

WILL
FOR

THE ANNUAL REPORT.

—OF THE—

INSPECTOR OF MINES

—OF THE—

STATE OF KENTUCKY.

FOR THE YEAR 1898.

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

FOR GENERAL DISTRIBUTION.

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LETTER OF TRANSMITTAL.

To His Excellency, WILLIAM O. BRADLEY,

Governor of the Commonwealth of Kentucky:

Sir: I have the honor to submit herewith my second annual report as Inspector of Mines, covering the calendar year 1898, being the fifteenth report of this office.

I do this in confidence that the record made will receive your hearty approval, and satisfy every demand of an enlightened and interested constituency.

I desire to again bear witness to the diligence and efficiency of Mr. C. W. Logan, Assistant Inspector, whose effective work among the mines has done much toward bringing about and maintaining the good mine conditions, so general throughout the State.

I sincerely thank you for your continued confidence and support, and beg to tender you my assurances of highest regard, and to express the wish that you shall always be appropriately honored by a united and happy people, whom you have so ably and faithfully served.

I am, very truly,

Your obedient servant,

G. W. STONE,

Inspector of Mines.

REMOVAL TO LEXINGTON.

The act of the Legislature, creating the first mining law for the State of Kentucky, went into effect on May 10, 1884. Under its provisions, the Inspector of Mines was required to keep an office in the State House at Frankfort, the Capitol city, where the work of the office was constantly projected and carried on, until April 20, 1898. The act authorizing the removal of the office, together with the property and effects of the Geological Survey, to the buildings of the State College at Lexington, became a law, without the signature of the Governor, on March 26, 1898. The work of removal was immediately commenced, and was conducted with but little interruption, until the 21st of July, when it was practically completed.

The third floor of the Natural Science Building was set apart for the museum, and more than six hundred dollars were expended by the college authorities, in fitting up the room for a proper display of the collection, and for the storage of the published surveys of the State. The further sum of three hundred dollars was also expended by the College, in providing suitable offices for the Inspector and his Assistant.

The room of the museum, where now located, is well adapted to the purpose. It has more than double the floor space of the old room at Frankfort, and has good light and ventilation, all of which were badly needed there. Steam heat and electric lights have also been provided.

The removal was conducted under the personal supervision of the present incumbent, and proved to be tedious and slow. In addition to the use of quite a number of boxes that were on hand, and others that were purchased for the purpose, more than 10,000 feet of lumber were used in crating the cases and furniture, and in boxing the collection and the publications of the Survey. The cases had

to be taken apart and carefully crated before shipment, and then rebuilt after reaching the new building. The many thousands of mineral and mechanical specimens and other collected material of the Survey, had to be separately wrapped and packed in boxes in order to insure their safe transference, and preserve their identity, and hundreds of them had to be specially labeled before being boxed. In replacing all these on exhibition, every specimen had to be unwrapped, examined and cleaned before being placed in its proper order in the new apartment.

The removal of so many heavy cases and boxes from the second and third floors, and from the basement room of the State House, required the services of from four to eight men, and was very heavy and necessarily slow. The item of expense paid for hauling includes all the work of removing the entire collection, cases and furniture from the several rooms of the State House to the street, and of hauling and loading them in the car for shipment, and their delivery at Lexington from the cars to the first floor of the new building. Nearly all the work of conveying this vast freight to the third floor was done at the instance and expense of the College authorities.

The weight of the entire collection and publications when crated and ready for shipment was 136,044 pounds.

The entire cost of transference, as paid by Auditor of Public Accounts, on warrants drawn by myself, was \$906.49, and is divided as follows:

Cost of lumber and boxes	\$135 00
" " hauling	168 00
" " railroad freight	127 72
" " excelsior for packing	14 35
" " nails	19 20
" " carpenter's work	192 75
" " labor in boxing, and unboxing and replacing the exhibit, etc., in the new museum, and for various services connected therewith ..	235 77
" " various items of incidental expenses	13 20
Total	\$906 49

I have no doubt as to the wisdom of the removal, and predict great benefits to the State at large, and to the work of this office as results of the same. The old room at Frankfort was far too small, and badly needed light and ventilation. Much of the collection could not be put on exhibition at all for the want of room. Its walls of bare brick and mortar, and its ceiling of naked joists and roof, had been for years an almost unbearable eye-sore and mortification to citizens and visitors. The property does not belong to any particular city or locality, but to the State at large, and ought to be located where it will do the greatest good. In the new apartments, the collection has become a delightful exhibit to the public, and a most interesting and valuable study and means of education to the hundreds of young men and women who annually flock to the State College. In this way its benefits will be gathered and diffused generally throughout the entire State, and its agency for the public good will be enhanced more and more as the years shall come and go.

In addition to the special outlays and other assistance already mentioned on the part of the College officials, they have in various ways gratuitously rendered material aid in the transference and replacing of the collection and publications, thus showing their hearty and beneficial co-operation, and great appreciation for this valuable loan to the high institution of learning over which they preside.

Personally I desire to express to them my sincere gratitude for their many favors and courtesies shown to this office and its incumbents since the removal, in all which I am most heartily joined by Mr. C. W. Logan, Assistant Inspector.

AMENDMENTS.

Relative to necessary amendments to the State mining law, I do not care to make recommendations, further than to emphasize the need of those mentioned in my former report, especially such as refer to the oil used in the mines, and the time for the completion of the annual report of this office. In some instances the whole mine has been found to be very smoky and unfit to work in, from the burning of a low grade of oil. Its use is positively discomforting and injurious to health, and should be forbidden. The men who must pay for the oil and endure the effect of its burning should be protected in their demands for the best grades. Such a law would work no loss to the operators, and would be of great benefit to the employees.

I refer to the further suggestions of my last report, as to beneficial amendments, and add that operators should be required to give this office immediate notice of all fatal accidents occurring in or about the mines, so that investigation can be speedily made if deemed advisable. In one case during last year, notice of the death did not reach the office until forty days after it happened. This ought not to be, and operators are urged to avoid delay in such cases.

GEOLOGICAL DEPARTMENT.

The correspondence of this department during the year was quite large, both from within and without the State, and the variety of its character indicates a very general desire for more particular information, as to the nature and extent of the State's mineral resources.

Numerous specimens were sent to this office for identification, or analysis, nearly all of which were worthless, or of but little consequence. The most valuable of the specimens were kaolin, gypsum, a fertilizing marl, asphalt rock, and lubricating oil. The kaolin is of the finest quality, but the quantity is not yet determined. The two last named have been analyzed by Dr. Alfred M. Peter, chemist of the Kentucky Experiment Station, and the results are highly satisfactory. One of them is given in connection with the article contributed by Mr. James Gray, on the "Blaine Oil Fields."

The other was made from a sample rock taken from extensive asphalt beds of Carter county.

There is general activity in the exploration of many sections of the State, especially along the eastern and southeastern borders, and large investments are being made, looking to the better development of the oil and gas fields. I am persuaded that if transportation shall be provided for these sections, their resources of oil, gas, coal, and iron ores, will soon be found to surpass in extent and value the calculations of the most enthusiastic and credulous.

The work of the Geological Survey did not cover all this territory, and its revival on these and some other important lines would certainly be of immense value.

Requests for publications of the survey were frequent, and came from several States of the Union. Many of them were from State universities and public libraries. These have been furnished when

available. The supply of some of the most important, such as F., or "Jackson's Purchase Region," and C., part 2, or "Southeastern Kentucky Coal Field," and many smaller ones, are practically exhausted. A limited number of each are held for sale, by The Robert Clarke Co., of Cincinnati, Ohio. Provision ought to be made for their republication.

The supply of State maps is also nearly exhausted, as only a few of the smaller ones remain. There should be a reprint of a large number of the latest edition. The demand for them continues without abatement.

Some years ago, large numbers of the publications of the Survey were deposited with The Robert Clarke Co., for sale at stated prices, on an agreed commission of 33 1-3 per cent. on all sales made. On the 14th of August, 1897, a letter was written by the company to Mr. C. J. Norwood, my predecessor in office, claiming that a settlement of sales made on July 1, 1896, contained mistakes, so as to leave an indebtedness to the company of \$47.15. Mr. Norwood forwarded the letter to me, and having been in office but a short time, and not understanding the communication, nor the facts that led to it, I wrote to the company for an explanation, and received an answer and statement of their account, bearing date of August 18th, which is as follows:

"Dear Sir, Your favor of 17th inst. is received. We have had this stock of the publications of the Kentucky Geological Survey ever since Mr. Procter's time, he requesting us to act as the authorized agent of the State for the sale of the publications.

"In reporting last year, we counted as on hand 32 No. C., Eastern Coal Field. This we now find should have been 82 copies, as in making up the stock this year, we found a package of 50 copies which had been overlooked. Seeing such a mistake I (R. C.), went carefully over the stock and found a few other discrepancies resulting from careless counting. This statement sent you represents the stock really on hand, on 1st of July.

"By comparing it with the statement of stock reported July 1, 1896, you will see that we have \$47.14 more stock now than we had

then, thus having overpaid you that amount. It will be just as well to let it stand to be paid out of future sales."

Having no reason to doubt the correctness of the account as rendered, I accepted it as true, and have since been working from that basis. The account and letters are on file in this office.

On September 1, 1898, a settlement was made with the company for sales made to that date, from July 1, 1897, a detailed account of all which was rendered and has been placed on file, amounting to \$72.00, which, after deducting the commission due the company, left a balance of \$48.00 due the State. This amount was set off against the \$47.14 above named, leaving a final balance of 86 cents. This sum was paid to me, and I have paid the same to the Auditor of Public Accounts.

There is no insurance on the publications, and their burning would be a complete loss.

The value remaining in the hands of said company September 1, 1898, was \$5,142.40; but after deducting one-third of the amount, as the prospective, and unearned commissions, the net value of the deposit was only \$3,428.27.

During 1898 I sold one volume of Nettelroth on Kentucky Fossil Shells, for \$5.00, and one-half dozen small State maps for \$1.50, and paid the money to the Auditor of Public Accounts.

NOTICE TO MINE OPERATORS.

Your attention is again directed to the notice addressed to you on page 7 of the 1897 report.

You are urged to promptness in making your monthly reports. Delays are vexatious, and greatly hinder my work. This is especially important at the close of the year, when needed to complete my annual report.

The general question blank sent out about December 1st should also receive careful and prompt attention. Its work is an important factor in making up full reports of all mine incidents, improvements, etc.

You are also urged to report your output in tons (2,000 pounds). Many do this now, and I hope that all will do so. Since your accounts are kept in tons, it is a useless waste of time to reduce them to bushels, only to be again reduced to tons after reaching this office.

The blanks sent out for the monthly reports call for bushels only. This was a mistake in their make-up. They are used only as a matter of economy, or to avoid the waste of throwing them away. Let this notice be an amendment, in this particular, to every blank thus sent. A compliance with this request would greatly facilitate the work at both ends of the line, but while the present blanks are used, when tons are reported, that fact should be specially stated in each report.

You are also urged to report all important mine incidents, such as suspensions, or material damages to mines or equipments from any cause, and to give full particulars in every instance.

You are also urged to make immediate report and give full details of all fatal accidents among your employees.

You are urged to make and file in this office, by March 11th of each year, correct maps of your mines, as required by the mining law. In case of failure, you are liable to a fine of \$5.00 per day thereafter, until such maps are made and filed.

Respectfully,

G. W. STONE,

Inspector of Mines.

GENERAL MINE CONDITIONS.

Notwithstanding the increase of the labors of this department (moving geological museum, etc.), during the past year, the work, both in field and office, has been kept fully up to the demand.

The mining companies in general were very prompt in carrying out instructions in regard to remedying defective under-ground conditions, so as to comply with the mining law. The exceptions were few, and, as a result, only one application was made to the courts during the year to compel obedience on the part of operators.

It may be said, however, that the frequent inspections now made have been of material importance in expediting action on the part of the operators, but it may safely be said also, that the disposition of the operators toward voluntarily bettering the mine conditions, as a whole, has been quite manifest.

The results derived from the efforts of this office are very satisfactory, in regard to placing the mines in good condition as prescribed by the mining law, especially pertaining to the ways of egress and ingress, and safety in general, as they are set forth in detail in other sections of this report.

With a few exceptions, the work at the mines was good throughout a large portion of the year, many of them working from twenty to twenty-six days per month during that period. The workings were maintained in a remarkably good average condition, and it may not be deemed out of place to attribute these results largely to the operations of this department.

That some difficulties were encountered in the effort to have satisfactory conditions maintained will, it is thought, be generally admitted. Relating to the few mines that were idle for any length

of time, their conditions are not so good; for when a mine stands idle for any notable length of time, its condition deteriorates to a very great extent, as the lack of the usual daily attention permits accumulations of water, often affecting the pillars, softens the bottom, makes posting very insecure, and the weight causing the top to start, which, not receiving immediate attention, makes trouble with the roof, and other troubles of various sorts, as air courses get filled to a great extent with debris, doors and stoppings get out of order, and other little impediments occur, so that it takes some time to overcome all these after actual operations have begun.

From the beginning of the year until early June the condition of most of the mines was excellent, but, when the slack season came, depression in business caused the reducing of expenses wherever possible, and in many cases this was done to the detriment of the mine conditions.

There were delays in making break-throughs and in keeping ditches clear, failures to keep up brattices and curtains, and a tendency to neglect the very important matter of propping and timbering. As a consequence, there was more than ordinary difficulty in having the mining law duly complied with in regard to proper ventilation, drainage, etc., notwithstanding the fact that on account of atmospheric conditions good ventilation could not be as easily obtained as at other seasons of the year.

In the course of inspection some of the mines were found to be in a very defective condition, and instructions were given to remedy the defects.

In order to show the work of the office more fully, I now mention a few of the more important supervisions.

On April 27th the Rankin mine, operated by the Green River Coal and Mining Co., was inspected, and found to be in practically the same condition as it was at the time of my first inspection, which was late in 1897. The air way to the fan shaft, which was also intended as the second outlet to the mine, was completely closed on account of a squeeze, and no air current was traversing the bank, for the sixty persons employed therein. As the fan shaft could not

be reached, the mine was left with only one opening (the hoisting shaft), and had no ventilation whatever, except such as was produced by the moving of the cars. Instructions had been given to remedy these bad defects, but they had not been carried out.

A second report was made, pointing out these conditions, and twenty days were allowed the company to remedy them, else the matter would be taken to the courts, for its failure to carry out the instructions.

The company at once set about the work, but not being able to complete it, in the time allowed, asked for ten days further time, which was granted, and the work was finished.

On my next inspection, which was in August, I was gratified to find that the air course to the fan shaft had been cleaned out, thus making the second outlet available, and the fan had been put to work, which produced an abundant air current throughout the mine, thoroughly conducted through the workings, making the ventilation excellent.

On my first tour of inspection in the Southeastern district, in the latter part of 1897, I inspected "Mary Hull" mine, of Log Mountain Coal, Coke and Timber Co., which is a slope. Work was confined to the seventeenth and eighteenth right cross entries, and I discovered that this mine had only one outlet, or way of ingress or egress, for the fifty-five persons inside; notwithstanding the fact that the main entry stump had been reduced to an inadequacy, and weight had come on the entry, causing a squeeze from nine to thirteen right entries, which, however, was well timbered and seemed to have settled to a great extent. Instructions were given the company immediately to make a second outlet, or man way. An acknowledgment of the receipt of the report was made by Mr. T. Cairns, which stated that the proper outlet would be made at once, as their engineer was then making the necessary survey preparatory to starting the work.

In January, a communication was received at this office, which was taken to mean that the second outlet had been made, and this department was resting under that assurance, until another inspec-

tion showed there had been an incorrect understanding, and that same had not been made, but assurances were given that unavoidable hindrances had occurred that delayed this matter, and it would be attended to without further delay, and instructions fully complied with. On October 22d, a special trip was made to this mine, the pillars and stumps were being drawn, and instructions in regard to the second outlet had not been complied with.

The attention of Commonwealth's Attorney for the Twenty-sixth judicial district was called to their continued violations of the law, and he was requested to bring action against the company in case the orders contained in the inspection report should not be complied with in forty days.

Later it was ascertained that the second outlet had been made and instructions followed in compliance with the law, and the action was ordered annulled.

Hillside mine, of Hillside Coal Co., had but one opening (it being a shaft, and ventilated by a furnace); the company was notified of the strict necessity of making another man way, or inlet. This mine was again inspected on June 15th and found to be in the same condition as on the former inspection, and the company was notified that at the expiration of twenty days (extended until July 17th), action would be brought against them, unless another suitable way of egress and ingress was provided. The office was advised by the company that the required second outlet was completed within the time specified, and on inspecting the mine in September, I found instructions were fully complied with in every respect; the mine being well ventilated and in good condition generally.

Henderson mine, of Henderson Mining and Manufacturing Co., a shaft 180 feet deep, had only the one way of ingress and egress. The company was notified that they must reduce their underground employees to not more than ten persons, or make another man way. Either would be in compliance with the mining law, so the company chose the latter. The air shaft had been intended for an escapement or second outlet, but no way had been provided for ascending or

descending it, so it was necessary to have a secure ladder placed up same, which was done, thereby making a safe, secure second outlet.

Sebree mine, of Sebree Coal Co., was found to have no second outlet at the time of inspection in April. It was ascertained that more than 15,000 square yards had been excavated, and the company was instructed that more than ten persons must not be employed at one time inside, until the other way of egress and ingress was made. It is a shaft 175 feet deep.

Upon receipt of the report of inspection, it was decided by the company to suspend operations at the mine until the requirements of the law were complied with, which took about ninety days.

A later inspection showed the second outlet to be complete; a new shaft having been sunk about two hundred yards distant from the hoisting shaft, with ladders placed diagonally up and down same from one platform to another, which were situated about fifteen feet apart, thereby making a very excellent way of going up and down the shaft. A fan was set at this shaft and produced better results in regard to ventilation than were ever heretofore found in this mine.

