

REPORT OF STATE INSPECTOR OF MINES FOR 1897.

LETTER OF TRANSMITTAL.

PROF. W. S. BLATCHLEY,

State Geologist of Indiana:

I transmit herewith my third annual report as Inspector of Mines. I have endeavored to cover all the points required by law to be included therein, but it is unsatisfactory in some respects, owing to the reluctance of mine operators to furnish necessary data which can be obtained in no other way. This has compelled me to make some estimates which I can not claim to be accurate, notably the amount of capital invested, and the cost and character of improvements made during the year.

ROBERT FISHER,

Inspector of Mines.

Indianapolis, Ind., Jan. 15, 1898.

Report of Inspector of Mines

TO THE STATE GEOLOGIST.

1897.

ROBERT FISHER, Inspector.

JAMES EPPERSON, Assistant.

REPORT.

The first attempt at legislative control of coal mining in Indiana was by an act passed by the Fifty-first General Assembly, approved March 8th, 1879, though the industry had assumed considerable importance prior to that time. The first report submitted, by Herbert H. Richards, showed a total of 177 mines in 17 counties; employes, 3,459; coal produced, 1,196,490 tons of 2,000 pounds, and a capital invested of \$1,135,562. Of the mines reported, 115 employed less than ten men, leaving but 62 employing more than that number. Three hundred and eighty-eight of the 3,459 employes were employed in those small mines, and 3,071 employed in such mines as are now affected by the law in force, an average of nearly 50 men in each mine. Under the law then in force no mines were exempt from its operation. Now, the law does not apply to the mines employing less than ten men. During the year 1897 there were in operation in the State a total of 137 mines employing over ten men, with a total of 7,636 employes, and a production of 4,078,085 tons, from mines employing ten or more men.

The average production per employe in the 62 larger mines was 370.8 tons in 1879, while in 1897 the average per employe was 535 tons. The increase in average production in spite of the prolonged strike, referred to elsewhere, is to be accounted for by the increased use of powder in the mining of coal and the use of machinery for

mining and handling the coal. These points will be referred to at greater length later in this report. The facts stated above will give some idea of the development of the industry in Indiana during the past 18 years. While this has been great, we have not kept pace with our sister States in this respect. Illinois, Ohio and West Virginia have been especially active in increasing their production of coal during the past ten years, and have entered markets which were previously considered as belonging peculiarly to the Indiana fields.

From 1879 to 1891 no assistant was provided by law, the Inspector being required to do both the field and office work. This prevented him from visiting the mines as frequently as was necessary for the proper enforcement of the law. When recommendations were made or orders given for changes or improvements, his duties would not permit a return visit to learn whether or not they had been complied with, and many mine foremen took advantage of this fact to refuse to improve their mines. The Legislature in 1891 provided for the appointment of an Assistant Inspector, with a stated salary, but provided for an appropriation for expenses for both officers of only Three Hundred Dollars per year. This was totally inadequate to pay office and traveling expenses, and the result was that the Inspectors did the work that could be done with the least expense, and mines which were not convenient to visit were to a certain extent neglected. These facts account, to some extent, for the slow progress that has been made in improving the conditions of our mines, and cause us to feel like congratulating ourselves that so much advance has been made. The last General Assembly made an appropriation of One Thousand Dollars per year for the expenses of the Inspector and his assistant, which took effect on Nov. 1st, 1897. We hope to be able to do more effective work during the remainder of our term than has been done heretofore.

During the year under review our work in inspecting mines has been interrupted from a variety of causes. Feeling the necessity for the amendment of the law relating to mines in several respects, some of which have been suggested by my predecessors in every report since 1880, I spent considerable time in Indianapolis during the session of the Legislature endeavoring to secure the passage of such laws as I considered necessary, to the partial neglect of some of my other duties. I refer to this at length in another part of this report. The enactment of some of those amendments added greatly to the office work of my position, especially those requiring maps of mines to be filed, and requiring the examination of Mine Bosses, Fire Bosses and Hoisting Engineers. These laws took effect July the 15th, and nearly my whole time during the month of May was taken up with examinations

and correspondence in relation to them and to other of the amendments to the law. On July 4th a general strike of the miners of the State took place, and no systematic examination of the mines affected was possible until its conclusion, which occurred September 14th.

Since then so many mines have required examination that it has been impossible to make the number of visits necessary to assure compliance with the law where it was being violated, as prosecutions, in most cases, can be commenced only after giving notice of defects, and a reasonable time to remedy them. However, at the close of the year there are but few mines in the State which are not in fairly good condition, although those that could be passed without comment on some failure to fulfill the law are very few. Under appropriate heads, I notice Legislation, Examinations, Mine Maps, Improvements, Inspections, New Developments, Accidents, Operators and Employes, Production, and Wages, and other matters properly included in my annual report.

The following have been the Inspectors under the law:

Herbert H. Richards.....	1879—1881.
Thomas Wilson, Jr.....	1881—1885.
Thomas McQuade	1885—1889.
Thos. R. Tislow	1889—1891.
Thomas McQuade	1891—1895.
Robert Fisher	1895—

And the following have been assistants:

Welman A. Lackey.....	1891—1892.
Michael Comiskey.....	1892—1894.
Barney Martin.....	Jan. 1 to Mar. 15, 1895.
Wm. McCloud.....	Mar. 15 to Dec. 1, 1895.
James Epperson	Dec. 1, 1895—

Since the creation of the office its incumbents have been handicapped by reason of the amount of territory to be covered with the force of Inspectors, and inadequate provision for the necessary traveling and other expenses incident to the proper performance of the work to be done.

The report for 1879 notes that a ventilating fan had been placed in position by the Brazil Block Coal Company, at one of their mines, presumably the first that had been used in the State. At present there are but few mines in Indiana that depend on any other means of ventilation, as will be seen by reference to the descriptions of the different mines. This is the most efficient means that has been devised of forcing a current of air through a mine, and its use shows the progressive spirit of our operators. In this respect we compare

favorably with any other State whose reports I have examined. I am sorry to say that in many cases the underground management of mines has been entrusted to persons whose knowledge of the business is deficient, and that I am compelled to repeat a remark made by Mr. Richards. Referring to mine bosses, he says: "Many of them, having the means of good ventilation directly under their control, having a good supply of fresh air at the intake, yet leave the rooms of the workmen practically without air." While this is still true to some extent, there has been great progress in this direction, and the proportion of such mines and mine bosses is much smaller than he had to report. This refers, of course, to those that come under the observation of the Inspectors. In the small mines a great deal of the work is done on the haphazard plan of getting the most with the least present expense and letting the future care for itself. We usually find the effects of this when a mine that has been run with a small capacity increases its force of men sufficiently to bring it under our jurisdiction.

LEGISLATION.

As noted in closing my last annual report, several recommendations were made for amendments to the mining legislation of the State of Indiana. As there were but few, if any, members of the Legislature who had a practical knowledge of the working of coal mines, it became necessary for me to spend the larger part of my time, while the session continued at the Capitol, explaining the necessity of the proposed legislation, and urging favorable action upon the bills which were introduced for the better regulation of the mining industry. The committees in both Houses to whom they were referred were impressed with their importance and took prompt action upon them. All of the members of the Committee on Mines in the House and of that on Mines and Manufactures in the Senate were active in securing favorable consideration and final passage of each of them, and but for the pressure of other business at the close of the session I feel confident that each of my recommendations would have found a place upon the statutes of the State. Those recommendations were as follows:

1. Making better provision for communication between the working places of the mine and the escape ways.
2. That the Inspector of Mines shall be notified immediately when any serious accident occurs at a coal mine.
3. Providing that each mine owner shall make (or have made) a map of his mine, and furnish a copy to the Inspector of Mines.

4. Providing for the examination of Mine Bosses, Fire Bosses, and Hoisting Engineers.

5. Providing for the use of a pure oil for illuminating purposes in mines.

6. Providing for the inspection of mines employing less than ten men.

The bills prepared by this office, covering the first four of these subjects, were, after having been amended in some particulars, passed by both Houses and signed by the Governor. Copies of the acts are given below:

(Acts 1897, Page 226.)

AN ACT to amend an act entitled, "An act providing the means for securing the health and safety of persons employed in coal mines, providing penalty for the violation thereof, and repealing all laws and parts of laws in conflict therewith."

(Senate 154. Approved March 8, 1897.)

Section 1. Be it enacted by the General Assembly of the State of Indiana, That section 1 of the above entitled act, the same being section 5459 of Horner's Revised Statutes of 1896, be amended as follows:

Section 1. That it shall be unlawful for any owner, agent or operator to allow more than ten persons to work in any shaft, slope or drift at any one time after five thousand square yards have been excavated until a second outlet shall have been made. The said outlet or manway, and all approaches thereto, shall be separated from the hoisting shaft and its approaches by at least one hundred feet in width of natural strata, and shall be available at all times to all employes engaged in such mine, and that for every shaft used as a manway there shall be provided stairways at an angle of not more than sixty degrees, with landings at easy and convenient distances, and with guard rails attached to each set of stairs from the top to the bottom of the same: Provided, That, where such shaft shall be more than one hundred and fifty feet deep, the operator, owner or agent may elect to provide at such outlet or manway a hoisting apparatus, which shall be at all times available to miners and other employes of the mine, the same signals to be used as provided by law for use at hoisting shafts. The traveling roads or gangways to said outlet shall be not less than the height of the vein worked, and four feet wide, and shall be kept as free from water as the average hauling roads in such mines. All water coming from the surface or out of any strata in such shaft shall be conducted by rings, or otherwise, to be prevented from falling down the shaft so as to wet persons who are ascending or descending the shaft.

(Acts 1879, Page 168.)

AN ACT to amend sections 12, 14, 17 and 24 of an act regulating the weighing of coal, providing for the safety of employes, protecting persons and property injured, providing for the proper ventilation of mines, prohibiting boys and females from work in mines; conflicting acts repealed, and providing penalties for violation, in force June 3, 1891, the same being sections 5480M, 5480O, 5480R, 5480Y of the Revised Statutes of 1896.

(S. 195. Approved March 6, 1897.)

Section 1. Be it enacted by the General Assembly of the State of Indiana, That section fourteen (14) be and is hereby amended to read as follows:

Section 14. That whenever any accident whatsoever shall occur in any coal mine in this State which shall delay the ordinary and usual working of such mine for twenty-four consecutive hours, or shall result in such injuries to any person as to cause death or require the attendance of a physician or surgeon, it shall be the duty of the person in charge of such mine to notify the Inspector of Mines of such accident without delay, and it shall be the duty of said Inspector to investigate and ascertain the cause of such accident as soon as his official duties shall permit: Provided, That if loss of life shall occur by reason of any such accident said Inspector shall immediately, with the Coroner of the county in which such accident may have occurred, go to the scene of the accident. They shall investigate and ascertain the cause of such loss or life and have power to compel the attendance of witnesses and administer oaths or affirmation to them and the cost of such investigation shall be paid by the county in which the accident occurred, as costs of Coroner's inquests are now paid.

Sec. 2. That section 17 of said act, the same being section 5480R, of the Revised Statutes of 1896, be amended to read as follows:

Section 17. That the currents of air in mines shall be split so as to give separate currents to at least every fifty (50) persons at work, and the Mine Inspector shall have discretion to order a separate current for a smaller number of men if special conditions render it necessary. Whenever the Mine Inspector shall find men working without sufficient air, or under any unsafe condition, the Mine Inspector shall first give the owner, operator, agent or lessee a notice giving the facts and a reasonable time to rectify the same, and upon his or their failure to do so the Mine Inspector may order the men out of said mine or portion of said mine, and at once order said coal mine, or part thereof, stopped until such mine or part of mine be put in the proper condition. And the Mine Inspector shall immediately bring suit against such owner, operator, agent or lessee for failure to comply with the provisions of this section, who, upon conviction, shall be fined in any sum not exceeding one hundred dollars (\$100) for each and every day or part of day that said mine was operated.

Sec. 3. That section 24 be amended to read as follows:

Section 24. That for the violation of the provisions of any section of this act, where no special penalty is provided herein, the person or persons violating the same or any part thereof shall be held and deemed guilty of a misdemeanor, and shall, upon conviction, be fined in any sum not less than five dollars (\$5.00) nor to exceed two hundred dollars (\$200) in the discretion of the Court trying the cause.

Sec. 4. That section 12 of said act, being section 5480M of the Revised Statutes of 1896, be and the same is hereby amended to read as follows:

Section 12. That the Mining Boss shall visit and examine every working place in the mine at least every alternate day while the miners of such place are, or should be at work, and shall examine and see that each and every working place is properly secured by props and timber and that safety of the mine is assured. He shall see that a sufficient supply of props and timber are always on hand at the miners' working places.

He shall also see that all loose coal, slate and rock overhead wherein miners have to travel to and from their work are carefully secured.

Whenever such Mine Boss shall have an unsafe place reported to him he shall order and direct that the same be placed in a safe condition; and until such is done no person shall enter such unsafe place except for the purpose of making it safe. Whenever any miner working in said mine shall learn of such unsafe place he shall at once notify the Mining Boss thereof and it shall be the duty of said Mining Boss to give him, properly filled out, an acknowledgment of such notice of the following form:

I hereby acknowledge receipts of notice from of the unsafe condition of the mine as follows dated this day of, 18.....

..... Mining Boss.

The possession by the miner of such written acknowledgment shall be the proof of the receipt of such by said Boss whenever such question shall arise; and upon receipt of such notice such Mine Boss shall at once inspect such place and proceed to put the same in good and safe condition. As soon as such unsafe place has been repaired to the approval of such Boss, he shall then give permission for men to return to work therein, but no miner shall return to work therein until such repair has been made and permission given.

(Laws 1897, Page 269.)

AN ACT to compel owners of coal mines to make maps of mines, to file copies of the same with the Inspector of Mines, to make monthly reports of certain matters to said Inspector, providing a penalty for failure to comply with its provisions, and providing an office for the said Inspector.

(House 366. Approved March 8, 1897.)

Section 1. Be it enacted by the General Assembly of the State of Indiana, That within three months from the time this act takes effect the owner, operator or agent of each coal mine shall make or cause to be made, an accurate map or plan of the working of such mine on a scale of not less than one inch to one hundred feet, showing the area

mined or excavated, the arrangement of the haulage roads, air-courses, break-throughs, brattices, air-bridges and doors used in directing the air current in such mine, the location and connection with such excavation of the mine, of the lines of all adjoining lands, with the names of the owners of such land, so far as known, marked on each tract of land. Said maps shall show a complete working of the mine and, when completed, shall be certified to by the owner, agent or engineer making the survey and map, to be a true and correct working map of said mine. The owner or agent shall deposit with the Inspector of Mines a true copy of such map within thirty days after completion of the survey for the same, the date of which shall be shown on such copy, the original map and survey to be kept at the office of such mine, open for inspection of all interested persons at all reasonable times. Such map shall be corrected each year between the first day of May and the first day of September, and a new map and copy of the same shall be filed as required in the original survey, or the original map may be so amended as to show the exact workings of the mine at the date of the last survey.

Sec. 2. In case the owner, agent or operator of any coal mine shall fail or refuse to comply with the provisions of section one (1) of this act, it shall be the duty of the Inspector of Mines to appoint a competent Mining Engineer to make the survey and maps, and file and deposit them as required by said section one (1), and for his services he shall be entitled to a reasonable fee, to be paid by the party whose duty it was to make such survey and map, and shall be entitled to lien on the mine and machinery to the same extent as is now provided by law for other work and labor performed in and about the coal mines of this State.

Sec. 3. That the owner, operator or agent of every coal mine of the State shall be and is hereby required to report to the Inspector of Mines on or before the 15th day of each calendar month the name of the person in charge of such mine, the number of tons of coal produced at such mine during the preceding month, the amount of wages paid employes during such month, the amount of money expended for improvements during the said month, together with such other information as may be necessary to enable said Inspector to prepare his annual report as is now required by law.

Sec. 4. That any person who shall fail, refuse or neglect to do or perform any act or duty required by this act shall be held guilty of a misdemeanor and upon conviction shall be fined in any sum not less than five nor more than twenty-five dollars.

Sec. 5. That in order that maps, reports and other records pertaining to the office of Inspector of Mines may be properly preserved, a room in the State House shall be set aside and furnished in a suitable manner as an office for said officer.

Sec. 6. Provided, That the provisions of this act shall apply to all coal miners in this State except to those employing less than ten men.

(Acts 1897, Page 127.)

AN ACT to provide for the examination of mine bosses, fire bosses and hoisting engineers of coal mines, for issuing certificates of competency or service, prohibiting the employment of persons in either of such capacities without such certificate, and providing penalties for violation of the provisions of this act.

(S. 308. Approved March 4, 1897.)

Section 1. Be it enacted by the General Assembly of the State of Indiana, That after three months from the taking effect of this act, it shall be unlawful for any person to serve in the capacity of mine boss, fire boss or hoisting engineer at any coal mine in this State without having first received from the Inspector of Mines a certificate of service or of competency as hereinafter described and provided.

Sec. 2. That certificates of service shall be issued by the Inspector of Mines to any person who shall furnish satisfactory proof that he has been engaged as, and has successfully discharged the duties of mine boss, fire boss or hoisting engineer at coal mines in this State for three years preceding the granting of such certificate.

Sec. 3. That certificates of competency shall be issued by the Inspector of Mines to any person who shall prove satisfactorily upon examination, either written or oral, or both, as may be prescribed by such Inspector, that he is qualified by experience and technical knowledge to perform the duties of either mine boss, fire boss or hoisting engineer at the coal mines of the State. Examination for certificates of service or competency shall be public, and open to all citizens of the United States, and at least fifteen days' notice of such examination shall be given by publication in a newspaper published in the city where such examination is to be held. No certificate shall be issued to any person entitling him to serve in more than one of the capacities set out in this section, but two or more certificates may be issued to the same person on proper examination.

Sec. 4. It shall be the duty of the Inspector of Mines to hold examinations for certificates of service and competency within sixty days after this act takes effect in each of the cities of Brazil, Terre Haute, Washington and Evansville, and to publish notice of such examinations as provided in section 3 of this act, stating the time and place where examinations are to be held, and shall make and publish rules and regulations under which such examinations shall be conducted, previous to the first of such examinations.

Sec. 5. It shall be unlawful for any owner, operator or agent of any coal mine in this State to employ in such capacity any person in the capacity of mine boss, fire boss or hoisting engineer, unless such person has a certificate of service or competency as provided in sections 1, 2 and 3 of this act, or to allow any person not having such certificate to continue in his employ in such capacity after three months from the time this act takes effect, unless he has procured such certificate.

Sec. 6. That for the purpose of providing for the expense of holding the examinations and issuing the certificates herein provided for, each applicant, before entering upon examination, shall pay the Inspector of Mines one dollar, a receipt for which must be endorsed upon such certificate before it becomes effective.

Sec. 7. That any person violating any of the provisions of this act shall be guilty of a misdemeanor, and, upon conviction, shall be fined in any sum not less than five dollars nor more than fifty dollars.

The bill providing for the use of pure oil passed the House of Representatives too late to be acted upon in the Senate, and that for the inspection of the smaller mines failed of passage in the House. I wish to return thanks especially to Senators Horner, Humphreys and McCord and Representatives Berry, Henderson and Williams for their efforts in behalf of the above legislation.

The miners of the State wished to have a law enacted providing for a uniform screen at all mines in the State. A bill drawn by their officials was introduced into both Houses and passed by each, but neither House acted on the bill passed by the other before final adjournment, so the law failed to pass. This was intended to take the place of the law passed in 1891 providing for weighing coal before screening, which was declared inoperative by the Supreme Court in the case of *Martin vs. The State*, 143 Ind., 545. This matter causes a great deal of friction between miners and operators, as screens are of different sizes, and in many instances screens have been changed after the price for mining screened coal had been fixed. By this means more coal is permitted to pass through the screen, causing a virtual reduction in the price paid for mining. On the other hand, those operators whose screens are of a different kind or size than was contemplated by the law claim that it would entail a large expense to make the necessary changes and be a burden to the business. Improvements in coal-handling machinery are introducing rolling and shaking screens, for which it would be very difficult to make provision in a law on this subject that can be made effective, without providing that coal shall be weighed before screening. The States of Illinois and Pennsylvania each enacted a law for this purpose during the past year, but its enforcement is being resisted in both States. When our Legislature again convenes we may have some light on the subject from the courts of those States to enable our lawmakers to frame a law that will give relief from the annoyance that arises from dissatisfaction with the present method of basing the price paid for mining. One of the features of the law passed last winter provides that operators shall make monthly reports of their production to the Inspector of Mines. In the past there has been a great deal of trouble in getting anything

near an accurate return of the coal production of the State, as many operators failed or refused to furnish the information. This year there is a marked improvement in this respect, and I hope that next year the returns will be reliable. As the law was effective only eight months of the current year they are not so in the present report. However, the basis for such estimates as were necessary is much broader than it has been in previous years.

EXAMINATIONS.

By an act approved March 5th, 1897, it was made unlawful for any person to perform the duties of a Mine Boss, Fire Boss or Hoisting Engineer without first having received a certificate of service or competency from the Inspector of Mines. Certificates of service are issued on satisfactory proof of three years' successful service in the position for which the certificate is issued. This office prepared the following form of application for this kind of certificate:

.....Ind., 189....

To Robert Fisher, Inspector of Mines for Indiana:

I.....hereby apply for a "Certificate of Service" in the State of Indiana, as provided by section 2, page 127, Acts 1897. I am....years of age, have been employed about mines for....years and have served as.....for....years, as follows:

At Mine, from..... to.....

At Mine, from..... to.....

At Mine, from..... to.....

I have successfully discharged the duties of such position, as shown by the annexed "Certificate of Employer" or "Affidavit"—(as the case may be). I here inclose One Dollar Certificate fee, and 4c postage, for which please mail certificate.

.....Applicant.

.....Ind.

CERTIFICATE OF EMPLOYER.

.....Ind., 189....

This is to certify that has been employed by as at Mine for more than three years last past, has successfully discharged the duties of such position and is still so employed.

Affidavit of two acquaintances—(to be used only in case "Certificate of Employer" in above form can not be obtained).

State of Indiana.....County, ss.

Personally appeared before me, a Notary Public, in and for the County and State aforesaid.....and

.....known to me to be reputable citizens of said County and State, who being duly sworn, say that they have for more than..... years past been acquainted with.....who is applying for Certificate of Service as.....in the State of Indiana, that they have known him to be engaged as aIn said State for more than three years, as follows, to-wit:

At Mine, from..... to.....
 At Mine, from..... to.....
 At Mine, from..... to.....

That they were well acquainted with his work at each of said places and that to the best of their knowledge, information and belief, he has always successfully discharged the duties of said position, and is sober and competent.

Subscribed and sworn to before me, thisday of.....189...
Notary Public.

Note.—The right is reserved to require further proof if necessary.

INSTRUCTIONS.

1. Fill out and sign the application.
2. You should have employer make and sign the "Certificate of Employer" if possible.
3. If for any reason you can not get this Certificate, have two of your acquaintances go with you to a Notary Public and make the affidavit attached to this Application.
4. When you have filled the blanks as instructed above, mail as soon as possible to Robert Fisher, Inspector of Mines, Brazil, Ind. Enclosing one dollar for certificate and 4c in postage stamps.
5. If the papers are satisfactory, your "Certificate of Service" will be mailed to you shortly after next regular examination. Otherwise, they will be returned to you for correction.
6. Applicants for Service Certificates need not attend examinations.

ROBERT FISHER, Inspector of Mines.

As the law requiring certificates became effective on July 15th the "Certificate of Employer" has not been accepted as sufficient since that time, because any person having served after that date without a certificate did so in violation of the law. Though the instructions given answered all questions that had been asked about the matter up to the time the blanks were prepared, I was compelled to reject thirty applications for "Service Certificates" besides those which were returned and corrected.

Many of those whose applications were rejected passed examinations and received "Certificates of Competency." In only one case has there been manifested serious dissatisfaction with my rulings, when they were explained. To date there have been issued "Certificates of Service" as follows:

To.....Mine Bosses	119
To.....Hoisting Engineers	165
To.....Fire Bosses	4

A list of the names and addresses of those to whom certificates have been issued is given below:

MINE BOSSES.—SERVICE CERTIFICATES.

C. H. Baetz, Evansville.	David M. Hopkins, Shelburn.
Joseph Peters, Alum Cave.	James Cuthbertson, Brazil.
George Mitch, Rosedale.	W. J. Price, Cardonia.
D. W. Davis, Cannelburgh.	Jacob Ehrlich, Sr., Turner.
Wm. Grey, Seeleyville.	T. J. Thompson, Hoosierville.
John Jennings, Ayrshire.	John Chesterfield, Sr., Brazil.
H. W. Jenkins, Perth.	Thomas McQuade, Burnett.
James Dunn, Linton.	H. A. Butler, Dugger.
Andrew Dodds, Littles.	Wm. T. Hopkins, Carbon.
John W. Odell, Evansville.	John J. Scott, Brazil.
Andrew Gilmour, Cardonia.	James F. Andrew, Clay City.
Ellsworth Tibbitts, Turner.	T. V. Robertson, Linton.
Thomas Faulds, Clay City.	Jos. W. Small, Washington.
John Crosby, Shelburn.	George A. Davis, Coxville.
Morgan Roberts, Mecca.	Henry Payne, Coxville.
James Skene, Mecca.	John E. Kelley, Boonville.
Henry Schlatter, Brazil.	Robert F. Bleler, Macksville.
James Johnson, Coal Bluff.	John Bolin, Brazil.
Herbert Wheatley, Linton.	Jos. Carmichael, Seeleyville.
B. C. Walker, Troy.	John W. Alvis, Seeleyville.
H. T. Brewis, Petersburg.	Pius Schultheis, Evansville.
J. R. Willey, Petersburg.	Walter Knox, Ashersville.
W. E. Evans, Eagle.	Edward Donnely, Seeleyville.
Wm. Wooley, Boonville.	Thomas Harris, Washington.
R. M. Freeman, Bicknell.	Isaac H. Williams, Rosedale.
S. C. Risher, Linton.	Wm. Conroy, Brazil.
Wm. Chesterfield, Clinton.	Wm. Spears, Brazil.
Jacob D. Lewis, Carbon.	Wm. Penze, Brazil.
Welty A. Jacobs, Raglesville.	Wm. Wilson, Cardonia.
D. J. Evans, Carbon.	Alfred L. James, Brazil.
Thos. R. Small, Washington.	J. W. Hawkins, Terre Haute.
R. J. Wallace, Diamond.	N. C. Walker, Rockville.
Robert Lauder, Boonville.	Frank Smith, Farnsworth.
Joseph Ferry, Linton.	Moses Marks, Cardonia.
H. B. Ehrlich, Brazil.	Chas. Harting, Edwardsport.
John Cox, Brazil.	Wm. Devoll, Seeleyville.
James A. King, Brazil.	Isaac H. Valentine, Rosedale.
Charles Nash, Coal Bluff.	Frank Lockhart, Linton.
Gus. Wellinger, Washington.	Louis Schultz, Petersburg.
W. H. Sexton, Linton.	Ed. Somers, Staunton.

Thomas Dalton, Carbon.	J. S. Tiley, Silverwood.
G. W. Briggs, Cannelton.	Andrew Winterbottom, Sullivan.
Geo. R. Anthony, Fontanet.	Peter Andrew, Clay City.
Thos. J. Thomas, Princeton.	Thomas Clemmitt, Linton.
Louis M. Gaisser, Evansville.	George West, Seeleyville.
Steward Shirkie, Silverwood.	Wm. Hutchinson, Voorhees.
James L. Devonald, Burnett.	James C. Pascoe, Linton.
John McAnally, Hymera.	A. W. Stuckey, Raglesville.
Jeff. Ladson, Burnett.	I. H. Wooley, Shelburn.
Patrick Bartley, Evansville.	D. B. Hall, Evansville.
Wm. F. Horst, Evansville.	Geo. Bonenberger, Evansville.
W. L. Wallace, Turner.	James McCombs, Shelburn.
A. M. Moreland, Eagle.	August Dutell, Ashersville.
J. P. Hargrove, Boonville.	John F. Perry, Del Carbo.
August Norkus, Diamond.	Simeon Wooley, Shelburn.
George A. Donie, Perth.	Wm. Gatt, Odd.
Samuel Campbell, Del Carbo.	Wm. Robertson, Newburg.
M. Atkinson, Edwardsport.	Jas. Dunlap, Brazil.
Geo. H. Sargent, Eagle.	W. A. Barrowman, Huntingb'gh.

HOISTING ENGINEERS.—SERVICE CERTIFICATES.

