of the entries and air-ways, but several rooms were more than 60 feet in advance of the air.

Inspected September 18th by Assistant.

The air-way to the fan is almost closed, but it is being cleaned out. There is an ample volume of air entering the mine for the 55 persons under-ground, but it is not very well conducted. There should be a curtain in Main entry, between the 12th North entry and the air-course. There should, also, be a break-through near face of the 12th North entry. The last two break-throughs, between 10th North entry and air-course, are open. The second one from the face should be bratticed. There should be a new curtain on Main entry near the 11th North entry air-course. There was some timber badly needed on the air-course to 11th North entry near room 14. Drainage and propping fairly good.

Inspected by Assistant December 13th.

An abundance of air (17,700 cubic feet per minute) was entering the mine for the 100 persons employed under-ground, fairly well conducted to the working faces. The face of 11th South entry is more than 60 feet ahead of air and should have a break-through. Room 3 off 12th North entry air-course and room 2 off 12th North entry should have break-throughs. There should, also, be a break-through between rooms 26 and 27 off 10th North entry air-course and between rooms 28 and 29 off 10th North entry.

RENDER MINES (2).

At Render. P. O. Render.

Transportation by the Illinois Central Railroad.

Operated by the Central Coal & Iron Co. B. Coleman, President; R. R. Hathaway, Vice-President; S. Coleman, Secretary; Hywel Davies, General Manager. Head office, 410 West Main Street, Louisville, Kentucky. Simon Jones, Mine Boss.

About 25 per cent. of the output is marketed outside of Kentucky. The mining is done by machines. The vein worked is No. 9 and is four feet thick. Furnace ventilation. There was a small strike in July, but it was soon settled. There were no special improvements reported for the year.

NEW MINE, OR NO. 2.

Inspected May 12th. There was a volume of 12,500 cubic feet of air per minute flowing through the mine; well distributed to all the working places. The mine generally to all appearances was in a good, safe condition.

Inspected by Assistant September 20th.

The drainage and timbering were good. There were some very loose slabs of slate on Main South entry and on 1st East entry off Main South entry. Props were set fairly well up to faces of the workings. An abundance of air was entering the mine for the 50 persons employed and it was well conducted to the workings.

Inspected by Assistant December 14th.

An abundance of air was entering the mine for the number of persons employed inside, which is fairly well distributed to the working faces. But the second break-through from face of Southeast entry is open and it should be closed. On the 3d South entry the 2d break-through from face was open and should be bratticed. Also a check-curtain was needed between rooms 6 and 7 to force the air-current near the face of the workings. Other conditions are quite satisfactory.

OLD MINE, OR NO. 1.

Inspected May 12th.

The mine was well ventilated by a volume of 8,100 cubic feet of

air per minute flowing through it and conducted well up to the working faces. All other conditions were good and safe.

Inspected by Assistant September 20th.

No loose, dangerous top was noticed on entries. Timbering and drainage good. Props were not set as close to working faces as they should be. There was an ample supply of air in the mine for the number of persons employed, but the air from the main intake has to go so far before it reaches the workings that it becomes affected to some extent with black-damp from the old workings. The mine foreman stated that he inteneded to make his down-cast at a point near 11th North entry, thereby giving fresh air to the new workings in the mine.

Inspected by Assistant December 14th.

An ample volume of air was entering the mine for the number of persons employed under-ground and it was reasonably well carried to the working faces. However, the down-cast off 11th North entry should be made as soon as possible, so as to enable the fresh air to traverse the workings instead of the air from the present intake, which is mixed with impurities before it reaches the working places. Other conditions good.

Williams Mine.

Near McHenry. P. O. McHenry.

Transportation by the Illinois Central Railroad.

Operated by the Williams Coal Co. E. T. Williams, President; J. S. Williams, Secretary and Treasurer; F. E. Harris, Mine Boss.

The mine is ventilated by a furnace and the mining is done with picks. The vein worked is No. 9 and is four feet thick. About 30 per cent. of the product is marketed outside of the State. There was a strike in January that continued eighteen days. An increase of wages was asked for but not granted and work was resumed. No special improvements were reported.

Inspected May 12th.

There was an abundance of air entering the mine to make the ventilation good, but it was not well distributed on 2d Left entry and in the rooms off the same because of a fall about room 11 that obstructed the passage of the air. Props in many places were not set close enough to the working faces. Often there was a space of from

ten to eighteen feet without props. Some of the pillars between rooms were left too thin and too narrow at the base.

Inspected September 20th by the Assistant.

Drainage and timbering good. Props were not set close enough to face of workings. An ample volume of air was entering the mine for the 74 persons employed under-ground, which was fairly well distributed. There should be a curtain on Main North entry near the break-through to force the air from the intake at the Man-way into the working rooms on 3d West entry. The 2d break-through between Main entry and air-course should be stopped and there should be a brattice on Main entry air-course near the first break-through to force the current into 2d West entry room 17. There should be a brattice on 2d West air-course to force the air into the workings on 1st Left entry.

Inspected December 14th by Assistant.

The mime was idle and furnace was cold. Conditions generally were quite satisfactory. It was thought that with a fire in the furnace the ventilation would be good.

Taylor Mine.

Near Beaver Dam. P. O. Taylor Mines.

Transportation by the Illinois Central Railroad.

Operated by the Taylor Coal Company. J. P. Speed, President; I. P. Barnard, Superintendent; W. A. Jones, Secretary and Treasurer; Nicholas Barrass, Mine Boss.

Only about 5 per cent. of the product is marketed outside of Kentucky. The vein worked is No. 9. The mining is done with machines, and the mine has furnace ventilation. There were no hindrances worthy of mention, and no improvements for the year.