Water mains, or pipes, were placed in Monarch, No. 9, mine, of Anderson & Holloman, lessees, along the entries, and hose were attached and so arranged as to enable the mine and all working places to be thoroughly sprinkled. Instructions were given that the haulways on entries be dampened (roof, ribs and bottom), daily, so as to keep down any accumulation of dust that might arise.

With this complete water arrangement, and some precaution in the mine ventilation, all danger from dust explosions would be obviated, and I am proud to note, that in my opinion this very important matter is specially attended to, at least on my recent inspections no criticism could be made in regard to the mode of sprinkling or keeping the dust down.

With many other small and noteworthy defects discovered and remedied, that are mentioned in other appropriate sections of this report, I am gratified to be able to note that the mine conditions in general are more satisfactory than they were at the close of the year

1897, and it is to be hoped that the close of the year 1899 will find the mines running with a continuation of good underground conditions.

C. W. LOGAN.

Assistant Inspector.

EXHAUSTED AND ABANDONED MINES.

The following mines were on the 1897 list, but have since been exhausted or abandoned, and their names will no longer appear on the list of mines:

The New Crystal Creek mine, at Beattyville, Lee county, operated by Robert Birch, has been worked out and abandoned. Its product during 1898 was 4,291 tons.

The Old South Diamond mine, at Mortons Gap, Hopkins county, operated by the St. Bernard Coal Co., has also been exhausted. Its output during 1897 was about 17,000 tons, but there has been no output since that year.

The Victoria mine, Hancock county, recently operated by the Breckinridge Cannel Coal Co., after an eventful existence of fifty years or more, was permanently shut down and abandoned, as exhausted, on November 17, 1898. Its output for the year was 2,480 tons.

The Enterprise mine, at Greenwood, Pulaski county, operated by J. H. Chew, has also been practically exhausted. Its entire output for the year was 2,112 tons.

The old mines, Nos. 1 and 2, of the Beattyville Coal Co., at Beattyville, Lee county, have been abandoned, and all the work has been united in the New or No. 3 mine, and the latter has been idle for several months.

The old mines, Nos. 2 and 3, of the Star Furnace Coal Co., of Carter county, have also been exhausted, and a new mine has been opened near the same place.

The old mine of the Eagle Coal Co., at Barren Fork, Pulaski county, was abandoned during the early part of 1898, and a new mine has been opened near the same place.

IDLE MINES.

Several of the commercial mines of the State were idle much, or all of 1898, and have not since been operated. Most of them contributed to the output of the year.

The Stinson cannel mine, at Music, Carter county, has been idle continuously since in the early part of 1897.

The Mt. Savage mine, also in Carter county, has not been running since some time in July, 1898. These two mines were the property of the Lexington and Carter County Mining Co., but for some years have been operated by the Columbia Finance & Trust Co., of Louisville, Ky., as receiver. Both mines and their appurtenances and equipments, consisting of 10,067 $\frac{3}{4}$ acres of land, more or less; one cannel coal mine, the Stinson, located at Music; one bituminous mine, located at Mt. Savage; miners' houses, stores, tipples, machinery, bank cars, etc., located at Music and Mt. Savage, and twelve head of mules, were, on the 24th day of March, 1898, sold at public auction under a decree of the United States Court and purchased by the said Columbia Finance & Trust Co.

It is not the purpose of the company to operate the mines, but all the property is held for sale, and persons wishing to engage in coal mining would do well to purchase the same and revive the work.

The mine of the Pine Hill Coal Co., Rockcastle county, has not been operated since February, 1898. The cause of the suspension, nor probable date of resumption, has been reported to the office.

The Silver Creek mine, Muhlenberg county, operated during 1897 by the Gold Standard Coal Co., was idle during all of 1898, and there is no prospect of further operations.

The Dekoven mine, Union county, operated by the Ohio Valley Coal and Mining Co., suspended work on August 26, 1898, on ac-

count of a disagreement between the company and its employees, as to the wage scale. A general strike followed, and is still in force.

The Hawesville mine, Hancock county, operated by the Falcon Coal Co., was idle during all of 1898, caused from its being so flooded with water that it had to be abandoned. This mine has a soft, gravel bottom, and lies within a few hundred yards of the Ohio river. The entrance shaft is 105 feet deep, and reaches below the water level of the Ohio, and it is highly probable that water from the river seeps through the gravel bottom, and in this way the mine and shaft have become flooded.

The Reynolds mine, at Reynolds Station, Ohio county, has been idle since early in 1897, and there is no apparent prospect of its resumption.

The Alva Karnes mine, situated about one and one-half miles from Island, McLean county, was operated for a portion of the year only, and with less than five employees, and is, therefore, not subject to State supervision, and its name is now stricken from the list of commercial mines.

The Kentucky Jellico mine, at Halsey, Whitley county, has been idle ever since about May, 1898. The manager of the company writes: "They have entered into an agreement with the lessees for a cancellation of the lease, and removal of the plant, consequently the mine is permanently abandoned."

The new mine, No. 3, operated by the New Beattyville Coal Co., has been idle ever since about June. The company was lessee of the property, and seems to have abandoned the work. As to a resumption of operations, nothing has been communicated to this office.

The T. L. Taylor mine, at Providence, Webster county, has been idle ever since about October. A fire destroyed the engine house and hoisting machinery, none of which has been replaced. Work was suspended and has not since been resumed.

The Barren Fork, old mine, Pulaski county, operated by the Eagle Creek Coal Co., was abandoned in the early part of 1898, and has continuously since then remained idle, but a new mine has been opened in the opposite hill.

Work has been suspended for several months in mine No. 1, of the Mt. Morgan Coal Co., at Williamsburgh, Whitley county.

The following mines, mentioned in the 1897 report as being idle, have continued idle to this date, and there are no signs of a revival of operations, so far as this office has any knowledge, and until there are new developments, their names will be taken from the list of mines: J. C. Steley, Whitley county; Mt. Vincent, Bell county; J. P. Gaddie, Knox county; and Spottsville, Henderson county.

REOPENED MINES.

The Altamont Coal Mining Co., a corporation, with the following named officials: Wm. McHugh, presiden; John W. Weed, of No. 62 Williams street, New York City, secretary; and A. J. Totten, manager, has reopened the Diamond mine located near Altamont, in Laurel county, and is operating it in connection with the Manchester mine, the Manchester Coal Company having given up its mine to the new company. The mine had been idle from May, 1897, until in July, 1898, when it was reopened. Furnace ventilation has been provided and mining is done with picks. The company has been working a force of about seventy-five employees in both mines. The following output was reported for the several months of operation: August, 2,446 tons; September, 2,388 tons; October, 1,592 tons, November, 3,494 tons, and December, 2,803 tons.

NEW MINES.

The following mines were opened and put in operation during the year:

BEVIER.

The Bevier Coal Co. opened a mine, a shaft sixty-nine feet deep, at Bevier, Muhlenberg county, in No. 9 coal vein. The company has purchased a large tract of coal lands, and has constructed an extensive mining plant. In June, work was commenced in sinking the shaft, building a store house, miners' houses, tip houses, etc. No coal was produced until in December, when an output of 700 tons was reported. Mining is done with picks, but the introduction of mining machines is contemplated in the near future. The mine is provided with furnace ventilation, and is located on the Owensboro & Nashville division of the L. & N. R. R., with post office at Bevier.

The officers of the company are: J. W. Bastin, president; R. S. Little, secretary; and Geo. Givens, general manager.

EXCELSIOR.

The Excelsior Coal Mining Co., a corporation having the following named officers, J. M. Brooks, President; R. H. Fox, Secretary, and John A. Morrison, General Manager, opened a mine about three miles north of Middlesborough, in Bell county, in what is known as the Blue Lick coal vein.

The mine is a drift and is located on the Cumberland Valley branch of the L. & N. railroad, about four hundred feet above the level of the railroad track. Operations are over an incline 2,500 feet in length. The vein on main entry is about six and a half feet thick from floor to roof, but contains a fire clay and coal parting of eigh-

teen inches. This parting grows less as the entry advances. At and old opening near the present works it has a thickness of only eight inches.

The separation of the coal from the parting is clean and easy. The mine roof is a black slate about three feet thick and the floor is a hard fire clay. The work is against the dip, and good drainage will be easily effected.

The company organized in January, but operations were not commenced until some months later. The first coal was produced in December, when 143 tons were reported. Mining is done with picks, and furnace ventilation has been provided.

STAR FURNACE.

The Star Furnace Coal Co., Carter county, has opened a mine, No. 3, in the vicinity of the old mines, 1 and 2, that were worked out and abandoned during the year. A complete new tippie and a one-fourth mile tramway extension track, connecting the new mine with the railroad track, have been built at an aggregate cost of \$3,000. The mine will be provided with furnace ventilation, and will be operated with picks.

STANDARD.

The Standard Coal Co. reports the opening of a mine, two openings, near East Bernstadt, Laurel county, at a cost of \$800. It is a pick mine, and will have furnace ventilation.

NEW MANCHESTER.

Shortly after the Manchester Coal Co. surrendered its mine, the Manchester, located near Altamont, Laurel county, to the Altamont Coal Mining Co., it reopened the Raccoon mine, located about one-half mile distant, but the work not proving entirely satisfactory, it commenced prospecting on the opposite side of the railroad, where a mine, No. 2, has been opened and the prospects for success are quite flattering. The Raccoon mine is not abandoned, and is known

as No. 1. The company has a lease on 200 acres of coal lands. It reported an output from about June 15th to December 31, 1898, of 3,239 tons.

It is not expected that much coal will be run before fall, when the company hopes to put out ten cars or more per day. It is thought that the coal vein will show a thickness of from three to three and a half feet.

RAILROAD MINES.

The production of the mines located along the several lines of railways in the State are as follows:

Name of Railroad.	1897. Tons.	1898. Tons.
Louisville & Nashville.		
Henderson & Nashville division	801,318	803,408
Owensboro & Nashville division	173,734	168,282
Providence branch	62,087	44,649
Cumberland branch	245,621	372,213
Knoxville branch	324,315	606,229
Total L. & N. System	1,607,075	1,994,781
Illinois Central.		
Illinois Central (Main Stem)	655,763	742,301
" " Ohio Valley division	120,196	123,351
" " Owensboro & Falls of Rough	29,078	45,712
Total Illinois Central System	805,037	911,364
Louisville, Henderson & St. Louis	130,631	86,041
Chesapeake & Ohio	153,165	124,812
Cincinnati, New Orleans	78,294	143,268
Lexington & Eastern	22,241	27,423
Ashland Coal & Iron railroad	226,961	194,933

SHAFT MINES.

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

Name.	County.	Depth.
Empire	Christian	54 feet
Hawesville ..	Hancock ..	105 "
Green River.....	Henderson.....	50 "
Henderson	"	180 "
Peoples	"	185 "
Corydon	"	185 "
Basket ...	"	135 "
Monarch	Hopkins.....	265 "
Reinecke	"	300 "
Island	McLean.....	75 "
Central	Muhlenberg.....	180 "
Memphis	"	40 "
Pierce	"	132 "
Hillside	"	60 "
Oakland.....	"	70 "
Powderly.....	"	30 "
Bevier	"	69 "
Echols	Ohio.....	95 "
Aetnaville	"	About 75 "
Trade Water	Union	185 "
Davidson.....	"	200 "
T. L. Taylor	Webster	About 30 "
Sebree	"	175 "
Providence Shaft	"	80 "

COMMERCIAL MINES.

On the first of January, 1899, there were 95 companies, or persons, engaged in the operation of 128 commercial coal mines in the State. The following list contains the names of the operators, and of the counties where the mines are located, and the post office of each mine. In cases where the operators maintain a separate office, where the business of the company is transacted, the fact is noted, in connection with the comments made on the condition of said mines, under the general head of "Notes on the Mines."

Name of Operator.	Post Office.	County.	No. of Mines.	Character.
Pineville Coal Co	Pineville	Bell	2	Drifts
National Coal & Iron Co	"	"	1	"
Log Mt. Coal, Coke & Timber Co	Chenoa	"	1	Slope
Bennetts Fork Coal Co	Middlesboro.....	"	1	Drift
Eureka Coal Co	"	"	1	"
Excelsior Coal Co	"	"	1	"
Ashland Coal & Iron Co	Rush	Boyd	1	"
John Wurtz, Lessee	Ashland	"	1	"
Dudley, Shelby & Co	Jackson	Breathitt.....	1	"
Aberdeen Coal Mining Co	Morgantown ..	Butler	1	"
West Aberdeen Coal Co	"	"	1	"
Star Furnace Coal Co	Rush ..	Carter	1	"
Eastern Kentucky Railway Co	Willard	"	1	"
Columbia Finance and Trust Co	Music	"	2	"

COMMERCIAL MINES—Continued.

Name of Operator.	Post Office.	County.	No. of Mines.	Character.
Ashland Coal & Iron Co.	Rush	Carter	2	Drift
Strait Creek Coal Co.	Denton	"	1	"
Kentucky Canal Coal Co.	Grayson	"	1	"
Barney & Hargis.	Rush	"	1	"
Empire Coal & Mining Co.	Empire	Christian	1	Shaft
New Holland Coal Co.	Owensboro	Daviess	1	Slope
M. H. Enright	Adair	Hancock	1	Drift
Lloyd & Wright	Corydon	Henderson	1	Shaft
Henderson Mining & Manufact'g Co.	Henderson	"	1	"
F. Haag & Bros.	"	"	1	"
Pittsburg Coal Co.	Basket	"	1	"
Green River Coal & Mining Co.	Spottsville.	"	1	"
Booth & Glover	Hamby Station	Hopkins	1	Drift
Co-Operative Mining & Manufac'g Co.	Barnsley	"	1	"
Crabtree Coal & Mining Co.	Ilisley	"	1	"
St. Bernard Coal Co.	Earlington	"	2	S. & D.
St. Bernard Coal Co.	St. Charles	"	2	Drift
St. Bernard Coal Co.	Morton's Gap	"	1	"
Hecla Coal Co.	Earlington	"	1	"
Anderson & Holloman	Madisonville	"	1	Shaft
Reinecke Coal Co.	"	"	1	"
Oak Hill Coal Co.	Nortonville	"	1	Drift
Greasy Creek Cannel Coal Co.	Eliza	Johnson	1	"
White House Cannel Coal Co.	Louisa	"	1	"
North Jellico Coal Co.	Gray	Knox	2	"
N. Point Jellico Coal Co.	"	"	1	"

COMMERCIAL MINES—Continued.

Name of Operator.	Post Office.	County.	No. of Mines.	Character.
East Jellico Coal Co.	Coalport	Knox	1	Drift
J. W. Hemphill	Artemus	"	1	"
J. J. Pursifull	Flat Lick	"	1	"
East Bernstadt Coal Co.	E. Bernstadt	Laurel	1	"
Samuel F. Bastin (Star Mine)	"	"	1	"
Swiss Mining Co.	"	"	1	"
Standard Coal Co.	"	"	1	"
Altamont Coal Mining Co.	Altamont	"	1	Slopes
Manchester Coal Co.	"	"	2	Drift
East Altamont Coal Co.	"	"	1	"
Pittsburgh Coal Co.	Pittsburgh	"	1	"
Pitman Coal Co.	"	"	2	"
Peacock Coal Co.	"	"	1	"
Victoria Coal Co.	"	"	2	S. & D.
Kentucky Coal Co.	"	"	2	Drift
Laurel Coal Co.	"	"	1	"
Lily Coal & Coke Co.	Lily	"	1	"
Peach Orchard Coal Co.	Peach Orchard	Lawrence	2	"
Reliance Coal Co.	Walbridge	"	1	"
McGuire Coal Co.	Beattyville	Lee	1	"
New Beattyville Coal Co.	"	"	1	"
Field Coal Co.	Island	McLean	1	Slope
Bryant Coal Co.	"	"	1	Shaft
Central Coal & Iron Co.	Central City	Muhlenberg	1	"
Hillside Coal Co.	Mercer Station	"	1	"
Oakland Coal Co.	"	"	1	"

COMMERCIAL MINES—Continued.

Name of Operator.	Post Office.	County.	No. of Mines.	Character.
Greenville Coal Co	Powderly	Muhlenberg ..	1	Shaft
Bevier Coal Co	Bevier ..	"	1	"
W. H. Moore & J. W. Moore, Lessees	"	"	1	"
Black Diamond Coal Mining Co	Drakesboro	"	1	"
Mud River Coal, Coke & Iron Co	Mud River	"	1	Slope
Taylor Coal Co	Taylor Mines	Ohio	1	"
Williams Coal Co	McHenry	"	1	"
John. C. Thompson	Aetnaville	"	1	"
Guy M. Dean	"	"	1	Shaft
McHenry Coal Co	Echols	"	1	"
McHenry Coal Co	McHenry	"	1	Slope
Central Coal & Iron Co	Render	"	2	Drift
Fordsville Block Coal Co	Fordsville	"	1	"
Jamestown Coal Co	Livermore	"	1	"
Pulaski Coal Co	Flat Rock	Pulaski	1	"
Eagle Coal Co	"	"	1	"
Commercial Coal Co	Parker's Lake ..	"	2	"
J. W. Ramsey, lessee	Alpine	"	1	"
Pine Hill Mining Co	Pine Hill	Rockcastle ..	1	"
Ohio Valley Coal & Mining Co	DeKoven	Union	1	Slope
Paducah Coal Mining Co	Sturgis	"	1	"
Trade Water Coal Mines	"	"	1	Shaft
J. M. Lamb	Sullivan	"	1	Slope
B. C. Davidson & Sons	Uniontown	"	1	Shaft
Providence Coal Co	Providence	Webster	1	Slope
R. L. Forsythe, lessee	"	"	1	Shaft

COMMERCIAL MINES—Continued.