Wiley McCarty, Diamond.	James A. Harris, Littles.
Geo. Bolin, Harmony.	J. W. LaFollette, Shelburn.
Chas. Marshall, Harmony.	Wm. A. Cecil, Evansville.
James B. Downey, Bicknell.	Herman Ehrlich, Turner.
Chris. Menning, Clinton.	Ignatz Trappier, Washington.
Irwin Stewart, Del Carbo.	Fred Helliger, Sr., Harmony.
Albert Marshall, Clay City.	John Dosch, Washington.
Wm. Downey, Bicknell.	Noah Manuel, Alum Cave.
Chas. Froment, Shelburn.	Barney Wilhelm, Evansville.
John Stewart, Staunton.	John Hunter, Macksville.
Ellet Froment, Shelburn.	Frank Yocom, Perth.
Hubert Haag, Cannelburgh.	Frank Purcell, Washington.
John Meakin, Turner.	Chas. Jackman, Washington.
J. N. Rettinger, Evansville.	John Kunkler, Washington.
Jas. Burroughs, Center Point.	Wm. J. Thomas, Clinton.
Wm. Frazer, Ashersville.	Thos. Foxworthy, Coal City.
Wm. Meakin, Staunton.	Nimiviah Bush, Shelburn.
A. D. Blacketer, Ayrshire.	Wm. Biggins, Diamond.
Robert Wylie, Rosedale.	Robt. F. Bieler, Macksville.
James D. Miley, Ayrshire.	John W. McCarty, Diamond.
T. M. Nelson, Littles.	Andrew Davidson, Coxville.
Marlin Rhodes, Clinton.	Grant M. Duncan, Brazil.
I. N. Cassaday, Montgomery.	Fred Helliger, Jr., Harmony.
Jos. A. Kauble, Clay City.	S. N. Pritchard, Seeleyville.
Geo. C. Harth, Fontanet.	Grant McCurdy, Boonville.
Jos. W. Harth, Fontanet.	N. M. Humphreys, Linton.
R. Winningham, Seeleyville.	J. W. Yant, Ashersville.

- Louis Heiliger, Harmony.
 John A. Sharps, Carbon.
 David Reynolds, Center Point.
 Roy A. Somers, Staunton.
 James Kimlo, Blackburn.
 John J. Laurent, Eagle.
 Wm. Loyd, Shelburn.
 R. G. James, Burnett.
 E. W. Helton, Brazil.
 Algie A. Church, Clay City.
 Zeno Calvert, Clay City.
 Luther Pullen, Knightsville.
 Thos. Davidson, Shelburn.
 Aaron Martin, Knightsville.
 Harry H. Cotterill, Oakland City
 Albert Hixon, Carbon.
 Geo. Wood, Petersburg.
 Thos. Lauder, Boonville.
 Daniel Kincaid, Diamond.
 John Miller, Linton.
 S. Winningham, Seeleyville.
 Robt. Schofield, Washington.
 John Stiner, Dugger.
 James Parfitt, Brazil.
 Henry Herrington, Fontanet.
 Thomas B. Brooks, Carbon.
 Henry Heacox, Harmony.
 Thomas Alderson, Harmony.
 T. W. Thomas, Clinton.
 J. W. Hardin, Carbon.
 Edwin S. Boling, Coal Bluff.
 Henry Poff, Burnett.
 Wm. Morris, Coal Bluff.
 Jos. R. McCafferty, Augusta.
 Andrew Kennedy, Jr., Perth.
 Lee Morris, Clinton.
 Joseph D. Brown, Coal Bluff.
 Wm. Lauder, Boonville.
 Griff Howells, Center Point.
 Levi B. Cramer, Shelburn.
 Wm. H. Field, Vincennes.
 S. D. Holbert, Rosedale.
 W. T. Cassity, Fontanet.
 Louis F. Bergenroth, Troy.
 John J. Bergenroth, Troy.
 John Vonderschmidt, Linton.
 Wm. Judson, Fontanet.
 Geo. Biggins, Diamond.
 Wm. Spears, Brazil.
 Frank Bard, Brazil.
 Harry C. Duncan, Brazil.
 John L. Wilson, Washington.
 Wm. M. Boling, Coal Bluff.
 O. D. Bowles, Brazil.
 Wilmer Strawn, Eagle.
 James Gilmour, Cardonia.
 John Gilmour, Brazil.
 Noah Brillhart, Brazil.
 Arthur DeCamp, Diamond.
 Pearl Millburn, Brazil.
 L. S. White, Linton.
 Orlon Rose, Petersburg.
 James M. Toppas, Rosedale.
 W. S. Fulwider, Mecca.
 John E. Azbell, Vincennes.
 Harry T. Reed, Brazil.
 Wm. Snedden, Knightsville.
 John Moore, Brazil.
 Thomas Judson, Fontanet.
 Truman Hedge, Boonville.
 Hulbert Schee, Macksville.
 Wm. Burroughs, Center Pt.
 D. McPherson, Seeleyville.
 Thos. Potter, Macksville.
 Louis Lauby, Washington.
 J. W. Dunbar, Washington.
 James McCarty, Diamond.
 John Green, Montgomery.
 Frank Stanley, Burnett.
 Thos. W. Jones, Boonville.
 Nich. Polaskovitch, Brazil.
 Andrew Kennedy, Sr., Perth.
 J. C. Hopkins, Linton.
 Robert Jones, Alum Cave.
 Van Partington, Evansville.
 David Thomas, Brazil.
 W. J. Hancock, Farnsworth.
 Robert O. Pruett, Coxville.
 Leslie C. Frazer, Knightsville.
 Ira Champer, Seeleyville.
 Joseph Church, Washington.
 Otto Hartloff, Chandler.
 Jesse B. Auman, Ashersville.
 Rufus Bowles, De Forest.
 Andrew J. Blair, Harmony.
 J. N. Broadhurst, Macksville.
 George Watson, Vincennes.
 Fred Collins, Coal Bluff.
 Ross Vansickle, Silverwood.
 W. W. Fisher, Ashersville.

Sam W. Gentry, Macksville.	Fred McClanahan, Hymera.
P. Krackenberger, Macksville.	John R. Dickson, Brazil.
Richard G. Gentry, Macksville.	Wm. F. Somers, Staunton.
Thos. Andrew, Clay City.	John Davidson, Coxville.
L. B. Southard, Huntingburgh.	C. A. Taylor, Clinton.
Harvey Cochran, Sullivan.	

FIRE BOSSES.

Thomas J. Thomas, Princeton.
 Joseph Drovetta, Vincennes.
 Wm. Norton, Shelburn.
 Evan Davis, Shelburn.

Section 4 of the act above provides that "within sixty days after this act takes effect examination shall be held in each of the cities of Brazil, Terre Haute, Washington and Evansville, and that previous to the first of such examinations the Inspector of Mines shall make public rules and regulations under which such examinations shall be held." In compliance with this provision of the law the following circular was published, and notice was given by publication in "The Clay County Enterprise," "The Terre Haute Express," "The Washington Gazette," and "The Evansville Journal," of the time and place of the examination in the cities in which said newspapers are published.

The circular referred to is as follows:

To Whom It May Concern:

By an act of the Legislature of Indiana, approved March 4, 1897 (Cap. 84, Page 127, Session Laws 1897), in effect April 15, 1897, persons employed as Mine Bosses, Fire Bosses or Hoisting Engineers at coal mines in this State, after three months from the latter date, must have certificates of service or of competency signed by the Inspector of Mines. Certificates of the first class will be issued upon satisfactory evidence being presented to the Inspector that the applicant has successfully served in or about the mines of this State for three years or more, in the capacity for which he desires a certificate. Blanks on which to make this proof will be mailed about May 1st to all persons asking for them by mail.

Certificates of competency will be issued to all citizens of the United State who satisfactorily pass a public examination as to their fitness to discharge the duties of the position for which they desire certificates.

The following rules have been adopted to govern the first series of examinations held under the law:

1. Examinations will be held at Brazil, Indiana, Saturday, May 22d, 1897; Terre Haute, Indiana, Tuesday, May 25th, 1897; Washington, Indiana, Thursday, May 27th, 1897, and Evansville, Indiana, Saturday, May 29th, 1897. The hour and place of examination will be published twice in a weekly paper of the city where the examination is to be held, giving at least 15 days' notice.

2. The examination will be by a series of printed questions, given to each applicant on the morning of the examination. Answers to the same must be written on one side of ruled foolscap paper and numbered to correspond with the questions. Oral questions may be asked in addition if deemed necessary by the Inspector to test the knowledge of the applicants.

3. The examination for Mine Bosses will embrace questions on the "mining law of the State;" "examination of hoisting ropes, safety catches, cages and scales;" "ventilation of mines;" "safety of shafts, entries, rooms and pillars;" "drainage and haulage roads," and "handling men."

4. The examination for Fire Bosses will embrace questions on the "mining laws of the State," "ventilation of mines," "gases of explosive nature," "safety lamps," "detecting fire damp," and "clearing working places."

5. Examination of Hoisting Engineers will embrace questions on "mining laws of the State," "steam boilers and water," "steam and steam engines," "ventilating fans," "examination of wire ropes and safety appliances," and "pumps."

The questions will be so arranged, that the work can be done in four hours by a fair penman who knows his subject, but six hours will be given in which, to do it.

The above is intended to be suggestive and contains all that I can consent to give to any possible applicant before the day of examination, and I must decline to answer letters on the subject, except to send the blanks referred to above.

ROBERT FISHER, Inspector of Mines.

Brazil, Indiana, April 17th, 1897.

While holding this series of examinations it was learned that quite a number of Hoisting Engineers who had not served in that capacity in this State long enough to entitle them to "Certificates of Service" did not have sufficient education to pass a written examination, while they were well recommended as careful and competent workmen by their employers and others. Several of them requested an oral examination at the time specified in the notices of examination. As Rule 2, published, stated that the examination would be in writing I refused to grant the request. As I had some doubt of my power to hold an examination where part of the applicants took a written and part an oral examination, I submitted this and some other questions to the Attorney General for his opinion. The correspondence follows:

Robert Fisher, Esq., Mine Inspector:

Dear Sir—Answering the inquiries contained in your undated letter, handed me this morning, I beg to say:

Yes, to the first and second which are as follows:

(1) Under Section 4, Page 127, Acts 1897, is an examination entirely oral permissible?

(2) Is an examination entirely written permissible?

No, to the third which is as follows:

(3) Can an examination at the same time and place be held allowing the candidate to elect either written or oral examination; different lists of questions being used?

It is for the Inspector to elect or decide upon the propriety of an oral or written examination, and not at all for the candidate.

To the fourth, that the examination should take place at the cities named when and as in the opinion of the Inspector there is just occasion for it, and it might well be that there would be no occasion for an examination in one at a particular time when it might be very necessary in the other.

For answer to the fifth: The General Assembly has selected the particular cities in which examinations are required to be held. I doubt the right of the Inspector to have examinations held elsewhere, and yet, I can see no one who can complain, if circumstances should make it appear that it was more convenient and therefore desirable to hold the examination at some other place. The better practice, however, is to conform to the letter of the law where that is practicable.

I have the honor to be

Yours very truly,

WILLIAM A. KETCHAM,

Attorney General.

Indianapolis, June 17, 1897.

Acting upon this opinion, and to afford an opportunity to all desiring certificates to secure them, I issued the following circular and published notice of the examination as required by law:

To Whom It May Concern:

Notice is hereby given that on the 8th day of July, 1897, I shall hold an oral examination of applicants for Certificates of Competency as Hoisting Engineers, and on the 9th day of July a like examination of applicants for Certificates of Competency as Mine Bosses and Fire Bosses at the coal mines of Indiana, at the Court House, in the city of Terre Haute. Examinations will begin at 9 o'clock a. m., and continue till all applicants who present themselves have been examined under the following rules:

1. All persons desiring to take the examination must notify me by mail before July 7th, 1897, or present themselves for examination at the hour named above for examination of their class.

2. Applicants will be examined separately, but one applicant at a time being permitted to be in the room where the examination takes place. To all other persons the examinations shall be public.

3. Before entering upon examination each applicant must make a statement that he has not been informed by any person of the nature of any material question used on the examination, nor received any assist-

ance in preparing for the same since the examination opened, and promise that he will not divulge anything that transpires in the examination room until the last applicant has been examined.

4. Upon entering the examination room the applicant must deliver to the Inspector of Mines all books, papers and memoranda which might be used by him to assist in answering questions that might, or may be, asked him on his examination.

5. The examination will be by a list of written questions which will be read in their order to each applicant. If he does not understand the question he may ask for an explanation before attempting to answer, but not after.

6. The examination of Hoisting Engineers will include questions on the use, care and repair of boilers, engines, hoisting machinery, ventilating machinery, and pumping machinery, including fuel, water, lubricants, etc.

7. The examination for Mine Bosses will include questions on sinking, timbering and equipping shafts, development, ventilation and drainage in the different veins and mines found in Indiana, also accidents and the means of preventing them.

8. Examination of Fire Bosses will include questions on safety lamps, testing for gas, removing gas, ventilating of gaseous mines, and gaseous mines of Indiana.

9. Questions on the Mining Laws of Indiana. Copies of the edition of 1895 will be furnished free on request. The 1897 edition is about ready for delivery to those who have ordered it.

10. Answers will be graded as given and results announced at the close of each day of the examination.

11. This circular contains all information that will be given previous to the day of examination.

ROBERT FISHER, Inspector of Mines.

Brazil, Indiana.

Examinations have since been held in Evansville, September 22d, and Terre Haute, September 28th and October 23d. The following table shows the number of applicants at each examination, Certificates granted and Applications rejected:

EXAMINATION AT	Date.	APPLICANTS.			CERTIFICATES.			REJECTED.		
		M.B.	F.B.	Eng.	M.B.	F.B.	Eng.	M.B.	F.B.	Eng.
Brazil	May 22....	22 ^a	1	12	14	1	10	7	0	2
Terre Haute ..	" 25....	28	1	11	22	1	11	7	0	0
Washington ..	" 27....	9	0	4	8	0	3	1	0	1
Evansville ..	" 29....	5	0	4	5	0	4	0	0	0
Terre Haute ..	July 8-9..	18	1	7	13	1	6	5	0	1
Evansville ..	Sept. 22..	5	2	8	3	2	8	2	0	0
Terre Haute ..	" 28....	19	1	13	14	1	8	5	0	5
Terre Haute ..	Oct. 23....	7	1	8	5	1	6	2	0	2
Totals		113	7	67	84	7	56	29	0	11

^aOne applicant not a citizen of the United States.

This table shows that of 187 applicants 147 passed the examination and 40 failed, a percentage of failure of 21½. This in spite of the fact that there is nearly a total absence of technical questions in the examinations. We have endeavored to so frame the questions as to test the practical knowledge of the applicants, and not to allow practical and successful men to be displaced by others who, while they may have made a theoretical study of the subjects pertaining to the business, have little or no practical experience in the duties of the position for which a certificate is desired. I herewith give a sample of the questions used for each kind of certificate. These will give a fair idea of the scope of the examinations held to this date. Future examinations will be made more difficult, with a view of increasing study among those affected by them:

QUESTIONS FOR THE EXAMINATIONS OF MINE BOSSES IN THE STATE OF INDIANA, AT WASHINGTON, MAY 27, 1897.

1. Give your name, age and postoffice address.
2. Where were you born? If abroad, when and where were you naturalized?
3. What in your judgment are the necessary qualifications in a successful Mine Boss?
4. Describe the duties of a Mine Boss as provided by the law of the State of Indiana.
5. In what capacities have you been employed in coal mines, and how long in each capacity?
6. How do gob fires originate in mines? What are the best means to put them out, and how would you guard against them?
7. What precautions are necessary to prevent falls of roof or coal? How would you induce workmen to take those precautions?
8. What are the causes of foul air in mines? How would you discover the presence of black damp? white damp? explosive gas?
9. The velocity of the air current as shown by the anemometer is 280 feet, the air course is 9 feet wide and 4½ feet high, what amount of air is passing?
10. How many ways are there of producing a current of air to assist in ventilating a coal mine?
11. How do you determine the amount of air circulating in a mine?
12. What means can be used to increase the amount of air circulating in a mine without increasing the power used to produce the current?
13. Name the heaviest and the lightest gases met with in coal mines. In what parts of the mine would you expect to find each?
14. If an entry is driven at an angle of one-third with the face of the coal, how far apart would rooms on the face have to be turned to give rooms 21 feet wide and pillars 12 feet thick?
15. What persons are prohibited from working in the coal mines of Indiana, and what precautions that these provisions of the law are complied with?

16. Name some of the bad results of poor drainage in mines.
17. Describe the best means of constructing a haulage road where the bottom is soft and makes a good deal of water.
18. If you were not getting out the amount of coal that you should with the forces employed, what means would you take to discover the cause?
19. If miners or other workmen in your mine were in the habit of leaving doors open in the mine, or in any other way violating the law, what steps would you take to put a stop to the practice?
20. In a certain mine the main entries are advanced 500 feet on one side of the shaft and 350 feet on the other side. Two pairs of cross entries are working on each side of the shaft. The first pair are advanced 350 feet, the second 250 feet, the third 250 feet and the fourth 100 feet. Rooms are turned off the cross entries every 35 feet. The air splits at the bottom and measures 25,000 feet at the downcast. The mine worked six days in April, 1897. Make out the monthly report to the Inspector. (Blanks furnished.)

QUESTIONS FOR THE EXAMINATION OF FIRE BOSSES.—INDIANA, MAY, 1897.

1. Give your name, age and place of birth.
2. If born abroad, have you been naturalized? When and where?
3. What is the duty of a Fire Boss as provided in the mine law of Indiana?
4. How would you learn whether a safety lamp is in condition for use? Name three defects that would render it unfit.
5. In what part of a mine is fire damp most likely to gather? What conditions of the ventilation of a mine make the accumulation of gas most likely?
6. How would you prevent the accumulation of gas in the worked out parts of a mine?
7. Under what conditions would it be safe to use open lights in a place that makes fire damp?
8. What record would you keep of your daily examinations for fire damp?
9. How fast should the air current travel in places where there is likely to be a dangerous amount of gas generated?
10. What is the first indication given by the safety lamp of the presence of gas? What other indications as the amount of gas increases?
11. What kinds of safety lamps are you familiar with?
12. What dangers are met by a rescuing party in a mine after a serious explosion of fire damp?
13. What means would you use to overcome such dangers?
14. What experience have you had in gaseous mines? In what capacity?

QUESTIONS FOR THE EXAMINATION OF HOISTING ENGINEERS, AT TERRE HAUTE,
IND., OCTOBER 23, 1897.

1. What do you consider the most essential qualifications of a Hoisting Engineer?
2. Who may be placed in charge of a hoisting engine under the laws of Indiana?
3. In a general way describe the principles involved in the construction of steam boilers.
4. Describe two ways of setting boilers and how provision is made for their expansion and contraction.
5. Do the flues and tubes used in boilers increase or diminish their strength? Give reasons.
6. Where should water gauges be placed on a boiler? Why are steam gauges necessary?
7. Describe three different kinds of grates with which you are familiar.
8. Describe the principle of the safety valve.
9. The shell of a plain cylinder boiler is 30 inches in diameter and 20 feet long, and is made of single riveted wrought iron boiler plate three-eighths inches thick. What pressure can it carry safely?
10. How is a forced draft produced in a boiler furnace?
11. What different kinds of stress, or strain, is placed upon the different materials used in a hoisting outfit, including boilers?
12. What should be the smallest rope used to hoist two tons of coal, the cars, cage and rope weighing 3,500 pounds?
13. What different kinds of bolts are used in the construction of a steam engine? Tell where one of each kind is used.
14. An expansion joint is to be placed in a line of steam pipe 450 feet long. How much movement should it have?
15. What different methods are in use to fasten wheels, and pulleys rigidly to shafts?
16. Suppose a spur wheel broke and you wished to order a new one, where would you measure the diameter of the old one?
17. Name the parts of a plain slide valve engine to which motion is imparted when running.
18. Describe the course of steam from the boiler to make a complete revolution of the cranks.
19. How does the reverse link produce the desired result?
20. Give the changes made in the direction of motion in hoisting a cage from a shaft, and by what mechanism each change is produced.

On August 2d the following circular was published and distributed to all persons holding certificates and to all operators of mines employing ten or more men, as far as such operators had come to the knowledge of this office:

To Whom It May Concern:

I herewith publish a list of persons who have been granted certificates under the provisions of "An Act to provide for the examination of Mine Bosses, Fire Bosses and Hoisting Engineers at coal mines, etc.," p. 127, Acts 1897.

While in terms this law applies to all mines in the State, construing it in connection with other mining laws, this office holds that it applies only to mines employing more than ten men. However, if more than this number are employed at any time, even for a day, the person acting in either of the above capacities, without a certificate, is liable to be fined, as is the person, firm or corporation employing him. The theory of the law is that all persons entrusted with the performance of the duties of either of the above positions should be able to demonstrate their competency by passing an examination, but as a special favor to those who have served in either of those capacities for three years, in this State, they are exempted from such examination. A service certificate, therefore, does not indicate any opinion of the Inspector of Mines as to the competency of the person holding it, though it has the same force and effect in protecting the employer from a criminal prosecution as a certificate of competency. Certificates of competency are granted only after an examination, and are, in effect, a recommendation from the Inspector to the extent indicated by the percentage earned.

It is the duty of the Inspector of Mines to file affidavits against all persons holding, or giving, employment to persons not provided with certificates, as soon as evidence sufficient to secure conviction can be secured, either from personal investigation, or through other witnesses. Persons affected will govern themselves accordingly.

Examinations will be held within three weeks at any time after twenty-five applications, accompanied by the fee of \$1.00, have been received at this office. The convenience of the greatest number of applicants will determine the place where examinations will be held. No certificates will be issued until after the next general examination.

As inquiries are frequently addressed to this office for persons to fill positions, it will be of mutual advantage to all interested if all certificate holders who desire to change location would notify me by mail of such desire, where position is wanted, and salary expected, so that I can put parties into communication with each other. Hoping that by co-operation we may be able to raise the standard of efficiency in the positions covered by the law, I am,

Respectfully,

ROBERT FISHER, Inspector of Mines.

Brazil, Indiana, August 2, 1897.

I found it necessary to institute legal proceedings in several cases where the law was being violated flagrantly, but in only one case was any defense made. In that, the case of the State vs. William Horst, before — Poole, J. P., at Evansville, Indiana, the defendant was found guilty and fined five dollars and costs. No appeal was taken, so that no case has been tried in a higher court. All other parties against whom affidavits were filed pleaded guilty.

Several complaints have reached this office of persons who occasionally hoist coal and men at places where a properly certified man is in charge. I have uniformly refused to file charges in such cases, as I believe the spirit of the law permits such action as a part of the training and experience necessary to fit persons to pass examinations in the future. It appears to me that any other construction of the law would debar citizens of our State from securing the necessary preliminary practice to fit them to take charge of hoisting machinery and would limit our future choice of Hoisting Engineers to those who had obtained their practical knowledge of the business in another State or to those who had a purely theoretical knowledge. While the privilege may be abused by allowing incompetent men to have temporary charge, the remedy is with the certified men who have the responsible positions, and not at law.

The following is a list of those who have secured certificates of competency at the various examinations:

MINE BOSSES—CERTIFICATES OF COMPETENCY.

M. McMorrow, Brazil.	J. S. Newport, Linton.
Alex. Orr, Harmony.	Ed. Stewart, Hymera.
James G. Biggins, Perth.	G. E. Broadhurst, Macksville.
Thomas Orr, Harmony.	Wm. P. McQuade, Brazil.
Roland Elstone, Diamond.	James Watters, Clay City.
R. F. Jenkins, Knightsville.	George Epperson, Linton.
R. M. Irving, Knightsville.	Thos. Gregory, Fontanet.
Joseph W. Williams, Brazil.	David W. James, Clinton.
Andrew Spears, Brazil.	Wm. Devonald, Clinton.
George Myers, Brazil.	W. A. Edwards, Clinton.
Samuel Lindsay, Brazil.	John Archer, Clinton.
John Mushett, Terre Haute.	Duncan McCallum, Clinton.
P. J. Mooney, Brazil.	C. C. Hall, Shelburn.
Mike Hofmann, Ashersville.	George L. Potts, Diamond.
G. C. Potter, Augusta.	Griff Howell, Center Point.
Thos. R. Small, Washington.	Thomas Parr, Fontanet.
Thomas Harris, Washington.	Wm. Britton, Alum Cave.
W. H. Walton, Linton.	James Steele, Macksville.
Geo. B. Brown, Montgomery.	Alex. Faulds, Alum Cave.
Jas. B. Brown, Washington.	John Paton, Lyford.
Joseph Fennel, Linton.	Wm. R. Scott, Vincennes.
Richard T. Jones, Princeton.	Frank Gendthar, Evansville.
Hugh Monahan, Evansville.	John A. Bolln, Harmony.
Geo. F. Archbold, Newburgh.	Fred Eberwine, Knightsville.
H. L. Williams, Troy.	Thos. J. Russel, Cardonia.
Wm. T. Conroy, Brazil.	R. J. Monkhouse, Coal Bluff.
Martin Navin, Diamond.	John Watters, Clay City.

James McInnis, Carbon.	James M. Coakley, Cardonia.
John Chesterfield, Jr., Brazil.	John A. Beck, Dugger.
James Baxter, Cardonia.	Michael Doyle, Brazil.
John A. Templeton, Linton.	Frank Dunlap, Clinton.
Samuel Thorpe, Linton.	Thomas G. Marshall, Carbon.
A. L. Boore, Clay City.	John Quigley, Carbon.
Frank J. E. Urbain, Brazil.	A. D. Scott, Del Carbo.
J. F. Erwin, Macksville.	Hugh Kirkland, Perth.
David John, Shelburn.	P. H. Penna, Linton.
Bartly Stinson, Sophia.	J. W. Risher, Linton.
W. A. Jackson, Oakland City.	Wm. L. Erwin, St. Mary's.
A. H. Zimmerman, Mecca.	J. R. Horsfield, Knightsville.
John L. Suttle, Cardonia.	D. Bogle, Clinton.
Wm. Wilson, Cardonia.	Valentine Martin, Rosedale.
James Burt, Cardonia.	Wm. F. Brown, Alum Cave.

FIRE BOSSES—CERTIFICATES OF COMPETENCY.

Fred Brink, Coal Bluff.	Wm. Woods, Princeton.
Robert M. Irving, Knightsville.	Richard T. Jones, Princeton.
Chas. Sheridan, Diamond.	Jos. W. Horsfield, Knightsville.
David John, Shelburn.	

HOISTING ENGINEERS—CERTIFICATES OF COMPETENCY.

William Milburn, Cardonia.	Robert Biggins, Diamond.
John Beaton, Brazil.	John Cloyd, Rosedale.
Walter Irwin, Brazil.	Benj. Smith, Linton.
Wm. Vanlieu, Lyford.	John Dorman, Burnett.
D. H. Collier, Diamond.	Lee Wehr, Lyford.
Milton Smith, Diamond.	Thomas Gregory, Fontanet.
A. G. Collier, Diamond.	Joseph Haag, Washington.
Ed. Butts, Diamond.	Ambrose Cramer, Rosedale.
W. C. Biggins, Diamond.	Frank Ritzel, Evansville.
Thomas McNair, Carbon.	Alexander Maule, Princeton.
W. J. Hinkle, Hymera.	Smith H. Abshire, Newburg.
H. C. Cummins, Hymera.	W. J. Price, Montgomery.
Thomas Shannahan, Mecca.	Robert Hall, Evansville.
Benjamin F. Lyday, Lyford.	James W. Powell, Evansville.
Jona E. Meredith, Linton.	Thomas Roberts, Evansville.
G. F. Archbold, Newburgh.	Albert Lynch, Princeton.
H. M. Graves, Voorhees.	Frank Turber, Princeton.
E. R. Dickle, Dugger.	Charles Sterne, Francisco.
W. C. Ringo, Edwardsport.	Michael B. Miller, Evansville.
Austin Jackson, Clinton.	Charles E. Boots, Macksville.
Wallace Boone, Merom.	R. O. Pruett, Coxville.
C. F. Thorpe, Linton.	Mellie S. Hunter, Montezuma.
Frank Craft, Clinton.	Clarence Strader, Seeleyville.

Curtis Redding, Mecca.
A. H. Zimmerman, Mecca.
Geo. W. Rice, Coxville.
Mahlon R. Gustin, Sullivan.
John S. Robertson, Newburg.

Claude Erwin, St. Mary's.
Otis Bledsoe, Lewis.
J. W. Davis, Brazil.
Charles Woolf, Lyford.
Wm. F. Brown, Alum Cave.

MAPS.