Inspected May 11th.

The mine was in general good condition except there was a great deal of mud in the entries, as the result of the heavy spring rains, and this was fast being remedied by hauling and bedding coal ashes. Pillars are large and rooms well propped. There were 39,000 cubic feet of air per minute well distributed throughout the mine.

Inspected by Assistant September 21st.

There was an ample volume of air entering the mine for the 100 persons employed and it was well conducted to the working faces.

There should be a break-through between rooms 39 and 40 off 2nd Right entry. Drainage was good except in a few rooms on 1st Right entry, that are about done. Timbering and propping fairly good. Mr. Barrass' attention was called to some very loose slabs of slate on 1st Right entry off Main entry.

Inspected by Assistant December 15th.

Ventilation fairly good. There should be a check curtain between rooms 7 and 8 on 1st Cross entry air-course off 1st Left entry. The face of 1st Left entry off 3rd Right entry was 110 feet ahead of the ventilating current, and it should have a break-through.

ÆTNA COLLIERY.

At Deanfield. P. O. Ætnaville.

Transportation by the Owensboro & Falls of Rough Division of the Illinois Central Railroad.

Operated until August by D. Stewart Miller, and since that time by Guy M. Deane.

The general question blank sent to the mine was not returned, and some information desired has not been furnished. The mine is a shaft and is ventilated by a furnace.

Visited May 25th, but the mine was idle and so flooded with water as to make an inspection impossible.

Inspected September 23d by Assistant. "The air is not very good, but there is a new air shaft just completed, which at present serves as an intake, and as no provisions are yet made to keep the air from the two intakes coming in contact with each other, naturally no current is traversing the mine. The mine had just resumed after a month's suspension, and drainage, timbering, props, etc., are as well attended to as the circumstances permit, but there is far too much water in the mine, and it generally needs much attention."

Inspected by Assistant December 6th.

Drainage not good. Ventilation fairly good. Props fairly well up to face of workings. There should be a check curtain on Main West entry near the mouth of South entry air-course to force the air up near the head of the entry through the break-through into the North rooms.

Louise Mine.

At Deanfield. P. O. Ætnaville.

Transportation by the Owensboro & Falls of Rough Division of the Illinois Central Railroad.

Operated by the Thompson Coal Company. M. S. Thompson, President; Geo. C. Roberts, Secretary and General Manager.

The general question blank sent the company was not returned and information sought was not obtained.

Inspected May 25th.

The mine was in good condition, except too much air was escaping into 2d Right entry instead of being carried on to the 3d Right entry. There should be a new curtain at the mouth of the 2nd Right entry. Rooms are not propped close enough to working faces. From 15 to 25 feet is too far from the face. The volume of air entering the mine was abundant, 8,000 cubic feet per minute.

Inspected by Assistant September 23d.

The mine had just resumed work after a month's suspension, and under the circumstances the drainage, timbering and propping were fairly good. Ventilation was fairly good, but the mine boss was shown where to put a curtain on 2d West entry to force the air up Main entry through the head break-through into air-course and to have the air-course bratticed near head break-through of last room to force the current through the workings on same.

There was but one outlet to the mine, and directions were given to provide another, according to section 9 of the Mining law.

Inspected by Assistant December 6th.

The mine was idle. Work ceased at noon. Shooting had commenced, and a thorough inspection was impossible. From all appearances it was thought that the ventilation would be good with a good fire in the furnace.

Johnson Mine.

Near Fordsville. P. O. Fordsville.

Transportation by the Owensboro & Falls of Rough Division of the Illinois Central Railroad.

Operated by the Fordsville Block Coal Co. W. S. Gaines,

President; C. E. Ford, Vice-President; I. C. Adair, Secretary and Treasurer.

Mining is done with picks. The improvements for the year were a new furnace and air shaft.

Visited May 25th. The mine was idle and no one connected with the mine was present. The mouth of the mine needed drainage and the Main entry near the mouth was in a dangerous condition for the want of better timbering. Notice was served requiring these matters to be attended to. No further inspection was attempted.

Inspected September 22d by Assistant.

The drainage in the mine was fairly good. Some very bad top was noticed on 1st Left, 1st Right and Main West entries and the same should be pulled down or timbered at once to prevent accident. The timbering is not as good as it should be. None of the rooms were sufficiently propped. The ventilation is not good. The furnace is a very weak concern and not at all sufficient, but assurances were given by Mr. Gaines that a new furnace would be built and instructions were given that this must be done.

Some break-throughs should be closed and only those nearest the face should be left open. The curtain on Main entry is worn out and should be replaced by a new one. Those old room necks between the Hayti entry and the mouth of the mine should be closed except one. There should be a check curtain below it on Main entry to force the current into the Hayti entry, which is not ventilated at all at the present time, then let the air return out of the Main Hayti entry into the Main West entry, thence down the Main entry and to the other places where work is being done.

The mine has but one outlet and instructions were given to provide another according to section 9 of the Mining law.

Inspected by Assistant December 6th.

Propping, drainage and timbering fairly good. An ample volume of air was entering the mine for the number of persons employed inside the mine, but it was not properly conveyed to the workings. There should be a curtain on Main entry just above Oklahoma entry, also a curtain on mouth of air-course off Oklahoma entry. The repairing of the furnace and other improvements since last inspection were good. But the Hayti entry was not yet properly ventilated as directed in former notice and this must be done.

Reynolds Mine.

This mine is at Reynolds Station on the Owensboro & Falls of Rough Railroad, but it was idle most all the year. No reports have been returned except a small output for March, and the mine was visited, but found idle and not inspected.

Jamestown Mine.

Near Livermore. P. O. Livermore.