Name of Operator.	Post Office.	County.	No. of Mines.	Character.
Sebree Coal Co	Sebree	Webster ..	1	Shaft
T. L. Taylor	Providence	"	1	"
Whitley Coal Co	Halsey	Whitley	4	Drift
East Tennessee Coal Co	Jellico, Tenn ..	"	2	"
Hywel Davies Coal Co	Kensee	"	1	"
Jellico Coal Mining Co	Mountain Ash ..	"	2	"
Proctor Coal Co	Red Ash	"	6	"
Pine Knot Coal Co	Strunk	"	1	"
Bryant Bros	Pine Knot	"	4	"
Mount Morgan Coal Co	Williamsburg ..	"	2	"

The above list does not include those mines that were exhausted during 1898, but does include several mines that were temporarily idle at the close of that year, and had not resumed work at the beginning of the new year.

INJURIES TO MINE PROPERTY.

Several noteworthy injuries to the property of mining companies were reported during the year.

On the night of March 4th the tip house and hoisting machinery of the Field Coal Co., at Island, McLean county, were destroyed by fire, causing a loss to the company of about \$800, and a suspension of mining for nearly three months. The property was replaced at a cost of \$700. During the rebuilding, a carpenter engaged in the work was struck by falling timbers and killed. The origin of the fire has never been ascertained. Some think it was the work of an incendiary, but the company officials express a contrary opinion.

During the night of January 19th, the tip house and machinery of the Strait Creek Coal Company, at Denton, Carter county, were also destroyed by fire, which is believed to have been of incendiary origin. The loss to the company was about \$3,000. Mining was suspended for thirty days, during which time, the tippie was rebuilt and supplied with new machinery.

At another time during the year, date not given, the mine was flooded with water, causing further suspension, and an additional loss of \$1,500.

On December 1st, there was a boiler explosion in the power house of the Barren Fork mine, Pulaski county, operated by the Eagle Coal Co., which completely destroyed the boiler and buildings, and caused a suspension of mining for two weeks, and a loss to the company of about \$1,500. Fortunately, no one was killed, and only two persons were slightly injured. The mine was in full operation at the time, with a force of 125 employes, and many persons narrowly escaped death. A new boiler was purchased and put in place, and the mine resumed work on December 14th.

In October the engine house and hoisting machinery of the T. L.

Taylor mine, at Providence, Webster county, was also destroyed by fire. The cause of the fire and amount of loss sustained have not been reported to this office. The mine at once shut down and has not been reopened. The property has not been replaced.

Some time in November the boiler house of the Crabtree Coal Co., Hopkins county, was also destroyed by fire, causing a loss of about \$250. The origin of the fire appears not to be known.

The Hawesville mine, Hancock county, operated during 1897 by the Falcon Coal Co., was so flooded with water almost all the year that no mining could be done, and the mine was idle all the year. It may be classed among the abandoned mines, though if conditions shall improve, no doubt work will be resumed.

MINE IMPROVEMENTS.

Various valuable improvements were made, or provided, at a number of the mines during the year, the most notable of which are now briefly mentioned, the smaller ones being specially described under the general head of "Notes on the Mines," which forms a subsequent chapter of this report.

WESTERN DISTRICT.

M. H. Enright reports the following, at Falcon mine, Adair, Hancock county.

One large water ditch was dug, at an approximate cost of \$325. This was done in order to provide good mine drainage. Also, a new air shaft was sunk, and three new entries opened; all, at an aggregate cost of about \$1,600.

At the Trade Water mines, Sturgis, Union county, the company reports extensive improvements as follows: One shaking screen, one revolving screen, additions to tip house and to the buildings, general repairs to machinery, an extra boiler and other improvements and repairs, at a total cost of about \$8,500.

At Cumberland mine, also at Sturgis, a new furnace was built and a gasoline pump put in, at a cost of \$1,000.

The McHenry Coal Co. reports for the McHenry and Echols mines the following: At McHenry, 30 new bank cars, and one shaking screen at a cost of \$1,000; at Echols, 30 new bank cars, and laying the track of the main mine entry with heavy new steel rails, at a cost of \$1,500.

The Reinecke Coal Co. reports 60 new mine cars, at a cost of \$1,500.

Anderson & Holloman, lessees of the Monarch mine, report the

installation of two electric mining machines, the Link Belt, at a cost of \$1,000.

The Hecla Coal Co. reports the installation of two electric mining machines, the Morgan-Gardner, at a cost of \$2,000.

The Empire Coal Co. reports the installation of one Morgan-Gardner mining machine.

The Morgan-Gardner Electric Co., of Chicago, Ill., installed two complete mining plants, for mines in Muhlenberg county; one for the operation of both Hillside and Oakland mines, at Mercer Station, and the other for the operation of the Pierce mine, at Drakesboro. The first named plant consists of one new 72x18 inch boiler, manufactured by the Union Iron Works, Erie, Pa. One 16x18 inch center crank, automatic one-fourth cut-off Skinner engine, manufactured by the Skinner Engine Co., Erie, Pa. One 100 K. W. 250 volts, multipolar type 10 per cent. over compounded power generator, manufactured by the Morgan-Gardner Co. A switchboard with all instruments and connections necessary. Four under-cutting chain mining machines, together with wire, belt, steam connections, etc., to complete the plant. The entire cost was about \$14,000, of which \$8,000 is chargeable to Oakland and \$6,000 to Hillside mine.

Operations were commenced under the new system about October 20th, and the success of the enterprise has been fully equal to the expectations of the companies. The Oakland Coal Co., under date of January 30, 1899, in a communication to this office describing the new plant, expresses general satisfaction with its work and adds: "We find that mining by the use of machines produces a much better grade of coal. There is a larger per cent of good coal and less slack."

The plant at Drakesboro is in all respects similar to the one at Mercer Station, except but three mining machines were installed, and there was the addition of an electric pump.

After about three and one-half months continuous operation, the company expresses the highest satisfaction at the success of the experiment. The secretary of the company, under date of February 3d, writes to this office: "The plant has been at work every day

since it started and has caused no trouble, such as break-downs, etc. The plant is quite a success in every particular. The entire output of our mine is machine coal, and we are glad to say our output has increased at least a third since machines have been in operation here." The cost of the above plant was not reported.

The Greenville Coal Co. reports the putting in of a new shaking screen at its mine at Powderly, at a cost of \$1,500.

The Central Coal & Iron Co. reports extensive improvements to its mine at Central City, consisting as follows: The addition of one new revolving screen, re-modeling a shaking screen, the building of 40 new mine cars; inside track laid and motor haulage extended a distance of 1,000 feet; the installation of a 150 horse power boiler and a new engine; also a new ladder way in the pipe shaft. The new engine is used for the double purpose of running the fan and for hoisting, so that the miners now have two ways of escape from the mine, in case the regular hoisting apparatus should in any way become disabled; one up the new ladder way built in the pipe shaft, and the other by means of a cage which the fan engine can hoist out of the air shaft. The engine is 75 horse power. The aggregate cost of all these improvements is about \$7,500.

The Henderson Mining and Manufacturing Co. reports repairs made to mine shaft and other matters, all at a cost of \$500.

The Sebree Coal Co. reports the additional equipments of a boiler, and a pump, and repairs on screens, all at a cost of \$800, and has made a second outlet, which is also used as an air shaft.

The Field Coal Co., at Island, McLean county, in addition to replacing its tip house and attachments that had been destroyed by fire, reports the building of a railroad switch for loading lump and nut coal, and a like switch for loading slack, all at a cost of \$400.

The Taylor Coal Co. built ten new houses at their mine in Ohio county. Cost not given.

The Central Coal & Iron Co. reports the following improvements at their mine at Render, Ohio county: Thirty-five new mine cars built, and the railroad track on west side of the tip house, relaid with heavier steel rails, both at an approximate cost of \$2,500.

SOUTH-EASTERN DISTRICT.

The Eagle Coal Co. reports the following at Barren Fork mine, Pulaski county, at a cost of \$3,000, to-wit.: One new fan, new boiler, ten new houses for miners, and the building of a large church house. The latter act is especially commendable, and the more so, because entirely gratuitous and voluntary. It is the only instance of the kind coming under the notice of this office, and its like might be repeated with much profit in other localities.

The Mt. Morgan Coal Co. reports a revolving screen at a cost of \$500.

Bryant Brothers reports for the Tow Wad mines, at Pine Knot: Complete shaking lump and pea screens; hoisting engine and pumping plant, all at a cost of \$3,000.

The Pineville Coal Co. reports, at its No. 2 or cannel mine, the building of three new houses, and of a cannel storage bin, and track scales, all at a cost of \$500.

The National Coal & Iron Co. reports for Straight Creek, A mine, Bell county, the putting in of a complete set of shaking screens, and the installation of one electric mining machine, a Link Belt, at an aggregate cost of \$1,000.

The Whitley Coal Co. reports for the Birdseye mine, at Halsey, Whitley county, putting in a pipe line for compressed air, at a cost of \$800.

The North Jellico Coal Co. reports various improvements to its mine at Gray, Knox county, as follows: The building of one ware house, and two dwelling houses, the installation of two new Sullivan mining machines, operated by compressed air, being the first of this patent introduced in the State; also a condensing apparatus, not completed at the end of the year, and pumps, all at a cost of about \$3,000.

The Log Mountain Coal, Coke & Timber Co. reports for the Mary Hull mine, Bell county, a new boiler, for use in connection with the new hoisting engine, at a cost of \$500. It also reports making a second outlet, or way of escapement to the mine. It is described as

being to the left, and running parallel with the main entry from the crop to the second left entry, which has general connection with the rest of the workings.

NORTH-EASTERN DISTRICT.

The Ashland Coal & Iron Co. reports the installation of a new compressed air locomotive, for mine haulage, in No. 6 mine, at Rush, Boyd county, and a new steam locomotive, for the like purpose, in No. 7 or Grant mine, Carter county, at a total cost of \$4,800.

Davis & Wynn, operators of the Jackson mine, report a new furnace and air shaft at a cost of \$200.

The varied character and cost of the foregoing improvements denote permanency and progress to the mining interest of the State. They show alertness on the part of operators for the best methods regardless of cost, and that they regard utility and durability of appliances as the quickest and cheapest means of obtaining desired results, and of establishing their business as an abiding and profitable industry.

GENERAL STATISTICS.

OUTPUT.

(In tons of 2,000 pounds.)

The total coal production, of all the commercial mines of the State, including cannel, during 1898, is 3,542,132 tons.

This is the largest that has ever been made by the Kentucky mines, being 238,078.62 tons more than the production of 1897, which was larger than that of any previous year.

Considering the number of strikes and other hindrances, enumerated in other parts of this report, but for which the output would have been materially increased, the results of the year are highly satisfactory.

In the following tables, comparisons are made with the output of 1897:

PRODUCTION BY DISTRICTS.

DISTRICT.	Output 1897.	Output 1898.	Gain.	Loss.
Western	2,114,571.41	2,071,070.42	.....	43,500.99
Southeastern	796,430.49	1,123,892.94	327,462.45	.....
Northeastern	393,051.48	347,168.64	.....	45,882.84
Totals ,	3,304,053.38	3,542,132.00	327,462.45	89,383.83

Net gain, 238,078.62 tons.

The great gain in the Southeastern district was occasioned by the absence of prolonged strikes, and the almost continuous operation of the mines. The district has fast recovered from the general strike of last year, when the loss in output, as compared with 1896, was over 300,000 tons. The present output is even greater than that of 1896 by over 27,000 tons. The loss in the Western district is clearly the result of strikes in several of the counties.

PRODUCTION BY COUNTIES.

COUNTY.	Output 1897.	Output 1898.	Gain.	Loss.
Bell	80,737.13	86,891.76	6,154.63	.....
Boyd	172,888.00	138,694.65	.....	34,193.35
Breathitt	9,316.39	17,982.97	8,666.58	.....
Butler	30,511.60	32,698.80	2,187.20	.....
Carter	132,690.61	114,836.02	.....	17,854.59
Christian	36,325.64	66,496.32	30,170.68	.....
Daviess	3,549.20	7,140.80	3,591.60	.....
Hancock	19,901.67	9,435.44	.....	10,466.23
Henderson	121,223.72	89,594.72	.....	31,629.00
Hopkins	961,412.24	961,715.92	303.68	.....
Johnson	7,488.00	10,964.45	3,476.45	.....
Knox	164,882.70	285,321.65	120,438.95	.....
Laurel	294,075.27	272,918.95	.....	21,156.32
Lawrence	57,743.25	55,251.07	.....	2,492.20
Lee	12,925.24	9,439.50	.....	3,485.74
McLean	20,852.84	21,515.20	.....	9,337.61
Muhlenberg	261,733.32	268,507.40	6,724.08	.....
Ohio	460,693.06	436,518.68	.....	24,174.38
Pulaski	49,519.03	79,434.83	29,915.80	.....
Rockcastle	9,493.40	3,016.00	.....	6,477.40
Union	117,732.32	123,351.62	5,619.30	.....
Webster	70,585.80	54,095.50	.....	16,490.30
Whitley	197,732.95	396,309.75	198,576.80	.....
Totals	3,304,053.38	3,542,132.00	415,835.75	177,757.15

Net gain, 238,078.62 tons.

PRODUCTION BY MONTHS.

MONTHS.	Western District.	South-Eastern District.	North-East'n District.	Total.
January	218,928.91	102,672.36	33,261.11	354,862.38
February	182,073.54	92,612.72	29,309.43	303,995.69
March	188,779.66	92,579.26	29,452.37	310,811.29
April	137,102.62	74,837.41	28,487.52	240,427.55
May	122,608.50	60,352.51	23,619.95	206,580.96
June	109,988.81	69,598.76	21,899.70	201,487.27
July	115,395.82	76,931.50	27,534.54	219,861.86
August	142,650.72	84,182.36	23,759.62	250,592.70
September	159,067.12	85,372.29	24,865.15	269,304.56
October	200,759.63	103,879.24	33,187.91	337,826.78
November	234,929.62	125,248.56	34,925.23	395,103.41
December	258,785.47	155,625.97	36,866.11	451,277.55
Totals	2,071,070.42	1,123,892.94	347,168.64	3,542,132.00

The productions of the first and last six months of the year are as follows:

	1897.	1898.
First	1,384,156.70	1,618,165.14
Second	1,919,893.68	1,923,966.86
Totals	3,304,053.38	3,542,132.00

Gain first six months 234,008.44 tons.
 Gain last six months 4,070.18 tons.
 Total gain 238,078.62 tons.

PRODUCTION OF LEADING COMPANIES.

The names and output of all mining companies producing over 100,000 tons, are now given in the order of their production during 1898.

COMPANY.	Mines.	County.	1897.	1898.
1. St. Bernard Coal Co.....	5	Hopkins,	559,564	568,862
2. North Jellico Coal Co	2	Knox,	115,718	237,400
3. Central Coal & Iron Co	1	Muhlenberg }	205,283	213,957
Central Coal & Iron Co.....	1	Ohio		
4. Ashland Coal & Iron Co.....	1	Boyd	189,757	181,308
Ashland Coal & Iron Co.....	1	Carter }		
5. McHenry Coal Co.....	2	Ohio	153,314	167,349
6. Reinecke Coal Co.....	1	Hopkins	146,916	150,683
7. Procter Coal Co.....	2	Whitley	50,225	138,696
Totals.	16		1,421,377	1,657,755

The number of mines, that contributed to the entire output of the year, were 131, and were operated by 98 companies, counting only one company to a mine, though in a few instances, two or more operated the same mine, during different parts of the year. Thus it will be seen, that seven of the companies working sixteen of the mines produced nearly 47 per cent. of the entire output of the State.

PRODUCTION OF LEADING MINES.

The name, location, and output of the several mines producing more than 50,000 tons are now given in the order of their production during 1898, counting all contiguous mines, operated by the same company, located in the same vein, and using the same tippie, like the St. Charles and Render mines, as but one mine:

NAME.	County.	1897.	1898.
North Jellico.....	Knox.....	115,718	237,400
Earlington No. 9	Hopkins	185,373	172,653
Diamond.....	"	144,815	154,549
Reinecke.....	"	146,916	150,683
St. Charles	"	98,162	132,216
Rush No. 6.....	Boyd	145,391	130,500
Central	Muhlenberg....	112,055	109,985
Earlington No. 11	Hopkins	111,752	108,944
Render	Ohio	93,227	103,972
McHenry	"	73,306	86,926
Echols	"	80,007	80,423
Procter	Whitley	32,147	77,548
Taylor.....	Ohio	138,932	76,172
Empire	Christian	36,325	66,496
Grinstead	Whitley	18,678	61,148
Crabtree	Hopkins	61,961	60,911
Barren Fork	Pulaski.....	15,965	52,849
Monarch.....	Hopkins	46,100	51,841
Grant.....	Carter	44,366	50,809
Peach Orchard	Lawrence	57,505	50,600
Totals		1,758,701	2,016,625

The only serious loss is at Taylor mines, occasioned by the six

months' strike and suspension, discussed in the chapter on strikes. Nearly all the machine mining is done at fourteen of the above named mines.

LEADING COUNTIES.

The following table shows the monthly production of the three leading counties, Hopkins, Ohio, and Whitley:

MONTH.	Hopkins.	Ohio.	Whitley.
January	94,440.51	53,494.56	33,409.10
February	78,572.26	39,607.64	30,300.65
March	79,698.84	50,979.28	26,781.50
April	64,576.58	28,852.28	21,897.82
May	60,247.16	21,792.40	18,217.11
June	55,777.09	17,730.24	22,362.60
July	57,905.34	18,531.32	28,343.40
August	68,594.98	28,249.48	31,721.00
September	84,408.28	30,123.00	34,870.80
October	94,787.78	46,379.16	43,993.00
November	105,568.16	52,287.36	50,605.00
December	117,138.94	48,451.96	53,807.70
Totals 1898	961,715.92	436,518.68	396,309.75
Totals 1897	961,412.24	460,693.06	197,732.95
Gain 1898	303.00	.....	198,576.80
Loss 1898 .....	.....	24,174.38	.....