The law requiring maps to be made and filed with the Inspector of Mines has been very generally complied with. The strike which began July 4th and lasted until the middle of September interfered materially with the making of maps at some of the mines that were allowed to fill with water. At others, where the roof was bad, it was allowed to fall in places, so as to make a complete survey impossible, and so maps were not filed within the time limited. Where such causes existed I have not taken advantage of the provision of the statute authorizing the appointment of an engineer to make the survey and maps. This has been done only in cases where there seemed to be a willful disregard of the provisions of the law, and in several instances when appointments were made the owners of the mines made contracts with the engineer for the work. In only two instances have any complaints been made of the operation of the law in this respect. Several of the maps furnished do not comply with the law in all respects, but as they evidence a disposition on the part of mine owners to keep within the law, I have not insisted upon their being corrected at this time. The law provides that all maps shall be corrected each year between May 1st and September 1st, and I shall insist on the work next year being done by a competent person and on having the details properly shown on the maps. In regard to the necessity of correct maps I cannot do better than quote from the first report of the Mine Inspector of this State:

"I cannot exaggerate the importance of having correct plans. When our present mines are abandoned and filled with water these maps will have to guide us in future mining operations, and if they are misleading we should be much better without them, for they may cause much destruction of life," and from the report of 1883: "A great expense and annoyance is occasioned in approaching an abandoned mine where the extent of the worked-out territory is not known. The survey and map should be made by a practical surveyor, so that the accuracy of the survey could be relied upon. When a mine is worked out and abandoned all trace of it may disappear in a few years." In the case of mines working toward abandoned works we have had several examples lately of the expense attending approaching them without a map,

in one case a bore hole having been kept ahead of the workings for over 300 feet. In another case where apprehensions were felt as to the danger of breaking into an old mine, of which a map had been filed, a survey showed that the workings of the two mines were nearly 500 feet apart, and work was continued for more than a year without the expense attending upon keeping a drill hole in advance. But this does not appeal to mine owners, as the benefit derived from it will be received by future operators. But a correct working map is a present benefit in many ways. It has a tendency to secure a more systematic working of the mine, to keep the workings in such a shape that the greatest possible amount of coal is finally recovered from the pillars and to prevent accidents from shots blowing through pillars. In many instances an accurate map of a mine would have prevented costly litigation over property injured by roof falling on account of insufficient pillars being left to support it, and on account of trespassing on coal out of the proper lines. The value of the maps to this office lies principally in the assistance they render in understanding the monthly reports of Mine Bosses and their use as a guide to the mines on visits of inspection. We have received great benefit in these ways, and their value to a new incumbent of the office would be inestimable. One survey was made during the year at the request of an adjoining landowner, where a coal company was supposed to be trespassing on his land, which the survey showed to be true. The matter was amicably adjusted by the parties on the basis of the survey, and no certified copy of the map was necessary. This survey was made at the mine of the Currysville Coal Co., near Shelburn, on March 10th, 1897. No prosecutions have been instituted for failure to furnish maps, and I think none will be necessary.

DESCRIPTIONS OF MINES.

During the year 1897 mines employing more than ten men have been operated in the counties of Clay, Daviess, Dubois, Fountain, Gibson, Greene, Knox, Martin, Owen, Parke, Perry, Pike, Sullivan, Vanderburgh, Vermillion, Vigo, Warrick. I give below brief descriptions of the several mines in each county:

CLAY COUNTY.

BRAZIL BLOCK COAL Co.'s No. 1.

Located in the north part of the city of Brazil, on the C. & I. C. Railroad. Electric Mining Machinery is used. The shaft bottom is lighted with incandescent lamps. In securing the roof at the bottom of the shaft, instead of the timbers usually employed for this purpose, legs of $4\frac{1}{2}$ -inch diameter gas pipe and cross bars of railroad iron are used. These are lagged overhead with 2-inch oak timber. The result to date is highly satisfactory, as there has been no necessity for repairs since the mine was opened, though the roof is one that is very sensitive to the action of air, and in mines of this vein where timber is used it requires frequent renewal, and the roof gives a great deal of trouble. The double partings at the bottoms are floored, and with good tracks, the handling of coal is made comparatively easy. The underclay is soft, making it necessary to corduroy the hauling roads, as a great deal of water is coming into the mine from others that have been worked out and abandoned in territory surrounding it, the Campbell, Morris and Black Diamond having opened the most territory. Where corduroy is not used the roads are very muddy. For convenience in handling machines the bottom is taken up in all entries and nearly all rooms, so that it is very hard to keep water off the roads. Where the roof will admit of it, rooms are driven double 50 feet wide, with a road on each side and the refuse gobbed in the middle. This gives an opportunity for the circulation of air around the working face at all times. Ventilation is good in all the entries, but as machine mining requires shot firing at all hours of the day, the air is smoky at times, requiring a great deal more than the statutory amount of air to be kept in circulation. Keyes' Automatic Mine Doors are used on the main airways and have given very good satisfaction. The roof requires constant attention, and it reflects credit on the management that so few accidents from falling of roof have occurred in the mine during the year. The last inspection was made November 10th, 1897, and very few recommendations were found necessary, and nearly all of the defects were easily remedied. The air is split to afford five separate currents of air to different sections of the mine. The largest section has but 30 men in it.

GART NO. 3 MINE.

Located on the Harmony North Branch of the E. & T. H. Railroad one and one-fourth miles north of the main line. It is in territory that is nearly surrounded by abandoned works, and makes a great deal of water, six pumps being in use at the mine. On two occasions during the year the mine was laid idle on account of the water rising at the shaft. The works and the escape ways are so located that no danger to the workmen is to be apprehended from this source, however. The mine is fitted with self-dumping cages, the mine car remaining on the cage and being emptied without handling by the top men. This result is displacing one or two laborers on the pit top, the weighman doing all the work.

Two veins are worked in the mine, the coal from the upper being brought through a tunnel to the lower vein and hoisted from the bottom of the shaft. The works on the southeast side of the shaft are worked out and abandoned.

The roof in the bottom vein is good in most places, but the coal lies uneven, giving a very irregular haulage way, the grades being heavy, and making the haulage very costly. The roof in the top vein is fair, but requires a good deal of timber to keep it safe. The water from the upper vein is drained through drill holes to the lower vein and from there brought to the surface by pumps. Some of these are operated through bore holes from the surface reaching low places in the workings, thereby doing away with a great deal of piping and ditching underground, the steam pipes being laid from the boiler along the surface of the ground.

This helps to improve the ventilation by allowing the air passing through the mine to be kept free from the heat from a long line of steam pipe and from the exhaust steam from the pumps. Rooms and entries are worked standard width, as given in another part of this report, and are well drained and timbered where necessary. When the last inspection was made, November 10th, 1897, the ventilation was fairly good, but the air that was coming from the fan should have furnished a better current at the working faces. This was due to some extent to a door on the main air course being open a great deal, and to some of the air courses being used for stowage by miners, who lacked pure air in consequence. This is a thing that requires constant vigilance on the part of mine foremen, as workmen are in the habit of putting dirt, timbers, tools, etc., into the breakthroughs and thereby

choking the air-passage of the mines. Good ventilation can be secured at least expense by keeping airways clean. Owing to this mine being idle so much during the year it had been allowed to get into bad condition and had not been fully repaired at the time of my visit, but it appeared that Mr. Conroy was pushing the work with all possible speed.

GART NO. 5 MINE.

Situated in the town of Cardonia, on the Knightsville North Branch of the T. H. & I. R. R. This is the largest mine in the Bloek Coal District worked exclusively by pick miners. At the time of last report the output was greatly reduced on account of its original territory being nearly worked out. Since then some territory has been acquired on the east, and a cut has been made to the south, which opens up a large field of coal. The production at the time of my last regular inspection was 600 tons of screened coal per day. About one-fifth of the coal goes through the screen, making the total production 720 tons daily. The roof is good and there is comparatively little water to contend with, so that the haulage roads are in good condition, but very heavy grades are met with, which greatly reduce the hauling power of the animals employed. As an illustration of this fact I may remark that the cut above referred to, being made nearly level on the bottom for a distance of 500 feet, has a depth of over 20 feet near the middle. At the time of my last regular inspection, October 22d, 1897, a tunnel was being driven to the upper vein of block coal, which had reached the coal at the time of my later visit. When this is opened it should add materially to the output of the mine. For the first time since this mine was opened I found the ventilation badly deficient on October 22d. Along the entry going northeast was a line of steam pipe which warmed the air almost to the suffocating point, and though it had cooled considerably before reaching the working places, it did not have the life-giving force that it should have. In this part of the mine, near the face of the last entry, water sometimes accumulates and interferes with the air current. While I should have been pleased to see this in better condition, I did not insist on the necessary changes, as this part of the mine will soon be abandoned. On the south I found a great deal worse state of affairs. The entry, which is now being used as a haulage way, had gone over an extensive rise, and the coal for a great part of the distance was thin, in some places less than two feet. The air course following the entry was made only the height of the coal; at the time it was driven only

four men were at work there. When the haulage road was cut through no steps had been taken to increase the size of the airway. On the date above given I found 141 men and several mules at work in that part of the mine, and at least half of them were without sufficient air. If my authority had extended so far I should have ordered at least 40 men out of the mine, but the law provides, "Whenever the Mine Inspector shall find men working without sufficient air * * * he shall first give notice to the owner, operator, agent or lessee, a notice giving facts, and a reasonable time to rectify the same." I did this, and on my return found the conditions somewhat improved and work being pushed with reasonable diligence to still further improve it. The air course referred to was being enlarged by taking coal off the side and by taking down the roof, and another opening will shortly be made from the top vein to the surface in this part of the mine. This will, in my opinion, give sufficient ventilation for all men who are likely to be employed there in the future. However, the management could not be too strongly condemned for delaying this necessary work so long.

BRAZIL BLOCK COAL CO.'S NO. 8 MINE.

Located on the Coal Bluff Branch of the C. & I. C. R. R., near the north line of Clay County. Only the lower vein is now being worked. The output at present is about 400 tons of block coal daily. Adding screenings, the total will reach 500 tons. The production is restricted at present, owing to the difficulty of securing men to load coal after machines. Miners seem to prefer pick work when it is possible to get it, and men have been in demand ever since the settlement of the strike in September. While this mine employed 233 men in March, the managers could secure only 160 in October. The mine is laid out to be a large producer. Nearly all entries radiate from near the bottom of the shaft, and with roomy partings or sidings, give plenty of room to stock coal near the shaft, so that the underground work may go on for quite a while if, for lack of railroad cars or any other reason, the hoisting is suspended. The roof in most of this mine is excellent, giving a splendid opportunity to work machines to advantage. All entries are driven double, with a haulage road in each. Bottom is lifted to give the necessary height, the coal being from three to three and a half feet in height. All rooms are double, 50 feet in width, started from the entries with two necks, and having a road on each side, with a gob in the middle. This insures the passage of the air current around the face. The ventilating current is made into seven divi-

sions, with regulating doors so arranged that, if necessary, two or more of them can be turned into any part of the mine. By this means much of the evil from continuous shot firing is avoided, and if smoke is troublesome in any part of the mine, an increased current soon sweeps it out. Keyes' Automatic doors are used on the main haulage ways, and to force the air into rooms old-style hinge doors are placed in convenient places when necessary. When inspected October 27th it was in all respects a model mine. Ventilation is provided by a Crawford & McCrimson blowing fan 20 feet in diameter, which, at a speed of 60 revolutions per minute, discharges 72,000 cubic feet of air per minute into the mine. This is well distributed through the entries and air courses of the mine. The plan of the mine is by P. J. Mooney, Mining Engineer of the company, and the mine has been worked out under the superintendence of Robert J. Wallace, and both deserve credit for its success.

BRAZIL BLOCK COAL Co.'s No. 10 MINE.

Only a few men have been working in this mine at any time during the year, not enough to bring it within the law; consequently it has not been inspected.

BRAZIL BLOCK COAL Co.'s No. 11 MINE.

Located on the Coal Bluff Branch of the C. & I. C. Railroad, southwest of No. 8. This mine was opened in 1896, but no top nor bottom was taken to give the necessary height to use mules. The coal was brought to the bottom by pushers. About the 1st of March it was closed down, and no more coal was taken out until Sept. 1st. When inspected October 12th nothing had been done in the bottom vein. This shaft is equipped to handle a large output of coal. The cages are self-dumping. Two fans are used, one at the main and one at the escape shaft, each 14 feet in diameter. The airway is partitioned from the stairway in the escape shaft, and this is very freely used by the workmen in entering and leaving the mine. It is in splendid condition. The coal lies fairly level in this mine, giving fair grades for haulage. The roof is very dangerous, being a shale cut into large irregular blocks, which fall with very little warning. Several accidents have occurred in this manner during the year in this mine. There was but little work being done on the west side of the mine, as the roof was so bad that it could not be made safe to work under.

HARRISON MINE.

Located on a branch of the E. & I. Railroad, three miles southeast of Clay City. The mine has run very irregularly during the year. The coal lies irregularly, which makes drainage difficult and makes the haulage roads bad. The air courses have not been kept clean, and are choked with mud and water. In spite of these disadvantages a fair current of air was found in all the working places, but there was only half the number of men at work that could be employed in the mine. I am inclined to think that with a full force of men the ventilation would be found insufficient. The coal is of the character known as semi-block, the roof of gray slate and the bottom of fire clay. Charles Nash is in charge of this mine, and is also sinking a new shaft for the same company, and no pains are spared to keep traveling ways and working places well timbered.

BRIAR HILL MINE.

On the main line of the E. & I. Railroad, one mile northwest of Clay City. This mine has been an annoyance to Mine Inspectors for years. A great deal of water comes into the mine from an overlying bed of quicksand, which softens the underclay, and, unless pillars are left very strong, allows the roof to break or the bottom to "heave," in either case making work in the part of the mine where it occurs either impossible, expensive or extremely dangerous. This has caused an abandonment of all works opened prior to the fall of 1896, and developments made since then by A. L. Boore, who has charge of the mine, have kept these facts in view, and pillars are being left sufficiently thick to bear all weight which can be expected to be thrown upon them. Roads are in good condition. There are numerous "pots" in the roof, which are liable to give way without warning and with but little indication of their presence. Several accidents have occurred from this cause during the year, one of them fatal. The ventilation on my last visit was in good condition. Air courses were opened sufficiently that persons could walk through their whole length. In some places there was more dirt thrown into breakthroughs than I like to see, but in all respects they were all that the law requires, and the air was sufficient for a great many more men than were at work. The underclay from this mine is sold for the manufacture of Terra Cotta ware and encaustic tile, that commands a good market.

PRATT MINE.

Located about two miles west of Perth on the Big Four R. R. This mine is owned and operated by the Coal Bluff Mining Co., of Terre Haute, Ind. It was opened in July, 1888, and is worked exclusively as a hand mine. An attempt was made some years ago to work it as a machine mine, both Harrison and Legg machines driven by compressed air being used, but without success. A twelve-foot Crawford and McCrimmon fan is used to ventilate the mine and produces a good current of air, which is well conducted to the working places, though there is a great deal of old work between the air shaft and the present workings. The coal is the upper vein of block coal and is reached by a shaft 119 feet deep; the coal is $4\frac{1}{2}$ feet thick and has a good black slate roof. Rooms are driven 20 feet wide, with pillars six to nine feet in thickness. The coal from the pillars is recovered after the rooms are worked out. This mine was idle a great deal during the year, and it was not found working on either of my visits.

GLADSTONE MINE.

Is located on the Coal Bluff branch of the C. & I. C. R. R. near the line between Clay and Vigo counties. The lower vein of block coal is worked, which, however, is not of as pure a quality as further east, being somewhat of the nature of the semi-block found in the vicinity of Clay City. The roof is usually good, but in some places it is a flaky, sandy shale, which is very difficult to secure by timber. As it falls in thin sheets, however, it cannot be considered dangerous, and no accidents have been reported from this cause at the mine. The air courses which are not used as hauling roads had become badly choked by dirt from this cause, and have required a good deal of work to open them up this year. This work was the more necessary as the mine generates a quantity of firedamp in some places. The quantity of water had increased so much in the spring of 1897 as to emphasize the necessity of a better means of escape than was furnished by the old escape shaft, and an escape has been sunk at an elevated part of the workings, so that a sure means of egress would be given if water should rise so that the shaft and old escape-way should be shut off. On my last inspection, made October 21st, the ventilation of the mine was found in fair condition except in some rooms where impure oil was being used. On a later visit made by my assistant he reported that this had been remedied.

CRAWFORD NO. 2 MINE.

Located near Center Point on a branch of the T. H. & I. R. R., owned by the Crawford Coal Company, W. W. Risher, Superintendent. This has been one of the best mines worked in the block-coal field for many years. It is operating the lower vein, and has had good top throughout. The coal is very regular in height, about three feet nine inches, and the shaft being sunk in the lowest part of the territory, drainage has given but little trouble. Roads have been dry, and the grades being all in favor of the loaded cars, gave it a great advantage in hauling over other mines in this district. On every occasion when this mine has been examined it has been found in excellent condition in all respects. Pillars are being drawn now preparatory to abandonment. It will probably be finished during the present year. The company are making preparations to sink another shaft in this vicinity during the coming spring.

CRAWFORD NO. 3 MINE.

Located two and one-half miles northeast of Asherville, on the Center Point Branch of the T. H. & I. R. R. This mine was opened in 1896. It has had a very soft roof in a greater part of the work, as the territory goes to the outcrop of the vein in all directions. Good care has been taken by the mine boss to secure the working places and traveling ways, and but few accidents have occurred from falling roof. The mine has always been found in good condition when inspected. This mine will be worked out and abandoned within five months from January 1st, if present calculations do not miscarry.

WORLD'S FAIR MINE.

Located one and one-fourth miles northeast of Brazil, on the T. H. & I. R. R. Owned by the D. H. Davis Coal Co. Has been in operation very irregularly for several years. The coal is the average height and quality of block coal, and for the most part has a good roof. In some parts, however, the roof is a gray shale, badly cut up with slips, and requiring great care to prevent accidents. Under the circumstances these have been very few, which speaks well for Mr. Robt. F. Jenkins, who has charge of the mine, and for the character of the men employed there. Several times during the year complaint was made of the scales used at this mine, but on only one occasion were they found

working badly. On that occasion they were promptly attended to when the attention of the mine boss was called to their condition. The original territory of this mine is pretty well worked out, but two entries are being driven to test another piece of land recently acquired by the company. Should this prove good, the mine will probably last several years yet, but at present the prospects are very unfavorable. The mine has usually been found in good condition, but on the last inspection several rooms were found where the air was bad, without any chance to remedy it until the places are nearly finished. As this would be shortly and the men working the place requested it, I permitted them to be driven on. Each of them would probably reach their limit in six days. With this exception the mine and its equipments were in good condition.

DIAMOND NO. 3 MINE.

Located one mile south of Perth; is reached by a switch from the main line of the C. & I. C. R. R. It is owned and operated by the Diamond Block Coal Company, of Chicago. During the year the shaft at this mine has been sunk to the lower vein of coal, and some development has been made in it. The distance between the two veins is 25 feet. The roof is hard over the bottom vein, and the coal about three and a half feet thick, but very hard to mine. The coal is reported to be of excellent quality. When last inspected this mine was found to be in good condition, all provisions of the law being fully complied with. This mine is now in charge of James Cuthbertson, Sr., one of the oldest mine men in Clay County, which is an assurance that it will be kept in good condition if that is possible.

EXCELSIOR MINE.

Located about one mile northwest of Perth, on the Coal Bluff Branch of the C. & I. C. R. R. The upper vein at this mine has been worked out, and was abandoned during the year. The vein now being worked is very irregular in thickness, ranging from two feet ten inches to three feet eight inches. Both top and bottom are fairly hard, giving good haulage roads and safe traveling ways in all parts of the mine now at work. The shaft is located on the bank of a branch of Otter Creek, and the former operators mined the coal from under the bed, and did not secure the roof properly. This has caused a great deal of trouble from water, and on two occasions the mine has been flooded. By the carefulness of H. B. Ehrlich, manager, however, all the workmen have been warned in time to escape. This part of the mine has been secured by timber and packing till I think it is safe.

SUPERIOR MINE.

One-fourth mile west of Turner, on the main line of the T. H. & I. R. R. Is owned and managed by Peter Ehrlich, the oldest coal operator in the State. The coal is bituminous, of good quality, and from six and a half to seven feet in thickness. This mine has usually been found in good condition, both in respect to ventilation and safety, as far as could be seen. Some apprehensions have been felt owing to the nearness of the works of several abandoned mines, but a survey shows that there is a sufficient pillar to prevent danger. There are two escape shafts communicating with different parts of the mine, and ventilation is provided for by a fan and furnace. On my last inspection the air was being well circulated around the mine. The location of the shaft makes drainage and haulage difficult and roads hard to keep in repair.

EUREKA NO. 2 MINE.

One-fourth mile east of Carbon, on the Big Four Railroad, owned and operated by the Eureka Block Coal Company, of Terre Haute. Both of the principal veins of block coal are worked in this mine. The lower vein varies in height from two feet ten inches to four feet six inches. The roof is good in this vein, but the coal lying uneven makes drainage difficult, and a good deal of water lies on the road in places. This also interferes with haulage. In the workings of the upper vein the roof is bad and the bottom is soft. Hauling roads require to be closely floored or corduroyed, and a great deal of timber is required to make them safe overhead. Air courses become blocked by falling slate, and this renders ventilation very difficult, even with two fans running. On nearly every occasion when a regular inspection has been made at this mine the ventilation in the upper vein workings has been found deficient. On making his last inspection Mr. Epperson found it necessary to order some improvements in this direction, and also in one or two places in the bottom vein. A special inspection will be made soon to learn whether his instructions have been followed. As all the coal from No. 1 mine is now being brought out through this opening, the work extends over a large territory, and a great deal of work is necessary to keep the mine in good condition.

A new mine, to be known as No. 3, has been opened by this company during the year, further east, but as it has but recently begun producing coal, it has not been inspected during the year.

MONARCH MINE.

Located on territory adjoining the city of Brazil on the northwest. This mine is owned by Goucher, McAdoo & Co., and is operated by them solely to supply material for their sewer-pipe factory. During the year about 15 men have been on two turns in order to avoid prosecution for failure to provide a second outlet. With the exception of this failure I have at all times found the mine operated in full compliance with the law. Material is taken out of both top and bottom—shale and clay—for use in the factory, making the workings from nine to ten feet high and giving plenty of room for air to circulate. The mine is always well timbered, and I have never had occasion to call attention to dangerous roof. A change of superintendents during the year is given as the cause of failure to provide a second outlet, but the present manager, Mr. George Goucher, assures me that one shall be provided early in 1898.

BRAZIL MINE.

Located two miles northeast of Brazil. Owned by the Jackson Coal Co. Is reached by the Knightsville North Branch of the T. H. & I. R. R. All three veins of block coal are mined here. The bottom vein has had excellent roof and fairly hard bottom. It has been nearly worked out, and on my last visit but few men were working there, and they near the bottom of the shaft. The principal part of the work now being done is in the middle vein. There is a great deal of bad roof in this vein, and the bottom is very wet. Falls frequently occur, making openings from this to the upper vein, and making it very difficult to carry air through the air courses in the middle seam. However, on my last inspection, October 30, I found nearly all working places in this vein fairly well ventilated, and with few exceptions, safely timbered. I called the attention of the workmen to the dangerous ones, and I presume they took proper precautions to make themselves safe, as no accidents have been reported from such places. The works in the upper vein are in good condition, dry and well ventilated. The coal is of good height, but rather softer than the block coal from the regular veins. Very little water is found on the roads and the roof seems to be easily held by timber. No complaints have reached me since my last inspection, and I am informed that improvements have been made in the middle vein and that all are well ventilated.

NICKEL PLATE MINE.

Three-fourths of a mile northeast of the above, and owned by the same company; is nearly worked out. Two veins have been mined here. The lower vein has nothing but entry pillars left, and those only where it is necessary to support the work that is to be done in the upper vein. For a mine that is so nearly completed it is in good condition. In some places there is a very weak current of air, and in others a great deal of black damp is given off from old works, but sufficient fresh air is supplied to dilute it and render it comparatively harmless. It is thought that it will be abandoned in about six months. In work of this character there is always great danger from falling roof. Accidents can only be avoided by the highest degree of care on the part of all concerned. I think this is being exercised by most employes at this mine, and I hope the mine will be finished without mishap.

MARKLAND MINE.

Formerly known as the Burger mine, located at the north limit of Clay City, is now operated by Andrews & Burnham, who are rapidly developing it. When inspected on November 4th 31 men were employed, with a daily output of 100 tons. The coal is from three to four and a half feet thick and of excellent quality. The law is being complied with in all respects, except that no second outlet is provided. Permission was given to run until spring without one, though more than 5,000 square yards have probably been excavated. Yet so much of the older works have fallen in that it would be very difficult to prove the fact. A surveyor could not get through nor around this part of the mine. The proposed plan is to sink a larger shaft for hoisting, and use the present opening for an escape way. This will probably be done.

FAIRVIEW MINE.

Located on the C. & I. C. Railroad, four miles northwest of Brazil. Two veins of coal are mined. This mine has always been found in good condition when inspected. While the upper vein has all the drawbacks and dangerous features commonly found in this seam, no accidents have been reported as caused by falling roof or coal at the mine during the year. The mine is operated by the Otter Creek Coal Company, of Brazil, Ind. The Nellie mine, near Brazil, operated by the same company, was abandoned during the year.

SAN PEDRO MINE.

Located north of Staunton, on the T. H. & I. R. R. Owned by Joseph Somers. This mine has been operated very irregularly during the year, and was inspected but once—December 10—and was found in good condition. The coal is bituminous, seven feet thick, and of good quality.

LOUISE MINE.

One and one-half miles north of Center Point; operated by the Weaver Coal Company. This mine has not been operated with any regularity for the last two years; in fact, it has not run long enough at a time to enable the managers to put it in good condition before another shut-down. This is one of the few mines in this State that have been developed on the single-entry plan. As a result of these two drawbacks the mine was found in bad condition when last inspected—December 13. However, but very little work was required to make it fairly good, and orders were given to have that done before the close of the year, and the changes were begun immediately, with a promise that they would be pushed to completion as soon as possible.

BRIAR HILL MINE.

Located at Asherville, on the Center Point Branch of the T. H. & I. R. R. Owned by Zeller, McClelland & Co.; was idle from May 1st till the latter part of September. It is now being operated with a view to its final abandonment early in 1898. When examined, December 13, it was found in fair condition for a mine where only pillar work is being done.

COLUMBIA No. 4 MINE.

Located one and one-fourth miles southwest of Asherville, owned by the same company, was opened in 1896. It is being operated in the upper vein of block coal. The roof is very bad, even for this vein; and requires a great deal of timber and attention, making it difficult to make it secure. The main north entry is now standing in a very large fault. The mine is in fair condition, with a few exceptions, and efforts are being made to better those parts of the mine. The shaft at this mine will probably be sunk to the lower vein later. Several serious accidents have occurred here from falling roof during the year.

VICTORIA MINE.

Located one-half mile west of Cardonia, on the C. & S. E. Railroad. This is an old opening with a new name. It was operated by the Clay Coal Company in 1873, and by several other parties since then. The lower vein of block coal is being mined. The coal is brought to daylight through a drift, and is hoisted by a gin operated with horse power to a height of about 20 feet and dumped into railroad cars. While the mine has been operated so long there seems to be a considerable body of solid coal in the territory reached, and the mine may last quite a while. There are about 30 men employed, or were when the last inspection was made. The mine is operated by Allais & Urbain, Brazil, Ind. It is ventilated by a furnace which produces a sufficient circulation of air in all parts of the mine, and the roof is good.

DAVISS COUNTY.

CABLE NO. 4 MINE.

Located on a branch of the B. & O. S. W. R. R., near Washington, Ind., owned by Cable & Co. Was opened in 1885; has a capacity at present of 330 tons daily. It is opened by a shaft 42 feet deep, and the second outlet is by a slope, and no men or mules are supposed to be hoisted at the shaft. This rule, however, is not strictly observed. The coal lies very uneven, giving considerable grades over which it has to be hauled, and making drainage troublesome, though it is fairly carried out. The bottom is fire clay and, where water is permitted to stand on it, works very easily into mud. A very good gray shale roof overlies the coal, and it is well timbered where it is necessary. The coal that is now being worked is bituminous, about 2 feet 10 inches thick, of good quality. Double entries are driven 7 feet wide, with a pillar 20 feet in thickness between the pair of entries. The bottom is taken up to make the roadways 5 feet high. This gives an area of 7 feet by 5 feet for the principal air-ways. They are kept fairly clean, and afford a good passage for air currents. The ventilation is produced by a fan at the main shaft, which gives a good supply of air, but doors and stoppings allow a good deal of it to escape before reaching the working places. However, on the last inspection, all working places were found well ventilated. Pillars are nearly all saved.

CABLE NO. 9 MINE.

Located on the same branch railroad as the above, some distance west; it is owned by the same company. This mine was opened in 1892. During the summer of this year an electric plant has been installed, and at present two Morgan-Gardner mining machines are in use. The capacity is 125 tons per day. The conditions are about the same as at number four, except that a band of draw slate from 2 to 20 inches in thickness is found above the coal, and the height necessary for entries is taken from the top instead of the bottom. The escape way is by a slope 700 feet from the bottom, which is used almost exclusively by men and mules.