Transportation by Green River.

Operated by the Jamestown Coal Company. F. O. Coffman, President and General Manager; W. F. Coffman, Vice-President; W. S. Trunnell, Secretary; J. W. Greenwood, Mine Boss.

This is a new mine. Its first output was in August, 1897. Mining is done with picks. The vein worked is No. 9. The cost of improvements necessary to start the mine was about $2,000.

UNION COUNTY.

Output of coal in 1897, 117,732.32 tons, against 104,121.34 tons produced in 1896. The product of five mines is as follows :

Mine.	1896.	1897.		
	Output.	Av. Emp.	Days.	Output.
DeKoven	61,051.32	104.66	186.00	50,845.48
Trade Water	5,219.10	63.98	193.50	34,719.48
Cumberland	30,320.68	72.12	.....	25,572.04
Davidson	5,415.72	11.41	172.00	4,972.48
Sullivan	1,047.16	6.00	116.00	1,622.84
Conn	1,067.36	.....	.....	.....
Totals	104,121.34	.....	.....	117,732.32

Gain over 1896, 13,610.96 tons.

DeKoven Mines (2).

Near DeKoven. P. O. DeKoven.

Transportation by the Ohio Valley Division of the Illinois Central Railroad.

Operated by the Ohio Valley Coal and Mining Company. James S. Brown, President; S. P. Sturgis, Secretary; John Whitehead, Sr., Mine Superintendent.

About 70 per cent. of the output is mined with machines, and about 25 per cent. of the output is marketed outside of Kentucky. Ventilation by furnace. No hindrances or improvements reported for the year.

(Four Foot Slope.)

Inspected April 28th by Assistant.

There are but 11 persons at work in the mine, all in rooms on the bottom level. The ventilation is reasonably good. The drainage is good.

Visited September 2d. The mine was worked out.

No. 9. Inspected April 28th by Assistant. The mine was idle and there was no fire in the furnace, but it has sufficient power when fired. The curtains throughout the mine should be put in good condition. Many of them are badly torn. This done, the ventilation would be good. In some places props are set too far from faces. They should be kept within 8 feet of all working-room faces.

Inspected September 2d by Assistant.

There is an ample volume of air entering the mine for the 70 persons employed, and it is fairly well conducted to the face of workings. Timbering and drainage good. Props are well up to face of workings, but in some instances are rather far apart.

Inspected November 29th by Assistant.

Ventilation fairly good. The 2d break-through, from the face of 4th East entry air-course, should be closed. There should be a break-through near face of 2d East entry, which is more than 60 feet ahead of the air. There are too much slack, etc., in the break-throughs, that should be kept open to permit the current to properly traverse the workings. Other conditions are good.

TRADE WATER MINE.

Near Sturgis. P. O. Strugis.

Transportation by the Ohio Valley Division of the Illinois Central Railroad.

Operated by W. L. Gordon Jr., Lessee of the Trade Water Coal Mines.

The general question blank sent to the company has not been returned and information sought therein has not been received.

Inspected by Assistant April 27th. Since former inspection a good deal of well-directed and valuable timbering has been done, but more is yet needed at points indicated to Mr. Hamilton, and by him. Main West entry is quite sloppy. It should be gotten and kept drier. Elsewhere the drainage is very good. Touching the ventilation, there are 15,286 cubic feet of air per minute entering the mine and only 40 persons employed in the mine. On Main East entry rooms, 4, 5, 6 and 7 have two open break-throughs. The rear ones should be closed. On Main West entry, in rooms from 12 to 17, inclusive, there are from two to three open break-throughs in each. The rear ones should be closed so as to throw the air through the one nearest each face.

Inspected by Assistant September 1st.

Timbering and drainage fairly good. Props are set rather too far apart. Ample volume of air for the 52 persons in the mine, which is fairly well conducted to working faces, except in a few rooms near head of Main West entry, which are more than 60 feet ahead of the air.

Inspected November 30th by Assistant.

Drainage and timbering good. Props fairly well up to working faces. Ventilation reasonably good. There should be a door on Main West entry near room 12. The curtain on Left of short entry should be replaced. The face of Main West entry is more than 60 feet ahead of the ventilating current.

CUMBERLAND MINE.

Near Sturgis. P. O. Sturgis.

Transportation by the Ohio Valley Division of the Illinois Central Railroad.

Operated by the Cumberland Coal Co. W. W. Smith, President; Isaac Reese, Secretary and General Manager; C. H. Wilson, Superintendent; Charles Welch, Mine Boss.

The vein worked is No. 9 and is five feet thick. The ventilation is by a fan and the mining is done with picks. Operations were suspended several months, caused by a bad fire inside the mine, resulting in damages estimated at $5,000.

Visited April 27th by Assistant. Many brattices and timbers were burned by the recent fire, resulting in a heavy fall of top on Main entry, which had not been cleaned away. An inspection was impracticable.

Inspected by Assistant September 1st.

Timbering and propping fairly good. Drainage is not good, caused by the mine fire which stopped the pumps. But two pumps are at work. Ventilation is not what it ought to be.

Inspected November 30th by Assistant.

Props are not set close enough to face of workings. Mr. Welch's attention was called to some very loose slabs of slate on Main slope entry. Timbering fairly good elsewhere. Drainage very good. Some of the pillars are robbed entirely too much and this should receive prompt attention, lest there should be a creep that would entail great expense and loss otherwise.

An abundance of air is entering the mine, but is not well conducted to the working faces. The fan ought to be reversed, so as to make it a force, or down-cast. This would not permit the bad air from the burnt part of the mine to be sent through the workings. On 5th East entry the 2d break-through is open and should be closed. There should be a curtain between 1st and 2d rooms to throw the current near the face. There should also be a curtain on 5th West entry, between rooms 7 and 8, to act in the same way. The face of the 5th East entry is more than 60 feet ahead of the ventilating current.