ORDER OF PRODUCTION.

The counties, producing over 100,000 tons of coal during 1896, 1897, and 1898, stand in the following order for the years named:

1896.	1897.	1898.
1. Hopkins.	1. Hopkins.	1. Hopkins.
2. Whitley.	2. Ohio.	2. Ohio.
3. Ohio.	3. Laurel.	3. Whitley.
4. Laurel.	4. Muhlenberg.	4. Knox.
5. Muhlenberg.	5. Whitley.	5. Laurel.
6. Knox.	6. Boyd.	6. Muhlenberg.
7. Carter.	7. Knox.	7. Boyd.
8. Boyd.	8. Carter.	8. Union.
9. Henderson.	9. Henderson.	9. Carter.
10. Union.	10. Union.	10.

As is readily seen, Henderson county has dropped from the list, its production falling far below the 100,000 mark. Strikes at two leading mines, the Basket, and the Rankin, caused the shortage.

Knox has gained three points, Whitley and Union two, while Muhlenberg and Laurel have lost two, and Boyd and Carter one.

PRODUCTION BY YEARS.

The following table shows the annual production of all the commercial mines of the State since January 1, 1888:

YEAR.	Bituminous.	Cannel.	Total.
1888	2,342,058	42,835	2,384,893
1889	2,205,434	40,285	2,246,259
1890	2,483,144	49,382	2,532,526
1891	2,907,096	43,040	2,950,136
1892	2,973,455	53,842	3,027,297
1893	3,258,712	43,538	3,302,250
1894	2,899,692	57,503	2,957,195
1895	3,138,023	69,747	3,207,770
1896	3,128,818	54,660	3,182,478
1897	3,247,542	56,511	3,304,053
1898	3,492,243	49,889	3,542,132

Based upon present indications, the year 1899 will be an improvement over 1898, and such may be expected, unless another general strike shall be inaugurated. The principal mines in all the districts are entering the new year actively at work, and many of them with better equipments, especially in the way of new mining machines and extended and better haulage systems, and an increased output over that of 1898 is among the probabilities of the new year. However no safe predictions can be made on the basis of strikes. They may be few or many, and of long or short duration, and judging from the past, they are liable to occur in any locality at any time.

An adjustment of all conflicting interest between the operators and employees, so as to eliminate strikes, will settle all trade conditions of this great industry, and insure permanent good to all.

PRODUCTION OF CANNEL.

The cannel production of the State is less than during any year since 1893, and has not equaled our expectations. There was a material decrease in the demand for this coal, and the output was made accordingly. The report from these mines show a loss of 6,621.13 tons as compared with the tonnage of 1897. One explanation of the shortage is, it is stated that most of the product is exported, and marketed in foreign countries, and much of it in Spain. This latter trade was entirely cut off by the late war, and the general foreign trade was seriously affected. The resumption of peace and of trade relations with that country will most likely revive the demand for this important Kentucky product, and an increased output may be looked for during 1899.

The Breckinridge mine, at Victoria, Hancock county, after an eventful history of fifty years, is practically exhausted, and was permanently shut down on the 17th of November, 1898, and its name will no longer appear on the list of producing mines.

The excellent quality of this coal has long been so well known, as to make it prominent in the State's mineral history, but henceforth, it must live only in the record of past events.

The mine, operated by the White House Cannel Coal Co., is ascertained to be in Johnson county, and its output is now reported accordingly. This accounts for the dropping of Lawrence from the list of cannel-producing counties.

No reports have been received from the mines in Greenup county, they not being of the commercial class, and therefore, not subject to State supervision.

The following table shows the production of each county for the

years 1897 and 1898, counting the White House mine each year in Johnson county, and not in Lawrence, as heretofore.

COUNTY.	1897	1898	Gain.	Loss.
Bell	33,807.32	25,837.15	.....	7,970.17
Carter	9,313.21	5,585.79	.....	3,727.42
Hancock	3,231.07	2,480.00	.....	751.07
Johnson	7,488.00	10,934.45	3,446.45	.....
Whitley	2,671.42	5,052.50	2,381.08	.....
Total	56,511.12	49,889.89	5,827.53	12,448.66

Loss during 1898, 6,621.13 tons.

The following statement shows the output of the several mines during 1898:

COUNTY.	Mine.	Tons.
Bell	Mary Hull	21,825.15
Bell	West Pineville ..	4,012.00
Carter	Bog Head	5,585.79
Hancock	Victoria	2,480.00
Johnson	White House	4,932.60
Johnson	Greasy Creek	6,001.85
Whitley	Bird Eye	5,052.50
Total		49,889.89

The Mary Hull mine is operated by the Log Mountain Coal, Coke & Timber Co., post office at Pineville. Its output during the year was marketed in the cities of Rosani, Argentine Republic, and Rio Janeiro, and Santos, Brazil.

The West Pineville mine is operated by the Pineville Coal Co.,

with post office at Pineville. The No. 2, or cannel mine, was idle from April 1st to October 1st. Its output was marketed in various cities of the United States.

The Victoria mine was operated during the year by the Breckinridge Cannel Coal Co., H. V. Harris, General Manager, with post office at Cloverport. Its output was shipped to foreign markets.

The Boghead mine is operated by the Kentucky Cannel Co., with post office at Grayson. Its product was marketed in various cities of this country.

The White House mine is operated by the White House Cannel Coal Co., with post office at Louisa. Its output was mostly marketed in Chicago.

The Greasy Creek mine is operated by the Greasy Creek Cannel Coal Co., with post office at Eliza, Johnson county. Its product was marketed in Chicago.

The Birdseye mine is operated by the Whitley Coal Co., with post office at Halsey, Whitley county. Its product was marketed in various cities of the South.

The Stinson mine, near Music, Carter county, has been idle all the year.

• PRODUCTION OF COKE.

The tonnage of coke produced during the year is materially less than that of 1897 and is principally the product of the St. Bernard Coal Co., at Earlington, Hopkins county.

The Ohio Valley Coal & Mining Co., at DeKoven, Union county, operated its plant only during the months of January, February, July and August.

But 32.33 tons were produced by the Pineville Coal & Coke Co., at Pineville, its plant being idle all the year, except during part of January.

The production of each company for the years 1897 and 1898, is now given:

NAME OF COMPANY.	1897.	1898.	Loss.
St Bernard Coal Co.	28,229.25	20,542.10	7,687.15
Ohio Valley C. and M. Co.	2,097.91	819.10	1,278.81
Pineville Coal and Coke Co.	1,957.70	32.33	1,925.37
Total	32,284.86	21,393.53	10,891.33

Loss during 1898, 10,891.33 tons.

The shortage in the production was caused from lack of a profitable market. Much more could have been produced had there been a demand for it. In December, several thousand tons were stocked on the yards, waiting for sale. The price was the lowest ever known; the average for the first eleven months of the year being \$1.43 per ton on cars. This was too low for profit, but it was impossible to get more. Towards the end of the year, however, there

was an increased demand for this product, and the tendency was for better prices.

In the Eastern district, the Ashland Coal & Iron Co. has continued its experiments, using coal from No. 8 vein taken from Clinton mine, and while the company is not ready to make public the results of its several tests, yet it is expected that they have terminated satisfactorily, and the probabilities are, that during 1899 at least one extensive new plant will be put into operation, and that there will be a corresponding increase in the product.

EMPLOYEES.

The greatest number of employees engaged in all departments of mine labor, for the several months of the year, varies from 8,408 during December to 6,097 during June, divided among the three districts as follows:

DISTRICTS.	December.	June.
Western	4,183	3,123
Southeastern	3,304	2,196
Northeastern	921	778
Totals, 1898	8,408	6,097
Totals, 1897	8,611	5,051

BY MONTHS.

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

MONTH.	Greatest.	Average.
January	8,247	7,410
February	7,792	6,993
March	7,041	6,374
April	6,828	6,204
May	6,276	5,668
June	6,097	5,559
July	6,300	5,684
August	6,513	5,869
September	6,388	5,836
October	7,320	6,595
November	7,856	7,124
December	8,408	7,471
General average, 1898	7,089	6,399
General average, 1897	6,712	6,042

The reports from the various mines show, that about 85 per cent. of the employees worked under ground.

The following table shows the greatest and the average number of employees, in each county, for the months of December and June.

COUNTY.	DECEMBER.		JUNE.	
	Greatest.	Average.	Greatest.	Average.
Bell	388	303	302	225
Boyd	267	235	233	211
Breathitt	50	44	30	23
Butler	162	129	101	84
Carter	328	299	305	291
Christian	107	90	95	85
Daviess	17	15	7	5
Hancock	37	30	33	30
Henderson	214	197	217	198
Hopkins	1,537	1,479	1,273	1,254
Johnson	102	90	78	70
Knox	550	443	408	365
Laurel	934	803	647	563
Lawrence	139	125	119	95
Lee	35	25	13	13
McLean	45	40	25	22
Muhlenberg	741	695	530	512
Ohio	887	821	582	539
Pulaski	287	255	147	142
Rockcastle	...	...	...	...
Union	261	203	198	193
Webster	175	142	62	65
Whitley	1,145	1,003	692	634
Totals, 1898	8,408	7,471	6,097	5,619
Totals, 1897	8,611	7,740	5,051	4,460

The following table shows the number of mines in each county that produced coal in some part of the year, counting each one having separate means of ventilation, and requiring special inspection as a separate mine, and the month during which the largest output in each county was made, and the largest number of employees, and the output for said month:

COUNTY.	Mines.	Months.	Employees	Tons.
Bell	6	November	385	10,905
Boyd	2	January	234	13,665
Breathitt	1	November	55	3,009
Butler	2	December	162	4,688
Carter	8	December	328	14,652
Christian	1	December	107	6,919
Daviess	1	December	17	1,152
Hancock	2	October	56	1,484
Henderson	6	November	285	17,011
Hopkins	13	December	1,537	117,139
Johnson	2	July	112	1,200
Knox	6	December	550	30,933
Laurel	17	December	934	30,030
Lawrence	3	December	139	6,211
Lee	4	October	37	1,328
McLean	2	November	67	4,460
Muhlenberg	8	December	741	33,439
Ohio	10	January	880	53,495
Pulaski	6	November	227	8,407
Rockcastle	1	January	60	1,628
Union	5	November	285	17,011
Webster	4	December	150	7,224
Whitley	22	December	1,145	53,836
Totals, 1898	131	.....	8,493	439,826
" 1897	133	.....	8,330	432,181

FATALITIES AND INJURIES.

Continuing the rule of discarding injuries of mere minor importance followed by this office for a number of years, there were reported during 1898 fifty-three noteworthy accidents among the coal mine employees of the State, classified as follows: Fatal, six; serious, twenty-four; and slight, twenty-three.

This compares favorably with the record made during 1897, when there were twelve fatal, twenty-seven serious, and twenty slight accidents, making fifty-nine in all. In fact, there is no year in the history of this office when such a good record has been made by the Kentucky mines. The nearest approach to it is 1896, when there were also six fatal, nineteen serious, and forty-six slight accidents, making a total of seventy-one. It should also be remembered that four of the deaths that occurred during 1896 were caused by falls of top, whereas during 1898 only three of the deaths resulted from that cause, and a comparison of the production of the two years shows, that 1898 has an excess of 359,654 tons over 1896, and on the bases of fatalities and output is the banner year.

The cause, number, and class of the several accidents are shown in the following table:

CAUSE.	Fatal.	Serious.	Slight.	Total.
Fall of top	3	11	10	24
Fall of coal	1	2	3	6
Mining machine ..	1	..	..	1
Mine cars	..	3	3	11
Mine cages	..	5	1	6
Gas explosion	..	1	..	1
Blasting	1	1	..	2
By mules	..	1	..	1
Miscellaneous	..	..	1	1
Totals, 1898 ..	6	24	23	53
Totals, 1897 ..	12	28	19	59
Totals, 1896 ..	6	19	46	71

The following table shows the number of deaths each year, since January, 1888, among Kentucky coal miners, coming under the jurisdiction of this office:

Year.	Deaths.	Year.	Deaths.
1888	14	1894	10
1889	13	1895	8
1890	11	1896	6
1891	16	1897	12
1892	8	1898	6
1893	12		

In the following table is given the tonnage of coal produced by the Kentucky mines, to each death among the employees, every year since January 1, 1891: First from all causes; second, to each death occurring inside the mines; and third to each death caused from fall of top.

YEAR.	All Causes.	Inside.	Fall of Top.
1891	134,383	226,933	295,013
1892	378,412	605,459	756,824
1893	266,854	291,114	355,895
1894	295,719	328,577	492,866
1895	400,971	453,281	801,942
1896	530,419	636,496	795,619
1897	275,378	300,368	660,811
1898	590,355	590,355	1,180,710

Based upon the greatest number of employees, working during any single month of the year, one employee out of the following number was injured in the manner now stated:

Fatal, one out of every	1,401
Serious, one out of every	350
Slight, one out of every	365

The month, date, and cause of each death, and the mine and county where it occurred, are given in the following table:

No.	COUNTY.	Mine.	Month.	Date.	Cause.
1.	Whitley	Tow Wad...	February	14	Fall of coal.
2.	Muhlenberg	Central	February	26	Mining machine.
3.	Pulaski	Barren Fork	June	21	Blast.
4.	Christian	Empire	August	30	Fall of slate.
5.	Whitley	Mount Ash	December	4	Fall of rock.
6.	Whitley	Tow Wad...	December	7	Fall of slate.

The facts and circumstances connected with each of the said deaths, as reported to this office, are set forth in the following statements, in the order of their occurrence.

On Feb. 8th J. Ed. Reese, a miner, employed in the Tow Wad mines, located near Pine Knot, in Whitley county, and operated by Bryant Brothers, was caught by falling coal, and his leg was so crushed that amputation of the thigh became necessary. He never rallied from the shock of the surgical operation, but died on February 14th. His age and whether married or single were not reported.

The second death was that of Charles Allen, a machine helper, employed in Central mine, at Central City, in Muhlenberg county, operated by the Central Coal & Iron Co. On February 11th, he accidentally placed his leg in the way of the cutter chain. He was standing with his foot on the machine frame, while the machine was in motion. The coal, in which the jack-pipe was fastened to hold the machine in place, gave way and allowed the machine to move suddenly to the right, catching his leg in the chain-cutter, and by which his leg (the left one), was so badly mangled, between the ankle and knee that amputation above the knee became necessary. The operation was performed, but he did not survive the injury, but died on February 26. He was twenty-eight years old, and married. He left a widow and three children.

The third death occurred on June 21st, in the Barren Fork mine, Pulaski county, operated by the Eagle Coal Co., when Joe Soubrette, a miner, lost his life by the discharge of a blast. The company's report to this office, as to the cause of his death, says:

"Joe Soubrette was killed June 21st, at 4:30 o'clock p. m., our regular shooting hour. His room was in, about fifty feet, and had three shots to put off; two with fast squibs, and one with a slow squib. He set all three at once, and came out on entry, where the other men were who were firing, and was standing near Joe Robinson and Henry Coyle, colored miners. His two first squibs went off soon after he got out on entry. He waited about two minutes, and started to go back to relight the third shot, which he supposed had gone out. The two men standing by told him he had not given the

slow squib time, and to wait at least five minutes before going back. He would not do this and entered his room, and about the time he had gotten well in, about 35 or 40 feet and near the shot, it fired and killed him instantly, crushing his head with flying coal. As soon as the men on the entry heard the shot, they called for help, and went into his room, and found him dead. He was single, and about twenty-four years old, and had been mining for several years. He was a fast worker and risked too much, and to this fault alone can be attributed his death."

The fourth death occurred on August 30th, in the mine of the Empire Coal & Mining Co., located near Empire, in Christian county, when John Wiggins was killed by falling slate. He was a loader, twenty-five years of age and unmarried.

The company's report of the accident says: "He was loading coal, and took coal down, when a piece of draw slate, that was over the coal he was loading, fell, catching him before he could get out. Party knew slate was bad and went under same."

From the above, I conclude that as the result of blasting, all the coal had not fallen down, so it could be shoveled into the car, and that in taking this coal down, the piece of draw-slate, that had been loosened in blasting, came down with the coal and caught the deceased. It is evident that the piece of slate extended out some further than the coal, else he could not have gotten under it while taking the coal down. No doubt the setting of one additional prop would have held the slate and saved this life. It is but another instance of presumption, risk and death.

The fifth death occurred in Mountain Ash mine, in Whitley county, operated by the Jellico Coal Mining Co. On December 4th, Jimmie Brooks, a boy thirteen years old, while working in a room with his father, was killed by fall of rock. No other detail of the accident has been furnished to this office.

The sixth and last death of the year occurred in the Tow Wad mines, Whitley county, operated by Bryant Brothers, being the second death in this mine during this year.

The report of the operators to this office of this casualty says:

"On December 7, 1898, Wm. Brotherton, an entry driver, was crushed by a fall of slate, while working seventeen feet ahead of props. He died at 8 p. m., the same day. He left a wife and six children. Was attended by the railroad surgeon from Somerset. The injury was to his hips and spine, kidneys and bladder. The accident was particularly uncalled for and unfortunate, and seems to have been caused by the desire of the miner to get out as much coal as possible while the run was good in the early part of the day, and to set his props afterwards. He had a particularly good shot in the coal, which had broken back to a large hill seam, which was not visible at the time. He continued loading his coal out, until he had excavated all the coal out, up to the hill seam, and leaving no props behind him, the slate dropped. He virtually worked under a dead-fall and pulled out the trigger in taking out the coal to the hill seam. The bank boss had been in his place that very morning, not one hour before the accident, and told him to prop his place at once, and he had promised to set a whole car load of props. He had three in his place, and promised to set them. He promised the bank boss to have the driver bring him props at once. With that understanding, the bank boss left. A track layer also laid his track just before the accident, and noticed the slate working. The driver says, he did not ask for props at all, and did not have any piled up. Two men working near him say the slate gave no warning before falling so far as they could hear. They were turning a room twenty-one feet from Brotherton. The slate that fell was eight inches thick and ten feet long and fifteen feet wide."