Ventilation is produced by a ten-foot fan at the main shaft, and a good current of air is produced, which is nearly all carried to the working places. The size of the air compartment of the shaft is $7 \times 8\frac{1}{2}$ feet, and the principal air-ways are 8×5 feet in section. The miners here came out on a strike on May 1st, owing to a dispute about handling the dirt made by the draw slate which is spoken of above, and the mine was idle until August 1st, when it was started with colored men imported from Kentucky. A number of the old miners have left the place, but some are still insisting that the strike is being continued.

MONTGOMERY NO. 1 MINE.

Located on the main line of the B. & O. S. W. R. R. at Montgomery; it is operated by the Daviess County Coal Company. No men are hoisted at the shaft, as there is a good outlet by means of a slope 200 feet from the shaft. The capacity of the mine is 300 tons per day. The hoisting shaft is 85 feet deep, $18 \times 7\frac{1}{2}$ feet in size, with an air compartment $4\frac{1}{2}$ feet wide cut off one end of the shaft. The coal is a good quality of steam coal and is about 4 feet thick, with a thin dirt band near the middle. Rooms are driven 22 feet wide, with pillars 12 feet thick between them. About half of them are saved. Grades are irregular and bottom soft, making it difficult to keep hauling roads in good condition. A 10-foot fan furnishes ventilation for the mine, and does the work very well. The company is sinking another shaft about one mile west of No. 2, the No. 1 Mine being so nearly worked out there will be nothing but pillars to draw by next Spring.

MONTGOMERY NO. 2 MINE.

Located near the above and owned by the same company. It was opened in 1896, and is connected with No. 1 Mine for a second outlet, and has a present capacity of about 150 tons per day. The shaft is 65 feet deep, and conditions are about the same as in the case of No. 1. An 8-foot fan at the main shaft furnishes sufficient ventilation. Both mines are under the superintendency of Geo. B. Brown, and the methods of working are so nearly alike that no further comment is necessary here. Coal is furnished to the engines of the railroad, 14 pockets having been constructed for that purpose.

MUTUAL MINE.

Located three-fourths of a mile south of the B. & O. S. W. Railroad, near Clark's Station. It is owned by the Mutual Mining Company. The coal is hauled by mules from the shaft to the tip-house on a tram road, one mile in length. The tippie is at the railroad, and the coal is loaded there into railroad cars. The production is 200 tons per day at present. The escape is a shaft 600 feet from the hoisting shaft. The depth of the shaft is 100 feet to the vein that is now being worked. Another vein lies above this, but it has never been worked here. It is from $3\frac{1}{2}$ to 4 feet in thickness, but has not a good roof. The vein now being worked averages about $4\frac{1}{2}$ feet in thickness, two-thirds of which is cannel coal, and the other one-third an excellent quality of bituminous. The vein lies nearly level, and has a good roof generally, though some bad places are found. The mine is well drained and the haulage roads are good, and are laid with 12-pound iron. Entries and air-courses are 8 feet wide, with pillars from 12 to 14 feet thick, and require no timbering. Rooms are driven 24 feet wide, and pillars 12 feet thick are left in such a condition that nearly all the coal will finally be saved, the rooms being well timbered, and the road placed near the pillar side. Ventilation is provided for by a 12-foot fan at the escape shaft. A good current of air is found at the faces of all entries, and all the working places, for safety and ventilation, will compare favorably with those of any mine in the State of Indiana. This mine was opened in 1884.

HAWKINS MINE.

Is located on the E. & I. Railroad, near Washington, and is owned by the Washington Coal Company. Its production is 100 tons daily. The second outlet is by a shaft 100 feet from the main opening. This is a shaft 64 feet in depth. The bottom is soft, but well drained, and a good haulage road is kept up. The track is all wood, and turntables are used instead of partings. The coal is 6 feet in thickness and is a good quality of soft coal, with no dirt bands in the seam. The roof is a soapstone, and entries and air-courses are driven only 6 feet wide; and timbered. Air-courses are kept clean and well drained. Rooms are 16 feet wide, with pillars 10 feet thick, which are nearly all saved before the workings are abandoned. A good road is maintained to the escape way. A fan 10 feet in diameter, located at the escape shaft, furnishes the air necessary to ventilate the mine. A good current of air is maintained at the faces of all entries, and the mine generally is in excellent condition.

WILLSON'S NO. 4 MINE.

Owned by the Washington Coal Company; it is located near the town of Washington, and is operated to supply local trade. It was opened in 1894. A gin hoist is used with a chain instead of a rope. The mine has, at present, a capacity of 50 tons per day. The mine is driven through the hill, thus affording two outlets, on opposite sides of the same. It is opened by a slope 100 feet long, and depends on natural ventilation for air. The vein is $3\frac{1}{2}$ feet in thickness, of excellent soft coal, with a good shale roof and fire-clay bottom, and, while it lies irregularly, is well drained, and good roads are kept up. It is worked in such a way that all coal is saved. Timbering both in rooms and entries is well looked after. When inspected, December 22, a fair current of air was circulating in the mine.

RAGLESVILLE COAL CO.'S MINE.

Located one mile east of the town of Ragsville. It is operated by the Ragsville Coal Company, U. G. Stoy manager. The mine is opened by a shaft 36 feet deep, and the coal is hoisted with a gin operated by horse power. Coal is taken from the mine by wagon, the principal market being found in the immediate vicinity, though some is hauled to the E. & R. Railroad, a distance of three miles, and shipped

from there. The vein is about 3 feet thick, with good roof and fairly hard bottom. No animals are employed, the coal being brought to the bottom of the shaft by pushers. This mine was opened during the year 1897, and was in good condition when inspected, November 27th. There were 24 men employed on that date.

UNION MINE.

Located one and one-fourth mile southeast of Raglesville. It is operated by the Union Coal Company; is a drift opening made in 1896. One mule is used in this mine, and, with this exception, the remarks made in regard to the Stoy Mine will apply to this. Sixteen men were employed November 27th, and the mine was in good condition.

CO-OPERATIVE MINE.

Located one and one-half miles southeast of Raglesville. It is operated by the Co-operative Coal Company; is a drift mine, opened in August, 1897. No screens are used, but the coal is cleaned in the mine by the use of riddles. The roof is good, and no timber is used in entries or air-courses, and to this time no falls have occurred to interfere with the course of the air, and the mine is in good condition at present. Ventilation in each of the above is by furnace.

FOUNTAIN COUNTY.

INDIANA BITUMINOUS MINE.

Located west of Silverwood, Indiana, on the Clover-Leaf Railroad. It is operated by the Indiana Bituminous Coal Company, of Terre Haute; R. S. Tennant, President. It was opened in the fall of 1894. By reason of its location a good market has been found for its product, and it has been operated more steadily than any other mine in the State since it began shipping coal. It is equipped with self-dumping cages, and has a capacity of 600 tons per day. The coal is of a good quality of bituminous and seems to give satisfaction wherever it is used. The coal is very irregular in thickness, running from $4\frac{1}{2}$ to 7 feet, and has very great changes of level, requiring a great deal of grading to secure good haulage roads. The under-clay makes a good quality of brick, and has a fair demand for this purpose. The mine has usually been found in fair condition when examined, though an improvement could be made in the quality of oil that is used for light, which makes a great deal of smoke.

STURM MINE.

Located near Silverwood, on the Clover-Leaf Railroad. While this mine has been opened some time, it has been operated on a small scale until this year, when it passed under the control of the Silverwood Coal Company, who are now working about 25 men, and producing 50 tons of coal per day. The underground works of the mine are in good condition, and the ventilation is excellent. A few minor provisions of the law in respect to the equipment of the mine were not complied with when the mine was inspected, but they will be soon. The shaft is 51 feet deep.

DUBOIS COUNTY.

HUNTINGBURGH MINE.

Owned by L. B. Southard, Huntingburgh. It is located on the branch of the Air-Line Railroad, near the town. It was opened in 1886 and has been operated ever since, mostly, however, in a small way. The shaft is 35 feet deep. Very little attention was being paid to the mining law, and many recommendations were needed. There has not been a second visit made to see whether they have been complied with or not.

GIBSON COUNTY.

OSWALT MINE.

Located one mile north of Princeton, at the crossing of the E. & T. H. and the Air-Line railroads. It is operated by the Maule Coal Company, of Princeton, Ind.; it is opened by a shaft 440 feet deep. A second outlet has been completed at this mine during the year, and a good hoisting arrangement has been placed at the air-shaft. This has a separate engine, which is supplied by steam from the main boilers. The surface plant of this mine is one of the best in the State, having a double hoisting engine, with 18x32-inch cylinders coupled direct to a drum 8 feet in diameter. The coal is screened over perforated steel plates for the larger size, the screenings being elevated and passed through a revolving screen with meshes of three different sizes. The whole screening plant is operated by an engine,

with a cylinder 10 inches in diameter with a 20-inch stroke. Seven different sizes of coal are made. Ventilation is produced by a fan 12 feet in diameter, which produces a good current in the mine. The shaft is very wet, but in other respects is in a good condition. The coal is a very hard bituminous, from $6\frac{1}{2}$ feet to $7\frac{1}{2}$ feet in thickness. Entries and air-courses are driven 8 to 9 feet wide, giving a large area for air travel. While considerable fire-damp is generated in some parts of the mine, no accidents have occurred from this cause during the year. Part of the coal is mined by hand and part by machinery. The Yoch mining machine, driven by compressed air, is used.

GREENE COUNTY.

ISLAND NO. 1 MINE.

Located one and one-half miles south of Linton, on the I. & V. Branch Railroad. It is the pioneer mine of Greene County, having been the first of any consequence opened in the county. It was opened in 1883 and worked as a pick mine until 1892, when the company equipped it with the Harrison compressed-air machines and a rope haulage about 1,200 feet in length. The mine is also equipped with the shaker screens, which are found to be very effective in removing all the fine dirt or slack, and making a very desirable grade of lump coal. They have also put in the improved Prox & Brinkman self-dumping cages. The capacity of the mine at present is 600 tons daily, giving employment to 100 men. When last inspected it was found necessary to order several changes in the mine to secure better ventilation, which was not good in some parts. This the company readily agreed to do. The depth of the shaft is 66 feet, and thickness of coal, as was given in the 1896 report, is 5 feet.

ISLAND NO. 2 MINE.

Located at Linton, one-half mile west of the town proper; it is worked by a shaft 95 feet deep. This is one of the most favorably situated mines in Indiana, as to railroad facilities, having a double tipple, one on the main line of the I. & I. S., and the other on the I. & V. Branch R. R. The advantages of location are two-fold; first, their ability to secure empty cars from either line, and that of sales and shipments on both roads. The mine is equipped with the Harrison machines, 25 in number, and has a rope haulage on the south

side 2,200 feet in length, while the coal on the north side is hauled by mules, some of it a distance of 4,000 feet. The daily output at present is 1,200 tons. The coal, as has been previously reported, is 5 feet in thickness, and of excellent quality for steam and domestic purposes. I have made two visits to this mine during the past year, and at both inspections found the mine in excellent condition.

ISLAND VALLEY MINE.

Located two miles southeast of Linton, on the I. & V. Branch Railroad. It was opened in 1892 by a joint stock company, composed principally of miners, and has been one of the most successfully operated mines in Greene County. It is worked by a shaft 52 feet deep, and has an excellent vein of bituminous coal 5 feet in thickness. The daily capacity at present is 350 tons, giving employment to 58 miners. When last inspected, an overcast was ordered put in on the west side, to assist the ventilation in that part of the mine, which was very poor at that time. This the company did, and the mine is now fairly well ventilated.

FLUHART MINE.

Located one and one-half miles southwest of Linton; it is worked by shaft 72 feet deep. This mine was opened in 1891 and ranks among the largest pick mines in Indiana. The output at present is 800 tons daily, giving employment to 120 miners. This, however, is not its full capacity, owing to an insufficient number of miners to do the work. The mine is well equipped with improved screening machinery, also a number of coal bins for storing small coal. The coal is 5 feet thick and of excellent quality. When last inspected it was found necessary to request the air-courses to be cleaned out, and the brattice replaced in the main shaft to assist the ventilation, which at that time was poor in some parts of the mine. The company promptly complied with the request, and the mine is now in fair condition.

SOUTH LINTON MINE.

Located one mile south of the town proper of Linton. This is a pick mine, worked by a shaft 81 feet deep, and was opened in 1893. It has a vein of bituminous coal 5 feet thick, and of excellent quality for steam and domestic purposes. This is one of the best regulated mines in Indiana. I have made two inspections of it during the past

year and at each inspection found it in excellent condition, the law being complied with in every particular. The daily capacity at present is 400 tons, giving employment to 66 men.

SUMMIT MINE.

Located one mile west of Linton. It is very favorably situated as to railroad facilities, having two switches, one from the I. & I. S. and the other from the I. & V. R. R.; thus giving it excellent shipping facilities and the additional advantage of securing empty cars from the two roads. This is one of the largest pick mines in Indiana, having a daily capacity of 750 tons, and employing 125 miners. It is worked by a shaft 95 feet deep and has an excellent vein of bituminous coal 5 feet 4 inches thick. This company suffered a very considerable loss in the early part of last March, owing to the heavy rainfall which flooded the mine and caused the man-way to cave in, which, when cleaned out and stairway replaced, cost several hundred dollars. At the last inspection the mine was in a fair condition.

TEMPLETON MINE.

Opened in 1892. This mine is situated within the corporate limits of the town of Linton, and about three-fourths of a mile from the town proper. It is located on a branch of the I. & I. S. R. R. It is a pick mine, worked by a shaft 52 feet deep, with a vein of bituminous coal 5 feet thick. During the past year the mine has been materially developed. One year ago about 40 men were employed, with a capacity of 250 tons per day, and there are now employed 112 miners, with a capacity of 750 tons per day. I have made two inspections of the mine during the past year. On the last inspection it was found necessary to order some changes made to promote ventilation, which order was promptly complied with, and the mine is now in good condition. Among other improvements made, with a view to the safety of the mine within the last year, there has been an escape shaft sunk and equipped with a stairway, as provided by the law.

KNOX COUNTY.

BICKNELL MINE

Located at Bicknell, on the I. & V. Railroad. At present it is operated by the Bicknell Co-Operative Coal Company, and is opened by a shaft 97 feet deep, sunk in 1890. The present production is about 140 tons per day, of a fair quality of bituminous coal. The roof is good and no timbering is required in the narrow work. The mine has always been found in excellent condition when inspected.

EDWARDSPORT MINE.

Located one mile northeast of Edwarsport, on the I. & V. Railroad, and is operated by the Edwarsport Coal Company of Indianapolis, Ind. The opening was originally made in 1894 by a slope, and the coal was brought to the dump by mules. During 1896 a shaft 45 feet deep was sunk and the coal is now brought out by that opening, the slope being used for an escape way. The mine is in excellent condition, except that at the point where the shaft was sunk the coal had been previously mined. This makes the pillar very weak at the bottom of the shaft, and may cause trouble in the future. However, every possible precaution has been taken to prevent this by putting in heavy timber, and it is likely to stand for years. The present output is 175 tons per day, of excellent bituminous coal. The vein contains two thin veins of clay near the middle of the coal, but the dirt is easily separated. No timber is used in the narrow work, and the air-courses are not kept clean, but a good current of air is kept in circulation. This is produced by a fan at the main shaft. The tippie is located 530 feet from the shaft, and a gravity plane is used to take the coal from shaft to the tippie.

PROSPECT HILL MINE.

Located near the city of Vincennes. It is operated entirely for local trade, having no shipping facilities. This mine has given us a great deal of trouble during the year, owing to the fact that it had no second outlet. An escape shaft had been begun some years since, but work on it had been abandoned and the mine worked with such a small force of men that its completion had never been undertaken. The experience of 1896 convinced the manager, Mr. F. Clarke, that to make the mine profitable more men must be employed, and he let a contract early in the Summer to have the escape-way completed. The contractor failed to do the work, and finally men were employed by the day, and the work was completed about December 1st. On several occasions we were informed that more than ten men were being employed in the mine at one time, and, on August 4th, we found nearly twice that number. On the promise of the manager that the offense would not be repeated, we did not prosecute the company for this violation. As far as we have been able to learn, the promise was kept, and two shifts of men, working night and day, kept the

trade supplied. The probabilities are that this mine will be developed considerably during the year 1898, as means of ventilation and hoisting facilities will be greatly improved by the opening of the second shaft.

MARTIN COUNTY.

THE BEDFORD COAL COMPANY'S MINE.

Located at Tunnel Switch, on the E. & R. Railroad, is the only mine in this county employing over ten men. It is a drift opening, and has natural drainage; no steam power is used about the mine. The coal is of excellent quality, and has good roof and hard bottom, requiring very little timber. The vein is from 30 to 36 inches thick. Ventilation is produced by a furnace, and, while the current is not strong, working places were all found to be clear when inspected, November 26th. There are two other veins showing in the hill where this mine is located, both of good quality, but are thin—22 and 28 inches, respectively.

OWEN COUNTY.

LANCASTER NO. 4 MINE.

Located near the west line of Owen County, about three miles east of Clay City. It is operated by the Lancaster Coal Company, of which John Andrews, one of the first operators in the block coal field of Indiana, is President. The mine is connected with the E. & I. Railroad by a switch three miles in length. Its present capacity is about 100 tons per day. The coal lies near the surface, the shaft being but 20 feet deep. It is a hard coal, of good quality, and is known as the semi-block, as is all coal in the vicinity of Clay City. In thickness it is from $3\frac{1}{2}$ feet to 5 feet. Being so near the surface, the roof is soft and requires a great deal of timber. In spite of this fact, the mine is in good condition, the air-ways being kept clean and a good current of air being circulated. This is the only mine in Owen County within the provisions of the law; and it will not last very much longer.

PARKE COUNTY.

COX No. 3 MINE.

Located near Coxville, on the C. & I. C. Railroad. It is owned and operated by the Brazil Block Coal Company, of Brazil, Ind. The equipment of this mine for handling coal and preparing for market is the best in the State, being fitted with a screening and washing plant, which is described at length in another part of this report. The coal is mined by machinery. Twenty-one Harrison and one Ingersoll-Sergeant machines are used, driven by compressed air. Two Norwalk compressors, each of 125 horse power, are a part of the plant. The coal is of the average quality of the "L" seam, as found in different parts of this State. It averages 6 feet in thickness, separated into two strata by a clay band from 2 to 4 inches in thickness. This gives a good height for haulage-ways and air-courses. The roof consists of a gray shale, which falls in slabs when acted upon by air current. This makes it very expensive and difficult to keep traveling roads and air-ways safe, but no accidents to persons have been reported as having occurred from unsafe roof in such places, which speaks well for the management. Ventilation is provided for by two fans, one at the main shaft and one at the No. 1 shaft of the company, which is located 1,200 feet from No. 3, and is used as an escape-way for the present works. A good current of air is maintained in all entries, and all working places are clear. No recommendations were necessary when the mine was last inspected.

OTTER CREEK MINE.

One mile northwest of Carbon, on a switch constructed from the Big Four Railroad. It is operated by the Brazil Block Coal Company. The works at present are in the upper vein of block coal, which is reached by a slope, and lies above water level. The bottom vein was reached by a shaft here, but this is now filled with water and has not been used for over two years. The roof in the vein now being worked is very bad, as a general thing, and as the bottom is a soft clay, and a good deal of water is found in the mine, plenty of timbers are needed to keep the entries and air-courses open. This is being accomplished in such a way as to prevent accidents and keep the mine well ventilated. But little work has been done here during the year 1897.

LYFORD NO. 2 MINE.

Located near Lyford Station, on the C. & E. I. Railroad. It is operated by the Calumet Coal Company, of Chicago, Ill.; has been open for several years, but has been idle a great deal of the time. Since the beginning of this year this mine has run as steadily as others in the bituminous district of this State. It is equipped to produce a large output, having a railroad track on each side of the shaft, with a full outfit for the handling of coal on either. Since starting this year, however, self-dumping cages have been put in, which are available only on one side. The present output is about 500 tons per day, which is mined by seven Harrison machines, operated by compressed air. The escape shaft has been provided with a stairway during the year. The coal is of the same general character as that at Coxville, with like material about $6\frac{1}{2}$ to 7 feet in thickness, and has about 4 feet of gray slate overlying it. This cuts and falls when acted on by the air, until a stone is reached which requires no timber, but as the handling of so much dirt is expensive, different means have been tried to hold it. The only one that has proven successful so far is to leave enough coal to keep the air from the roof. Where this has been tried no breaks have occurred yet, though some of the work has stood a great deal longer than was necessary to show the failure of other plans. If that slate can be kept up, it will greatly reduce the cost of working this vein of coal here and elsewhere. This mine was found to be in good condition in all respects when last inspected. The No. 1 Mine of this company has not been in operation since February, when the shaft tower was burned. It has been rebuilt, but no work has been done underground.

PARKE NO. 8 MINE.

Located one mile northwest of Rosedale, operated by the Parke County Coal Co., of Rosedale, Ind. It is the same coal field as Cox No. 3, and remarks made as to underground condition apply here. This mine has a switch from the T. H. & L. Railroad from Rosedale, and from the C. & I. C. Railroad at Coxville; is equipped with self-dumping cages and has a capacity at present of 500 tons per day; but this could be greatly increased. The coal is mined by Harrison machines, driven by compressed air, furnished by three 125 horse power Norwalk compressors. Twelve machines are in use at present, but 20 more are available when needed. The shaft is 125 feet deep, and coal is

brought to the bottom by a rope haulage of 900 feet in length. The haulage roads and air-courses are timbered where it seems necessary, but where air-courses are not used as haulage-ways, very little attention is given to them, and they are generally found in bad condition, and the ventilation of the mine defective. The escape-way is through No. 6 shaft, which has recently been abandoned as a hoisting shaft. They are 2,100 feet apart. When inspected, December 15th, though the fan was running at a high rate of speed, the ventilation was found to be very defective. I hope to be able to report improvement soon.

MECCA NO. 1 MINE.

Located at Mecca, on the C. & I. C. Railroad. It is operated by the Otter Creek Coal Company, of Brazil, Ind. During the year an electric plant has been installed, consisting of a 30-horse-power dynamo, an electric motor for haulage and a power drill. The motor is not heavy enough for the work that it was expected to do, and is being operated over only a part of the distance it was intended to work upon. On my last visit some work was being done with a view of remedying this. Two veins of coal are being worked at this mine, but the upper vein seems to lie in pockets, and is reached by tunnels at two different points in the mine. The distance between the veins is from 4 to 10 feet, of a rather soft material. This mine has worked quite a distance from the shaft, and the motor is intended to haul coal about 2,600 feet. The roof in the greater part of the mine is so that it is not difficult to keep the roads open, and, with more power, the electric haulage would be a success. There are heavy grades and many curves, however, which require a great deal heavier motor than would be needed on a straight road. The coal in this mine is a hard bituminous, of good quality. It is mined by blasting without undercutting. All the work is done by hand except that accomplished by one electric drill. The output of the mine is about 150 tons per day. The mine is well ventilated in all of the working places. Only one fan is in use, but another is in place and can be put in operation at any time it should be desirable.

CRAWFORD NO. 1 MINE.

Located two miles northeast of Carbon. It is operated by the Crawford Coal Company, of Brazil, Ind.; is a block coal mine, working in both of the principal veins of this character. The bottom vein is reached by a shaft 35½ feet in depth, while the upper vein lies under

the hill to the south of the shaft and is worked through a drift. The total output of the mine at present is 476 tons per day. Each vein is worked independently of the other with respect to ventilation and outlets, each having a fan and separate escape-way. The roof overlying the upper vein seems to be a brittle, hard pan, which, when it is allowed to fall, permits water to run into the mine from the surface, and the cracks do not close themselves, as is usual with the strata which overlies the coal in other places. This makes a great deal of trouble in the mine. In other respects this mine differs but little from other mines in the block-coal district. However, in spite of the fact that it usually runs very irregularly, I have always found this mine well ventilated, and the roadways well timbered and in good condition for hauling coal upon. The last inspection was made by Mr. Epperson, on November 10th, and was no exception to this rule.

McINTOSH MINE.

Located on the Coal Bluff Branch of the C. & I. C. Railroad, three-fourths of a mile northeast of the Brazil Block Coal Company's No. 8 Mine. It is owned and operated by I. McIntosh & Co., Brazil, Ind. The shaft is 127 feet deep to the bottom vein of block coal, the upper vein having been exhausted. The most of the thick coal has been mined, and there is very little being worked in the mine over 3 feet in thickness. The roof is good and the bottom fairly hard, giving good roads generally in the mine. Very few pillars are being removed from the bottom vein yet. The ventilation has generally been found good in this mine, but, on my last visit, several places were found where doors and stoppings are needed to carry the air to the working places. The mine boss promised to remedy this soon.

STANDARD MINE.

One-fourth mile west of the above. It is operated by the Standard Coal Company, of Terre Haute, Ind. Both of the regular veins of block coal are being worked. The coal from the upper vein is lowered by a drop shaft to the workings below, and all the output is hoisted from the same landing. The car service from the C. & S. E. Railroad proved so unsatisfactory that during the year a switch has been secured for this mine from the C. & I. C. Branch, thus giving an outlet by two different routes. The latter switch was not finished on my last visit to the mine, November 9. But little work had been done in the upper vein at that time. The places that were open there were very wet. The bottom was in good condition, well ventilated and safely timbered.

COLUMBIA NO. 1 MINE.

Formerly known as Superior No. 1, is located one-fourth of a mile north of the above. This mine is being operated in the upper vein of block coal, has a bad roof, dips and rises are irregular in pitch and direction, and makes a great deal of water. This renders it difficult and expensive to maintain haulage roads and air-courses, and I have usually found the ventilation defective. During the past year, however, a great improvement has been made in this respect, and on my last visit, November 9, I found the ventilation much better than at any previous time. A large part of the mine is being finished, and when this is cut off it will be easier to keep the rest of the mine in good condition. This mine and Columbia No. 2 are owned by Zeller, McClellan & Co., Brazil, Ind.

COLUMBIA NO. 2 MINE.

Located one-half mile southwest of the above. It is owned by the same company. It is arranged to ship coal on both the C. & S. E and C. & I. C. railroads, having a separate screening outfit, scales and switch tracks from each road. The capacity is about 400 tons per day. There are no special features worthy of notice in the condition under which it is operated, except that possibly the roof in the upper vein is worse than usual, and a great deal of timber is necessary. The entries are well taken care of, but a great deal of dirt is allowed to accumulate in the air-courses. As the works have not been extended very far yet, a good current of air is being circulated around the regular air-ways, but it does not seem to have force enough to clear out smoke where work is being done any distance in advance of the current. All entries in the top vein were smoky, and a great many rooms where a good current of air was passing the mouths of the room. I think a great deal of this was due to bad oil. I found the bottom vein workings well ventilated and safe.

PERRY COUNTY.**CANNELTON MINE.**

Located three miles northeast of Cannelton. It is operated by the American Cannel Coal Company. The mines have been operated here by this company for many years; in fact, they were among the first opened in this State. The coal lies in the hills above water level. Two of these have been worked out and abandoned; except that a haulage-way is maintained through them, through which all coal that

is mined is drawn by mules. The present works are quite extensive, but there is very little being done now except to remove pillars. Ventilation is produced by a furnace, and this is the only extensive mine in which I have seen this method successfully employed. I found good air in all parts of the mine on my inspection, December 21, 1897. The daily capacity is about 160 tons, eight mules being used. The coal is hauled by mules through the tunnels mentioned above, to the dump, a distance of one and one-fourth miles. It is there dumped into hopper cars, which are taken to the river by a small locomotive, and lowered by a self-acting plane to a tippie and loaded on boats. The greater part of the product is sold for the use of the steamboats. Some, however, is used for local trade in the town, but there are several country mines in competition for this market.

TROY MINE.

Located one-half mile above the town of Troy, on the Cannelton Branch of the Air-Line Railroad. It is operated by Bergenroth Bros., and was opened in 1887. The daily output is about 50 tons, which is nearly all sold to boats on the Ohio River. The shaft is 50 feet deep, being sunk most of the distance through a massive sandstone. The roof and bottom are both hard, so that there is but little danger in working the mine. The coal is about 3 feet thick and of a very good quality. Ventilation is provided for by a furnace, which, however, was not in operation when the mine was inspected, on December 21st. There was a good current of air passing through the mine, being produced by natural ventilation between the two openings. The mine was not running on my last visit.

PIKE COUNTY.

PETERSBURGH MINE.

Owned by the J. Wooley, Jr., Coal Company, of Evansville; is located near the south limits of the town of Petersburg, on the E. & I. Railroad. It was opened in April, 1896, but employed but few men during that year. The production is 170 tons per day, mine-run. The shaft is 52 feet deep, and there is about 5 feet of clean coal, of a fair quality. It is driven on a very irregular plan, entries being from 8 to 12 feet, and rooms from 18 to 22 feet wide; this causes pillars to be of irregular thickness, and they are expected to be lost. Ventilation is furnished by a steam jet, which seems to furnish sufficient air for the workings at present. A second outlet will be necessary during the coming year.