Davidson's Mine.

Near Uniontown. P. O. Uniontown.

The mine is a shaft 200 feet deep. It is located near the Uniontown Branch of the O. V. Railroad, but is operated to supply the local trade.

Operated by B. C. Davidson & Sons, a firm consisting of B. C. Davidson, B. C. Davidson, Jr., and H. T. Davidson.

There has been no disturbances or improvements reported for the year.

Inspected by Assistant April 26th. The mine was idle. When working, the ventilation is produced by exhaust steam at the bottom of the air shaft. A sufficient current of air is produced in this way, and it is fairly well conducted through the mine. The drainage was good.

Inspected by Assistant September 3d.

Timbering and drainage fairly good. Props were not all close enough to face of workings. There was an ample volume of air entering the mine for the eight persons employed, which was fairly well conducted to the working faces.

Inspected December 21st by Assistant.

Conditions were good, except the three working rooms off 1st left entry should have a break-through. Mr. Davidson was cautioned about keeping his cage, safety catches, ropes, etc., in repair. The mine has but one place of ingress and egress.

Sullivan Mine.

At Sullivan. P. O. Sullivan

Transportation by the Ohio Valley Division of the Illinois Central Railroad Co. Operated by James M. Lamb.

The mine was idle during three months of the year, and while at work, generally had less than six men in the mine.

Visited September 2d by Assistant. Only four men were working in the mine and no inspection was made.

Visited again December 1st. Only four men engaged in the work, and no inspection was made. However, the mine was examined, and the conditions were found to be good.

WEBSTER COUNTY.

Output of coal in 1897, 70,585.80 tons, against 50,538.96 tons produced in 1896; the product of the following mines:

MINE.	1896.	1897.		
	OUTPUT.	AV. EMP.	DAYS.	OUTPUT.
Providence Slope	40,614.44	88.50	188.00	51,962.12
Providence Shaft	972.00	13.33	30.00	1,580.00
T. L. Taylor	4,576.52	18.00	76.00	8,544.88
Sebree	4,376.00	14.16	144.00	8,498.80
Totals	50,538.96			70,585.80

Increase over 1896, 20,046.84 tons.

PROVIDENCE SLOPE.

At Providence. P. O. Providence.

Transportation by the Providence Branch of the St. Louis & Nashville Division of the L. & N. Railroad.

Operated by the Providence Coal Company. W. A. Nesbit, President; W. J. Nesbit, Secretary and General Manager; Jack McIntosh, Mine Boss.

About 80 per cent. of the product is marketed outside of Kentucky. The mine is ventilated by a fan and mining is done with picks. Improvement reported, one new vibrating screen, cost $500.

Inspected April 23d by Assistant.

The mine was idle, and no men were in it. The fan has ample ventilation power, and when running the ventilation is good. In a number of rooms the props were not set close enough to the faces. The drainage was good.

Inspected by Assistant August 26th.

There were 65 men in the mine, and a volume of 15,799 cubic feet of air per minute was entering the mine, and it was fairly well conducted. Props, generally, were not set close enough to working faces. Timbering was good. Drainage was very good, except in

room No. 9 off 1st Right entry. There was some very loose top in room No. 7 off 6th Right entry, and Mr. McIntosh was instructed to put road through break-through into room No. 6 and haul the coal that way.

Inspected November 24th by Assistant.

The mine was idle. The 2d break-through, from face of 8th and 9th entries, should be bratticed. Propping was not satisfactory. The props were not set close enough to the working faces, and entirely too far apart. Other conditions were satisfactory.

Providence Shaft.

At Providence. P. O. Providence.

Transportation by the Providence Branch of the St. Louis & Nashville Division of the L. & N. Railroad.

Operated during the winter by R. L. Forsythe and during the latter part of the year by Forsythe & Lloyd.

No return of the general question blank was made, and the information therein sought has not been obtained. The output of the mine for the latter part of the year is included with that of the Providence Slope.

Visited by Assistant April 23d. Only four men employed, and mine idle at the time and no inspection was made.

Visited August 26th by Assistant. Mine again idle and no inspection was made.

Inspected by Assistant November 24th. The basket was cold and natural means were employed for ventilation. With a fire in the basket and a curtain on Main entry air-course to force the current into the 2d Right entry workings the ventilation would, no doubt, be good. There must be two separate and distinct ways of ingress and egress.

Taylor's Mine.

At Providence. P. O. Providence.

The mine is not connected with the Railroad, but is located near by. Operated by T. L. Taylor.

Inspected by Assistant April 23d.

There were but six miners employed. Their working places were dry and well ventilated, but not well propped.

Inspected by Assistant August 26th. The drainage was good. The props were not set close enough to face of the workings. Timbering fairly good. Ventilation not very good. The mine is so scattered that a proper conveyance of air is impossible. There was air enough entering the mine if it was properly conducted.

Inspected November 24th by Assistant.

Drainage and timbering fairly good. Props only reasonably up to working faces. Air fairly good. The working rooms on the East side should have the ventilating current turned through them by means of a curtain to be hung on entry near 1st working place.

SEBREE MINE.

At Sebree. P. O. Sebree.

Transportation can be made by the St. Louis & Nashville Division of the L. & N. Railroad.

Operated by the Sebree Coal Co. S. F. Powell, President; T. J. Ashby, Secretary and Manager; J. L. Jackson, Mine Boss.

This mine is a shaft 175 feet deep and is ventilated by a fan and the mining is done with picks. About 50 per cent. of the product is marketed outside of Kentucky. No improvements or hindrances were reported.