Not one of the foregoing fatalities can be said to have resulted from any defective condition of the mines where they occurred.

Returning to relight the slow squib, before it had time to discharge the blast, was a fatal mistake, and the death that followed the shot, as well as the death from fall of coal, and the one coming from contact with the mining machine, resulted clearly from mere mine operations, connected alone with the actions and responsibilities of the unfortunate victims.

The two deaths from fall of slate evidently came from sudden

and temporary causes, and from risky operations on the part of the men who were killed, as they had knowledge and warning of the danger, and by the exercise of ordinary care could have avoided injury. None of these indicate in the least degree what may be termed defective or bad mine conditions, such as the law requires discovery and reparation on the part of the officials of this office, who are not required to visit or inspect the mines more than once in every four months.

It is a matter of much gratification that we record that during the first whole year of the administration of this office by the present incumbents that the production of the mines was the largest ever known, and that the fatalities were reduced to a number equal to the lowest ever reached in any one year since the office was created.

All things duly considered, we have no hesitation in saying that the record of 1898 is the best in the history of this office, and we congratulate the mine officials, and mine employes of the State for their diligent co-operation and for the important part performed by them towards bringing about such favorable results. Considering the special causes of these fatalities, and the causes and character of the non-fatal injuries, we are constrained to say, that the year's work strongly testifies to the existence of the three essential prerequisites to successful and profitable mining to-wit, good mine construction, good mine conditions, and good mine management on the part of mine officials rarely if ever equaled and never excelled in any mining community of the world.

In like manner does it testify to the watchfulness, skill and efficiency of the mine employees, for after all has been done that can be done by the most painstaking mine officials, there are constant dangers to be avoided, and the final safety of the employees depends alone upon their vigilance and faithfulness in carrying out mine regulations, and in looking out for their own personal safety.

A further consideration of these fatalities with reference to the months when they occurred and the tonnage of coal produced each month, makes prominent the following interesting facts: During

the eight months of January, March, April, May, July, September, October and November, there were no fatal accidents, and 2,334,779 tons of coal were produced.

February, with two deaths, produced 303,996 tons.

June, with one death, produced 201,487 tons.

August with one death, produced 250,592 tons.

December, with two deaths, produced 451,277 tons.

With reference to the output of successive months, in which there was no death, in comparison with the output of the months when the deaths occurred, the following table is presented:

MONTH.	Tons Mined.	Deaths.	Tons per Death.
January	354,862	..	
February	303,996	2	151,998
March	757,819	..	.....
April .....		..	.....
May		1	201,487
June	201,487	..	.....
July	219,862	..	.....
August	250,592	1	250,592
September	1,002,234	..	.....
October .....		..	.....
November		2	225,638
December	451,276	2	

I will further mention the facts, that three of the six deaths occurred in Whitley county, and that two of them in the mines of one company, Bryant Brothers, that produced but 28,006 tons during the entire year.

NON-FATAL INJURIES.

The following pages contain brief statements of the non-fatal injuries without specially classifying them as serious or slight. The counties are taken in alphabetical order.

BELL COUNTY.

On September 7th, J. R. Justice, superintendent of the Mary Hull mine, operated by the Log Mountain Coal, Coke & Timber Co., was severely burned about his head and hands, caused from an explosion of gas in said mine.

The accident occurred in the last room of cross entry No. 18, which is the last entry being driven in the mine.

From the reports given, I gather that on September 1st, Mr. Justice discovered some gas escaping from fissures in this room, and he warned the men who were working in it not to let the gas accumulate, and to watch carefully after firing their shots. On the same day there was a slight explosion of gas that had lodged in the roof of the entry adjoining this same room, caused from the open lamp of a miner, and the fire extended to the room, and it was immediately bratticed up. On the day of the accident, Mr. Justice, indiscreetly, went into the room with an open lamp, to see if there was a further accumulation of gas, and the explosion and injury immediately followed. He was able to get out of the room without assistance, but did not recover from the accident for several weeks, during which time he suffered greatly.

This is the only instance of gas explosion or disturbance reported during the entire year.

Also in the above-named mine, on November 25th, G. W. Crawford, a timberman, while engaging on the main entry was injured by fall of slate. He was sounding the top after a fall, preparatory to setting some posts, when some loose slate fell and knocked the timber he was using across him, breaking a bone in one thigh and bruising him about the head. The report of the accident, received on December 9th, stated that he would be at work before long.

BOYD COUNTY.

On June 4th, in No. 6 mine, at Rush, operated by the Ashland Coal & Iron Co., Wm. Fain, a miner, while working on Simpson entry, was struck by falling slate, which broke a bone in his right leg. Lost time not stated.

Also in the above-named mine, on July 29th, H. C. Wilson had a leg bruised by fall of slate, which caused him a loss of two weeks' time from work.

BUTLER COUNTY.

One minor injury was reported from this county.

CARTER COUNTY.

On February 6th, Wesley Mullins, while engaged in driving an entry in the J. P. Strother mine, was injured by fall of slate. The character of the injury was not stated, except that no bones were broken. The report of the accident, received on April 9th, said: "He has almost fully recovered."

HANCOCK COUNTY.

A slight injury, a broken finger, was reported to Lee Yager, assistant carpenter, at the Breekinridge mine, while repairing a flat-car.

HOPKINS COUNTY.

In No. 9 mine, at Earlington, operated by the St. Bernard Coal Co., on Jan. 4th, Tom Cap, a driver, was injured in his foot, caused by the car jumping the track and catching his foot against a post, and mashing it so as to cause him a loss of ten days' time from work.

Also, in the above named mine, other injuries occurred as follows: On January 15th, John Clements, a driver, was injured by fall of slate, and lost four days from work.

In July, George Miller, assistant shooter, while standing too near

a blast, was injured in his side by flying coal, and as a consequence was off work for thirty days.

In September, Jack Thomas was injured by fall of coal and lost ten days.

In mine No. 11, also operated by the St. Bernard Coal Co., the following accidents were reported: Frank Smith, a driver, had his leg bruised from running into another car, and on October 11th, Ben Fitzpatrick was slightly injured by fall of slate.

On August 5th, Wm. Jeffreys, a cutter in the St. Charles mine, also operated by said company, was bruised by fall of slate, which caused him to lose twenty-two days from work.

In Hecla mine, operated by the Hecla Coal Co., on June 13th, Alex Campbell and Wm. Jennings were slightly injured by fall of slate. Lost three or four days.

On July 14th, an accident occurred in the cage of the Monarch mine, operated by Anderson & Holloman, which caused serious injury to several persons. It was brought about from lowering the cage too fast. A report of the accident made by the operators to this office describes the occurrence and gives the names of the injured parties and the character of injury that each received as follows: "On the 14th day of July an accident, caused by the cage being lowered too fast. The following were injured: John Tenents, sprained ankle and back. Ross Lee, knee out of place. John Still, knee out of place. E. L. Almon, sprained ankle. Wm. McClelland, sprained ankle and instep of foot. One colored boy, who was on cage was not hurt.

"All are now well and able to work, this date, September 23, 1898."

Relative to the above accident, it is proper to say that the said mine was duly inspected by Mr. C. W. Logan during the month of May, and again during the month of September, 1898. Each time the cage and its catchers, and other appliances for lowering and hoisting the same were examined and found to be in good condition. As to their condition between these dates, and especially on July 14th, the day of the accident, this office knows nothing from personal knowledge, but must conclude that they were also in good condition at that time, and that the accident was caused from defective or

inefficient management of the cage on the part of the person who then had it in charge. The regular engineer was not in charge of the cage at the time of the accident.

In Crabtree mine, operated by the Crabtree Coal Mining Co., on August 11th, J. E. Crawford, a miner, aged seventy-one years, was severely injured by fall of coal. The report of the accident made to this office says: "He was mining down a standing shot, and the coal fell on his leg, and crushed it so badly it had to be amputated just below the knee." He survived the injury.

On August 14th, in Barnsley mine, operated by the Co-Operative Mining and Manufacturing Co., Dick Hart had a leg broken by fall of coal, and on September 15th, Walter Scroggin had a foot mashed between a door and a mine car. Loss of time not reported in either case.

In Oak Hill mine, on November 5th, James Whinnell, while pulling down slate was hurt by the same falling on him, and as a result of the injury he lost nineteen days.

In Reinecke mine, operated by the Reinecke Coal Co., on October 11th, P. Q. Roberts was slightly injured in chest and back, from being caught between slack car and post. Lost four or five days.

Mere minor injuries from various causes were reported by the St. Bernard Coal Co., at Nos. 9 and 11 mines, to T. H. Smith, John Calvert, James Gough, Wm. Brown, Robert Cole, and Wm. Haddox.

KNOX COUNTY.

The following accidents were reported from the North Jellico mine, operated by the North Jellico Coal Co.

On February 8th, George Darby, an entry driver was seriously injured in right ankle, by fall of draw-slate. He had fired a shot and did not wait for the smoke to go away before going back, and was caught by the slate that evidently had been loosened by the shot. The report of the accident received on April 25th says: "He is recovering slowly, and may yet have to lose his foot." Nothing has been heard from him since that time.

On March 31st, James A. Digger, a track-layer, while riding out

of the mine on a car, had his collar bone broken by fall of slate. Lost time not stated.

On July 11th and 14th, John Berry and J. H. Fletcher were "badly injured" by fall of slate. The character of the injuries, nor the time lost, was reported in either case.

On August 23d, James Singleton had his hand so mashed between the bumpers of coal cars that his thumb had to be amputated. Lost time not stated.

On August 12th, W. T. Alexander was seriously injured while moving his drill on a car, which was struck by a loaded train, throwing him out and crushing him between the car and side of the entry. He was laid up for about five weeks, but resumed work in October.

During November, Thomas Cain had a leg broken by fall of slate. Lost time not stated.

LAUREL COUNTY.

The following accidents were reported from mines in this county:

In Diamond mine, operated by the Altamont Coal Mining Co., Ed. Haly, finger mashed between cars.

In Pittsburgh mine, operated by the Pittsburgh Coal Co., on December 20th, James Evans, a driver had his foot mashed between cars. Lost ten days.

In Kentucky mine, operated by H. C. Thomson, on October 17th, two men, Commodore Anderson and Luther Lithigo, were seriously hurt by fall of slate on main entry. As a result, they lost about two months' work. There was no loss of limbs.

LAWRENCE COUNTY.

In Torch Light mine, operated by the Reliance Coal Co., G. S. Sellars was hurt by fall of slate (a piece three inches thick and four or five feet long). Both thighs were broken, and side of head also was injured. Lost time not stated.

MUHLENBERG COUNTY.

In Central mine, operated by the Central Coal & Iron Co., in September, James Duncan, a driver, carelessly placed his foot on

track and it was so mashed that he was not able to work for three weeks.

In Powderly mine, operated by the Greenville Coal Co., October 6th, George Ashley, while mining down coal, let the coal fall on his leg, breaking it, and disabling him from work eight weeks.

In the mine of the Memphis Coal Co., on November 13th, Robert Doss, a driver, was run over by a car, which cut off his great toe on one foot. Lost time not stated.

PULASKI COUNTY.

On May 5th, in Barren Fork mine, operated by the Eagle Coal Co., Wm. Linsey, while pulling stumps, suffered a dislocation of hip by fall of draw-slate. Lost time not stated.

WEBSTER COUNTY.

August 22d, in the Slope mine, operated by the Providence Coal Co., Wm. Bastin, a driver, had collar bone broken. The report of the accident says: "While driving, mule kicked at him, and in getting out of reach was struck on collar bone by projection in roof of mine. Laid off from work about four weeks."

In the mine at Sebree operated by the Sebree Coal Co., on September 14th, G. W. Sandafer was injured in his knee while being let down in the cage, caused by the oil can being left unnoticed under the brake, so that it could not be properly applied.

WHITLEY COUNTY.

In the Birdeye mine, operated by the Whitley Coal Co., in February, Thos. Parker, while shoveling slack after a mining machine was slightly bruised by fall of slate. It appears that he had observed the danger, and attempted to pull the slate down, and failed, and was caught by it a short time afterwards. Also in said mine, on June 26th, L. Jones, a machine helper was injured by a fall of rock. The extent of the injury and time lost not stated.

A slight injury was also reported to a miner of the East Tennessee Coal Co., but as the character of the injury nor time lost was stated, we presume it to have been one of mere minor importance.

The following table shows the number of injuries that were re-

ceived by the employees of the several counties, and the character of the same, also the tonnage of coal produced by each county and the greatest number of employees, in the said counties, working during any one month of the year:

COUNTY	Tons.	Employees.	Fatal.	Serious.	Slight	Total.
Bell	86,892	383	..	2	..	2
Boyd	138,695	280	..	1	1	2
Breathitt	17,983	55	..	..	..	..
Butler	32,699	162	..	..	..	..
Carter	114,836	413	..	..	1	1
Christian	66,496	114	1	..	..	1
Daviess	7,141	22	..	..	..	..
Hancock	9,435	69	..	..	1	1
Henderson	89,595	259	..	..	..	..
Hopkins	961,715	1,537	..	8	12	20
Johnson	10,964	118	..	..	..	..
Knox	285,321	550	..	7	..	7
Laurel	272,918	934	..	2	2	4
Lawrence	55,251	148	..	1	..	1
Lee	9,440	95	..	..	..	..
McLean	21,515	75	..	..	..	..
Muhlenberg	268,507	741	1	1	2	4
Ohio	436,518	887	..	..	..	..
Pulaski	79,434	293	1	1	..	2
Rockcastle	3,016	60	..	..	..	..
Union	123,351	334	..	..	..	..
Webster	54,095	175	..	1	1	2
Whitley	396,309	1,219	3	..	3	6
Totals	3,542,132	8,943	6	24	23	53

THE BANNER COUNTY.

It is a notable fact, and worthy to be made prominent by special mention, that Ohio county, with nearly 900 employees, and a production of 436,518 tons, reported no accident of any kind, to any employee during the entire year, and on the record thus made must be considered the banner mining county of the State for 1898..

Several other counties were in like manner free from all accidents, but their working force and output were much smaller than those of Ohio. Union county is entitled to second place.

THE BANNER MINE.

On the same basis of production, employees and accidents, the Diamond mine at Mortons Gap, Hopkins county, operated by the St. Bernard Coal Co., must be made the banner coal mine of the State for 1898. This mine with an average working force of 166½ employees, engaged for 231½ days, and producing 154,548 tons, reported no accident whatever to any employee.

Reinecke mine, at Madisonville, Hopkins county, operated by the Reinecke Coal Co., stands a close second, with a record almost as good as the Diamond. This mine with an average working force of 188 1-3 employees, engaged for 247½ days, and producing 150,863 tons, reported for the entire year only one slight accident, causing the injured party to lose but four or five days from work. Counting to each employee one chance of injury for each day worked the records of the two mines are as follows:

The Diamond worked 38,545 men for one day each, and no one was injured.

The Reinecke worked 46,612 men for one day each, and four or five of them were slightly injured.

The records of several other mines would be as good as these two, if the output was as large.

MINE TIMBERING.

As such a large per cent. of mine accidents is caused from lack of sufficient propping in working rooms and of timbering on entries, especially the former, I think it well to emphasize the necessity of extraordinary diligence in the use of these safeguards against injuries to the thousands of our fellow citizens who are constantly engaged in the hazardous work of coal mining; and to make clear the duties of mine officials, and of mine employees, and locate the responsibilities of each, as relates to the fulfillment of this important requirement of our mining law, in the operation of every coal mine. Human life is too valuable to be lost from failure to set a five-cent prop, as is sometimes done, even after discovery and warning of the impending danger.

The practice of presuming conditions good, and of risking bad conditions when apparent or well known, and of unnecessary and reckless exposure of life and limb, is still getting its victims, whereas vigilance and a little time and work would discover and avert the danger and save life and suffering and prevent want in many homes. The energy and muscle of the intelligent miner is his stock in trade, and is the invaluable property and support of his family, and when he goes down their staff is broken and the home is left desolate, and sorrow and want take the place of mirth and plenty. This strong obligation to his dependent relatives should exercise him to extra effort to save to them their comfort and source of living.

Mine regulations require that operators furnish all necessary props to the miners, either in the working rooms or at the mouth of the mine to be taken from thence to the rooms by the haulers, and no instance of failure to supply props has been brought to my notice. It is the custom in the rounds of inspection to note any lack of propping and to observe the supply of props at hand ready for use,

and I remember of no instance where they had not been provided as required by law and the regulations of the mine. It is much better to prop an apparent safe top or one that is good and without necessity than fail to prop one not good. Presumption and negligence on these lines yearly have their scores of victims.

I reprint, for the study of all concerned, some observations of the writer on this subject contained in the 1897 report, on pages 42, 43 and 44, as follows:

"It is the duty of the mine superintendents and mine bosses to see that all reasonable regulations for the government of their mines are strictly and promptly enforced, and to discharge any employee who fails or refuses to obey them. They have the legal right to do so, and it is the surest and quickest way to enforce such rules. A mere admonition on their part is not enough. They must require the enforcement of such regulations or compel the miner to quit his work. Nor can they leave it merely to the judgment of the miners as to when timbering shall be necessary and escape responsibility in that way. Ventilation, drainage and timbering are the three special safeguards enjoined by the law in order to prevent mine accidents. As nearly 60 per cent. of the deaths, and a very large per cent. of the non-fatal accidents that have occurred in the mines since there has been State supervision, have been occasioned by falls of top, I am persuaded that far too little attention has been paid to this provision of the law. It is the special duty of the underground foreman to personally see to the necessity of timbering in all parts of the mine and compel the miners to do it in the proper manner and at the right time.