AYRSHIRE MINE.

Located on the main line of the Air Line Railroad; is owned by David Ingle, of Oakland City. It is equipped with self-dumping cages and a roller screen to make nut coal from the coal that goes through the stationary screen. The capacity is about 600 tons per day. The coal is hoisted through the shaft, 22 feet deep, and is 5 feet thick of an excellent quality of bituminous coal, with a good roof and soft bottom. Very little timber is needed in the entries, but large pillars are left, containing about one-third of the total amount of coal in the vein. This keeps the roof good and the air-courses open, though haulage roads are muddy. The ventilation is produced by a fan and is good in all parts of the mine. A large proportion of the coal is nut and slack, and miners consider 33 cents per ton for mine-run coal the equivalent of 60 cents for screened coal.

HARTWELL MINE.

Located near Augusta, on a branch of the Air Line Railroad, five miles long. It was built in 1894, when the mine was opened, and is operated by the Cabel & Kaufman Coal Company, of Washington, Ind. It is opened by a drift and has a capacity of 70 tons per day. An electric plant has been installed here during the year, and one Morgan-Gardner chain machine is now in operation. Six mules are used in hauling the coal from the mine. The coal is $4\frac{1}{2}$ feet in thickness, but contains a good deal of impurity in the way of sulphur and dirt. Ventilation is provided for by a small fan, which produces a good current of air. The engine house and tippie were burned during the year, but have been built more extensively than before the fire.

BLACKBURN MINE.

Owned by the S. W. Little Coal Company; is located at Blackburn, on the E. & I. Railroad. There is one of the most complete screening outfits here that is to be found in the State. Perforated plates 12 feet long by 4 feet 4 inches wide are used. For making lump coal the perforations are 4 inches in diameter and the nut coal screen has perforations $2\frac{1}{2}$ inches in diameter. They are so arranged with double eccentrics that all jar from their motion is neutralized. The method by which this is accomplished was designed by Mr. S. W. Little, of Evansville. Space will not permit a full description of the arrange-

ment here. The production of the mine is 300 tons per day. The main opening is a slope 475 feet in length, the coal being brought up by steam power. The escape-way is also a slope 400 feet in distance from the main opening. The grades in the mine are easy, with fairly hard fire-clay bottom, making the maintenance of good haulage roads comparatively easy. The coal is a hard bituminous, $7\frac{1}{2}$ feet thick, with a good black slate roof. Entries are driven from 8 feet to 20 feet in width and stand without timbering. There being no falls of roof, air-courses are kept clean, giving a good passage-way for air. Rooms are driven 25 feet wide, with pillars 7 feet in thickness, and no attempt is made to remove the coal from room pillars. The ventilation is secured by a fan located at the old slope, 475 feet from the new one. This fan is 10 feet in diameter, driven by an engine whose cylinder is 7 inches by 12 inches, which produces a good current of air, which is carried fairly well to the working places.

LITTLE'S MINE.

Owned by the same company, located at Little's Station, on the E. & I. Railroad; was opened 1887. Its present capacity is 600 tons per day. It is opened by a shaft 80 feet deep. The mine is comparatively dry and has a hard bottom, the only drawback to the haulage being the uneven bottom, and the grades are light compared with other mines in the State. The coal is a fair quality of bituminous, $6\frac{1}{2}$ feet thick, with an excellent roof and slate bottom. Entries are driven from 8 to 12 feet wide, and the height of the coal. No timbering is required. Air-courses are in good condition and kept clean. Rooms are from 24 to 30 feet wide, well timbered, and pillars 12 feet thick are left to support the roof. A splendid man-way communicates with the escape shaft, which is available at all times to the employes. A fan 10 feet in diameter, located at the escape-way, furnishes an excellent current of air, which is well conducted around the faces of the entries and rooms. About 100 men are employed, under the management of Andrew Dodds, mine foreman.

CARBON MINE.

Located one mile west of Ayrshire. It is operated by William A. Jackson, of Oakland City, Ind., and was opened in 1894. It is developed through a slope 160 feet in length. The coal is 4 feet and 4 inches in thickness, and of an excellent quality of bituminous. The roof is a black slate and requires no timber to keep it safe in entries. This is well attended to. Air-courses are kept clean and the ventilation, produced by a furnace, is fairly good.

SULLIVAN COUNTY.

STAR MINE.

It is located at Gramercy Park, on a branch of the E. & T. H. Railroad; owned and operated by Harder & Hafer Coal Company, and is worked by a shaft 120 feet deep, with a vein of bituminous coal 5 feet in thickness. This is one of the best-equipped mines in the State, having the Prox. & Brinkman self-dumping cages; also the latest improved roller screens for screening the small coal. It is an electric machine mine, the Morgan-Gardner machine (six in number) being used. On my last inspection they were running the machines night and day. Eighty-five miners were employed, with a capacity of 700 tons daily. The mine is also well regulated in way of ventilating apparatus, an overcast being provided for every pair of cross-entries, thereby doing away with doors on the entries and making a saving of no small consequence in way of expenses; and also providing a fresh current of air for each pair of entries. I have made two inspections during the year, and at both visits I found the mine in good condition.

JUMBO MINE.

It is located at Jackson Hill, on the E. & T. H. Branch Railroad, which leaves the main line at Farmersburgh. This mine ceased operating on September 16th, 1897, by reason of a fire, which destroyed all the buildings and damaged the machinery to a great extent, entailing a great loss to the company. The company rebuilt and resumed operation on October 15th, the same year. The mine is worked by a shaft 24 feet deep, with a vein of bituminous coal 5 feet 8 inches thick and of good quality. It is a machine mine, in which the Harrison machine is used, 15 in number; employs 69 miners, and has a capacity of 500 tons daily. It is equipped with Prox. & Brinkman self-dumping cages, and is ventilated by two fans, one on each side of the shaft. At the last inspection it was found in a very satisfactory condition.

CURRYSVILLE MINE.

Located one mile north of Shelburn, on the E. & T. H. Railroad. It is owned and operated by the New Currysville Coal Company; worked by a shaft 260 feet deep, with two veins of bituminous coal, the upper being $3\frac{1}{2}$ feet and the lower $5\frac{1}{2}$ feet in thickness. This is the oldest mine on the E. & T. H. Railroad, having been opened in 1867, when the top vein was worked quite extensively. Some years later

the shaft was opened to the bottom vein, and the top abandoned; and it has been worked but very little since that time. Mr. Herbert Wooley, the superintendent, however, opened it in 1896, in order to get a few sample cars of the clay that underlies the coal, which he shipped to Evansville to have tested. I have not been able to learn the result of the test. The mine is worked partly by Harrison machines (three in number) and partly by hand. At my last inspection, made November 23d, it was in fair condition; 21 miners were employed, with a capacity of 120 tons daily.

PHENIX MINES No 's 1 AND 2.

Located at Alum Cave, on the E. & T. H. Branch Railroad. This mine ranks among the largest machine mines in the State, the Harrison compressed-air machine being the kind used; but the company have lately begun the work of putting in an electric plant, and intend mining and hauling their coal at No. 1 shaft by electricity. This mine is also well equipped in hoisting and screening machinery, having the Prox. & Brinkman self-dumping cages and the latest improved roller small-coal screens, together with a large washer, making it the most complete small-coal arrangement in the State. The No. 2 mine is a slope mine, and is worked by hand. The coal is hauled from the bottom of the slope by rope to the surface, and then hauled by mules through the west side of the No. 1 to the bottom of the shaft, the coal from both mines being hoisted through the same opening and dumped together. The coal at both mines has an average thickness of 6 feet. I have made two inspections of each mine during the year, and at each visit found them in excellent condition; employing 76 miners at No. 1 and 22 at No. 2 mine, with a capacity of 800 tons daily.

HYMERA MINE.

Located at Hymera, on the Farmersburgh Branch of the E. & T. H. Railroad. It is owned and operated by Harder & Hafer, of Chicago, Illinois. It is a shaft opening 55 feet deep, with a vein of bituminous coal 5 feet 6 inches in thickness. This is one of the most costly-equipped mines in the State, having the Prox. & Brinkman self-dumping cages and the latest improved screening machinery, with electric mining and hauling machinery. The Morgan-Gardner machines (7 in number) are in use mining the coal, and two large motors for hauling the same.

There are employed 51 miners, with a daily capacity of 225 tons. At the last inspection the ventilation of the mine was in a very bad condition, so much so that several changes were ordered to improve the same. It should be said, however, in extenuation of this seeming mismanagement, that the mine had been idle for some time previous, and had recently changed ownership.

SHELBURN MINE.

Located at Shelburn, on the E. & T. H. Railroad, and is worked by a shaft 240 feet deep, with a vein of bituminous coal $5\frac{1}{2}$ feet thick. It is a machine mine, in which both the Lehner and Harrison machines are used. There are 28 miners employed, with a capacity of 200 tons daily. During the year the ventilating fan was moved from the No. 2 to the No. 1 Mine, and hoisting of coal from the latter has been suspended since that time. The two shafts are connected underground. This should give good ventilation, if air-ways were placed in proper order. At the last inspection the ventilation was poor, and necessary changes were ordered to remedy the same. This is one of the few mines in Indiana that generates fire-damp in quantities which make close attention to the ventilation apparatus necessary. By enactment of the last Legislature it became imperative on the part of coal companies to file maps of their mines with the Inspector of Mines. The Shelburn Mining Company failed to do this in the required time, and the Inspector employed a surveyor to do the work. A copy of the map is now filed in the Inspector's office.

BUSH CREEK MINE.

Located three miles east of Sullivan, on the I. & I. S. Railroad, and is owned by Thomas Watson, of Chicago, Illinois. At the time of my last inspection this mine was idle, and remained so until October, 1897, when operations were resumed again and continued until November 25th. It again lapsed into idleness, and remains so at this time. I have made one inspection, on November 19th, when I found the mine in a very unsatisfactory condition, chiefly owing to a long period of idleness. Orders were given to make the necessary changes, which the company readily agreed to do.

FREEMAN MINE, OR BRIAR HILL

This mine is located one-half mile southeast of the town of Dugger, on the I. & I. S. Railroad. At the time of my last report the mine was being operated on a very small scale, there being only 8 men employed, those being the lessees of the mine at that time. Since that time the

mine has changed hands, and is now leased and operated by the Lyonton Coal Mining Company. There are now employed 35 miners, with a capacity of 125 tons daily. I have made one inspection during the year, and found the mine in good condition, and a full compliance with the law. This mine is equipped with the Prox. & Brinkman self-dumping cages, a roller screen for small coal, and a storage capacity of three 60-ton small-coal bins.

BUNKER HILL MINE.

Located four miles east of Sullivan, on the I. & I. S. Railroad. During the past year I have made two inspections of this mine, and found it in an excellent condition. It is worked by a shaft 72 feet deep, and has a vein of bituminous coal $4\frac{1}{2}$ feet in thickness, of good quality. While the mine is not equipped with modern machinery, yet it is one of the best laid-out mines in the State. Its capacity at last inspection was 100 tons daily, with 35 miners employed. This, however, is by no means the full capacity of the mine, which at that time was limited by scarcity of miners.

VANDERBURGH COUNTY.

DIAMOND MINE.

Near the north city limits of the city of Evansville, on the Stringtown road. It is operated by the Diamond Coal Company, and does an exclusively local trade. This, as are all mines in this county, is opened by a shaft to a vein of bituminous coal, that runs about 4 feet in thickness. It is a fair quality of steam and domestic coal. Owing to the competition from outside coals, none of these mines are very largely developed. About 90 tons per day are being produced at this mine. The company have been trying all summer to arrange their escape-way so that men can be taken out of it, but claim that they have been delayed by the failure of machine shops to furnish the necessary machinery on time. All of it was on the ground but a drum when I made my last inspection, and the manager promised that it would be in operation before the end of the year; but it has not been so reported.

UNION MINE.

One-half mile southeast of the above. It is operated by the Evansville Union Coal and Mining Company; was opened in 1891, and has been working some ever since. It is at present producing from 40 to 60 tons per day. An escape shaft was completed to this in 1896, and

the machinery with which it was sunk is still in the place, giving an available means of egress. The roof is a black slate, which cuts very badly after the coal is removed. The bottom is soft, and, water being allowed to lie on it, it becomes very muddy, and the hauling roads are in bad condition.

FIRST AVENUE MINE.

The improvements of this mine, noted in my report of last year, have been continued, and the mine is now in a fair condition. There is an indictment against the manager of this mine for violation of the law requiring an available means of escape besides the main hoisting shaft. No other complaint came to me of the condition of the mine.

SUNNYSIDE MINE.

This is the only mine in Vanderburgh County where mining machines are in use. Those of both the Harrison and Sergeant type are used. The production has been steadily increasing during the past 18 months, till now it has a capacity of 425 cars, which will average about one ton each. The shaft is 265 feet deep and is in good condition, but the tower and dump-buildings need repairing to conveniently handle the increase in output. The coal is all handled by mules, though the distance from the inside to the shaft bottom is 2,700 feet. For that distance the air has to be carried through old works. The ventilation is excellent, though the total volume is not so large as I have seen in other mines employing the same number of men.

UNITY MINE.

Was worked but a very little during the year. During the summer it was sold to a stock company, who intended to develop the north side of the mine, but dissension among the stockholders has delayed the work so that but seven men were employed when I visited the mine, December 18; and I made no inspection.

INGLESIDE MINE.

Located near the Ohio River, just below the city limits of Evansville. It is owned and operated by the John Ingle Coal Company. This is the oldest mine in the State, being opened in 1858, and has excavated a large area. Besides the local trade, the mine is convenient to the river and to the L. & N. Railroad, on both of which shipments are

made. Coal is brought to the bottom of the shaft by a tail-rope haulage system, 3,000 feet in length. The other conditions are much the same as other mines in the county, except that very little trouble is experienced from water. I have always found this mine in good condition and complying with the mining law, except in respect to an escape-way. A second outlet is provided by a shaft a quarter of a mile from the main shaft, but no means are provided by which men may enter or leave the mine at the second shaft. As long as the law required a stairway in the escape-way, I took no steps to enforce it, as, by obstructing the air, it would have done more harm than the circumstances warranted for the possible good. The law now giving, as an alternative, a hoisting apparatus, and the company having begun to arrange for this before, but failed to complete it, I have caused an indictment to be found against them in the Circuit Court, which is now pending.

VERMILLION COUNTY.

FERN HILL MINE.

Owned by the Hazel Creek Coal Company, of Clinton, Ind. It is located on a branch of the C. & E. I. Railroad, about one mile west of the town of Clinton. This mine has been in operation a number of years, and the underground works are quite extensive. Its capacity is about 600 tons per day, equally divided between lump and screenings. The coal is hoisted through a shaft 48 feet deep, and the second outlet is by a slope separated from the main entrance about 100 feet. Men and mules use this way exclusively for entering and leaving the mine. The main entry is driven double width, and has double track for 1,400 feet. There are very few heavy grades, and coal is brought from the workings to the bottom of the shaft without change in the make-up of the "trips," or of the mules pulling them. The roadbed is hard and dry, which makes the work a great deal easier on animals than when water and mud is on the road. The coal mined here is a good quality of bituminous, 5 feet in thickness, with a hard slate for a roof. Large boulders, known as "nigger-heads" among the miners, are frequently found. These often fall, leaving "pot-holes" in the roof, and are very difficult to handle, as the material of which they are composed is so hard that it is almost impossible to break them. Some instances have occurred where they lay so far down into the coal as to cause entries to be turned to pass around them. Bottom is taken up to give entries a height of 5 feet 3 inches. They are driven in pairs 7 feet

wide, with pillars 18 feet thick between them. Rooms 21 feet wide, pillars 9 feet thick. Room pillars are not saved. The east side of the mine is worked out and abandoned, and a great deal of black damp is given off from these abandoned places into the air circulating through the mine, which makes it very difficult to secure good ventilation. In addition to this, I have nearly always found a very poor quality of oil burned in the mine, especially by drivers. At the time of my last visit 18 mules were being used. All of these came to the bottom of the shaft with their loads. On the main entry the air was so strong that ordinary oil would not hold a light; so drivers burned a mixture of coal oil. When they went to the working places they left a trail of smoke behind them which would hang until their next visit. Many miners say that as they have to suffer from the smoke, it is of no use to burn pure oil themselves, and buy the cheapest they can get and add to the difficulty. The result is that in spite of a good current of air, few places in the mine are in a condition fit to work in. The same facts are found at other mines in the State, but at none to so great an extent as here. The mine is ventilated by a 12-foot fan, and sends a sufficient quantity of air into the mine to supply a great many more men than I ever found employed there, but from the causes noted the ventilation is usually very poor.

BROUILLET'S CREEK MINE.

Owned by the Brouillet's Creek Coal Company. It is located one-half mile south of the above. This mine has heretofore been reported as the Indiana Bituminous Coal Company's No. 1 Mine. The present company was organized during this year. During the year 1896 the mine was remodeled, and it is one of the best-equipped mines in the State. Self-dumping cages are used, and about the only set of track scales at a coal mine in the State that are of sufficient strength and length to handle the largest coal cars without especial effort. A revolving screen is used to make nut coal, the screenings being elevated for that purpose. A 10x12 engine furnishes the power for this work. The total production at the time of my last visit was 700 tons per day, with a fair prospect of an increase in the near future. The shaft is 60 feet deep to the same vein of coal as is worked at the Fern Hill Mine, and what is said in regard to coal, roof and bottom there, applies equally to this mine. Coal is taken from but one side of the shaft, and, to facilitate handling it, a track has been made around the shaft at the bottom, the empty cars being taken from the cage on the east side, and pushed around to the west side to be taken into the

works. The main entry has a double track, and the mine is developed on the double-entry system. Ventilation is by a fan at the hoisting shaft, which supplies a good current of air to all parts of the mine. The only defect found on the last inspection was at a point where the works had broken into those of the Fern Hill Mine, where a great deal of black damp was found.

TORREY NO. 4 MINE.

Owned by the Torrey Coal and Mining Company. It is located near the town of Voorhees, $3\frac{1}{2}$ miles northwest of Clinton. The equipment of this mine is in good order, as all the buildings about the shaft were burned on June 12th, and the machinery was badly damaged and had to be completely overhauled. The boiler and engine room has been replaced by a brick building, and the shaft tower is enclosed with galvanized iron siding. The screens are stationary, but constructed entirely of iron, and seem to be very conveniently arranged. The production is 400 tons per day. The shaft is 75 feet deep to the vein that is now being worked, but has been sunk 175 feet farther to the "L" seam, and it is intended to develop this during 1898. The present workings are very wet, and the haulage roads are soft and difficult to keep in repair. The roof is generally very good, but there are some bad places, and falls frequently block air-courses and interfere with the ventilation. A tail-rope haulage system was used previous to the fire, but has not been placed in order since, all the coal now being brought to the bottom of the shaft by mules. Entries and air-courses are 8 feet wide and 5 feet high, this being the thickness of the coal. A fan at the hoisting shaft furnishes ventilation. A good volume of air is sent down the shaft, but stoppings and doors are so poorly constructed that most of the working places are smoky and foggy-looking. This is especially true where mining machines are at work and compressed air is being discharged. There are 11 Harrison and two Ingersoll-Sergeant mining machines in use.

BUCKEYE MINE.

Owned by McClellan, Eastman & Co. It is located one mile north of Fern Hill. It is in the territory where the upper vein was worked out by the Thompson Hill Coal Company. The present company sunk a shaft to the lower or "L" seam in 1895, and have been working since that time. The production is about 300 tons per day. The coal is from 5 feet 10 inches to 6 feet 6 inches in thickness, with a hard

clay bottom. The roof appears hard when the coal is removed, but after standing some time it cuts and falls in slabs. This has not occurred to any great extent in this mine yet, but it has begun, and, taking warning from what has happened elsewhere, the experiment is being tried of leaving a layer of coal under the slate. This is easily done, as there is a parting at which the lower coal separates about a foot from the top. There is also a clay band from 2 to 6 inches thick, $2\frac{1}{2}$ feet from the bottom. The plan of work differs very little from that described in the Parke County mines at Rosedale and Lyford. I have generally found the ventilation good in all working places here. The fan is driven by an engine 10 inches by 14 inches in size, geared by a link-belt to make two revolutions of the fan to one stroke of the engine. The air is divided into separate currents near the bottom of the shaft, thus giving a current of fresh air to each section of the mine.

VIGO COUNTY.

DIAMOND NO. 2 MINE.

Owned by the Coal Bluff Mining Company. It is located two and one-half miles southwest of Fontanet, on the Big Four Railroad. It was opened in 1895, but has not been worked very steadily. This mine is equipped with self-dumping cages, and an air compressor is in place, but no use has been made of it yet. Five hundred tons per day are being produced, all mined by hand. The shaft is 65 feet deep to the "L" vein, which shows all the characteristics noted elsewhere in describing this seam. Twenty-four-foot entry pillars and 15-foot room pillars are the rule, and nearly all of them are finally gotten out. The mine is well timbered and the safety of employes is well looked after. Ventilation is produced by a fan placed at the escape-way, 145 feet from the hoisting shaft, which produces an excellent current of air. All the working places are well ventilated. Bins have been erected with a view to putting in screening machinery.

PEERLESS MINE.

Owned by the Coal Bluff Mining Company. It is located one-half mile north of the crossing of the Big Four and C. & I. C. railroads. Shipments are made by the latter road. Shaking screens are used, the power being furnished by an 8x10 engine. The production is 200 tons per day, all mined by hand, but a great deal more could be handled. The shaft is 101 feet deep. The bottom is soft, but is well

drained, and haulage roads are good. Iron weighing 16 pounds per yard is used on main entries, and 12 pounds on cross-entries. The coal is good quality, 7 feet thick. It is soft, however, and does not bear handling. Entries and air-courses are 8 feet wide, with 40-foot pillars. Rooms are 24 feet wide, with 14-foot pillars, most of which are removed in finishing the mine. Ventilation and timbering are well attended to. The fan is situated at the escape-way, 100 feet from the hoisting shaft. The shaking screens were recently introduced. A bar screen is used to clean the lump coal and perforated plates to screen nut. A double eccentric is used which relieves the jar on the tippie. Its success was not assured at my last visit, as it had not been sufficiently tested at that time, but I have no doubt that it has come to stay.

UNION MINE.

Owned by the same company. It is located one and one-half miles northeast of Fontanet. Seven Harrison mining machines, driven by a Norwalk air-compressor, are in use at this mine. The mine is equipped with self-dumping cages and is producing about 700 tons of coal per day. The grates used under the boilers admit of burning the finest screenings that are made at the mine, and give good service. The shaft is 111 feet deep to the same vein that is worked at the Peerless. Haulage roads are good and the output is handled by 11 mules. Entries are 7 feet wide, with 24-foot pillars, rooms 22 feet, pillars 5 feet. The coal is nearly all saved. Near the bottom of the shaft some bad roof was found, but this is not the case in the present working part of the mine. Ventilation is produced by a 12-foot fan situated at the escape-way, 200 feet from the shaft. A good current of air was found in all entries on last inspection. Cross-bars of railroad iron are being used quite extensively on the north side of the mine, and have proven a success, especially in narrow entries. Rooms are well timbered.

BROADHURST MINE.

Owned by J. N. & G. Broadhurst. It is located one mile southwest of Macksville. It has been operated on a small scale for several years, the product being hauled in wagons to Terre Haute. There is no likelihood that more than a local business will be done, though from 20 to 30 men have been employed this year for this trade. The shaft is 89 feet deep, 6 feet by 12 feet in size. The coal is 5 feet in thickness, with a fair roof but very soft bottom. This gives trouble both in

making haulage roads and in keeping up the roof. Pillars are left 12 feet thick and are not removed. The mine was originally worked on a very poor system, but this has been improved during the last year, and it is now being developed systematically.

SEELEYVILLE MINE.

Owned by Julius Ehrlich. It is located immediately south of the town of Seeleyville, on the T. H. & I. Railroad. It has been opened for a number of years, but for some time past has worked very little. It is fairly well equipped for handling coal, having self-dumping cages, and plenty of hoisting power in a double engine with cylinders 22x42 inches. Everything about the pit top is in good condition, but very little coal is being produced. Only one side of the shaft is used for hoisting coal, a water box being used in the other. Part of the mine is being finished by drawing pillars. On my last inspection I found several rooms very smoky for lack of break-throughs between them. In other places the ventilation was good.

NICKEL PLATE MINE.

Owned by the Ehrman Coal Company, of Terre Haute. It is located on the Brazil Branch of the C. & E. I. Railroad, three miles southeast of Grant Station. The coal lies nearly on a level with the valley up which the railroad switch runs. The mine is developed under the hills on each side of the valley, and is ventilated by two fans, one on each side. Men and mules enter and leave the mine by a slope running from the bottom of the shaft to the surface, and a second outlet is provided by the air-shaft on the west side of the mine. The coal is soft, but of a good quality for steam purposes, and is 7 feet thick. The roof is a gray shale and very soft in some places, but the mine is well timbered. There is very little deviation from the usual plan of working. Ventilation was found to be good in all parts of the mine.

HECTOR MINE.

Owned by the Loughner Coal Company. It is located one-fourth of a mile west of Seeleyville, on the T. H. & I. Railroad. It was opened in 1896, and an escape shaft has been made this year. The production is about 300 tons per day, but only one side of the mine is being worked at present. The roof is good and the bottom hard. The roadways are well drained. The coal is from 6 to 7 feet in thickness, and

of fair quality. No timbering is necessary in entries, which are driven 12 feet wide. Rooms are 24 feet wide, and all pillars 12 feet thick. The work is well laid out, and as the company has a large territory, this is likely to be an important mine in the near future. Ventilation in those parts of the mine where work is being done is excellent.

GRANT MINE.

Owned by the Grant Coal Company. It is located on the Brazil Branch of the C. & E. I. Railroad, one-half mile south of the crossing of the Big Four at Grant Station. It was opened in 1889, and has quite a large territory worked out. In addition to the usual hoisting equipment an Ingersoll air-compressor is in use at this mine. The shaft is 80 feet deep; 600 feet of tail-rope haulage is in use, and all coal is being mined beyond that distance from the shaft. The track is laid with 16-pound iron on a good roadbed. The coal is 6½ feet in thickness, of the same character and quality as that at Fontanet. Large pillars are left both in entries and room work, and they are only partially saved. There is not enough attention given to the timbering of entries and air-courses, so that the ventilation is very imperfect in many places in the mine. This is caused in a great degree by the air having to be carried so far along abandoned works before reaching the working places. The road to the escape shaft is not very well timbered, and it has been necessary, on every visit I have made to this mine, for me to call the attention of the Superintendent to this fact. This road is seldom used and is therefore neglected. It is available in case of an accident, but should be kept in better order.

BRICK WORKS MINE.

Owned by the Terre Haute Brick and Pipe Company. It is located at their brick works, one mile northwest of Macksville. The product is nearly all used by the company. The mine is splendidly equipped, and is worked on a regular plan. An escape shaft has been completed during the year. It is 600 feet from the main shaft, and, as the coal is but 35 feet from the surface, it makes a convenient means of getting in and out. The ventilation is all that could be desired, a 10-foot fan having been placed at the mine during the year.

VIGO MINE.

Operated by Ed. Davis. It lies one and one-fourth miles northeast of the Nickel Plate Mine, and was originally opened in 1893. This is a slope, and two engines are used. One hauls the coal from the opening to the incline, which is built to the tippie, and another draws it to the tippie. The capacity is only 75 tons per day. The mine was in fair condition when last visited.

RAY MINE.

Owned by the Vigo County Coal Company. It is located one-half mile east of Sceleyville, on the T. H. & I. Railroad, and was opened in 1893. This mine has a very complete equipment, everything being in first-class shape. A double hoisting engine, with self-dumping cages, is used to bring the coal up the shaft. Elevating machinery carries the screenings to a roller screen, by which the nut coal is separated from the slack. The production of the mine is 350 tons per day. The shaft is 110 feet deep, and the coal 7 feet thick. The plan of working includes double entries 7 feet wide, separated by 21-foot pillars, rooms 28 feet wide, room pillars 12 feet. No pillars are taken out. A good escape shaft is provided. The fan is placed at this opening.

ST. MARY'S MINE

Operated by J. F. Erwin. It is located near the Convent of St. Mary's of the Woods, and is owned by the Sisters of Providence. This mine was opened in 1894, and, though it has never come under the provisions of the mining law, I found, on inspection, that it complied in all respects with its requirements, except that no safety catches were on the cages. The owners informed me that they were ordered, and I presume they have been put on before this time. The shaft is 97½ feet deep, and is excellently timbered and equipped. The working under ground is following the usual plan used in working similar veins of coal, and though not extensive, may be made so. Timbering and ventilation are excellent.

LARIMER MINE.