Inspected by Assistant April 24th. Props were not close enough to face of workings. Drainage was good. The air current was not sufficient for good ventilation. Some of the break-throughs between rooms were not large enough.

Inspected by Assistant August 31st.

Timbering and drainage were good. Props fairly well up to face of workings. The fan was running and a measurement showed 1,470 cubic feet of air per minute passing through the mine, and well conducted. The mine has but one outlet, but employs only nine men under ground.

Inspected by Assistant November 25th.

Props are not well up to the working faces. Drainage good. Some very loose top on 2d South entry was shown to Mr. Jackson. Ventilation only reasonably good. The air shaft to fan was too full of slate near the bottom of the shaft. On 2d North entry rooms 1 and 2 are more than 60 feet ahead of the air. The curtain on 2d South entry should be moved to the last break-through. On 1st South entry the 1st and 2d rooms are more than 60 feet ahead of the air. There should be a check curtain on this entry between these rooms to force the current near the faces. Attention is again called to necessity for two outlets to the mine.

LAWS RELATING TO MINING, ETC.

THE MINING LAW.

AN ACT to provide for and regulate the ventilation of coal mines in this State and for the better protection of miners, enacted by the General Assembly of 1891-3, and amended at the session of 1894.

Be it enacted by the General Assembly of the Commonwealth of Kentucky: SECTION 1. That there shall be appointed by the Governor, with the advice and consent of the Senate, an Inspector of Mines, who shall hold his office for four years, and until his successor is appointed and qualified; but he shall be liable to be removed by the Governor for willful neglect of duty or malfeasance in office. Any vacancy in the office of Inspector which may occur when the Senate is not in session shall be filled by appointment of the Governor till the close of the next session of the Senate. Said Inspector shall have a practical knowledge of chemistry, geology and mineralogy, and shall also possess a practical knowledge of the different systems of working and ventilating coal mines, and of the nature and properties of the noxious and poisonous gases of the mines, especially fire-damp, and he shall also have a practical knowledge of mining and engineering; and said inspector shall, before he enters upon the discharge of his official duties, be sworn to discharge them faithfully and impartially, which oath shall be subscribed on his commission, and certified by the officer administering it, and his commission so indorsed shall be filed with the Secretary of State in his office; and said Inspector shall give a bond in the penal sum of five thousand dollars, with surety, to be approved by the Governor, for the faithful discharge of his official duties.

SEC. 2. Said Inspector shall give his entire time and attention to the discharge of the duties of his office, and it shall be a part of his duty to visit and inspect, as often as may be necessary, all the coal mines in actual operation in Kentucky and to see that the provisions of this act are complied with by the owners, agents and superintendents of all the mines in this State.

SEC. 3. Said Inspector shall have power to visit and inspect any mine to which this act applies. He shall examine into the condition of such mine with respect to ventilation, drainage, timbering and general security; and if, upon inspection, he finds that such ventilation, drainage, or timbering as the health or safety of the persons employed in the mine would require has not been provided, or should he find the mine insecure in any part, or should he find that sufficient means of ingress and egress have not been provided, said Inspector shall at once notify the agent, superintendent or owner of the mine as to the unsafe or unwholesome condition of such mine, and require him to put the mine in a safe and wholesome condition, and such mine shall forthwith be rendered safe and healthful. For a failure to comply with the directions of the Inspector to render such mine safe, and to provide such ventilation as is sought to be secured by this law, and to provide safe and suitable means of ingress and egress, within *twenty* days from the date of the inspection, the agent or superintendent and owner shall be liable to a fine of fifty dollars per day for every day that such mine shall be suffered to remain in such unsafe or unhealthful condition after the expiration of the *twenty* days above provided in which the required improvements should be made, which fine may be collected by indictment by the grand jury of the county in which such mine is situate; but in cases in which the Inspector is satisfied, from personal investigation, that, even if due diligence is observed, the required improvements can not be completed within the twenty (20) days above provided, he shall have authority to extend the time for not more than *twenty* days longer; but when the time is thus extended, the agent, superintendent or owner who is delinquent after the expiration of the additional time, shall be subject to indictment and fine as above provided; and as a cumulative remedy in case of failure of any owner, agent or superintendent to conform to the provisions of this law, after notice from the Inspector, within the time provided by this section, any circuit court, or the judge in vacation, may, on application of the Inspector, by civil action, in the name of the State, enjoin or restrain, by writ of injunction, the said owner, agent or superintendent from working or operating such mine with more than five persons until it is made to conform with the provisions of this law. But before such writ of injunction shall issue, the owner, agent or superintendent shall have at

least three days' notice of such contemplated action, and shall have the right to appear before such court, or the judge in vacation to whom the application is made, who shall hear the same on affidavits and such other testimony as may be offered in support, as well as in opposition thereto. It shall be the duty of the Commonwealth's attorney of the district, and of the county attorney of the county, in which the mine lies, to prepare and prosecute proceedings upon said application. [This section is in accordance with amendment approved March 3, 1894.]

SEC. 4. The Inspector of Mines shall keep an office in the State House at Frankfort. He shall be provided with all necessary stationery, to be supplied by or through the State Librarian as other offices are supplied; and he shall keep a record of all the inspections made by him, and shall furnish a certified copy of his report of the inspection of any mine inspected by him to the Commonwealth's attorney of the district in which the mine is situated, on application therefor, which copy shall be admissible in evidence in any court in this Commonwealth, and shall be *prima facie* evidence of the truth of recitals therein contained.