"Section 11 of the mining law gives the mine boss (as underground superintendent), full authority to act independently of the wishes or judgment of the miner, and the employee of any mine, who, intentionally or wilfully neglects or refuses to securely prop the roof of any working place under his control, or neglects or refuses to obey any order given by the superintendent of the mine in relation to the security of that part of the bank where he is at work, shall be liable to a fine of not less than ten nor more than fifty

dollars.' Where there is power there must be proportionate responsibility. If it was not intended that the mine boss or superintendent should exercise such supervision and require the enforcement of the legal and adopted regulations on the part of the miners, then why was the law enacted? If it is not to be enforced then it ought to be repealed. But under the law as it now exists it is the plain duty of the mine boss or other person having special charge of the underground work to personally inspect every working place and entry that may be used in the mine operations and determine as to the necessity of propping or timbering, and see that it is properly done, and if he fails to do his duty in this respect then the mining company will be liable for his negligence. I do not want to be understood as indicating that the miner is to be under no responsibility in such cases, as it is equally clear that if he fails or refuses to set all necessary props when required to do so, that no recovery can be had for injury sustained and he is also under special necessity of looking out for his own safety, and while he has the right to expect the watchful eye of the superintendent to warn him of the danger of his working place still he must also watch, and he has no right to expose himself to any known or apparent danger and recover damages for an injury thereby sustained. If the superintendent fails to inspect the working places he can not know where special or apparent dangers exist, and can not, therefore, give any order as to propping, and consequently, no miner could become liable to the penalty of the law and the law would be wholly inoperative; but where he does his duty along these lines with reasonable watchfulness and promptness and accidents still occur, very clearly the mining company could not be held responsible. Mining is a hazardous business and no system has ever been put in operation since the first coal mine was started many centuries ago, that has been free from fatalities and serious injuries. It is not now expected to find such a system, but an intelligent and faithful enforcement of existing regulations will certainly reduce the list of casualties to the lowest point ever known.

"The regulation as to timbering is a legal one and it does not re-

quire any action on the part of the mine officials to make it obligatory on them, but every company on its formation undertakes to faithfully carry out this legal regulation. The law does not say how thick nor how close to the working faces the posts should be set. This must be left to the conditions of each mine. Much depends on the kind of top, strength of pillar, character of bottom, etc., and herein lies the obligation on every mine foreman to study his mine conditions and observe every necessity for timbering."

A strict enforcement of this rule would certainly have saved one life during the year, that of Wm. Brotherton, who lost his life December 7th, by fall of slate in Tow Wad mine, Whitley county. He not only knew of the immediate danger, but the bank boss had been in his room about one hour before the accident and discovered the danger and ordered the deceased to prop his place at once. This he promised to do, but failed to comply with the order. An immediate setting of the props or a peremptory dismissal would have saved his life to his family and State.

I append hereto an editorial found in the American Manufacturer and Iron World, bearing on this subject, as worthy of special study. In the issue of December 30, 1898, in commenting on the meeting and work of the "Central Mining Institute of Western Pennsylvania," the editor says:

"This body of practical coal mining men, holding its annual meeting in Pittsburg this week, has had for discussion some of the most important questions that can affect the coal business as a whole and the lives and safety of those whose duties take them underground. Statistics relating to the number and kind of accidents are of good to the community only if they point a way towards their control. It is almost useless to publish tables of such information if at the same time there are no recommendations as to how the evils spoken of can be brought to an end. There should be discriminations as to the kind of so-called accidents, whether they fall into the category of such events as can be prevented by unremitting attention to the details of mining, with special reference to the safety of the men, or whether they lie beyond human foresight and prevention. It is far

too easy to say that such and such a thing was 'an accident' and could not have been prevented, when as a matter of fact many occurrences could be prevented if due attention were given to all the circumstances attending them. Take, for instance, the falls of roof, etc. More fatal accidents are due to this cause the world over than to any single cause, but in American coal mines generally the percentage of deaths due to falls is much higher than in any other civilized country. It is everywhere recognized that the condition of the roof, etc., in coal mines is a thing that is hardest of inspection and most liable to sudden changes which can not always be foreseen or prevented. The general average of deaths due to falls in the United States is close upon sixty per cent. of the fatal cases, while in England, France, Germany, Belgium, etc., it is about thirty-six per cent. The system of classification may not be the same in these various countries, but it is not likely that such differences as do exist would account for the wide differences in the number of fatal cases. Inspection of the roof, etc., does go on and in some mines, doubtless, a great deal of attention is given to this point. But the fact that year after year the same thing goes on and that the number of deaths from this cause does not materially diminish shows that something is wrong. It is said that in England, for instance, where the long-wall system is generally used, it is possible for inspectors to traverse the haulage-ways and working places much more frequently than can be done here where the work is more scattered. It is also said that the discipline in English mines is more thorough and that regulations are enforced there that could not be enforced here, owing, we will suppose, to the idea that in the United States the factor of personal liberty comes more into play. It is also said that it is more difficult to secure prompt administration of the law in this country than in England, and that the vexatious delays lead to indifference in following the matter up to its conclusion. It is also said that the mine laws should be amended so as to allow prosecutions for neglect of duty, whether from the side of the operators or from the side of the miners, so that the responsibility could be fixed and the penalty imposed. In the discussions that were carried on

at the meeting of the Central Mining Institute, and they were carried on by the very men who have charge of the mines and to whom the public generally looks for suggestions, hardly any two speakers occupied the same ground. It is fair then to assume that all of the causes adduced should be considered, inasmuch as practically all of them were assigned as the reasons for this condition of affairs.

"We believe that the State Inspectors are, as a rule, well qualified for their onerous and delicate duties and that they give a great deal of attention to their business. Our experience with them teaches us that they are an earnest and well-balanced set of men who strive to perform the work laid upon them faithfully and conscientiously. But the root of the trouble lies farther back, and is to be found in the conditions that surround the daily conduct of the business of mining. The inspectors visit the mines as often as possible but it is not their duty to regulate the actual mining except in so far as to make suggestions for the improvement of conditions that fall under their personal notice at the time of the inspection. It lies with the operators and with the miners to say what shall be done towards increasing the safety of the men and the property, for they are chiefly concerned. It is not so much a question of State laws as a question of personal security, and the only concern the general public has with the matter is to see to it that the safeguards thrown around a hazardous business should be such as are taught by a high regard for human life and property."

MINING LAWS.

The necessity for laws to regulate the conditions and operations of coal mines is almost universally recognized. Every coal producing state and country of any consequence has such a law, though most of them have been enacted within the last quarter of a century.

The results obtained, after years of fair trial, have proven their utility and beneficence. They uniformly lead to safer and more comfortable and healthful mine conditions. Much depends, of course, on their faithful execution.

I do not know of the repeal of any such law, but, on the contrary, various amendments have been from time to time added, tending to make them more effective.

As a rule, the employees regard them as a great protection, and look upon suggestions of repeal with disfavor. The business is immense and hazardous and affects humanity in every form, reaching as it does the masses in a thousand ways; in the homes, and through every line of manufacture and trade until every citizen is interested in its protection and success.

The principal aims of all such laws are to procure and maintain safe mine conditions, and the health and comfort of the employees. About 60 per cent. of the injuries, fatal and otherwise, that have befallen the Kentucky miners since the enactment of the State mining law, have been caused from falls of top. These can only be prevented by good timbering and propping.

Much discomfort and sickness arise from bad air, and from the accumulation of mud and water, wherever they exist. To remedy these, there must be good systems of ventilation and drainage effectually carried out in every mine, and the poisonous and explosive gases that yearly cause so many fatalities in the mines of the world, must be discovered and expelled. These and other pur-

poses and the results obtained have yearly testified to the wisdom and value of the various mining laws.

What is true of Kentucky can generally be said of other States and countries.

Perhaps a brief mention of the workings of the law in England will be profitable. The first law providing for the inspection of the coal mines of that country was enacted during 1850. Before that date no cognizance was taken of them except there was an enactment to prohibit the employment of female labor underground. Subsequent acts, variously extending the law, were passed in 1855, 1860, 1862, 1872, 1887 and 1896.

As to the beneficial effects of the law I quote from the 1896 report of C. Le. Neve Foster, Her Majesty's Inspector of Mines, page 4, where he says:

"Statutory regulations and the general advance in technical knowledge have had the effect of considerably reducing the mortality from mine accidents. The results may be summed up as follows: In the five years, 1851-5, the average death rate from accidents in and about coal mines was 4.3 per 1,000 employees. In the five years, 1891-5, the corresponding death rate was 1.5. In other words, the dangers of coal mining have been reduced to nearly one-third of what they were forty years ago. It is not only as regards safety of life and limb that the miner has been benefited; the use of machinery has to a certain extent relieved him from manual drudgery, and the general conditions of his work have been vastly improved."

A reference to the report of Mr. Foster for 1897 shows that still more favorable results were obtained, as only 1.49 employees out of every 1,000 of the underground workers, and only .71 to every 1,000 of the surface workers, were killed during the year.

SELLING VALUE, MARKETS, ETC.

The yearly blanks, mailed to the several mining companies of the State, in order to get information on various lines, connected with the year's output, not provided for in the monthly report sheets, were nearly all filled and returned to the office as requested. Through these, I have obtained the general cost and selling prices of the output, as compared with those of 1897.

Some companies have reported no material change, and others an appreciable and even marked gain, but a majority of the largest producers have reported a material decrease for the year. The general average of the whole State shows an appreciable loss to the operators in disposing of the 1898 product. In many instances the decrease has been heavy and positively hurtful. It was brought about either from an increase in the cost of production, or from a decrease in the selling price, and in numbers of cases from both causes.

An increased cost of five cents per ton on more than 150,000 tons produced by one company aggregates a loss of more than \$7,500. Such is the experience of more than one large company during the year just past, while many smaller ones suffered the same percentage of loss.

These facts are discouraging to operators, and furnish food for grave thought to employees who sometimes press their claims for a wage scale, that can not be maintained without bringing financial ruin upon those whose investments have provided them with work.

Other leading companies were not affected so greatly but still suffered much loss. One of them in answering the questions, relative to the comparative figures for the two years, reported a little increase in the cost, and that the "selling price for 1898 was a fraction over one cent per ton less than in 1897."

Another prominent company reported the cost of production about the same, but the selling price $1\frac{3}{4}$ cents per ton less than in 1897. It also gave the selling price of its product, "Run of Mine," on board cars at the mines for several years past as follows:

	Cents per ton.
1894	72.00
1895	67.99
1896	68.22
1897	65.78
1898	64.03

This is a loss of nearly eight cents per ton during the last five years, and the tendency is still downward. How much lower price, if any, the operators will permit, or can stand, remains to be seen; but in order to continue business further decline must in some way be averted, else there must be further curtailment in the cost of production and transportation.

In another section of the State, a leading operator reported prices practically the same as last year; from 60 cents per ton during mid summer, to 65 cents later in the season.

In another large section of the State, prices were generally higher, but the cost of production was also higher.

How to improve the market for Kentucky coal is a question asked a thousand times over, but as yet appears to be without solution. Everyone knows that economy in the cost of manufacture, and good selling prices, are the best possible trade conditions, in all lines of commerce. These are the coveted aims of every business enterprise, and they alike fulfill the demands of capital and feed and satisfy labor. Low prices produce labor troubles, but good prices dissipate them and add permanency and continued advancement to good conditions. Coal of the same quality must be sold at one price on the same markets, regardless of difference in the cost, which is often great on account of varied local conditions, such as methods of mining and handling the product, thickness of coal seam, cost of freight, etc. All these center into one common level at the

selling end of the line as surely as do the waters of many rivers that empty into one common sea.

Just how to adjust the differences in the cost of machine and pick mining, long and short haul on railroads, and other minor matters, so that the burdens and the profits of the industry shall be shared equitably by the capital and labor employed, according to the relative values of each and insure continued operations on a general cost basis that can compete with the output of contiguous coal fields, are questions for the consideration of the wise. If all these hardships fall on labor, it can not subsist; if all on the operators, they will be driven out of business else their substance will be speedily drained from them. There is much need of candid discussion of all these conflicting interests and trade embarrassments that a spirit of mutual friendliness and concession may be fostered on both sides.

The Kentucky coal field is peculiarly a hard one. Its best markets are largely supplied by other mining sections. Pennsylvania, West Virginia and Ohio lie on the north and east and have the advantage of down-river freight, which is the cheapest in the world, and are in easy reach of all our great river cities and towns and manufacturing centers.

Tennessee and Alabama are on the south, and Indiana and Illinois on the west. Their products must be met in markets much nearer to them than to us.

Notwithstanding such hindrances, much of the State's output has been sold in adjacent States, and some of it in foreign countries. Fully 1,300,000 tons, or 37 per cent., as against 32 per cent. in the previous year, have been thus sold, finding markets in many of the principal cities and towns of Tennessee, Georgia, North and South Carolina, and some of it in Alabama, Indiana and other States. In the very nature of things these facts mean low prices.

The approximate production of these States for 1898 is as follows:

	Tons.
Pennsylvania	109,000,000
Illinois	18,600,000
West Virginia	15,000,000
Ohio	13,500,000
Alabama	6,250,000
Tennessee	2,700,000
Indiana	5,400,000

The output of several leading counties has been marketed outside the State in amounts as follows:

	Per cent.
Hopkins County	60½
Muhlenberg County	60
Whitley County	53
Ohio County	27

Reports from some of the smaller counties show even a larger per cent sold out of the State.

STRIKES.

There were numerous strikes among the coal mine employees during the year in different sections of the State but confined mostly to some counties in the western district. While none were extensive and disastrous as the great "Jellico Strike of 1897," yet their number, extent and duration were sufficient to materially lessen the State's output for the year and in a corresponding degree lessen the amount of wages paid to the employees and the amount of profits made by the operators.

In some counties a new wage scale, known as the "Central City Agreement," as demanded by the local organizations of the "United Mine Workers of America," has been adopted by a number of the mining companies, and in every mine where the demand was made and refused, a strike and suspension of work followed.

The general effect of the "Agreement" is to shorten a day's labor from ten to eight hours and otherwise increase the price of mine labor, and having been the one point of difference and cause of suspension at so many mines, I copy the same herein as follows:

CENTRAL CITY AGREEMENT.

The following agreement entered into in the joint convention at Central City, Kentucky, April 14, 1898, by and between the mine operators (of the Louisville Division of the I. C. and the O. & N. Roads), and their employees, witnesseth:

PICK MINING.

RESOLUTION NO. 1.

Resolved, that the price of Pick Mining for the year ending March 31, 1899, shall be 66 cents per ton, over the District Standard Screen. It is distinctly understood that when any company uses a

shaker screen that screens more than the standard screen, they shall weigh coal in the cars on a run of mine basis.

It is agreed that the ratio of lump coal to mine run over 1½-inch district standard screen shall be based on 62 per cent. going into the weigh box, and this per cent. shall regulate the ratio of lump and run of mine coal whenever any change is made in the price of mining.

That the mine run price shall be 41 cents per ton, an equivalent of 62 per cent. of 66 cents, the price of lump coal.

It is understood that coal shall be mined 2½ feet, and the solid may be shot not more than an equal amount.

RESOLUTION NO. 2.

Resolved, that the price of yardage in entries shall be \$1.00 per yard, but when the entry exceeds 10 feet and not more than 12 feet, the price shall be 75 cents per yard, and no yardage shall be paid in excess of 12 feet.

Should the bank boss and miner driving an entry agree that it is wet, then the miner shall receive 25 cents per yard extra.

RESOLUTION NO. 3.

Resolved, that the price of turning rooms shall be \$3.00 per room.

MACHINE MINING.

RESOLUTION NO. 4.

Resolved, that the price for drilling, shooting, loading and timbering, after the chain and punch machines, shall be one-half of the price of pick mining.

There shall be no differential in loading between the punch and chain machines, on condition that the companies using chain machines brad the coal, handle the slack and take up the bottom.

RESOLUTION NO. 5.

Resolved, that chain machine runners and helpers shall be paid at the rate of \$2.75 per 27 cuts, under ordinary conditions, divided:

\$2.00 to the runner and \$1.75 to the helper; and when they work by the day, the runner shall receive 25 cents per hour and the helper 21 $\frac{7}{8}$ cents per hour.

The punch machine runners shall receive 6 cents per ton, and the helpers 4 cents per ton for mine run coal; and when they work the day, the runner shall receive 25 cents per hour and the helper 18 $\frac{3}{4}$ cents per hour.

RESOLUTION NO. 6.

Resolved, that the yardage for chain machines and punch machines shall be 50 cents per yard, to be divided as follows: 35 cents to the loader, 8 cents to the cutter and 7 cents to the helper in chain machine mines, and 26 $\frac{1}{2}$ cents to the loader, 14 cents to the cutter and 9 $\frac{1}{2}$ cents to the helper in punch machine mines.

RESOLUTION NO. 7.

Resolved, that turning rooms in machine mines shall be paid for by the yard at 50 cents per yard, divided between loaders and cutters and their helpers.

RESOLUTION NO. 8.

Resolved, that the company shall lay all roads and timber all bad places not caused by the miner's own negligence.

RESOLUTION NO. 9.

Resolved, that a square turn shall be kept all over the mines in rooms and narrow work, under ordinary conditions. Half turn to boys between 12 and 16 years.

RESOLUTION NO. 10.

Resolved, that miners absent without notice to the bank boss, for three consecutive days, shall forfeit their working place.

RESOLUTION NO. 11.

Resolved, that any miner loading an unusual amount of slate, sulphur or other impurities shall be laid off one day for each offense.

The weighmaster and the check-weighman to be the judges of such unusual amount, and any miner laid off three times during any one month shall then be subject to discharge.

RESOLUTION NO. 12.

Resolved, that the check-weighman shall have a number to run his account, and shall be allowed to cut each miner to an amount not exceeding \$1.00 per month.

It is distinctly understood that such cuts must be with the approval of each miner.

Any additional cuts can only be made on the written order of each employe, and such orders shall be payable out of the cash balance due to said employe on pay day.

That no miner shall be blacklisted, who does not agree to have check-weighman or other cuts collected.