Operated by William Lankford. It is located on the National road, two miles southwest of Macksville. It is a shaft 125 feet deep, sunk in 1888, and has been working more or less ever since. Though a good deal of territory has been worked over, the mine is in excellent

shape, except parts that have been abandoned. A second opening has been made 900 feet north from the hoisting shaft, and an entry 7 feet wide and $4\frac{1}{2}$ feet high is driven between them. The production is about 50 tons per day. Ventilation and timbering were all that could be desired when inspected, and I have good reports from there ever since.

KRACKENBERGER MINE.

Owned by P. Krackenberger. It is located on the Paris road, one mile west of Macksville. It was opened in 1896, and but little has been mined from it. Everything about the pit top bears evidence of pinching in expenses, which gives a bad impression. The boiler and machinery are old, and the shaft buildings are cheaply constructed. The shaft itself is $4\frac{1}{2}$ feet by 5 feet in size, and a part of this is cut off for an air-chamber, in which a steam jet was used to produce a current of air. The underground works are laid off in a good manner, and if the shaft were enlarged to admit of two cages being used a good output could be secured. Entries are 6 feet wide, driven in pairs, with 45-foot pillars and rooms in proportion, the idea being to save pillars before abandonment. Since my inspection, connection has been made with an abandoned shaft, and a furnace built; this should secure good ventilation. The last three mines described, as well as Broadhurst's and several small mines west of the Wabash River, depend entirely upon wagon trade, having no railroad connections. Risher's, Eagle and Gruenholtz mines, which were mentioned in my last report, have not employed ten men at any time during the year, and I have not inspected No. 10 Mine since the water was gotten out of it at the close of the year.

WARRICK COUNTY.

STAR MINE.

Owned by John Archbold, Evansville, Ind. It is located on the Evansville Suburban & Newburgh Railway, one mile from Newburgh, and has shipping facilities by this railroad and by the Ohio River. The mine is well fitted up to handle coal and produces 220 tons per day. The shaft is 100 feet deep, and the coal 5 feet thick, of a fair quality of steam coal. The mine is dry and fairly level, so that good haulage roads are easily maintained. Entries are 14 feet in width and air-courses 8 feet. They are driven parallel, with a pillar of 15 feet between them, and stand without timbering. Rooms are 24 feet

wide, with pillars 12 feet thick. Pillars are left in the mine permanently. Ventilation is furnished by a fan at the escape-way 100 feet northwest of the main shaft. A good current of air is maintained throughout the mine, and during my term as Inspector there has been no necessity for any recommendations to improve the condition of the mine, on any of the visits of myself or assistant, as it has always been found in compliance with the law and is one of the best cared-for mines in the State.

CHANDLER MINE.

Owned by Patrick Barty, Evansville, Ind. It is located near the depot at Chandler, on the Air Line Railroad. Its production is 50 tons per day. The shaft is in good condition, 115 feet in depth. It was opened in 1892, and there has been a great deal of trouble from decaying timbers in the bottom this year. The coal is 5 feet thick, of a fair quality of soft coal. The mine is dry and the haulage roads and air-ways are in good condition. About half the coal is left in pillars, and is not taken out on abandoning the working places. A second outlet has been made 400 feet south of the shaft, but for the two years previous to July, 1897, no attention had been paid to it and the road had become closed. A new shaft is now being sunk and will soon be finished. There were only 11 men working in the mine when inspected, July 30th, and, though the air current was weak, there was sufficient for the men employed.

GOUGH MINE.

Owned by Robert Gough, and operated by Kelly & Nester. It is located one-half mile east of Boonville, on the Air Line Railroad. This mine was opened in 1879, but has been operated only in a small way. The second outlet is by a slope 150 feet from the shaft, reached by a good road under ground. The hoisting shaft is 42 feet deep and the coal varies from 4 to 7½ feet in thickness, and is of good quality; excellent roof, except near the outcrop. The plan of working is very irregular, pillars being thin, and no attempt is made to save them. Places are well timbered and ventilation is good. Production, 150 tons mine-run coal per day, when inspected.

BIG VEIN MINE.

Owned by the J. Wooley, Jr., Coal Company. It is located one mile east of Boonville, on the Air Line Railroad. It was opened in 1891. This mine is opened by a slope. In addition to the necessary hoisting machinery an air-compressor is used, which furnishes power to two

Jeffery air-drills and three mining machines. The daily capacity is about 300 tons. The coal is an excellent quality of bituminous, and is from 6 to 8 feet thick. Ventilation is provided for by a fan located 50 feet from the slope, the outlet being furnished by openings to the surface where falls occur. The coal lying near the surface, the roof is very soft, but no trouble is experienced from this source in narrow work, as it is easily held by timber. The ventilation is good in the working places.

CALEDONIA MINE.

Owned by the Caledonia Coal Company, of Boonville, Ind. It is located east of the Big Vein Mine. It was opened in 1894, but for the greater part of the time not men enough have been employed to make the mining laws applicable. However, when visited, July 29th, the mining law was being fairly well complied with. The production at that time was 85 tons per day; this, as well as other mines in this part of the State, having a better market than usual on account of the general strike.

BRITZIN'S MINE.

Owned by William Robertson; near Newburgh, Ind. This mine was not employing 10 men when visited, October 21st, but the owner expected to have more during the fall and winter. This mine has connection with the E. S. & N. Railroad, and will ship coal to Evansville, in addition to local trade. It is in the same vein of coal as the Star Mine, and underground conditions will be the same as there, most likely. No inspection was made, but a second outlet was ordered to be made as speedily as possible.

TABLE No. 1.

Showing Men Employed Inside and Outside of Mines, Animals Used About Mines, Mines Opened and Abandoned During the Year, and Mines in Operation at the Close of the Year.

COUNTIES.	MEN EMPLOYED.		ANIMALS.	MINES.		
	Inside	Outside.		New.	Abandoned.	Working
Clay.....	2,320	195	186	7	5	31
Daviess.....	330	46	40	7	2	9
Dubois.....	15	2	1	1		1
Fountain.....	112	10	13	1		1
Gibson.....	85	12	13		1	1
Greene.....	751	77	69			7
Knox.....	113	18	9			4
Martin.....	33	2	2			1
Owen.....	31	4	3			1
Parke.....	715	88	58		1	18
Perry.....	58	5	6			2
Pike.....	343	49	60	1		6
Sullivan.....	554	63	76			12
Vanderburgh.....	183	26	33			6
Vermillion.....	432	35	44	1		5
Vigo.....	632	86	71	1		5
Warrick.....	128	21	18	1		8
Total.....	6,835	739	702	16	13	124

The above table refers, of course, to mines employing more than ten men, and a number of those listed as new mines are such as have come into the list during the year, having previously been operated on a smaller scale. On the other hand, mines which employed more than 10 men at the date of my last report, and are now employing less than that number, are classed as abandoned mines; so that the number of new openings and the number of mines finally abandoned are less than shown in the table, and some classed as abandoned may again increase their employes so as to bring them within the list of mines in operation.

TABLE No. 2.

Showing Production of Coal, Men Employed Inside and Outside of Mines, and Animals Used in the Mines During the Years 1896 and 1897, by Months.

MONTHS.	COAL PRODUCTION.		MEN EMPLOYED.				ANIMALS USED.	
			Inside.		Outside.			
	1896.	1897.	1896.	1897.	1896.	1897.	1896.	1897.
January.....	445,677	469,626	7,257	6,564	796	708	589	539
February.....	372,628	408,137	6,668	6,690	719	707	569	532
March.....	433,751	388,040	6,445	5,776	683	542	557	506
April.....	417,155	380,321	5,886	5,776	669	537	498	518
May.....	152,829	241,114	3,835	4,065	44	501	339	361
June.....	196,95	261,907	4,130	4,349	330	570	333	419
July.....	181,879	1,235,3	3,377	1,746	403	276	318	287
August.....	254,963	61,131	4,453	681	461	112	287	32
September.....	301,650	229,188	4,737	4,349	585	448	388	357
October.....	382,272	484,680	5,111	5,907	571	662	459	584
November.....	760,812	544,946	6,143	6,448	614	741	531	590
December.....	424,769	562,512	6,413	6,835	694	739	542	702
Small mines, estimated	136,398	150,000						
Total.....	4,068,124	4,228,085						

The increased estimate for small mines is based on the fact that many of them had a largely increased output during the strike of the larger mines from July to September.

TABLE No. 3.

Table Showing the Annual Production of Coal for the State of Indiana, from 1879 to 1896 Inclusive, as Shown by Reports of Mine Inspectors.

YEAR.	TONS.	CAPITAL.	INSPECTORS.
Oct., 1879, to Oct., 1880.	1,996,490	\$1,135,562	Richards.
1881	1,771,536	1,442,210	Wilson.
1882	1,990,000		
1883	2,540,000	1,600,000	Wilson.
1884	Est. 2,260,000	1,700,000	Wilson.
1885	2,275,000	1,850,000	McQuade.
1886	3,000,000	1,975,000	McQuade.
1887	3,140,979		McQuade.
1888			
1889	3,676,000	2,081,000	McQuade.
1890	3,714,479		Tielow.
1891	3,819,600	(new) 185,000	McQuade.
1892	4,494,811		McQuade.
1893	4,358,897		McQuade.
1894	3,440,353		McQuade.
1895	4,312,081	1,852,500	Fisher.
1896	4,068,124	1,750,000	Fisher.
1897	4,228,085	1,600,000	Fisher.

LABOR TROUBLES.

The year has been prolific of labor difficulties in the mines of this State; but, to the credit of the miners, generally, and especially of their leaders, but little violence occurred. As a result, the sympathy of the public has been with the miners, and an unbiased investigation and discussion of the condition of the coal business in all its phases has been possible for the first time in many years. The result has been to show that the wages paid in the mines of the State and its competing fields, taken in connection with the small amount of work that could be given, had brought the employes to a state of nearly absolute destitution. On the other hand, the selling price of coal had reached a point where operators could not afford to pay living wages, and make a profit on their product. The result has been that the price of coal to consumers has been advanced to some extent, and the present tendency seems to be upward, so that there are lively hopes that an era of comparative prosperity will soon be enjoyed in this industry.

The year began with a slight reduction in the output of this State, which fell from 424,763 tons in December, 1896, to 403,074 tons in January, 1897, but during the first four months of the year the monthly increase averaged 3,293 tons. Owing to the question of wages being amicably settled on May 1st, 1897, the next two months showed a large increase of production over the corresponding period of 1896, though it still did not reach one-half the production, monthly, of December, 1896, nor one-third the productive capacity of the mines of the State. The general strike which occurred on July 4th, referred to below, caused an almost complete paralysis of the coal business in this State. The coal produced during July and August, and the greater part of that produced in September, came from the southern end of the State, where a number of mines continued in operation; most of them, however, of small capacity. Some coal was also mined in Knox and Vigo counties. The agreement made in April, 1897, provided for a price of 51 cents per ton for pick mining in Standard Bituminous coal, and 61 cents per ton in Standard Block coal, with extras for deficient coal, yardage and room timbering, based on this price. Machine mining was also governed by the price paid for pick mining, as had been customary in this State. On July 3d, a majority of the miners of the State ceased work, in common with those of Illinois, Ohio, western Pennsylvania and parts of other States, in response to an order from the national organization of United Mine Workers, and within a few days thereafter the strike extended to all

mines from Washington northward, with a few unimportant exceptions, and they were employed principally in supplying local trade. The strike, which at one time affected 125,000 miners in the Central Western States, continued until September 12th, when an agreement was reached by which nearly all began work within 10 days thereafter. In some parts of the territory, however, notably northern Illinois, the struggle was continued into December, on account of a failure to adjust the general settlement to local conditions. This affected the business in Indiana by curtailing the supply of coal in the market and making a greater demand here. This, together with the fact that stocks had been depleted by the long idleness, had the effect of stimulating production here, which would have been greater than is shown but for the scarcity of men and of railroad cars. On the basis of the September agreement, pick mining in Indiana was advanced 5 cents per ton, with a proportionate increase in other classes of work. The only difficulty that was left unadjusted in this State was that at Washington, referred to above. The company imported miners from the Kentucky coal fields, and put them to work in their mines, which are now running with a much smaller force than usual. Many of the old men have secured work in other places, but probably one-third of those who came out on strike are still continuing the struggle. While the advantage in a financial way from the strike was slight, comparatively, it gave the miners opportunity to let the public know their actual condition, and secure sympathy and, to a certain extent, co-operation, in their efforts to better it, also brought about a bitter feeling among all interested in the industry than has prevailed for years. The miners' organization has been greatly strengthened, and greater confidence is reposed in their leaders by the workmen, than has been the case for some time past. The effect of all this is bound to be that employers will enter agreements with the miners' officials with confidence that they will be carried out in good faith, and great benefits will be derived in the future, as much of the uncertainty attending the operation of mines will be removed, and sales of coal can be made with the assurance that strikes will not interrupt its delivery. It is to be hoped that the present good feeling will continue. The present mining rate is to continue until January 15th, 1898, and a conference of miners and operators is to be held at Chicago on January 17th, to fix the price for the year 1898.

TABLE No. 4.

Giving a List of Mines Employing More than Ten Men, the Names and Addresses of Mine Bosses and the Number of Men and Mules Employed at Each, January 1, 1898.

CLAY COUNTY.

MINE BOSS.	ADDRESS.	MINE.	EMPLOYEES.		Mules.
			Inside.	Outside.	
John Bolin	Brazil	Brazil Block No. 1	112	19	10
Wm. Conroy	Brazil	Gart No. 3	125	10	12
Andrew Gilmour	Cardonia	Gart No. 5	204	10	15
James Baxter	Brazil	Brazil Block No. 7	19	2	1
August Norkus	Diamond	Brazil Block No. 8	188	22	19
		Brazil Block No. 10	7	1	5
Martin Navin	Diamond	Brazil Block No. 11	110	8	1
Robert J. Wallace	Diamond	Brazil Block No. 12	37	9	12
W. P. McQuade	Brazil	Gladstone	138	8	3
A. L. Boore	Clay City	Briar Hill	34	6	6
Charles Nash	Clay City	Harrison No. 2	77	6	3
		Harrison No. 3*			
H. W. Jenkins	Perth	Fruit	60	6	6
Walter Knox	Asherville	Crawford No. 2	78	6	6
Wm. Penze	Brazil	Crawford No. 3	107	7	6
Samuel Lindsay	Brazil	Crawford No. 4*			
R. F. Jenkins	Knightsville	World's Fair	59	3	3
James Cuthbertson	Cardonia	Diamond No. 3	159	7	8
		Klondyke*			
H. B. Ehrlich	Brazil	Excelsior	27	4	4
T. J. Russell	Turner	Superior	55	5	3
W. T. Hopkins	Carbon	Eureka No. 2	179	8	16
John Quigley	Carbon	Eureka No. 3	23	2	6
James A. King	Brazil	Monarch	15	1	2
Moses Marks	Cardonia	Brazil	139	1	9
John Cox, Sr.	Brazil	Nickel Plate	36	3	4
Peter Andrew	Clay City	Markland	34	3	5
W. J. Price	Cardonia	Fairview	58	5	5
Ed. Somers	Staunton	San Pedro	42	7	4
Griff Howell	Center Point	Louise	75	6	6
M. Hofmann	Asherville	Columbia No. 3	14	2	1
Thos. Thompson	Knightsville	Columbia No. 4	83	5	4
F. J. Urbain	Brazil	Victoria	28	3	3
Total			2,320	195	186

DAVIESS COUNTY.

Anton Kocher	Washington	Cabel No. 4	31	3	3
Joseph W. Small	Washington	Cabel No. 9	54	8	14
James B. Brown	Washington	Montgomery No. 1	66	10	14
Geo. B. Brown	Washington	Montgomery No. 2	40	4	5
Geo. B. Brown	Montgomery	Montgomery No. 3*			
Daniel W. Davis	Cannelburg	Mutual	47	9	4
A. W. Starkey	Knightsville	Stoy	16	2	1
W. A. Jacobs	Knightsville	Union	16	2	1
		Co-operative*	37	6	3
Thomas Harris	Washington	Hawkins	23	2	2
J. Teverbaugh	Washington	Wilson's No. 4			
Total			330	46	40

* New mines; no reports yet.

TABLE No. 4—Continued.

DUBOIS COUNTY.

MINE BOSS.	ADDRESS.	MINE.	EMPLOYES.		Mules.
			Inside.	Outside.	
W. A. Barreman.....	Huntingburgh.....	Huntingburgh.....	15	2	1
Total.....	.....	.....	15	2	1

FOUNTAIN COUNTY.

Steward Shirkie.....	Silverwood.....	Ind. Bituminous Co.	92	7	13
J. S. Tiley.....	Silverwood.....	Silverwood.....	20	3	1
Total.....	.....	.....	112	10	13

GIBSON COUNTY.

Thomas J. Thomas.....	Princeton.....	Oswald.....	85	12	13
Total.....	.....	.....	85	12	13

GREENE COUNTY.

S. C. Risher.....	Linton.....	Island City.....	98	12	7
J. S. Newport.....	Linton.....	Island No. 2.....	165	21	17
Wm. Walton.....	Linton.....	Island Valley.....	67	5	5
James Dunn.....	Linton.....	Fluhart.....	122	11	12
Joseph Ferry.....	Linton.....	South Linton.....	69	6	5
W. H. Sexton.....	Dugger.....	Summit.....	119	12	17
John Templates.....	Linton.....	Templates.....	11	19	6
Total.....	.....	.....	751	77	69

KNOX COUNTY.

R. M. Freeman.....	Bicknell.....	Bicknell.....	41	4	2
M. Atkison.....	Edwardsport.....	Hofmann.....	50	8	4
W. R. Scott.....	Vincennes.....	Prospect Hill.....	22	6	3
Total.....	.....	.....	113	18	9

MARTIN COUNTY.

M. Dickie.....	Short's.....	Bedford.....	33	2	2
Total.....	.....	.....	33	2	2

TABLE No. 4.-Continued.

OWEN COUNTY.

MINE BOSS.	ADDRESS.	MINE.	EMPLOYERS.		
			Inside.	Outside.	Mules.
James T. Andrews	Clay City	Lancaster No. 4	31	4	3
Total			31	4	3

PARKE COUNTY.

George E. Davis	Coxville	Cox No. 3	134	22	8
John Bolin	Carb n	Otter Creek	48	4	4
John Musket	Lyford	Lyford No. 1†		6	5
H. Schlatter	Carbon	Lyford No. 2	40	6	7
W. L. Wallace	Pe th	Crawford No. 1	95	6	6
James Skene	Mecca	McIntosh No. 1	90	6	6
Morgan Roberts	Mecca	Mecca No. 1	40	6	5
George Mitch	Mecca	Mecca No. 2†			
John J. Scott	Rosetale	Parke No. 3	65	11	6
George Myers	Brazil	Standard	80	6	3
John Chesterfield	Brazil	Columbia No. 1	75	9	8
		Columbia No. 2	48	12	6
Total			715	88	58

PERRY COUNTY.

Geo. W. Briggs	Cannelton	Cannelton	42	4	4
R. C. Walker	Troy	Troy	16	1	2
Total			58	5	6

PIKE COUNTY.

G. Wellinger	Augusta	Hartwell	45	7	14
John Jennings	Ayrshire	Ayrshire	160	15	21
John R. Willey	Petersburgh	Blackburn	49	9	6
Andrew Dodds	Little	Little	123	8	11
Bart Stinson	Sophia	Carbon	20	5	2
M. T. Brewis	Petersburgh	Wooley	46	5	6
Total			343	49	60

SULLIVAN COUNTY.

J. A. Beck	Dugger	Briar Hill	35	4	2
Frank Smith	Farnsworth	Bunker Hill	49	6	5
S. Campbell	Del Carbo	Star	77	14	16
H. A. Butler	Dugger	Dugger	69	8	7
W. E. Evans	Eagle	Jumbo	94	18	17
R. M. Irving	Shelburn	Currys ville	32	10	3
Wm. F. Brown	Alum Cave	Phenix No. 1	13	20	15
Wm. Critton	Alum Cave	Phenix No. 2	21	1	3
	Hymers	Hymers			
D. M. Hopkins	Shelburn	Shelburn Nos. 1 and 2	50	12	8
A. Winterbottom	Farnsworth	Bush Creek†			
Total			554	83	79

*No report. †Shut down.

TABLE No. 4—Continued.

VANDERBURGH COUNTY.

MINE BOSS.	ADDRESS.	MINE.	EMPLOYERS.		Mules.
			Inside.	Outside.	
Geo. Bonenberger	Evansville	Diamond	26	4	6
Pius Schultheis	Evansville	Union	25	5	4
John Odell	Evansville	Ingleside	22	10	3
Frank Gendthar	Evansville	First Avenue	36	8	8
C. H. Baetz	Evansville	Sunnyside	74	9	12
Total .....	.....	.....	183	26	33

VERMILLION COUNTY.

Frank Dunlap	Clinton	Fern Hill	92	8	18
D. W. James	Clinton	Brouillet's	133	8	6
Wm. Hutchinson	Voorhees	Torrey No. 4	131	11	14
Wm. Chesterfield	Clinton	Buckeye	76	8	6
.....	.....	New Hazel* .....	.....	.....	.....
Total .....	.....	.....	432	35	44

VIGO COUNTY.

Thomas Gregory	Fontanet	Diamond No. 2	118	7	7
G. R. Anthony	Fontanet	Peerless	76	7	5
James Johnson	Fontanet	Union	150	13	11
J. W. Erwin	Macksville	Broadhurst	15	3	2
J. Carinichael	Seeleyville	Ebrlich	40	6	3
Wm. Grey	Seeleyville	Hector	62	6	4
Thomas McQuade	Burnett	Nickel Plate	60	8	13
James Devonald	Furnett	Grant	90	10	14
Wm. Gatt	Rosedale	Parke No. 10	71	9	4
Robert Biesler	Macksville	Brick Works	9	1	1
John W. Alvis	Elsie	Vigo Works	28	2	3
Geo. West	Seeleyville	Ray	68	9	3
W. L. Erwin	St. Marys	St. Mary's	22	3	1
James Steele	Macksville	Larimer	23	2	.....
Total .....	.....	.....	632	86	71

WARRICK COUNTY.

Geo. Archbold	Newburgh	Star	34	5	4
Patrick Bartley	Chandler	Chandler	13	2	2
Wm. Nester	Boonville	Gough	19	3	3
T. B. Hall	Chandler	Air Line	7	3	1
Wm. Woolley	Boonville	Big Vein	36	6	6
F. P. Hargrove	Boonville	Caledonia	19	2	2
Total .....	.....	.....	128	21	18

* No report.

TABLE No. 5.

Showing the Production of Coal in Tons of 2,000 Pounds in Indiana During the Year 1897.

CLAY COUNTY.

OWNER.	ADDRESS.	MINE.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Allair & Urbain	Brazil	Victoria	590	630	916	847	895			Strike		716	1,777	1,478	7,849
Brazil Block Coal Co	Brazil	No. 1.	7,133	4,974	6,595	5,594	3,887	2,767	353		2,520	6,983	7,461	8,982	56,918
Brazil Block Coal Co	Brazil	Gart No. 3.		2,061	3,127	3,844	3,237	1,979			2,546	1,185	5,577	4,363	27,897
Brazil Block Coal Co	Brazil	Gart No. 5.	7,853	6,121	4,638	6,988	1,245	2,166	343		5,327	12,485	1,656	10,120	69,012
Brazil Block Coal Co	Brazil	No. 7.										26	772	1,047	1,845
Brazil Block Coal Co	Brazil	No. 8.	13,546	11,772	18,334	12,447		3,526	783		3,946	9,801	11,193	11,138	91,996
Brazil Block Coal Co	Brazil	No. 10.	775	697	617	627					471	627	522	456	
Brazil Block Coal Co	Brazil	No. 11.	6,294	3,664	154						3,24	8,296	8,067	6,840	36,529
Brazil Block Coal Co	Brazil	No. 12.											414	94	1,348
Brazil Mining Co.	Brazil	Gladstone	6,152	6,331	5,631	6,364	2,646	1,721	339		2,818	6,100	6,500	6,500	51,002
Briar Block Coal Co	Clay City	Briar Hill	900	1,200	770	700	480	1,300			1,770	1,900	84		9,160
Chicago and Indiana Coal Co.	Terre Haute	Harrison No. 2.	3,446	4,155	573	751	944	703	80		927	3,389	3,898	4,400	22,866
Coal Bluff Mining Co	Terre Haute	Pratt	5,082	5,124	5,790	3,741					3,112	4,621	546	3,671	35,687
Crawford Coal Co.	Brazil	Crawford No. 2.	5,739	5,252	5,226	6,102	1,063	4,822	418		3,760	7,535	7,594	3,555	51,036
Crawford Coal Co.	Brazil	Crawford No. 3.	5,742	3,302	3,771	3,526	838	2,612	49		4,058	8,061	6,342	5,449	43,050
Crawford Coal Co.	Brazil	Crawford No. 4.													
D. H. Davis Coal Co	Knightsville	World's Fair	1,543	1,479	1,319	1,191	824	759			1,370	3,197	2,846	2,943	17,469
C. Ehrlich	Turner	Fortner	218	2,125	784	3,678	1								9,005
C. Ehrlich Coal Co	Turner	Klondyke												7,454	7,454
C. Ehrlich & Co.	Turner	Excelsior					2,964	1,891			1,188	2,623	3,215	1,992	13,873
P. Ehrlich	Turner	Superior	5,636	2,813	3,576	4,320	2,090	207			2,000	8,220	5,520	7,263	41,734
Eureka Coal Co	Terre Haute	Eureka No. 2.	11,192	10,811	3,466	9,677	2,846	3,444	536		7,909	5,443	10,721	7,978	74,517
Eureka Coal Co	Terre Haute	Eureka No. 3.													
Diamond Block Coal Co	Chicago, Ill.	Diamond No. 3.	9,031	9,472	8,223	8,280	4,520	2,404	96	47	3,406	8,441	8,342	7,511	70,373
Goucher, McAdoo & Co	Brazil	Monarch	750	600	653		622	578	59		572	66	636	615	6,221
Jackson Coal and Mining Co.	Brazil	Nickel Plate	5,021	4,153	4,048	4,755	1,960	282	292		5,024	10,216	9,653	4,975	50,389
Jackson Coal and Mining Co.	Brazil	Nickel Plate	2,962	2,979	1,840	2,987	939	20						1,604	13,301
I. McIntosh & Co.	Brazil	McIntosh No. 2.	641	118	1										759
Andrew & Burnham	Clay City	Markland	100	100	100	100	100	113	144	193	522	1,310	1,495	1,378	5,655
Otter Creek Coal Co	Brazil	Fairview	3,974	4,312	2,611	2,10	2,547	4,280			924	2,421	2,523	2,561	28,163
Otter Creek Coal Co	Brazil	Nellie	99	1,072	73	785	1								3,519
Jos. Soars	Staunton	San Pedro	2,621	2,623	2,215								3,386	2,720	16,162
Weaver Coal Co.	Center Point	Louise	390	1,040							2,640	1,100	3,450	3,000	11,600
Zeller, McClellan & Co	Brazil	Columbia No. 3.	2,105	3,891	3,078	2,811					566	1,741	1,217	15,379	
Zeller, McClellan & Co	Brazil	Columbia No. 4.	3,668	2,140	1,753	2,597	1,053	1,662	196		2,529	5,886	4,886	1,275	29,956
Total			116,003	104,425	85,898	95,355	32,998	39,163	4,407	799	60,986	124,817	134,290	126,538	925,679

*Idle. †New mine. ‡Abandoned. §Included in line above.

TABLE No. 5—Continued.

DAVIESS COUNTY.

OWNER.	ADDRESS.	MINE.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Cabel & Co.....	Washington..	Cabel No. 4.....	3,467	2,932	1,973	1,938								7 6	10,146
Cabel & Co.....	Washington..	Cabel No. 9.....	2,723	3,307	3,011	3,743							1,750	1,800	16,269
Davies County Coal Co.....	Montgomery..	Montgomery No. 1.....	7,599	7,429	5,522	6,999	6,388	4,996				6,164	6,236	6,642	57,975
Davies County Coal Co.....	Montgomery..	Montgomery No. 2.....	1,410	1,735	1,546	1,963	2,294	2,527				2,948	3,497	3,846	21,766
Davies County Coal Co.....	Montgomery..	Montgomery No. 3.....	†												
Mutual Mining Co.....	Cannelburg..	Mutual.....	1,150	810	895	605	485	890	2,500			2,650		1,720	11,695
Oden Coal Co.....	Oden.....	Winklepeck.....	100	100	191	†									391
A. F. S. or & Son.....	Ragsville..	Stoy.....	†												
Ragsville Coal Co.....	Ragsville..	Stoy.....	†									836	785	645	2,260
Ragsville Co-operative C. Co.....	Ragsville..	Co-operative.....	†								500	750	1,000	1,000	3,250
Union Coal Co.....	Ragsville..	Union.....	149	115	53			374	219		377	387	663	377	3,049
Washington Coal Co.....	Washington..	Hawkins.....	1,403	1,080	1,121	692	403	807	136		1,777	1,185	2,009	2,000	11,553
Washington Coal Co.....	Washington..	Wilson No. 4.....	†						32			55	636	1,000	2,900
Total.....			18,001	17,508	14,337	15,045	9,570	9,591	2,917	377	2,119	15,826	10,771	19,689	141,754

DUBOIS COUNTY.