SEC. 5. Such Inspector, while in office, shall not act as agent, or as a manager or mining engineer for, or be interested in operating any mine, and he shall annually, on or before the tenth day of February, make report to the Governor of his proceedings for and during the calendar year ending on the thirty-first day of December, and of the condition and operation of the coal mines in this State, enumerating all accidents which shall have occurred in or about the same, and giving such other information as he may deem useful, and making such suggestions as he may deem important as to further legislation on the subject of mining. The Inspector shall also report the number of persons employed in and about the mines, and the amount coal mined; and, for the purpose of enabling him to make such report as is required by this section, the owner, lessee, agent or superintendent of every mine to which this law applies is hereby required to give, each month, accurate information, on blanks to be furnished by the Inspector, as to all accidents occurring in and about the mines, the number of persons employed, and the amount of coal mined, during the preceding month; and the owner, lessee or superintendent, refusing or failing to furnish the Inspector such information for sixty

days after application therefor has been received, shall be liable to a fine of fifty dollars, to be recovered in the county in which the mine concerning which such information is refused is situated. The Inspector is authorized to extend his observations, so as to be prepared to report upon the mining possibilities and mineral resources of the counties to which he is called in the prosecution of his duties as Inspector. One thousand copies of the Inspector's annual report shall be printed for general distribution.

SEC. 6. The Inspector shall receive an annual salary of eighteen hundred dollars, payable monthly, and shall likewise be allowed and paid his necessary traveling expenses when absent from his office on business connected with his department; and he shall keep on file in his office maps and plans of all coal mines in operation in this State, which maps, plans, and all the books, records, and apparatus of his office, he shall carefully keep, and turn over the same, with all official correspondence pertaining to his office, to his successor; and upon application of the owner, agent, lessee or superintendent therefor, he shall make out a duplicate of any map on file in his office of any mine owned or operated by the owner, agent, lessee or superintendent making such application, for the making of which duplicate a fee of five dollars must be paid, and which fee shall, within thirty days after its reception, be paid into the State Treasury by the Inspector receiving it.

SEC. 7. There shall be provided for said Inspector all instruments and chemical tests necessary for the discharge of his duties under this law, which shall be paid for on the order of the Inspector, and which shall belong to the State.

SEC. 8. The owner, agent, lessee or superintendent of every coal mine in this State, to which this law applies, shall annually, within sixty (60) days after the first day of January, make or cause to be made, an accurate map or plan of the workings of such mine, on a scale of not more than one hundred feet to the inch, showing the area mined, and the form of the excavations up to the said first day of January, together with the location and connection with such excavations of the lines of all adjoining lands, and the name or names of each owner or owners so far as known, marked on each tract; a true copy of which map the said owner, agent, lessee or superintendent shall deposit with the Inspector of Mines within seventy days after said first day of January, and another copy of which shall be

kept at the office of such mine. But, after the making and filing with said Inspector of the first map of the mine, as required herein, the owner, agent, lessee or superintendent shall only be required to annually make and file with said Inspector, within the times herein specified, such additional map and statement as may be necessary to truly show the progress of the workings and the amount of excavation of said mine from the date of the preceding map or survey up to the first day of January, as provided herein. The Inspector shall annually, on or before the first day of January, give warning notice that said map is required; and upon the refusal or failure of the agent, owner, lessee, or superintendent receiving such notice, to make, or cause to be made, such map within the sixty (60) days, and deposit the same with the Inspector within the seventy (70) days, specified herein, said owner, agent, lessee or superintendent shall be liable to a fine of five dollars ($5) a day for each day elapsing until said map is made, said fine to be recovered in the county in which the mine to be mapped is situated. The correctness of each map provided for by this section shall be certified to by the person making such map; and the Inspector may reject any map as incomplete, the accuracy of which is not so attested.

SEC. 9. It shall not be lawful for the owner, agent, or superintendent of any coal mine, worked by a shaft, slope or drift, wherein fifteen thousand square yards have been excavated, to employ more than ten persons to work therein, or to permit more than ten persons to work in such mine, unless there are to every seam of coal worked in each mine at least two separate outlets, separated by natural strata of not less than one hundred feet in breadth, by which shafts or outlets distinct means of ingress and egress are always available to the persons employed in such mines; but it shall not be necessary for the two outlets to belong to the same mine; and every shaft opened after the passage of this act shall have two such separate outlets, after fifteen thousand square yards shall have been excavated; and to all other mines, whether slopes or drifts, two such openings or outlets shall be provided within twelve months after the passage of this law, provided fifteen thousand square yards have been excavated at or before the passage of this law, or if not, then within twelve months after that extent has been excavated. In case any coal mine has but one shaft, slope or drift for the ingress or egress of the men working therein,

and the owner thereof does not own suitable ground for another opening, such owner may select appropriate associate adjacent surface ground for that purpose, and have the same condemned, and appropriate the same by proceedings in the county court of the county where the mine is situated, similar to proceedings now allowed by law for securing a private passway.

SEC. 10. The owner, agent or lessee of every coal mine, whether slope, shaft or drift, to which this act applies, shall provide and maintain for every such mine an amount of ventilation of not less than one hundred cubic feet of air per minute per person employed in such mine, which shall be circulated and distributed throughout the mine in such a manner as to dilute, render harmless, and expel the poisonous and noxious gases from each and every working-place in the mine, and no working-place shall be driven more than sixty feet in advance of a break-through or air way; and all break-throughs or air ways, except those last made near the working-face of the mine, shall be closed up and made air-tight by brattice, trap doors or otherwise, so that the currents of air in circulation in the mine may sweep to the interior of the excavations where the persons employed in the mines are at work; and all mines governed by this statute shall be provided with artificial means of producing ventilation, such as suction or forcing fans, exhaust steam, furnaces, or other contrivances, of such capacity and power as to produce and maintain an abundant supply of air. All mines generating fire-damp shall be kept free from standing gas, and every working place shall be carefully examined every morning with a safety-lamp, by a competent person or persons, before any of the workmen are allowed to enter the mine. And at every mine operated by a shaft there shall be provided an approved safety-catch, and a sufficient cover overhead, on all cages used for lowering and hoisting persons, and at the top of every shaft a safety-gate shall be provided, and an adequate break shall be attached to every drum or machine used in lowering or raising persons in all shafts and slopes.