Union and non-union men shall be employed without prejudice.

RESOLUTION NO. 13.

Resolved, that no mass meeting shall be held during working hours, on or off the companies' premises, when the mine is running, and any one calling a meeting shall be subject to discharge.

No committee shall visit any employe at his working place, except in company with the bank boss, to settle a grievance, and any employe caught out of his working place during working hours, except for satisfactory reasons, is liable to have his turn stopped at the option of the bank boss.

RESOLUTION NO. 14.

Resolved, that all labor shall be paid for by the hour or quarters of hours, and that eight hours shall constitute a day's labor, so far as mine laborers and miners are concerned, but the eight hours shall not affect the engineers, fireman, pumpers, outside teamsters, nightwatchman or special repair work, nor such men as are now paid by the month.

That an eight-hour day means eight hours' work in the mine at usual working places for all classes of day laborers and miners, and

any miner late without reasonable excuse shall forfeit his turn for the day. This shall be exclusive of the time required in reaching working places and departing from same at night.

Regarding drivers, they shall take their mules to and from the stable, and the time in so doing shall not include any part of the day's work, their work beginning when they reach the change at which they receive empty cars, but in no case shall a driver's time be docked while he is waiting for such cars at point named.

That the following scale of wages shall be paid for inside work:

	Per day
Tracklayers	\$1 75
Tracklayers' Helpers	1 60
Trappers	50
Bottom Cagers	1 60
Drivers	1 60
Riders	1 60
Water Haulers	1 60
Timbermen	1 75
Pipemen	1 70
All other inside day labor	1 60

The present outside scale of wages per hour in force at each mine shall remain unchanged, except that we agree that eight hours' work shall receive nine hours' pay.

RESOLUTION NO. 15.

That there shall be no boys employed as drivers, except on straight track, and said drivers shall receive 25 cents per day less than the district scale.

RESOLUTION NO. 16.

Resolved, that employees are liable to be discharged for,

- a. Disorderly conduct.
- b. Gambling and shooting on the company's premises.
- c. Taking coal, tools, timber, etc., without permission.

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

e. Committing a nuisance in entries, airways or the necks of rooms.

RESOLUTION NO. 17.

Resolved, that in the case of a death in the family of an employee, or upon death of an employee, the following rules shall prevail:

a. Death by accident in or around the mines shall lay the mine idle until after the funeral.

b. Death of a grown person or employee, from natural causes, the mine will lay idle on the afternoon of the funeral.

c. On the death of a child or minor, the work will not lay idle, but those wishing to attend the funeral may do so.

The turn lost by the grave-diggers in the last two rules shall be made up to them during the month.

RESOLUTION NO. 18.

Resolved, that we require that married men shall at all times form the majority of all Grievance Committees.

RESOLUTION NO. 19.

Resolved, that in all conferences the employees of each mine, or especially the mine affected, shall be represented by not less than three of the employees of such mine, and that the voting power shall always be vested in such employees, but this does not preclude the presence of any officials of the labor organization.

RESOLUTION NO. 20.

Resolved, that there shall be a Board of Arbitration and Conciliation to adjust all disputes arising under this agreement, composed of three on each side, with power to select an umpire, and their decision shall be final and binding on all parties to this agreement, and those they represent, but under no circumstances shall work stop, and any suspension of work before the decision of the arbi-

trator is received. Such suspension will be sufficient cause to discharge all parties causing the dispute.

RESOLUTION NO. 21.

Resolved, that it is the spirit of this agreement that, in consideration of the co-operation of the mining companies with the U. M. of A., said organization must at all times show, when required, that they control two-thirds of the mine employes of the district making this agreement, and in consideration of such co-operation, the said organization guarantees uniformity and equality of mining and day scale wages with other competitive mines, especially those of Western Kentucky.

This has special reference to the I. C. and O. N. mines for immediate uniformity, but this equality is guaranteed with the Henderson division mines by September 1, 1898.

RESOLUTION NO. 22.

Resolved, that this contract goes into effect May 1, 1898, and continues in force until March 31, 1899.

In witness whereof, we have hereunto subscribed our names, this 14th day of April, 1898.

C. L. FIELD,
SIMON JONES,
J. S. WILLIAMS,
C. W. TAYLOR,
GUY M. DEANE,
Operators' Scale Com.

J. F. SMITH,
JOE. B. REED,
JAMES A. WALKER,
THOMAS R. JEFFREYS,
J. H. WILLIAMS,
Miners' Scale Com.

W. G. DUNCAN,
HYWEL DAVIES,
Advisory for Operators.

W. G. KNIGHT,
JOSEPH SMITH,
Advisory for Miners.

GUY M. DEANE,
Secretary for Operators.

JAMES WOOD,
Secretary for Miners.

TAYLOR MINE.

The mine most seriously affected was the Taylor, operated by the Taylor Coal Co., the largest producer in Ohio county, standing as it did in 1897 as the fifth in output in the entire State. The strike commenced on April 7th and continued until the 12th of October, when mining was resumed. Between these dates no coal was produced and the mine soon became in bad order. However, a few weeks before the resumption of general operations an agreement was reached and mine repairs were begun and the mine was again put in first-class condition. I do not know the basis of settlement, but it is fair to presume that mutual concessions were made. I understand that the "Agreement" was not signed, but all differences were adjusted in a way satisfactory to the parties concerned and work was resumed, but with a decreased force, and has continued without interruption until this date and the force and output of the mine have again reached the normal point.

To give a better idea of the magnitude and effect on the local community of this one strike I give in the following table the average number of employees, the number of days worked, and output of the mine during every month of the year:

MONTH.	Av. Em.	Days.	Tons.
January	180	22	14,946.36
February	176	21	13,730.76
March	168	20	13,085.24
April	164	5	1,902.00
May .....	....	....	....
June .....	....	....	....
July .....	....	....	....
August .....	....	....	....
September .....	....	....	....
October	120	9 3-5	5,573.32
November	150	22	13,254.40
December	145	22	13,675.04
Totals, 1898	157 4-5	121 3-5	76,172.12
Totals, 1897	151 1/4	251	138,932.12

As compared to 1897 there was a loss of the wages of 157 4-7 employees for 129 2-5 days each, and a decrease of 62,760 tons in the production of the mine. Had there been no suspension the production for the year would probably have reached 150,000 tons. From the above table one can easily approximate the losses sustained by both operators and miners. It was a losing business on both sides, and as usual in such cases, those least able to bear the losses suffered most. The profit on the coal that would have been produced and marketed but for the suspension is still in the mine and may yet be gathered by the company under future conditions of the trade, even more favorable than that of 1898, but the wages of the employees is gone, a clear loss forever.

Comparing the business with that of 1897 and considering the increased demand for coal during 1898 and the great activity among the mines to supply this demand, it is fair to estimate that as a direct result of this one strike an average of 160 employees were out

of work for 115 days. I do not know the average daily wages of the employees, but at a low estimate of \$1.50 per day, the loss sustained by them was \$27,600. This amount can not be withheld from any local labor community during so short a time without producing much deprivation and suffering. As to the necessity or advisability of the strike I know nothing and express no opinion, but regret its occurrence and sincerely hope that it will not be repeated. I deem it a duty, however, to portray its general effects that its lessons may be so well learned that its recurrence may be averted.

Work means wages, and wages means bread, and bread means happy homes, but idleness leads to want and brings discontent and suffering and often ends in violence. It will require considerable advantage in a new contract and much time to regain all this loss, and I note that generally in the case of strikes new complications arise and further suspensions follow before such is done.

It is to be regretted that some better method than the "strike" can not be inaugurated to adjust all these differences. A joint "board of arbitration," composed of the wisest and best men among both operators and miners would inevitably settle all these disputes more equitably than by any other method and without a suspension of work. Contracts made on any wage scale can not be filled when the mines become idle, and broken contracts mean certain and permanent damages and losses to the operators, and they will be slow to make contracts of any magnitude unless they have the reasonable hope that the existing mining scale will be maintained until the same can be filled; and no contracts mean no work, and no work no wages, etc.

PIERCE MINE.

There was a strike at the Pierce mine, Muhlenberg county, operated by the Black Diamond Coal Co., commencing on May 11th and ending on August 15th. Between these dates a force of about 80 men were out of work. It was caused by the refusal of the company to adopt the "Central City Agreement." However, it finally did so,

and work was resumed and has been continued under the same ever since.

In the following table is given the average number of employees, days worked and output of this mine during each month of the year:

MONTH,	Av. Em.	Days.	Tons.
January	88	13.25	2,625
February	88	13.25	3,323
March	85	14.40	3,704
April	85	8.50	3,414
May	75	5.00	596
June .....	....	....	....
July .....	....	....	....
August	68	7.00	1,797
September	70	12.05	2,505
October	75	14.50	3,290
November	80	18.00	4,340
December	92	17.00	4,751
Totals, 1898	80 3-5	122.95	30,345
Totals, 1897	68.92	121.75	23,982

DEKOVEN MINE.

A strike was also inaugurated at the above mine, Union county, operated by the Ohio Valley Coal & Mining Co., commencing August 26th and continuing the remainder of the year. At this writing, February 7, 1898, the mine is still idle and there is no indication of a resumption of work. The trouble arose over a demand made for the adoption of the "Central City agreement," which was refused by the company, and an average of more than 100 employees volun-

tarily quit work, and, in so far as this mine and company are concerned, have been idle ever since.

The record of the mine for the several months of the year is as follows:

MONTH.	Av. Em.	Days.	Tons.
January	125	20	6,313
February	125	16	5,397
March	125	18	5,757
April	100	10	2,712
May	100	10	2,857
June	100	12	3,361
July	100	10	3,101
August	100	15	2,950
September .....	....	....	....
October .....	....	....	....
November .....	....	....	....
December .....	....	....	....
Totals, 1898	109 3-8	111	32,448
Totals, 1897	104 2-3	186	50,845

TRADE WATER MINE.

A demand made for the adoption of the "Central City Agreement" caused a strike and suspension of mining at the Trade Water Mines, at Sturgis, Union county, from May 1st to October 1st, but the time was well utilized by the company in making needed repairs and in adding extensive improvements to the mine the character and cost of which are noted in another part of this report. The company finally signed the "Agreement," and the mine has continuously since been operated under it.

The record of the mine for the several months of the year is as follows:

MONTH.	Av. Em.	Days.	Tons.
January	75	14	3,922
February	75	14	3,725
March	75	8	2,109
April	60	6	1,293
May	60	10	2,090
June .....	....	....	....
July .....	....	....	....
August .....	....	....	....
September .....	....	....	....
October	75	16	5,405
November	90	17	8,374
December	90	16	7,733
Totals, 1898	75	99	34,651
Totals, 1897	67	193½	34,719

RANKIN MINE.

There was also a demand for the "Central City Agreement" at the Rankin mine, at Spottsville, Henderson county, operated by the Green River Coal Co., resulting in a strike during the months of September and October, affecting about 80 employees. The company resumed mining with a small force of non-union men, and has since continued in the same way.

About November 10th the strike was declared off, and the old miners generally wanted to return to work at even lower prices than before. Under the new scale the company is paying but 37½ cents

per ton for mining "run of mine," and 60 cents per ton for "screened lump."

The work of the mine during the several months of the year and how it has been affected by the suspension is shown in the following table:

MONTH.	Av. Em.	Days.	Tons.
January	78	19	4,211
February	80	16	4,304
March	89	16	4,054
April	80	12	3,355
May	70	11	3,559
June	74	7	2,907
July	76	9	2,670
August	76	10	3,222
September .....	....	....	....
October .....	....	....	....
November	20	16	679
December	37	21	1,478
Totals, 1898	68	137	29,629
Totals, 1897	64	181	39,778

BASKET MINE.

After the adoption of the "Central City Agreement" there was a strike at Basket mine, Henderson county, operated by the Pittsburgh Coal Co., lasting from September 19th until late in October.

The circumstances and cause of the strike are set forth in an article written in September by Mr. Thos. C. Blair, the mine superintendent, and published in the Henderson Gleaner. It is as follows:

"The miners employed by the Pittsburgh Coal Co., at the begin-

ning of this month made a demand for an advance in wages according to the standard scale made out by their union officials. After a few days considering the matter I concluded to give the men everything demanded. Even drivers and all day hands in the mine were advanced from 10 to 25 per cent and that for eight hours per day instead of ten hours as heretofore. After this the miners, through a committee, approached me with a printed agreement to sign the terms of which were to be binding on the company and the men until the 31st day of March next. After examining carefully said agreement I did sign it in good faith, as I thought a number of resolutions in said agreement would have a tendency to obviate trouble during the existence of the same.

Two of these I hereby quote verbatim. Resolution No. 12, (last clause), "Union and non-union men shall be employed without prejudice."

Resolution No. 22. Resolved, that there shall be a board of arbitration and conciliation, to adjust all disputes arising under this agreement, composed of three on each side, with power to select an umpire, and their decision shall be final and binding on all parties to this agreement and those they represent, but under no circumstances shall work stop, and any suspension of work before the decision of the arbitrators is received will be sufficient cause to discharge all parties causing the dispute."

Notwithstanding the plain statements contained in this agreement, last Saturday week a committee of three came to me in my office, one colored man and two white ones. The former was spokesman, and informed me that the men would not work with James Goodley. I asked the reason why. No reason came. I then suggested was it because he did not belong to the "Union?" Well, all they had to say was he did not belong to the "Union" and they would not work with him. I immediately informed the committee that I would not discharge James Goodley. Then I drew attention to the agreement the men had signed with me, that "Union and non-union men shall be employed without prejudice." Then the contents of resolution No. 20, as given above.

With these facts confronting them on Monday morning following

all the miners quit work and left the mine standing idle and not one of them went to work, and I beg to leave the case in the hands of the public to work out their own conclusions as to who has been mistreated, whether the men or the company."

This strike, like most others, was very hurtful to both the company and the miners. The company lost many orders for coal that they could not undertake to fill because of the suspension, besides other general losses incidental thereto, and the miners finally went back to work at less wages than they were receiving before the strike was inaugurated, as the price of mining had been reduced from 66 cents to 60 cents per ton for lump coal, and day hands that had been getting 20 cents per hour were reduced to \$1.50 per day of ten hours. The company fast gathered a good force and resumed operations and ended the year with great activity.

The record of the company for the several months of the year is as follows:

MONTH.	Av. Em.	Days.	Tons.
January	110	13.50	5,700
February	75	9.00	5,337
March	80	10.00	4,090
April	80	9.25	3,794
May	80	7.00	3,000
June	73	6.50	2,820
July	73	9.00	3,280
August	70	8.00	2,370
September	64	4.25	1,360
October	45	1.50	200
November	90	15.00	3,806
December	100	20.00	6,478
Totals, 1898	76 2-3	113.00	39,837
Totals, 1897	99 2-3	147.50	58,224

MUD RIVER MINE.

The Mud River Coal, Coke & Iron Co., at Mud River, Muhlenberg county, reports a suspension of their mine from August 4th until September 12th on account of the demand of its employees for the adoption of the "Central City Agreement." The company finally yielded and made it the basis of future operations, and mining was resumed.

CARBONDALE.

There was a strike at the above-named mine, Hopkins county, operated by Booth & Glover, from September 12 to October 7th, over the demand of the U. M. W. A. for the adoption of the "Central City Agreement." The organization finally withdrew its demands and the employees returned to work on the terms offered by the company.

FALCON MINE.

At Adair, Hopkins county, the employees of the above named mine, operated by M. H. Enright, refused to work from the 2d to the 23d of August, over a demand made by them for a two weeks' pay day. The matter was settled by an advance of one-fourth cent per bushel for mining, on September 1st, and another one-fourth cent per bushel advance on October 1st, and by making the second Saturday in each month regular pay day.

CUMBERLAND MINE.

There was a two days' strike, from 1st to 3d of March among the employees of the Cumberland mine, at Sturgis, Union county, operated by the Paducah Coal Mining Co., over a demand for the adoption of the "Central City Agreement." The company yielded and work has since been carried on under that "Agreement."

POWDERLY MINE.

There was a strike at the above named mine, Muhlenberg county, operated by the Greenville Coal Co., from April 1st to April 20th, caused by the size of the screen. No mining was done during that month.

SOUTH-EASTERN DISTRICT.

This district was so paralyzed by the great strike of 1897, throughout the Jellico district, that none of great magnitude was inaugurated during the year.

PEACOCK MINE.

There was a strike from May 5th to May 24th, among the employees at the above named mine, at Pittsburgh, Laurel county. Its cause and manner of settlement have not been reported to this office. Its effect can be plainly understood by comparing the work of the mine for May with the work done in April:

April, employees, 60; days worked, 19; tons mined, 2,586.
May, employees, 40; days worked 3; tons mined, 420.

PITMAN MINE.

The Pitman Coal Co., at Pittsburgh, Laurel county, reported a strike among its employees from the 1st to the 15th of May, but did not report the cause nor manner of settlement. I note that the output of the mine was reduced from 3,802 tons during April to 381 tons during May, and the time worked was reduced from 11 days during April to 2 days during May.

LAUREL MINE.

The Laurel Coal Co., at Pittsburgh, Laurel county, reports a three weeks' strike among its employees during May, occasioned by a demand for an increased wage scale, but work was resumed at the price offered by the company. I note that during April the company worked an average of 75 men for 11 days and produced 1,771 tons of coal, but during May it worked but 60 men 1½ days and produced but 223 tons.

EAST ALTAMONT.

There was a strike of two days during September among the employees at the above named mine at Altamont, Laurel county, over the pay day. The matter was settled satisfactorily to both sides.

PITTSBURGH MINE.

The Pittsburgh Coal Co., at Pittsburgh mine, Laurel county, reports a suspension from the 25th to the 29th of November, "caused by men refusing to be docked on account of loading impurities in coal. Settled by men agreeing to be discharged in case they were docked the second time."

PINE KNOT.