L. A. South rd.....	Huntingburg.	Huntingburg.....	300	300	300	300	200	150	250	300	200	400	500	500	3,600
Total.....			300	300	300	300	200	150	250	300	200	400	500	500	3,600

FOUNTAIN COUNTY.

Indiana Bituminous Coal Co.	Terra Haute..	Ind. bit. No. 2...	10,12	10,487	9,800	12,900	6,100	10,715	4,117		991	10,502	12,217	12,478	100,470
Silverwood Coal Co.....	Silverwood...	Silverwood.....	300	300	300	300	500	500	1,000	1,300	1,500	1,700	1,790	1,717	11,357
Total.....			10,412	10,787	10,100	13,200	6,600	11,365	5,117	1,300	2,491	12,292	14,037	14,195	111,927

†New mine. †Abandoned. †No report.

GIBSON COUNTY.

Manle Coal Co.....	Princeton.....	Oswald.....	7,500	4,000	3,750	1,250	1,500	2,000	4,000	2,171	3,000	5,800	7,300	6,780	49,878
Total.....			7,500	4,900	3,750	1,250	1,500	2,000	4,000	2,171	3,000	5,800	7,300	6,780	49,878

GREENE COUNTY.

Island Coal Co.....	Indianapolis.....	Island City.....	5,723	8,690	6,018	5,760	.....*	3,881	.....	.....	.....	9,372	10,321	10,070	79,815
Island Coal Co.....	Indianapolis.....	Island No. 2.....	12,222	12,517	15,380	10,484	15,380	11,811	.....	.....	.....	16,714	17,407	17,001	128,584
Island Valley C & M. Co.....	Linton.....	Island Valley.....	4,358	5,630	4,250	3,340	3,105	2,969	675	.....	1,413	5,283	6,004	6,175	44,273
Linton C. & M. Co.....	Linton.....	Fluhart.....	4,468	9,815	10,582	3,235	1,230	2,652	388	.....	1,207	8,378	9,168	8,391	84,902
South Linton Coal Co.....	Linton.....	South Linton.....	4,215	.....	4,725	3,450	2,230	4,725	700	.....	1,075	6,285	7,220	9,000	44,745
Summit Coal Co.....	Bloomfield.....	Summit.....	5,235	6,655	6,455	4,472	6,804	5,400	902	.....	3,783	11,315	13,215	14,165	79,651
Western Indiana Coal Co.....	Terre Haute.....	Templeton.....	2,589	4,290	1,500	3,993	7,600	5,526	477	.....	1,892	7,651	10,425	8,758	55,231
Total.....			44,740	47,617	48,950	35,794	37,170	86,334	3,083	.....	9,570	66,078	74,058	73,989	477,201

KNOX COUNTY.

Bicknell Co-operative C. Co..	Bicknell.....	Bicknell.....	1,500	840	867	150	324	343	556	208	975	2,371	2,932	2,906	13,972
Edwardsport Coal Co.....	Indianapolis.....	Hofmann.....	2,463	2,712	2,315	870	935	1,101	353	.....	738	2,624	2,500	2,500	19,167
Prospect Hill Coal Co.....	Vincennes.....	Prospect Hill.....	1,090	839	749	381	290	383	853	1,510	1,142	982	1,240	1,118	10,577
Total.....			5,053	4,421	3,951	1,401	1,549	1,827	1,768	1,718	2,855	5,977	6,672	6,524	42,716

MARTIN COUNTY.

Bedford Coal and Mining Co..	Bedford.....	Bedford.....	612	990	722	498	685	700	700	700	700	750	900	1,100	9,037
Total.....			612	990	722	498	685	700	700	700	700	750	900	1,100	9,037

*Idle.

TABLE No. 5—Continued.

OWEN COUNTY.

OWNER.	ADDRESS.	MINE.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Lancaster Block Coal Co.....	Terre Haute.	Lancaster No. 4.	2,331	1,534	1,815	2,230	851	455	.....	.....	700	2,000	2,100	1,403	15,419
Total.....	.....	.....	2,331	1,534	1,815	2,230	851	455	.....	.....	700	2,000	2,100	1,403	15,419

PARKE COUNTY.

Brazil Block Coal Co.....	Brazil.....	Cox No. 3.....	8,228	10,948	11,359	6,816	9,557	10,314	.....	.....	.....	6,860	13,876	15,853	93,811
Brazil Block Coal Co.....	Brazil.....	Otter Creek.....	211	1,060	.....	.....	.....	.....	.....	.....	446	2,109	2,811	2,203	8,840
Cal met Coal Co.....	Chicago, Ill.	Lytford No. 1.....	1,019	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,019
Calumet Coal Co.....	Chicago, Ill.	Lytford No. 2.....	.....	1,194	716	9,563	10,843	2,381	311	.....	.....	6,399	10,129	8,051	56,070
Crawford Coal Co.....	Brazil.....	Crawford No. 1.....	5,969	3,908	4,718	3,286	116	.....	144	.....	3,572	4,566	7,125	4,280	30,164
I. McIntosh & Co.....	Brazil.....	McIntosh No. 1.....	7,227	5,800	6,869	7,452	3,641	4,629	646	.....	47	3,340	3,814	4,844	48,109
Otter Creek Coal Co.....	Brazil.....	Mecca No. 1.....	1,004	2,393	2,387	2,824	1,619	1,563	.....	.....	.....	2,100	3,586	4,140	22,136
Otter Creek Coal Co.....	Brazil.....	Mecca No. 2.....	665	779	939	582	.....	.....	.....	.....	.....	.....	.....	.....	2,965
Parke County Coal Co.....	Rosedale.....	Parke No. 6.....	5,862	6,114	5,620	8,078	5,284	9,154	.....	239	682	.....	.....	.....	41,033
Parke County Coal Co.....	Rosedale.....	Parke No. 8.....	4,754	6,113	3,576	6,773	8,087	8,389	.....	3,067	8,226	11,067	.....	12,015	71,688
Standard Coal Co.....	Terre Haute.....	Standard.....	2,838	2,932	4,648	3,908	722	1,527	123	.....	2,199	4,620	3,224	5,699	3,740
Zeller, McClellan & Co.....	Brazil.....	Columbia No. 1.....	4,185	4,060	1,912	3,173	.....	.....	.....	.....	2,103	6,940	8,090	7,578	38,011
Zeller, McClellan & Co.....	Brazil.....	Columbia No. 2.....	3,584	3,606	4,134	4,986	1,905	2,694	392	.....	2,513	7,038	8,240	7,636	46,628
Total.....	.....	.....	45,146	48,937	53,231	56,871	41,944	40,682	1,616	.....	14,086	53,790	71,962	72,299	500,534

PERRY COUNTY.

American Cannel Coal Co.....	Cannelton.....	Cannelton.....	1,116	1,184	1,494	1,543	1,318	1,229	1,631	781	1,405	394	914	1,428	14,507
Bergenroth Bros.....	Troy.....	Troy.....	1,000	760	1,140	807	716	886	764	758	844	760	611	1,104	10,180
Total.....	.....	.....	2,116	1,944	2,634	2,350	2,034	2,115	2,395	1,539	2,249	1,154	1,565	2,532	24,687

†† Shaft buildings burned.

PIKE COUNTY.

Cabel-Kaufman Coal Co.....	Washington..	Hartwell.....	2,940	2,880	2,905	2,222	.....	350	.....	1,077	2,059	1,716	1,982	2,767	17,976
D. Ingle.....	Oakland City.	Ayrshire.....	6. 4	6,561	4,675	4,766	3. 97	3,719	12,458	13,020	14,611	13,567	12,396	10,531	106,573
W. A. Jackson.....	Oakland City.	Carbon.....	1,777	1,223	1,055	946	1,862	1,285	1,7 4	730	1,614	1,360	1,729	1,696	17,031
The S. W. Little Coal Co.....	Evansville...	Blackburn.....	2,194	1,387	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,581	
The S. W. Little Coal Co.....	Evansville...	Little's.....	3,783	3,797	5,777	5,573	4,405	2,9 4	.....	.....	12,186	11,069	10,986	11,000	71,550
The J. Wooley, Jr., Coal Co..	Evansville...	Petersburg.....	.....	.....	.....	.....	1,408	1,317	3,455	1,954	4,153	4,981	.....	3,615	20,943
Total.....	.....	.....	17,636	15,848	13,712	11,285	10,972	9,655	17,667	16,781	34,653	32,713	27,093	29,639	237,654

SULLIVAN COUNTY.

Lynton Coal Mining Co.....	Dugger.....	Briar Hill.....	150	150	125	1 0	100	100	100	100	500	700	1,000	800	3,975
Hancock & Conkel.....	Farnsworth.	Bunker Hill.....	2,289	1,966	1,363	617	491	651	162	8	803	2,141	2,544	3, 83	16, 48
Harder Hafer Coal Co.....	Del Carbo.....	Star.....	13,469	14,633	8,9 0	15,464	7,843	13,258	7,729	4	14,336	15,631	11,018	16,663	139,311
Indiana & Chicago Coal Co..	Dugger.....	Dugger.....	6,241	5,716	2,718	1,351	.....	.....	.....	.....	.....	5.6	3,465	4,858	25. 95
Jackson Hill Coal Co.....	Eagle.....	Jumbo.....	11,017	11,898	9,261	11,431	6,924	5,390	4,540	.....	.....	.....	3,977	11,985	76,453
New Currysville Coal Co..	Shelburn.....	Currysville.....	1,540	1,472	978	687	749	.....	79	99	.....	1,966	2,423	1, 77	12,355
New Pittsburgh C & C. Co..	Alum Cave.....	Phenix Nos. 1 & 2.	14,300	11,628	14,350	11,447	.....	11,322	6,748	.....	3,991	15. 31	11,018	16,809	117,548
Hymera Coal Mining Co.....	Hymera.....	Hymera.....	3,000	3,000	1,800	1,320	1,440	1,000	.....	.....	480	2,174	2,174	5,736	22,124
Shelburn Mining Co.....	Shelburn.....	Shelburn No. 1. }	2,120	2,000	1,440	1,500	1,500	1,800	299	.....	2,025	2,610	2,700	2,800	20,824
Shelburn Mining Co.....	Shelburn.....	Shelburn No. 2. }	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Watson Little Coal Co.....	Farnsworth.....	Bush Creek.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,365	.....	1,365
Total.....	.....	.....	54,115	52,483	40,985	43,997	19,047	33,525	20,117	445	22,135	42,009	42,074	64,506	435,398

VANDEBURGH COUNTY.

Diamond Coal Mining Co....	Evansville...	Diamond.....	2,992	2,816	2,784	1,440	1,320	1,158	1,463	1,072	1,678	1,840	1,885	2,343	22,791
Evansville Union C. & M. Co.	Evansville...	Union.....	1,462	1,041	783	512	457	443	637	60	969	1,122	1,510	1,541	10,497
John Ingle Coal Co.....	Evansville...	Ingliside.....	6,966	5,973	7,641	4,549	4,086	4,358	5,811	7,000	6,300	6,250	6,500	6,250	71,674
H. A. Lozier.....	Evansville...	First Avenue.....	1,898	1,797	1,510	1,145	1,316	1,569	2,752	2,573	3,168	3,770	3,540	27,566	
Sunnyside Coal & Coke Co..	Evansville...	Sunnyside.....	5,945	5,164	5,408	3,304	3,603	2,973	6,927	6,552	7,726	7,798	8,27	8,616	72,228
Total.....	.....	.....	19,233	16,741	18,106	10,940	10,782	10,491	17,590	17,797	19,191	20,178	21,937	22,250	105,256

*Idle. †Abandoned. **Shut down. ‡Burned.

TABLE No. 5—Continued.

VERMILLION COUNTY.

OWNER.	ADDRESS.	MINE.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Hazel Creek Coal Co.....	Clinton.....	Fern Hill.....	6,560	10,425	12,434	12,450	3,389	2,055	.....	.....	8,166	10,759	12,845	11,000	90,083
Hazel Creek Coal Co.....	Clinton.....	Hazel No. 3.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Brullette's Creek Coal Co.....	Clinton.....	Brullette Creek.....	.....	.....	.....	.....	.....	.....	.....	.....	5,627	13,202	16,529	11,700	46,858
McClellan, Eastman & Co.....	Clinton.....	Buckeye.....	850	7,686	9,723	6,793	6,682	7,893	.....	.....	2,000	6,200	8,100	7,500	63,327
Torrey Coal Co.....	Voorhees.....	Torrey No. 4.....	9,840	10,325	12,649	13,352	13,041	5,996	.....	.....	233	4,149	7,074	7,000	83,660
Total.....			17,251	28,436	34,806	32,595	23,114	15,943			16,426	34,310	44,448	37,400	283,928

VIGO COUNTY.

J. N. & Geo Broadhurst.....	Macksville.....	Broadhurst.....	1,347	1,000	1,000	1,000	.....	.....	3,459	965	965	700	900	921	12,287
Burke Bros.....	Glenn.....	Burke.....	100	100	100	100	75	75	120	2.0	15	200	20	200	1,620
Coal Bluff Mining Co.....	Terre Haute.....	Diamond No. 2.....	.....	.....	.....	.....	.....	.....	.....	.....	1,644	5,195	7,397	8,383	24,469
Coal Bluff Mining Co.....	Terre Haute.....	Peerless.....	2,915	803	3,966	4,494	3,971	4,033	499	.....	.....	1,877	3,748	6,293	33,619
Coal Bluff Mining Co.....	Terre Haute.....	Star.....	230	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	230
Coal Bluff Mining Co.....	Terre Haute.....	Victor.....	1,448	740	1,688	1,040	.....	.....	.....	.....	.....	.....	.....	.....	4,966
Coal Bluff Mining Co.....	Terre Haute.....	Union.....	7,766	10,176	13,118	15,940	11,508	15,583	1,232	.....	4,932	14,010	14,100	12,902	121,297
Edward Davis.....	Elsie.....	Eagle.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
James H. Erwin.....	St. Mary's.....	St. Mary's.....	500	500	500	500	500	500	560	600	600	700	900	1,000	7,560
Ehrman Coal Co.....	Burnett.....	Nickel Plate.....	3,920	5,885	3,716	5,065	4,670	4,863	.....	.....	1,611	6,204	6,801	5,723	48,464
Julius Ehrlich.....	Seeleyville.....	Seeleyville.....	546	1,821	1,692	1,002	216	706	1,055	.....	.....	192	1,816	2,200	11,308
Grant Coal Mining Co.....	Burnett.....	Grant.....	11,000	10,100	10,700	11,800	9,638	9,483	.....	.....	3,173	8,848	9,717	9,189	93,771
T. H. Brick and Pipe Co.....	Terre Haute.....	Brick Works.....	700	685	720	745	760	765	715	750	750	750	700	750	8,480
Soules Bros.....	Terre Haute.....	Soules.....	500	500	500	500	500	500	575	700	700	800	800	800	7,375
Edward Davis.....	Elsie.....	Vigo.....	1,000	2,100	.....	.....	.....	1,200	.....	.....	.....	825	600	1,100	6,900
William Lankford.....	Macksville.....	Larimer.....	575	690	608	301	241	213	740	1,432	1,350	1,400	1,570	1,600	10,792
Loughner Coal Co.....	Seeleyville.....	Hector.....	2,001	2,993	2,202	3,859	1,190	4,558	458	1,539	4,027	5,965	4,000	5,465	38,389
Vigo County Coal Co.....	Seeleyville.....	Ray.....	4,084	4,307	4,203	6,587	284	1,700	.....	.....	1,455	5,342	6,166	7,804	41,937
Murry & Lloyd.....	Macksville.....	Murry.....	.....	80	162	36	.....	61	150	200	200	400	1,000	1,200	3,445
Parke County Coal Co.....	Rosedale.....	Park No. 10.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,941	6,679	12,620
Total.....			38,938	42,067	45,019	63,029	33,583	44,465	8,795	6,406	21,557	53,208	66,393	72,744	486,904

WARRICK COUNTY.

John Archbold	Evansville...	Star	2,655	3,034	2,436	1,781	1,600	1,570	3,000	2,100	2,300	2,052	3,195	3,700	29,233
Caledonia Coal Co.....	Bourville	Caledonia.....	1,088	1,100	1,000	96	70	80	1,100	1,100	864	1,672	1,539	1,400	11,499
Kelley & Nester	Bourville	Gough	2,14	2,200	2,400	2,561	3,00	1,21	1,900	2,83	2,809	1,800	1,50	700	24,578
Hall & Lowrance.....	Chandler.....	Air Line.....	400	400	40	400	30	250	40	500	50	600	600	600	5,800
Patrick Bartley.....	Chandler.....	Chandler.....	1,280	1,700	1,000	432	50	500	60	850	80	80	90	900	9,912
Wm. Roberts n.....	Newburg.....	Brisbins.....	30	200	500	20	15	150	10	150	30	30	300	300	2,80
J. Wooley Jr., Coal Co.....	Evansville.....	Big Vein.....	2,333	1,765	2,779	691	1,835	1,315	4,71	3,515	5,297	5,79	3,882	2,434	35,906
DeForest Coal Co.....	Evansville.....	DeForest.....	150	150	150	10	250	150	400	500	300	45	50	500	3,675
Total			16,310	10,149	10,365	7,151	8,445	6,436	12,31	1,798	13,170	12,978	10,816	10,34	*15,403

Coal produced in small mines 150,000 tons.
 Grand total 4,228,085 tons.

*Idle. †New mine. ‡Abandoned.

METHODS OF MINING.

There are seven different veins of coal mined in the State of Indiana, varying in thickness from three to nine feet. Room and pillar is the only system of mining used in this State, subject to many modifications as to the direction and width of entries, the thickness of entry pillars, the width of rooms, and the arrangements for the recovery of the coal in the room pillars before the final abandonment of the mine. These modifications are made necessary by the character of the coal and of the overlying and underlying strata. This system, when conditions are favorable, as they are in but few mines in this State, consists of a main entry and air-course, each 8 feet wide, separated by a pillar 12 feet in thickness, and making what is known as a double entry. At intervals of 100 yards cross-entries are driven at right angles to the main entries. These are of the same dimensions as the main entry, but the pillar between them is usually not so thick, and a haulage road is kept up in each cross-entry. Break-throughs are made between each pair of entries every 45 feet to provide for the circulation of the ventilating current through the mine. These entries are driven to the boundaries of the territory in each direction. As the cross-entries are being driven, rooms are "turned" at right angles. These are started at a width of 8 feet and are gradually widened to 24 feet. They are carried at this width until they reach a point midway between the two cross-entries. The roadway is kept near one side of the room, so that it is in place to be used in taking the coal from the pillars. These are left standing until the mine, or at least that part of it, is about to be abandoned, when all the coal is removed that it is possible to remove, and the roof is allowed to settle to the floor. Where conditions are favorable, nearly the whole of the coal in the vein can be removed. The pillars in this case are left about 10 feet thick, and break-throughs are made in them at intervals to provide for the ventilation of the rooms while they are being worked.

The first modification of this method occurs when, for any reason, it is not desirable to keep so much open work standing, on account of bad roof, or where the work is not being developed fast enough to keep up the desired output from the new work. In either of these cases, as soon as the rooms are driven to their destination, the pillars are taken out, or at least so much of them as circumstances will permit, care being taken to leave enough coal near the entries to keep them safe while the work is being carried on beyond the point where the room pillars have been taken out. While this allows the operator

to realize the profits of his development work sooner than the first method, the coal can not be taken out so clean, and the final result is a loss to all concerned in the working of the vein.

In some of our mines, mostly those operating in low or thin veins, instead of keeping up a roadway in each of the entries, only one of each pair is made to serve the purpose of a permanent haulage road. This entry is made of sufficient height by taking roof or bottom along with the coal, and a good haulage road is made along it. Its companion entry is sometimes made only in the coal, and a branch road is laid from the principal entry to each room which is turned from the "air-course," as the second entry is called in such cases. A door is necessary at each of these roads to direct the ventilating current, and, as these are seldom made air-tight, and must be frequently opened to permit the passage of coal and men, this plan usually results in very poor ventilation, the more so as the area of the air-course is so much smaller than that of the entry. In fact, this method has nearly all the disadvantages of the single entry system. This is sometimes modified by making a "cross-cut" between the entries at every third or fourth room. This reduces the number of doors and improves the ventilation to that extent, but I find that the parts of the air-course between those which are used for a roadway are usually allowed to become filled with dirt, thereby choking the air-way and preventing the free circulation of air and requiring a great deal more ventilating power to keep the mine in a fit condition for the men to work in. Also, as the roads in the air-course are abandoned as soon as the rooms are worked out, the proper attention is not given to it to prevent it from being filled up with falling roof, and in a short time it is practically useless as an air-way. This is especially true where the roof is of such a character that it is affected by the action of the air. Where the roof is very much affected by the action of air, and also where it is naturally weak, a modification of the first plan, known as the "block system," is adopted.

In this system, instead of driving entries to the boundary and turning rooms at regular intervals for the whole distance, when the cross-entries have been driven a distance of 100 yards, a pair of entries are started parallel to the rooms and driven to the next cross-entry. When this is done the air may be sent through these entries, and they are also used for haulage-ways, and all but one of the original cross-entries may be abandoned to the point of connection with the cut-off entries, as soon as the coal has been removed from the block formed by the four pairs of entries. The advantage of this plan is that it

avoids the necessity of keeping open so much haulage road and airway, and gives a shorter road for the air to travel. Also where the roof and surface conditions are favorable the coal may be taken out before the conditions have become unfavorable for pillar work.

In some machine mines, while one or the other of the plans outlined above is followed, the rooms are driven double with a road on each side. This is made possible on account of the fact that as the coal is mined by the machines comparatively little powder is used and the roof is not shattered, and so can be more easily kept up by timber than in places where large charges of powder are used to loosen the coal without mining, as is generally done where pick mining is practiced. This method allows all wastage to be thrown into that part of the room between the two roads, and provides for the ventilation of the working places without the necessity of such frequent breakthroughs between the rooms. It also does away with a great deal of the trouble and work in moving the mining machine from one working place to another and adds largely to the amount of work that it may do in a given time.

Other modifications of these plans are made necessary by the varying thickness of the coal in some veins, by the irregular dip and rise of the strata and by the character of the material forming the roof and floor of the mine. In thin veins, in order to save the expense of making the necessary height to permit of mules going to the faces of the rooms, entries are kept as nearly as possible in the "dip" or lowest part of the mine and all rooms are driven to the "raise," so that the mine cars may be brought to the entry by man power. This results in very crooked roadways and a great deal of experimental work, and working places running at all kinds of angles, making it almost impossible for a stranger to see any plan to the workings. In other cases pillars must be a great deal stronger than is given above; in some mines entry pillars are 50 feet thick, and room pillars 20 feet thick. In others entries can not be made more than 6 feet wide, and rooms 15 feet wide. The exigencies of drainage requirements and haulage conditions also have their effect in determining the final shape of the mine, so that although it is easy to plan mining operations as they should be, the person who directs them from day to day finds himself constantly confronted with problems whose successful solution means much to the comfort of the persons employed in the mine and to the financial outcome of the investment of his employer.

MINING MACHINERY.

Mining machinery was introduced into this State in 1884, as a result of a strike at the Currysville Mine, and the mines at Rosedale, Parke County. Having been introduced by force of circumstances, it was demonstrated that the bituminous coal of Indiana could be successfully mined by machinery, and its use has increased until at present a large part of the production of the State is mined by machinery. Originally, only compressed air was used as a motive power, but recent developments in electricity have led to the invention of mining machinery operated by its use. Block coal had not been successfully mined by machinery until 1894, when electric machines were installed at the No. 1 and No. 8 mines of the Brazil Block Coal Company. Since that time they have been successfully operated at those places, but no additional installments have been made in that district. I give a table showing the extent of the use of machinery in this State:

MINES.	COUNTIES.	ELECTRIC.				COMPRESSED AIR.		
		Jeffrey.	Independent.	Morgan-Gardner.	New Morgan.	Jeffrey.	Harrison.	Ingersoll-Sergeant.
Brazil Block Coal Co.'s No. 1.	Clay			12				
Brazil Block Coal Co.'s No. 8.	Clay		5	10	1			
Briar Hill.	Clay						4	
Cable No. 9.	Daviess			2				
Island City No. 1.	Greene						12	
Island No. 2.	Greene						24	
Oswalt.	Gibson							10
Parke No. 8.	Parke						32	
Cox No. 3.	Parke						21	1
Lyford No. 2.	Parke						7	
Hartwell.	Pike			1				
Phenix No. 1.	Sullivan						14	
Jumbo	Sullivan						15	
Currysville	Sullivan						6	1
Shelburn	Sullivan					14		
Hymera.	Sullivan			7				
Star	Sullivan			6				
Sunnyside	Vanderburgh						1	5
Torrey	Vermillion						12	2
Union.	Vigo						7	
Grant	Vigo						8	
Big Vein	Warrick							5
Total			5	8	1	4	53	22

In addition to the above a machine drill is used at Mecca, in Parke County, and two at the Big Vein Mine, in Warrick County. The Indiana & Chicago Coal Company are at work installing an electric plant, which they hope to have in operation before February 1st, as is the New Pittsburgh Coal & Coke Company, at its Phenix mines.

*12 idle. †3 of them Lechner.

Mechanical haulage is in use at several mines in this State. A list follows, showing the kind of power used and length of haulage.

MINE.	COUNTY.	KIND OF HAUL- AGE.	POWER USED.	LENGTH.
Island No. 2.....	Greene.....	Tail rope.....	Steam.....	2,600
Island No. 1.....	Greene.....	Tail rope.....	Steam.....	1,200
Parke No. 8.....	Parke.....	Engine plape.....	Steam.....	900
Hymera.....	Sullivan.....	Motor.....	Electricity.....	1,000
Torrey.....	Vermillion.....	Tail rope.....	Steam.....	1,200
Ingleside.....	Vanderburgh.....	Tail rope.....	Steam.....	3,000
Grant.....	Vigo.....	Tail rope.....	Steam.....	600
Mecca.....	Parke.....	Motor.....	Electricity.....	2,600

ACCIDENTS.

The following list shows the accidents, fatal, serious and minor, that have been reported to this office, or have by any other means come to the knowledge of my assistant or myself during the year. They consist of 16 fatal, 24 serious and 74 minor accidents. This is a large decrease since 1896, when the list showed 28 fatal, 66 serious and 94 minor accidents. This speaks well for the management of the mines, as the output of coal is nearly equal in the two years, and those affected by the strike were in bad condition when work was resumed, especially where the roof is at all inclined to break and fall from the action of the air. This has usually been a time when accidents were most numerous from various causes, some of which are set out in a circular sent out by this office about the time work was resumed after the strike, in September. A short account of the circumstances attending each fatal accident, as they were developed at the Coroner's inquest in each case, will be found following the list of accidents. With one exception, no charge of negligence could be made against the person in charge of the mine where an accident occurred, and but few where gross carelessness could be imputed to the injured person, or any of his fellow-workmen. A large proportion of them were from causes that were so hidden that they could not have been discovered by the closest observation. The same is true to a less extent in the other classes of accidents, but, as but few of them have been personally investigated by myself or assistant, I am not in a position to make comments upon them.

Fatal Accidents.

DATE.	NAME.	CAUSE.	INJURY.	MINE.	COUNTY.
Jan. 2	Robert Sills	Falling slate	Fatal bruises	Grant	Vigo.
Jan. 27	B. F. Watson	Falling slate	Fatal bruises	Star	Sullivan.
Jan. 28	J. Bristow	Explosion of powder	Fatal bruises	Union	Vanderburgh.
Mar. 16	Wm. Delgeman	Explosion of powder	Fatal bruises	Diamond	Vanderburgh.
May 29	Dd. Williams	Fall of slate	Fatal bruises	Eureka	Clay.
June	Wm. Crawley	Falling slate	Fatal bruises	Nickel Plate	Clay.
Sept. —	B. Dunville	Falling roof	Fatal bruises	Oswalt	Gibson
Sept. 27	David Clark	Powder smoke	Death	Phenix No. 2	Sullivan.
Sept. 27	J. Anderson	Powder smoke	Death	Phenix No. 2	Sullivan.
Sept. 30	Geo. Hickson	Electric motor	Broken bones	Mecca	Parke.
Oct. 1	I. N. Williams	Fall in shaft	Bruises and burns	Parke No. 10	Vigo.
Oct. 5	Geo. Saur	Shot in coal	Bruises and burns	Summit	Greene.
Oct. 7	John Hunter	Fall of slate	Bruises	Flubart	Greene.
Nov. 13	D. Benzo	Falling roof	Fatal bruises	Brazil B. C. Co. No. 11	Clay.
Nov. 13	A. Miccillitte	Falling roof	Fatal bruises	Brazil B. C. Co. No. 11	Clay.
Nov. 24	Arthur West	Falling slate	Crushed head	Briar Hill	Clay.