SEC. 11. Any person employed in any mine governed by this statute who intentionally or willfully neglects or refuses to securely prop the roof of any working-place under his control, or neglects or refuses to obey any order given by the superintendent of the mine in relation to the security of that part of the bank where he is at work,

and whoever knowingly and willfully does any act endangering the lives or health of the persons employed in a mine, or the security of the mine or machinery, shall be liable to a fine of not less than ten dollars nor more than fifty dollars, to be recovered in the county in which the mine is situate.

SEC. 12. Coal mines in which not more than five persons are employed at one time shall be exempt from the provisions of this law.

SEC. 13. On account of the emergency hereby declared to exist, in that it is necessary for the employes in mines to receive the protection of the provisions of this law in timely season, this law shall be in force from its approval by the Gorvernor.

Approved February 15, 1893.

CURATOR OF GEOLOGICAL DEPARTMENT.

EXTRACT from Resolution 61 of General Assembly of 1891–'92–'93, as amended in chapter 78 of Acts of General Assembly of 1894.

1. That the Inspector of Mines, in addition to his duties as such Inspector, shall be Curator of the Cabinet and other property of the Geological Survey or Department, and all the records, documents, collections, instruments, apparatus, books, maps and other property of the Survey are hereby confided to his care and keeping; and, as such Curator, he is hereby required to attend to all correspondence and respond to all requests concerning the mineral resources of the State that come to him in his said capacity; to attend to the distribution of all published maps and reports in his hands intended for distribution, and to preform all the duties usually devolving upon such a Curator, so far as is applicable in this case; and he shall, whenever the General Assembly shall direct and provide therefor, cause to be printed, under his supervision, any or all of the unpublished reports of the Geological Survey that may be in his custody. He shall be allowed and paid fifty dollars per month as compensation for his services as such Curator, and shall give bond for the faithful performance of his duties as such Curator, with surety to be approved by the Governor.

ASSISTANT INSPECTOR.

AN ACT to increase the efficiency of the Inspector of Mines, and more fully provide for the protection of the lives and health of persons employed in the coal mines of this State, enacted by the General Assembly of 1891–'92–'93. Approved December 3, 1892, and June 9, 1893.

Be it enacted by the General Assembly of the Commonwealth of Kentucky: 1. Every mine subject to the provisions of the act providing for the inspection of coal mines, shall be inspected not less than three times each year, the inspection to be, as nearly as possible, not more than four months apart, and as many more times as the facilities of the office will permit.

2. In order that the requirement of section one above may be carried out, there shall be appointed by the Governor, with the advice and consent of the Senate, an Assistant Inspector of Mines, who shall hold his office for four years; but shall be liable to be removed by the Governor for willful neglect of duty or malfeasance in office. Said Assistant Inspector shall have a practical knowledge of the different systems of working and ventilating coal mines, and of the nature and properties of the noxious and poisonous gases of mines, especially of fire-damp, and he shall also have a practical knowledge of mining. Said Assistant Inspector shall, before entering upon the discharge of his official duties, be sworn to discharge them faithfully and impartially, which oath shall be subscribed on his commission, and certified by the officer administering it, and his commission, so indorsed, shall be filed with the Secretary of State in his office, and said Assistant Inspector shall give bond in the penal sum of two thousand dollars, with surety, to be approved by the Governor, for the faithful discharge of his official duties.

3. Said Assistant Inspector shall give his entire time and attention to the duties of his office, which shall consist of aiding, under the direction of the Inspector of Mines, in carrying out the provisions of this and all other acts relating to the inspection of coal mines.

4. Such Assistant Inspector, while in office, shall not act as agent or as a manager or mining engineer for, or be interested in operating, any coal mine in this State. He shall receive an annual salary of $1,200 (twelve hundred dollars), payable monthly, and shall likewise be allowed and paid his necessary traveling expenses when

absent from his office on business connected with his department. He shall have his office with the Inspector of Mines in the State House at Frankfort, and shall keep a record of all inspections made by him, and make a monthly report of the same to the Inspector of Mines for said Inspector's use when preparing his annual report.

5. (As amended, and approved June 9, 1893.) For the reason that the number of mines in this State, subject to the law requiring inspection is now so great that it is impossible for one person charged with the duties of Inspector of Mines to give all of them the immediate, detailed and frequent attention they require, and, in addition, discharge the other duties of his office, an emergency is hereby declared to exist, and this act shall be in force from its approval by the Governor; but the term of said Assistant Inspector of Mines provided for herein, and his salary, shall begin only with the date of his appointment.

(Act went into effect June 9, 1893.)

TO PROVIDE FOR A CHECK-WEIGHMAN.

Chapter 1251 of Acts of General Assembly of 1885-'86.

Be it enacted by the General Assembly of the Commonwealth of Kentucky: SECTION 1. That when a majority of the miners engaged in digging or mining coal at any coal mine in this State, at which as many as twenty men are employed, request the owner or owners, or operator or operators, of any of said mines to allow said miners to employ, at their own expense, a person to inspect the scales at said mine, and see that the coal digged and mined by said miners is properly weighed and accounted for, and do and perform such other duties as will insure that said coal is properly weighed and correctly accounted for, said owner or owners, or operator or operators, shall permit such person to be employed by said miners making the request: *Provided*, The person so employed has the reputation of being an honest, trustworthy, discreet and upright man. The appointment, under the provisions of this act of each inspector and assistant weigher, shall be approved by the judge of the county court of the county wherein the same is made.