Serious Accidents.

DATE.	NAME.	CAUSE.	INJURY.	MINE.	COUNTY.
Jan. 3.....	John Olson	Railroad car.....	Finger mashed.....	Brazil B. C. Co. No. 8.	Clay.
Jan. 6.....	Ben. Dally	Explosion of shot.....	Body bruises.....	Brazil B. C. Co. No. 1.	Clay.
Jan. 18.....	F. Jackson	Falling slate.....	Leg broken.....	Hector.....	Vigo.
Feb. 12.....	Chas. Walter	Falling roof.....	Spine hurt.....	Briar Hill.....	Clay.
Mar. 20.....	M. Winegar	Fall of slate.....	Collar bone.....	Lyford No. 2.....	Parke.
Mar. 23.....	N. Cowie.....	Explosion of fire-damp.....	Bad burns.....	Standard.....	Parke.
Mar. 31.....	H. Dubney.....	Fail of coal.....	Bones broken.....	Island No. 2.....	Greene.
April.....	J. Demont.....	Draw slate.....	Ankle broken.....	Island No. 2.....	Greene.
April.....	A. Hayman.....	Descending cage.....	Leg broken.....	Lancaster.....	Owen.
April 18.....	C. Nicola.....	Explosion of keg of powder.....	Badly burned.....	Pratt.....	Clay.
May.....	John Quigley.....	Fall in shaft.....		Standard.....	Parke.
May 18.....	John Bain.....	Mine car.....	Finger cut off.....	Island No. 2.....	Greene.
June 21.....	Wm. Bedford.....		Arm broken.....	Hector.....	Vigo.
June 3.....	Thos. James.....		Leg broken.....	Hector.....	Vigo.
June 5.....	Sam Switz.....	Falling slate.....	Broken leg.....	Brazil B. C. Co. No. 1.	Clay.
Sept.	A. B. Buyer.....	Falling slate.....	Sprained leg.....	Hartwell.....	Pike.
Sept.	J. Thompson.....	Falling slate.....	Leg broken.....	Columbia No. 4.....	Clay.
Oct. 7.....	M. Glover.....	Falling slate.....	Back broken.....	Brazil B. C. Co. No. 11	Clay.
Oct. 5.....	Geo. Tinscher.....	Falling slate.....	Ankle mashed.....	Summit.....	Greene.
Oct. 15.....	Jac. Butler.....	Mule kick.....	Broken rib.....	Summit.....	Greene.
Oct.		Falling slate.....	Broken limb.....	Ray.....	Vigo.
Oct. 26.....	Lee Wake.....	Blast.....	Burns and bruises.....	Diamond.....	Clay.
Oct. 27.....	Joe Williams.....	Falling slate.....	Back broken.....	Brazil B. C. Co. No. 1	Clay.
Nov. 6.....	Rubin Smith.....	Falling coal.....	Bone broken.....	Louise.....	Clay.

Minor Accidents.

DATE.	NAME.	CAUSE.	INJURY.	MINE.	COUNTY.
Jan. 11.	John Burnett.	Fall of slate.	Bruised face.	Brazil B. C. Co. No. 11	Clay.
Jan. 11.		Coal off cars.	Foot mashed.	Chandler.	Warrick.
Jan. 6.	Chas. Marky.	Falling slate.	Bruises.	Bicknell.	Knox.
Jan. 10.	Martin Guy.	Draw slate.	Bruises.	Brazil B. C. Co. No. 11	Clay.
Jan. 28.	L. Marbeto.	Mine car.	Foot hurt.	Pratt.	Clay.
Jan. 28.	Wm. Kehoe.	Premature explosion.	Burns.	Eureka.	Clay.
Jan. 28.	Thos. Kehoe.	Explosion.	Bad burns.	Eureka.	Clay.
Feb. 28.	F. Smith.	Mine car.		Dugger.	Sullivan.
Feb. 20.	Chas. Brown.	Falling slate.	Back bruised.	World's Fair.	Clay.
Feb. 19.	H. Ford.	Fall of slate.	Hip bruises.	Parke No. 8.	Parke.
Feb. 22.	John Simes.		Bruised leg.	Crawford No. 1.	Parke.
Feb. 27.	A. Witty.		Head cut.	Brazil B. C. Co. No. 8.	Clay.
Feb. 24.	Wm. Barber.	Draw slate.	Bruised leg.	Brazil B. C. Co. No. 8.	Clay.
Feb. 1.	Fred Walters.	Falling slate.	Bruises.	Briar Hill.	Clay.
Feb. 10.	Adam Ebler.		Bruises.	Cabel No. 9.	Daviess.
Mar. 31.	T. Health.	Fall of slate.		Fluhart.	Greene.
Mar. 26.	H. Johnson.	Draw slate.		Summit.	Greene.
Mar. 26.	Sam Taylor.	Fall of slate.	Bruises.	Parke No. 6.	Parke.
Mar. 26.	J. Hanthom.	Fall of slate.		Parke No. 6.	Parke.
Mar. 26.	John Yando.		Toe hurt.	Brazil B. C. Co. No. 8.	Clay.
Mar. 4.	John Tuttle.	Slate.		Diamond.	Clay.
Mar. 4.		Fall of slate.		Montgomery No. 2.	Daviess.
April 1.	James Barnes.	Falling coal.		Island No. 2.	Greene.
April 27.	Wm. Lundwell.	Mule.	Bruised face.	Phenix.	Sullivan.
April 5.	M. Albright.	Moving coal.	Bruised fingers.	Brazil B. C. Co. No. 8.	Clay.
April 12.	L. Dormely.	Railroad cars.	Bruises.	Brazil B. C. Co. No. 1.	Clay.
April 12.	Wm. Morton.	Falling slate.	Back hurt.	Eureka No. 2.	Clay.
June 12.		Falling coal.	Bruised foot.	Oswalt.	Gibson.
June 9.	M. Templeton.	Draw slate.	Bruises.	Templeton.	Greene.
June 4.	C. Robertson.	Explosion of fire-damp.	Burns.	Prospect.	Greene.
June 17.	Guss Larr.	Scales of iron.	Eye burned.	Brazil B. C. Co. No. 11	Clay.
June 8.	Adam Metz.	Fall of slate.		Brazil B. C. Co.	Clay.
July 13.	S. W. Druter.	With car.		S. W. Littles.	Pike.
Aug. 13.	John Muller.	Fall of slate.	Wrist cut.	Sunnyside.	Vanderburgh.
Aug. 24.	J. Kretringer.		Sprained foot.	Union.	Vanderburgh.
Sept. 9.	Ben. Hunt.	Mine car.	Bruised hips.	Oswalt.	Greene.
Sept. 20.	J. Goodman.	Falling coal.	Arm cut.	Bicknell.	Knox.
Sept. 27.	Geo. Fockner.	Mine car.	Ankle hurt.	Brazil B. C. Co. No. 8.	Clay.
Sept. 2.	B. McKey.	Falling slate.	Leg hurt.	Gart No. 5.	Clay.

Minor Accidents—Continued.

DATE.	NAME.	CAUSE.	INJURY.	MINE.	COUNTY.
Sept. 20.....	G. Everhart.....	Machine.....	Leg hurt.....	Brazil B. C. Co. No. 8.	Clay.
Oct. 5.....	B. Decker.....	Mine car.....	Bruises.....	Blackburn.....	Pike.
Oct. 22.....	Geo. Rife.....	Cars off track.....	Foot hurt.....	Hazel Creek.....	Vermillion.
Oct. 1.....	G. Woodburn.....	Mine car.....	Toe mashed.....	Briar Hill.....	Clay.
Oct. 4.....	J. B. Jones.....	Slate in room.....	Head hurt.....	Crawford No. 2.....	Clay.
Oct. 6.....	Ira Hadly.....	Falling coal.....	Arm hurt.....	Crawford No. 2.....	Clay.
Oct. 8.....	Fred Enour.....	Falling coal.....	Leg hurt.....	Crawford No. 2.....	Clay.
Oct. 25.....	Richard Wake.....	Explosion of powder.....	Cut on side.....	Diamond No. 3.....	Clay.
Oct. 24.....	Geo. Church.....	Falling coal.....	Foot hurt.....	Crawford No. 3.....	Clay.
Oct. 14.....	Jos. Auman.....	Mine car.....	Leg hurt.....	Crawford No. 3.....	Clay.
Oct. 3.....	Mike Conner.....	Blast shot.....	Burns.....	Diamond.....	Clay.
Oct. 23.....	James Patrick.....	Falling coal.....	Foot hurt.....	Brazil B. C. Co.....	Clay.
Oct. 20.....	Chas. Scott.....	Fall of coal.....	Back and ribs.....	Brazil B. C. Co.....	Clay.
Nov. 11.....	Thos. Scully.....	Mine car.....	Bruised leg.....	Star No. 3.....	Sullivan.
Nov. 27.....	J. Cuthbertson.....	Falling down shaft.....	Eye and bruises.....	Diamond No. 3.....	Clay.
Nov. 24.....	Chas. West.....	Falling roof.....	Cut over eye.....	Briar Hill.....	Clay.
Nov. 11.....	Ted. Jones.....	Falling coal.....	Leg hurt.....	World's Fair.....	Clay.
Oct. 15.....	Chas. Wilson.....	Slate.....	Leg hurt.....	South Linton.....	Greene.
Dec. —.....	C. R. Carleton.....	Draw slate.....	Sprained foot.....	Cable No. 9.....	Daviess.
Dec. —.....	J. Carpenter.....	Kicked by mule.....		Brazil B. C. Co. No. 1.....	Clay.
Dec. —.....	H. Nickles.....	Fall of draw slate.....	Bruised body.....	Brazil B. C. Co. No. 11.....	Clay.
Dec. —.....	A. Campbell.....	Falling slate.....	Foot mashed.....	Brazil B. C. Co. No. 11.....	Clay.
Dec. —.....	J. Schaniske.....	Fall of slate.....	Rib broken.....	Crawford No. 2.....	Clay.
Dec. 1.....	O. Decamp.....	Fall of coal.....	Shoulder hurt.....	Templeton Mine.....	Greene.
Dec. 3.....	T. Templeton.....	Empty cage.....	Bruised back.....	Gart No. 3.....	Clay.
Dec. 9.....	Christ Brown.....	Railroad car.....	Arm hurt.....	Otter Creek, No. 1.....	Parke.
Dec. 9.....	Erwin Young.....	Mine car.....	Foot mashed.....	Cox No. 3.....	Parke.
Dec. 13.....	M. Shoemaker.....	Car on track.....	Both legs hurt.....	Cox No. 3.....	Parke.
Dec. 13.....	S. Polavinski.....	Mine car.....	Five ribs broken.....	Brazil B. C. Co. No. 8.....	Clay.
Dec. 15.....	Geo. Dixon.....	Falling slate.....	Bruised back.....	Dugger.....	Sullivan.
Dec. 18.....	Wm. Burnet.....	Draw slate.....	Arm hurt.....	Eureka No. 2.....	Clay.
Dec. 28.....	John Sims.....	Hurt by mule.....	Foot hurt.....	Louise.....	Clay.
Dec. —.....	Wm. Marchel.....	Fall of coal.....	Leg broken.....	World's Fair.....	Clay.
Nov. 30.....	David Palid.....	Falling slate.....	Leg broken.....		

COMMENTS ON ACCIDENTS.

As required by law, either myself or my assistant, in conjunction with the Coroner of the county where each death in the mines occurred during the year, made a full investigation as to the cause of each accident resulting in death. I herewith give a brief resume of our findings in each case of fatal accident reported to this office during the year and reported in the above table:

John Sills died January 2d, from injuries received from falling roof in the Grant Mine, in Vigo County. His attention had been called to the dangerous condition of the roof by the mine boss shortly before the accident occurred, but he delayed taking the necessary steps to make it safe until he had finished the work he was engaged in at the time, and before he got ready to attend to it the slate fell, with the result above noted. A large proportion of all the accidents which occur in the mines of this State are caused by delaying to take the precautions which are known to be necessary to render working places reasonably safe, always with the intention of attending to it as soon as some other work of more seeming importance is finished. If workmen and their employers would learn that in all mining operations the unavoidable accidents are quite too frequent, and that safety should be cared for first, we should be called on to chronicle fewer that might have been prevented. In this particular case it seemed, from the evidence, that the deceased was entirely at fault himself, but this is not always the fact by any means.

B. F. Watson was caught under a falling stone on the main traveling way of the Star Mine, in Sullivan County, while on his way to work. From all the evidence obtainable, the roof at the point where the accident happened had been in apparently good condition the evening before, when it was last examined, and other workmen who had preceded Mr. Watson to work that morning had noticed no indications of danger at that point. An examination of the place after the accident by Mr. Epperson, Assistant Inspector of Mines, failed to show any of the usual indications that danger might have been apprehended. It was clearly a case of accident which ordinary foresight could not have prevented.

J. Bristow was fatally injured by the premature explosion of a blast which he had prepared and was in the act of lighting at the Union Mine, in Vanderburgh County. From the testimony of an eye-witness it was learned that he had placed a squib in the needle-hole and was holding the lamp to the match of the squib, but had not yet given

warning of his intention to fire, when the shot exploded. The only reasonable theory to account for the accident is that the squib was defective and that powder had found its way into the match of the squib and become ignited shortly after the match had begun to burn.

Wm. Delgeman was injured at the Diamond Mine, also in Vanderburgh County, in a manner almost identical with the above, as far as could be learned from the testimony available at the inquest. There was no eye-witness in this case, but the decedent had prepared his shot some time before the time for firing, and been engaged in conversation with several of his fellow-workmen when firing time arrived. He left them and went to his working place, and had been there but a few seconds when the explosion occurred. From the position of the body, and his tools, it appeared that he had been in the act of firing his squib when the shot exploded. The squibs used in both of the above instances were what are known as the American brand of patent squibs, and examination of a number of others from the box used by Mr. Delgeman showed several so defective as to have caused the accident, if they had been used in the regular way.

David Williams was working on pillars in the Eureka No. 2 Mine, in Clay County, when the roof gave way and fell on him, inflicting fatal injuries. On investigation it appeared that the particular piece of slate that fell had been loosened by removing coal in the course of his work, and that it would have been impossible for any person to have foreseen the likelihood of an accident in time to have secured the place and prevented the accident.

William Crawley received fatal injuries in the Nickel Plate Mine, in Clay County, under circumstances very similar to the above. A miner who was working near him at the time of the accident testified that before Mr. Crawley began to remove the piece of coal that loosened the slate that fell on him, the place where he was working seemed to be perfectly safe, and that when it was loosened by the removal of the coal it fell without warning. The place where this accident occurred was one in which extraordinary precautionary measures were necessary, as it was at a point where a room had been turned, and top had been taken down on two sides of the block of coal he was mining, and it fell in triangular shape, breaking across from one "loose end" to the other.

Brady Dunville was injured by falling slate in his working place at the Oswalt Mine, in Gibson County. To an experienced miner the indications of danger were sufficient to have given warning of the danger to which he was exposed in ample time to have made the place safe. From the testimony taken in the case it seems that the deceased

had been employed in mines but a short time, and that this fact was known to the company. The only blame that could be attached to any party or person is in allowing an inexperienced man to work in a dangerous place without keeping a careful watch over him. There is too much of this neglect in some parts of the State, and it should be discontinued, either by refusing employment to such as have not sufficient experience in mines to be able to care for themselves, or by allowing them to work only in company with an experienced miner, who should be responsible for the safety of such persons.

David Clark and John Anderson were suffocated by powder smoke in the Phenix No. 2 Mine, in Sullivan County. They and two other men were working a pair of parallel entries and also turning the rooms off them. On the afternoon of the accident their partners had gone home early, leaving the deceased to fire all shots that were to be discharged in both entries. On one of the entries a room was being turned inside of the last break-through. Two shots had been fired in this entry and two others were prepared in the room neck. On returning to fire these shots the men seemed to have lost their way and were overcome by the fumes of the powder already burnt, and were not discovered until about nine o'clock in the evening, when a searching party was organized to learn what had become of them. From the position of the bodies it is surmised that they had both gone into the room to fire the shots, instead of one waiting at the break-through while the other went in. Both had had considerable experience in mines and should have known the risks they were running in going into such a place.

George Hickson was engaged as motorman on an electric locomotive in the Otter Creek Coal Company's Mine at Mecca, in Parke County. While running into the mine with the train of empty cars one of them had, in some way, become uncoupled and remained on the road. When returning with his loaded cars he was riding on the front end of the motor and ran into the empty car on a curve at the bottom of a heavy grade. From the position in which he was found it appears that, after striking the empty car, he had reversed his motor and started to run into the mine again, when the empty car struck him again, crushing him severely and throwing the motor from the track. When discovered he was fastened between the motor and the side of the entry, his leg being caught in that position. The deceased had assisted in installing the electric plant at this mine, and had been in charge of the motor since it had been in use. The accident was caused by his failure to notice the number of cars he had when starting into the face of the mine from the bottom and the number that he had on

arriving at the siding where he exchanged his empties for loads. This would have taken some time, but the result shows that it would have been time well spent.

Isaac N. Williams was the mine boss in charge of the Parke County Coal Company's No. 10 Mine, in Vigo County. The mine had been idle for some time and water had accumulated in it. Pumps were placed on the cages and lowered as the water was taken out. On the day of the accident which caused his death the pumps had not been working well and he had been assisting the engineer to keep them running. He had returned to the mine after supper and remained till nearly midnight, when he told the engineer that he was going home. The engineer went into the boiler room and supposed that Mr. Williams had carried out his intention, but, in fact, in attempting to walk past the shaft he had fallen into it, and was found the next morning lying upon one of the pumps with bruises sufficient upon his body to indicate that he had been killed by the fall, but he was also badly burned by the escape steam from the pump. He had evidently been worn out by the work and worry of the day and had not been in a condition to see where he was going.

Dominic Benzo and Anton Miccillitti were both killed by the same fall of slate in a room in which they were working together at the No. 11 Mine of the Brazil Block Coal Company, near the town of Diamond. The accident occurred in the afternoon as the men were in the act of completing their day's work. One of the men was tamping a hole preparatory to firing and the other was gathering their tools to carry them back out of the way of flying coal. From the evidence of the driver, who had been in the place a few minutes before the accident occurred, the room was well timbered and there were no indications of danger. The fall which caught the men extended entirely across the room back to the row of props nearest the face, and was about three feet in thickness. The position of the bodies indicated that they had made no attempt to escape, and the probabilities are that the fall came without warning. In all my experience in coal mines I never before saw such a fall, and I am of the opinion that before the accident it would have been impossible to foresee the fall of the roof, as it occurred, for any considerable time before it occurred.

Arthur West was killed instantly by a fall of roof in the Briar Hill Mine, near Clay City, in Clay County. While he and his brother were engaged in loading a car of coal a circular or conical piece of slate, known as a "pot," fell from directly over the car, catching the head of the deceased, on a lump of coal which had been placed on the corner of the car crushing his skull. He made no sound after being hit. No

indications of the existence of a pot were visible before the accident, and on being tested the roof appeared to be solid. As this lay directly over the roadway, no props were placed under any part of it. Stones of this character are of frequent occurrence in shale roofs overlying coal seams. They are very dangerous, from the fact that they are separated from the regular strata forming the roof by a thin layer of other material, forming a "slip" on all sides of the pot-shaped stone, which fits so closely that it gives no warning of danger until it suddenly falls without any of the sounds that usually accompany falling roof. Usually, by close examination, the outline of the slip can be detected in the roof material, but in this instance a layer of "draw slate" lay between the coal and the shale forming the roof, and the pot did not show through this. This accident, therefore, must be classed as one caused by the ordinary risks of the miners' occupation.

George Saur lived near Dugger, about four miles from Summit. He and his son worked together and traveled back and forth with a horse and buggy. At about fifteen minutes before firing time he sent his son out to have the team ready to start home when he came out, as he was going to stay and fire two shots, one near the left rib and the other near the middle of the room pointing toward the right rib.

The son waited until after 5 o'clock and, as his father did not come out, he got uneasy, and, with three other miners, went back into the mine to look for him. They found him dead, lying near the right rib of the room, almost covered with large pieces of coal. Both shots had been fired, and the supposition was that the middle shot had caught him, but we had no means of learning how the accident occurred. It is possible that he had fired the shot on the left rib and had gone back and fired the other and got lost in the smoke when starting to run from the second one. It is also possible that he fired both shots at once, as is frequently done, and the middle shot holding fire from a defective squib, or some other reason, he had gone back to it. From the position he was found in, I think the latter was the cause of his death.

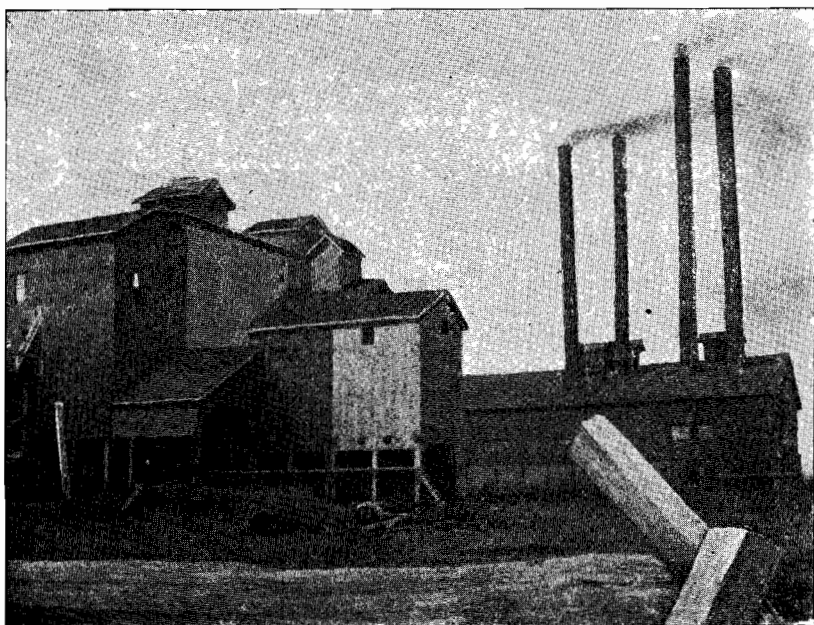
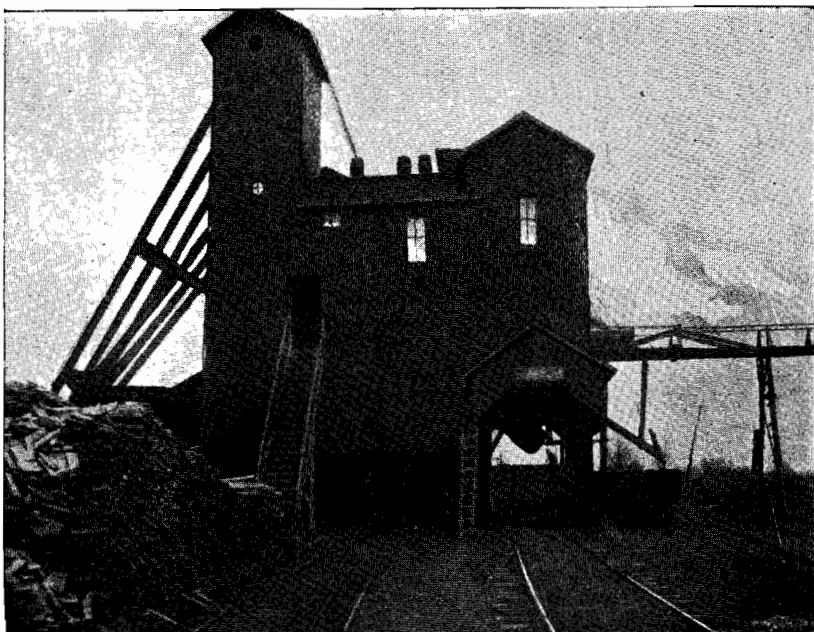
W. M. Hunter, aged 16 years, was working with his father on the morning of October 8th, 1897. At about 9 o'clock he was loading a car, when a large piece of slate fell, catching him with his breast across the car, crushing him terribly and killing him instantly. The timber on the side where the slate fell was back about 11 or 12 feet, while on the other side it was back only about 6 feet. Chas. Hunter, father of the deceased, claims to have examined the slate that morning and thought it safe, but, in my opinion, the condition of the top

was such that it should have been timbered within 6 or 8 feet of the face, as the draw slate is very bad in this part of the mine. There were plenty of timbers on hand in the room.

COAL WASHING MACHINERY IN INDIANA.

All coals have more or less impurities in the vein. These consist principally of slate, sulphur and bone coal, each of which is heavier than the pure coal. In the larger sizes these are easily seen and separated by hand, either in the mine or when the coal reaches the surface, before being shipped to the market; but in the smaller sizes of coal, the impurities being also broken up, are too small to be seen or removed in this manner advantageously. The consequence has been that a great amount of fine coal was useless, fit only for the waste pile, and some of the nut and pea coal produced has lost a great deal of its value on account of the presence of these impurities. This has led inventors to work in the direction of machinery which will remove the impurities from small coal at a reasonable expense. The most successful have taken advantage of the difference in weight, referred to, and separate the materials by the use of water. This has been accomplished in various ways with more or less success. Of the different styles of washers in use are the jig washer, the percussive table, the trough washer, and those in which an upward current of water accomplishes the separation. Washers were originally introduced to clean the coal used in making coke. The superiority of the washed over the unwashed coal for other purposes has led to their introduction at many places to clean coal for the general market. Though very little coke is produced in this State (only the plant at Ayrshire having operated during the year, and that only partially), coal is washed for the market at Alum Cave and Coxville. Extensive improvements were made at the Coxville plant during the year, making it very complete, and, as a short description of the plant and its results may prove interesting to mining men, I give it herewith. The plant is so enclosed that a good photograph of the machinery is not obtainable:

The illustration on the opposite page shows the 400-ton Robinson coal-washing plant, in connection with the coal tippie and screening plant of the Brazil Block Coal Company, at Coxville, Ind., and is the most successful washing plant in this section of the country. The object in washing their nut and pea coal is to eliminate the coal from all impurities, thus creating a greater demand for their coal for commercial purposes. After placing their washed product on the market they



VIEWS OF PLANT OF COX NO. 3 MINE, COXVILLE, INDIANA.

have not only been able to find ready sale for their entire output, but have also been able to increase their price per ton on the washed coal. The installation of this washing plant has been a paying investment and should commend itself to the coal operators of the West.

The method of operating this washing plant in connection with the coal tippie is as follows:

The coal is first dumped over the lump screen; the coal passing into the lump car on railroad track, the screenings passing into the boot of the elevator. This product is then elevated and discharged into a large revolving screen of about $1\frac{1}{2}$ -inch mesh, which is placed over a coal storage pocket. The tailings from this revolving screen is classed as egg or prime nut coal and is picked free from slate as it passes down the chute into the bin. The nut, pea and slack coal that passes through the meshes of this revolving screen is stored into a bin below; from the bottom of this bin a chute is arranged to conduct this product to the Jeffrey-Robinson washer. The coal is then discharged into the center of the washer, on the inside of a deflecting ring, with the current of water to the overflow or discharge spout of the cone tank. The slate, sulphur, sand and other material of greater specific gravity than the coal passes downward into the settling or slate chamber at the bottom of the cone tank. The washer is partially supplied with a fresh current of water pumped from the mine and discharged into a tank below the washer; from this tank the water is pumped by means of two large pulsometer pumps into the lower part of the washer, just above the slate chamber. The accumulation of the slate or refuse is removed from the lower slate chamber by means of valves at stated intervals, which depends entirely upon the per cent. of refuse in the coal. The refuse is deposited into a small mine car and carried to some convenient point and dumped. The good coal is discharged with the water into a revolving screen at the mouth of the washer. This screen is covered with wire cloth of about one-inch mesh. The coal in passing through the screen is thoroughly cleaned and presents a very fine appearance. The tailings or nut coal from this screen is elevated by means of chained buckets into a nut bin; from this bin it is discharged into railroad cars. The pea and slack coal which passes through the revolving screen passes over a fine perforated metal screen set at an angle of about 30 degrees. The material that passes over this screen is classed as pea coal, which is also elevated and discharged into a settling tank; from this tank an overflow pipe is connected to conduct the water back to the water tank below the washer, which is again pumped back into the washer, with the additional supply of

fresh water from the mine. They gather enough fine coal from the settling tank to run their entire battery of boilers, and with this product they are never troubled with clinkers forming over the grate bars.

This plant has been in successful operation for several years. The construction and arrangement of machinery is very simple and effective, and is especially adapted to the washing of coal for commercial purposes. The Jeffrey Manufacturing Company, of Columbus, Ohio, has full control of the manufacture and patents of this Robinson coal-washing system, together with the screening, elevating and conveying machinery, and will promptly answer all inquiries relative to the installation of these plants, for the washing of coal for either commercial or coking purposes.