SEC. 2. The person appointed and employed by miners to perform the duties set forth in the first section of this act shall, at all times,

have free access to the scales at the mines, and the said person so employed by the miners shall not be hindered or prevented from a proper performance of his duties by the person who weighs coal for the operator or operators of any mines, nor any of the agents or employes of said operator or operators. Said person employed by the miners shall in no way prevent the weighman or other employes of said operator or operators from performing their duties in a proper manner.

SEC. 3. Any person violating any of the provisions of this act shall be fined not less than ten nor more than fifty dollars, and each day on which any of the provisions of this act is violated shall constitute a separate offense.

SEC. 4. This act shall take effect and be in force from and after its passage.

Approved May 18, 1886.

[By oversight this law was omitted from the Kentucky Statutes compiled by Barbour & Carroll, 1894.]

ROADS FROM MINES.

Section 815, Kentucky Statutes, 1894.

SEC. 815. Any person engaged in operating a mine or stone quarry within three miles of any navigable stream or railroad may, for the purpose of transporting material to and from such stream or railroad, and such mine or quarry, construct and operate a line of railroad from such mine or quarry to the most convenient and accessible point on such stream or road, and may, under the general laws, condemn such land as may be necessary, not exceeding fifty feet in width for each track necessarily constructed, and not exceeding two acres of land at such railroad or stream for the purpose of necessary buildings. The owner or operator of such road shall be, so far as they are applicable, governed and controlled by the laws relating to other railroads, and shall have the same rights and privileges granted to corporations owning and operating lines of railroad.

WAGES—PAYMENT IN MONEY—STATUTORY REQUIREMENT—CONSTRUCTION.

Kentucky Statutes, Chapter 36, Section 1350—Wage-earners—Penalty for Not Paying In Money.

That any corporation or person or persons having the ownership or control of any factory, mine or workshop in this Commonwealth, who shall violate the provisions of section 244 of the Constitution, reading as follows: "All wage-earners in this State employed in factories, mines, workshops, or by corporations shall be paid for their labor in lawful money," shall be guilty of a misdemeanor, and, on trial and conviction, had in any court of competent jurisdiction, shall be fined not exceeding five hundred dollars for each violation thereof.

Kentucky Statutes, Chapter 36, Section 1386—Notes of Incorporated Banks Only to be Circulated.

It shall not be lawful to make, offer to pay, or to pass or offer to pass any note, bill, order or other thing passing by delivery, as a circulating medium, in lieu of or as the representative of money, unless it be the note or bill, of not less than five dollars, of some banking institution legally incorporated in the United States, or currency of the United States. If a note, bill, order or other such thing, be of the denomination of less than five dollars, it shall be presumed to have been made, paid or passed, or offered in violation of this section, unless the contrary be shown.

CONSTRUCTION.

Case in Point.—The Avent Beattyville Coal Co., Lee county, was convicted of not paying its wage-earners in lawful money, and appealed. Reversed.

In Brief. A mining Company paid its employees once each month in lawful money for the past month's labor, and at any time during the month, upon their application, issued checks to them, payable in merchandise at the company's store. The amount of checks so issued to each man was deducted from his wages on every pay-day, and he was paid the balance in cash, but no money was paid for outstanding checks. *Held*—That such arrangement was not in violation of Constitution, section 244, and Stats. of Ky., section 1350, providing that wage-earners shall be paid for their labor in lawful money. (Opinion delivered by Judge Hazelrigg, December 1, 1894. Published in full in report for 1894.

SESSION 1898.

AN ACT concerning employees and servants in mining work or industry in this Commonwealth.

Be it enacted by the General Assembly of the Commonwealth of Kentucky: SECTION 1. That all persons, associations, companies and corporations employing the services of ten or more persons in any mining work or mining industry in this Commonwealth, shall, on or before the sixteenth day in each month, pay for the month previous, such servant or employee, on his or their order, in lawful money of the United States, the full amount of wages due such servant or employees rendering such service. But if such person, corporation or company, after using due diligence, is unable to make said payment as above required, he or it shall, within fifteen days thereafter, make out a pay-roll and statement of amount due each employee, and also a due bill for said sum, bearing interest from said sixteenth day of the month, and deliver same to each of said employees.

SEC. 2. It shall be unlawful for any person or persons, association, company or corporation employing others, as described in section 1, either directly or indirectly, to coerce or require any such servant or employee to deal with or purchase any article of food, clothing or merchandise of any kind whatever, from any person, association, corporation or company, or at any place or store whatever. And it shall be unlawful for any such employers as described in the first section, to exclude from work, or to punish or blacklist any of said employees for failure to deal with any other, or to purchase any article of food, clothing or merchandise whatever, from any other or at any place or store whatever.

SEC. 3. Any person or persons, company or corporation described in the first section that shall violate any of the provisions of this act shall be guilty of a misdemeanor, and on conviction shall be fined not less than fifty dollars nor more than one hundred dollars for each offense, and the doing or failure to do any act or thing required by this act shall constitute a separate offense.

J. C. WICKLIFFE BECKHAM,
Speaker of House of Representatives.

W. J. WORTHINGTON,
President of Senate.

Became a law without the Governor's approval, he having failed to sign or return it to the House in which it originated within the time prescribed by the Constitution.

CHAS. FINLEY,
Secretary of State.