Bryant Bros. report a two days' strike at their mine, at Pine Knot, Whitley county, on account of changing screens.

MARY HULL MINE.

The most serious strike of the year in the Southeastern district occurred among the employees of the Log Mountain Coal, Coke & Timber Co., operators of the above named mine, located near Pineville, Bell county. It lasted from June 17 until July 5th, and resulted in most of the employees moving to other mining territory. The company, in a brief report as to the cause of the strike, says: "Reason for strike, would not recognize the authority of an organizer by the name of Evans, who claimed to be acting for the Knights of Labor."

NORTH-EASTERN DISTRICT.

No strike was reported at any of the mines in this district during any part of the year. The operators and their employees were agreed on the mining scale, and work was conducted without friction.

REINECKE MINE.

Among the many coal mines of the State worthy of special mention, the one above named stands in the front rank. It is located in Hopkins county, about one mile west of the city of Madisonville, and is owned and operated by the Reinecke Coal Co., Conrad Reinecke, president; I. Bailey, secretary and general manager; and Louis Feger, superintendent of the mine.

It is a shaft, three hundred feet deep, and has the advantage of a coal vein (No. 11), with an average thickness of six and one-half feet. It has the best facilities for mining and handling the product, and its management above and below ground are in keeping with the genius and enterprising spirit of the operators, and continued success and advancement have rewarded their efforts.

The coal is of excellent quality and sells readily on all markets.

The mine was opened in December, 1888, and its first year's output of about 40,000 tons has grown to more than 150,000 tons during 1898.

Mining is done with eight Jeffrey chain cutting machines, run by compressed air, and ventilation is provided by two fans, one located to the right near the hoisting shaft and the other to the left and some distance in advance of the first named. The main shaft is the place of intake, where an abundant volume of air is drawn into the mine and carried straight to the head of the main entry, where the current is divided about equally by the fan on either side and carried back and distributed through all the workings, taking the several entries and rooms off each in regular succession, thus making the whole mine ventilation the very best.

As will be seen from the map following this article, the main entry runs south, with a return air course on either side and all cross entries are turned at right angles, east and west. The mouths of all entries are supplied with doors and the necks of all rooms, except those that are used as air courses, are curtained so as to keep the air well up to the working faces. Break-throughs are regularly made and brattices are placed where necessary.

The entries are 12 feet wide, and the over-lying slate, varying in thickness from 6 to 24 inches, is taken down, leaving an entry height of 7 to 8½ feet. The rooms are from 40 to 45 feet wide, and contain a double track. The room necks are 12 feet wide and 20 feet long, reaching to the point where the double track begins.

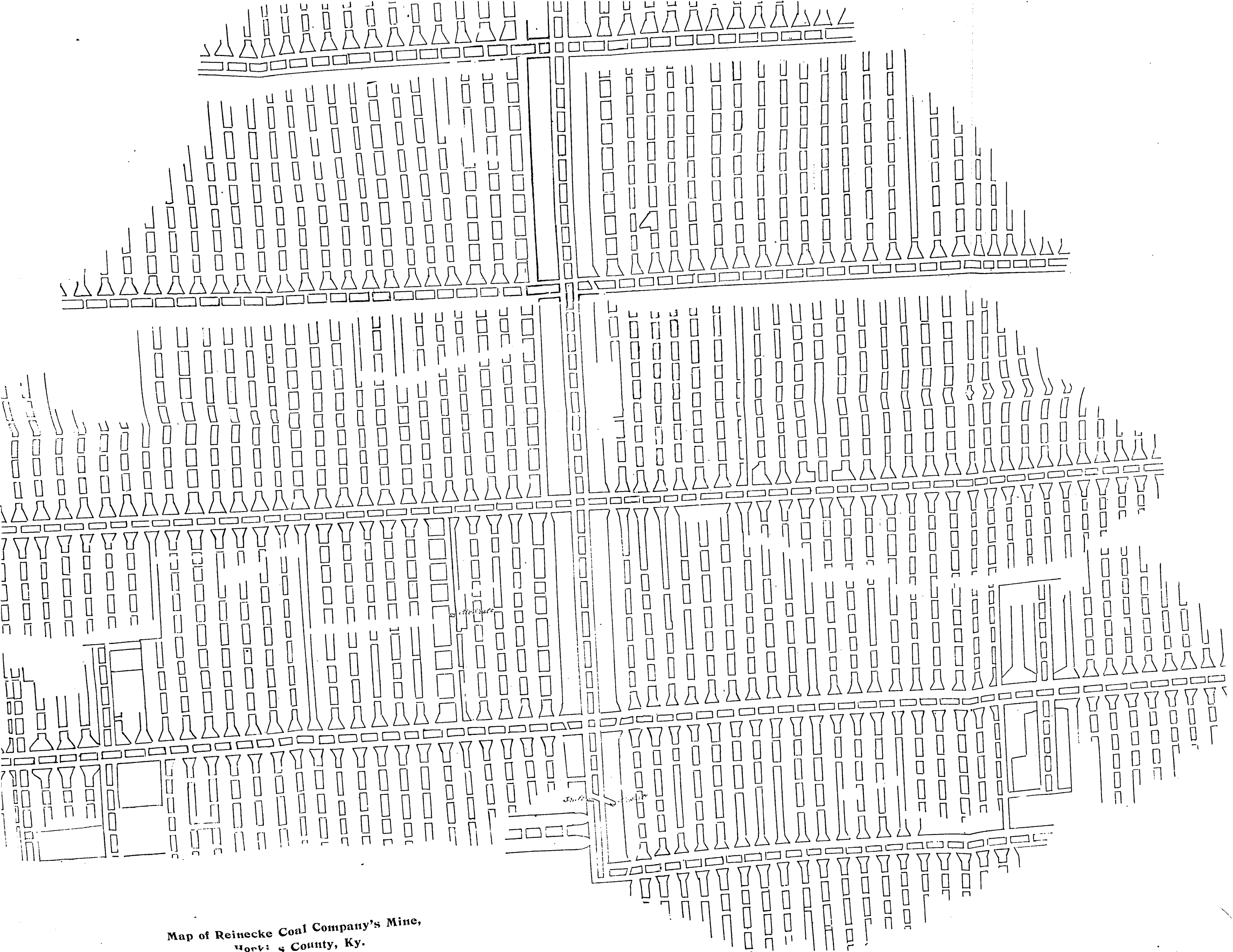
The whole mine in its plan of construction in the extent and character of its equipments, in its manner of operations, and with its superior business management, is a model of completeness never excelled and not often equaled among Kentucky coal mines. Its excellence and success are the results of the combined skill and labors of Mr. Bailey, as general manager, and Mr. Feger, as under-ground superintendent, each in his appointed place. Among the many officials who deserve honorable mention in connection with the coal mining industry of the State none are more deserving than these two gentlemen.

The mine map presented is the work of Mr. Feger's own hands. It shows in its execution commendable engineering skill and it is published for imitation and for the general good that it will do.

The foregoing is briefly descriptive of present conditions. But the company is preparing for greatly enlarged operations in the near future. Already it is installing a complete electric haulage and mining plant. It has put in a 150 K. W. Westinghouse generator, a 225 horse power engine to run this generator, a 12-ton locomotive, and four new boilers 72 inches by 18 feet, with 70 tubes in each boiler. These boilers are to be fitted out in the very latest approved method with automatic stokers, and will produce 600 horse power.

The mine tracks are being relaid with 40-pound new steel rails, thus making the mine haulage speedy and safe, and electric mining machines are to be added.

It is expected that the new plant will be completed by the first of the coming July when operations will be carried on by both air and electricity, as the air plant is not to be abandoned, and the present capacity of the mine, of 800 tons per day, will be increased to about 1,400 tons per day, the attainment of which will no doubt make it the best equipped and most productive mine in all the South.



Map of Reinecke Coal Company's Mine,
Herk Co., Ky.

ELECTRICITY IN MINING.

Having a number of mines that use electricity in many departments of mining, the following editorial article, copied from the issue of "The Engineering and Mining Journal," of January 14, 1899, shows the rapid progress of the movement and indicates that no backward step will be taken on this line of mine equipment.

Commenting on the above heading, the editor says:

"For many years it has been acknowledged that electricity can furnish the power for every line of mining work. At first it began with signaling, then blasting, and there was a pause. The idea of using electricity as a power for heavy work seemed absurd when exemplified to the ordinary observer in a current carried by a little copper wire, not much bigger than a telegraph or telephone wire. It was in Colorado that the first application on a large working scale were applied, and the combination of water and electricity was put in practice. The installation at the Virginus mine is a familiar example.

"Now we find electricity employed for hoisting, pumping, drilling and all the operations of mining. There was a hitch about the drill, the gadder and the coal-cutter, but it seems to have been overcome; so that it is now safe to say that there is nothing done in mining which can be done by steam power directly or indirectly by compressed air or wire rope transmission, which can not be done equally well by electricity—the selection depending upon difference in first cost, running expense and maintenance. The strange thing is that in some cases electricity has helped its competitors, as, for example, in the combination with air compressors.

"Recently the advances have been quiet, but in reality revolutionary. In Ohio and Pennsylvania coal mines electric coal-cutters have made a place for themselves, despite the opposition of those

who desire to maintain hand labor and object to all machinery on general principles, and the antagonism of rival machine systems.

"Underground haulage is another wide field for electricity. The system is particularly applicable in this direction, supplanting the clumsy chains, wire ropes, etc., and lessening the chance of accidents.

"Of recent noteworthy plants we now mention only that of the Colorado Electric Power Company, at Canyon City, a full description of whose plant has already been published in the "Engineering and Mining Journal."

"The advantages of electric power distributed to small consumers are well proved at Cripple Creek. This is a most important point—the installing of small power plants where the mine owners could not afford steam hoisting and pumping works.

"One great field for electricity in mining at present is not in connection with steam power, or a competition with wire ropes or air transmission, but where it can take advantage of water power. The difference between old and new conditions is that formerly the water power had to be above the point of application; now it may be thousands of feet below. If any one had dared propose to a physicist of only a couple of generations ago that this could be done, the idea would have been pronounced incredible. Yet here we have a mechanical paradox in actual working shape."

COAL WASHING.

The following article was written by Mr. Charles C. Upham, of New York City, on "The Effect of Sizing on the Removal of Sulphur from Coal by Washing," and was read before the American Institute of Mining Engineers at its meeting in the city of Buffalo in October, 1898. A copy of the article has been furnished this office by the secretary of the Institute, and it is deemed of sufficient importance to all persons in our State interested in the production of coke, to give it a place in the annual report. The article reads:

"Not long ago a few acres of coal-land in the Connellsville region of Pennsylvania were sold at the rate of \$1,500 per acre. While this was doubtless a "fancy" price, affected by some consideration other than that of the simple value of the coal in the tract, it may fairly be taken as an indication of a progressive and already perceptible diminution in the economically available coal-resources of that famous region. This present and prospective development emphasizes the commercial importance of producing, from the inferior coals of other districts, coke suitable for use in the blast-furnace.

"Many of the bituminous coals of the United States would meet this requirement if sufficiently freed, before coking, from slate and sulphur, and, so far as the removal of slate is concerned, the problem is not specially difficult. There are many forms of trough-, jig- and gravity-washers which easily and cheaply reduce the slate from as much as 20 per cent. in the coal to as little as 8 per cent. in the coke. But to reduce the sulphur from 4 per cent. in the coal (a proportion sometimes encountered), to 1 per cent. or less in the coke (the proportion demanded by the furnace-manager) is not so easy.

"It may be safely assumed as familiarly known to members of the institute interested in this subject that, of the three forms in which sulphur usually exists in coal (hydrogen sulphide, calcium

sulphate and pyrite), the pyrite is the one to be removed, as far as possible, by mechanical treatment before coking. Hydrogen sulphide, being volatile, is expelled in coking; calcium sulphate, or gypsum, is not practically removable by preliminary treatment, and remains in the coke, while pyrites (the most abundant source of sulphur in coal), may be, to some extent, oxidized, with removal of its sulphur, in the coke-oven, but can be, by reason of its high specific gravity, more advantageously removed by mechanical treatment before coking.

"Concerning the removal of sulphur in the oven, it may be observed, in passing, that this result (at best, only partial) seems to depend upon something more than the simple oxidation of the sulphide. The presence of water—that is, of hydrogen as well as oxygen—apparently promotes the expulsion of sulphur in a volatile form. It has been observed that coal charged wet into bee-hive ovens will yield a coke containing less sulphur than if charged dry, and the same is probably true of closed retort-ovens; but in the latter case, no doubt, experience would prove, as it has done in the former case, that wet coal requires a longer time in coking.

"It is therefore evident that the pyrites should be removed, as far as practicable, before the coal is charged into the coke-oven, and it is the purpose of this paper to call attention to an element in this preliminary treatment which is, according to my observation, very generally neglected in the washing of coal in this country.

"It may be proper to say here that this point was forced upon my attention in connection with certain experiments on a large scale (which need not be more particularly described at present), in which the presence of pyrites in coal was found to be disadvantageous. I was, consequently, led to study the general practice in the washing of coal, and to make certain experiments, described below.

"When coke-ovens are located at the mines the slack produced in the ordinary screening of the coal for market is very commonly washed and coked. But in many cases the coal is treated just as it comes from the screens—in pieces varying all the way from an inch-cube down to dust—while in few, if any, cases is the slack sepa-

rated into more than two or three sizes. Of course, in the process of separation by specific gravity, pieces of coal or slate with adhering pyrites, having an average specific gravity, perhaps midway between coal and slate, or even very nearly that of the clean coal, may go to the coal-side of the apparatus; but a preliminary crushing and sizing, reducing all pieces below a given maximum diameter (to be determined, doubtless, for each coal separately, but to be probably not more than one-fourth inch diameter for any coal requiring washing), will separate all the pyrites from the coal or slate, leaving each to the action, in the process of washing, of its own specific gravity. Experimental illustration of this proposition is given below.

"Again, a portion of the pyrites in coal as it comes from the mines seems to be in particles finer even than those of the coal-dust and constituting an impalpable powder. This 'flour-pyrites' floats in air or water. The following experiments were made to test its relative fineness:

"A sample of finely-crushed coal was passed over a 20-mesh screen. The material remaining on the screen contained, by analysis, 1.11 per cent., while that which passed through contained 1.49 per cent. of sulphur.

"Again, a sample of coal-dust was submitted to suction from a centrifugal blower. The part thus taken up and deposited in a separate chamber contained 1.36 per cent., while the remaining portion, not acted upon by the suction, contained 1.14 per cent. of sulphur.

"These results, especially in view of the higher specific gravity of the pyrites, seem to prove conclusively that it pulverizes more finely than the coal.

"The practical importance of this fact will be evident, when it is considered that, in many plants where coal-slack is washed for coking, the washed coal is passed over screens and the water is drained off, to be returned to the washing-apparatus and used again. Obviously, this practice can not give the best results; for on the one hand, some of the 'flour-pyrites' will be left on the coal in draining,

and some will be carried back by the water, to accumulate by successive operations, and ultimately pass off with the coal.

"With regard to both the foregoing suggestions, but chiefly as to the importance of the finer crushing of coal before washing, the following experiments may be of interest:

"They were made upon coal from the Pittsburgh seam, and on a working scale, with samples of several tons. The apparatus employed was a trough-washer, of a type in general use. Since the same apparatus was used in all the experiments, its special merits may be regarded as not requiring attention in connection with this particular investigation.

"A sample, A, of ordinary slack, and a sample, B, of the same slack, crushed to particles .3-16 inch and less in diameter, were treated in the washer and the cleaned material was analyzed. The analyses of the original slack and of the result from each sample, were as follows:

	Ash Per Cent.	Sulphur Per Cent.
Unwashed Slack	10.51	2.876
A, washed	7.97	2.230
B, "	4.56	1.188

"The result from sample B would make coke carrying about 1 per cent. of sulphur.

"Another sample of Pittsburgh coal, containing 11.95 per cent. of ash and 2.121 per cent. of sulphur, was crushed to about 20-mesh size, and washed as before, the result showing 4.86 per cent. of ash and 1.046 per cent. of sulphur. The coke made in a crucible from this sample contained 0.836 per cent. of sulphur—an amount well within the commercial limit.

"In this experiment, the coal and water, after passing through the separator, were led into a settling-bin, where the coal was deposited at the bottom, while the water (and with it the 'float-pyrites'), was conducted away from the top in a stream half an inch deep. So much of the fine pyrites was carried on the surface of the water that the glistening particles could be readily skimmed off with the hand.

"Additional experiments made with other coals have shown that the critical size at which an almost complete division of the coal and pyrites takes place varies with coals from different districts and beds. In designing plants for coal washing, the proper fineness of crushing should be determined beforehand by careful experiment.

"As a result of the observations and experiments above described, I have been led to believe that, by due observance of the conditions indicated, coke of good quality could be made from many coals not now considered as suitable for that purpose, and many inferior cokes now in the market could be greatly improved."

THE BLAINE OIL FIELDS.

The recent development of extensive oil territory near Blaine, in Lawrence county, is a matter of more than local importance. The field promise to be very productive of a high grade of lubricating and signal oil, and its further development will be watched with much interest.

A quantity of the oil has been analyzed by Dr. Alfred M. Peter, of the Kentucky Experiment Station. His certificate of analysis, under date of July 2, 1898, is as follows:

"The density of the oil was found to be 26.3 B. (O. 896 Sp. Gr.)
A fractional distillation gave:

"Oils distilling below 300 F. too light for burning.....	1 per cent.
"Oils distilling between 300 and 600 F. heavy burning oils of density 38 B. (0.830 Sp. Gr.)	26 "
"Residue of heavy paraffine oils, loss, etc.....	73 "
	100 "

"This petroleum is a heavy oil from which headlight and signal oils and lubricating oils may be prepared. It is also suitable for lubricating in its crude state.

"ALFRED M. PETER."

Mr. James Gray, one of the principal promoters of this new enterprise, at my request, has written a very interesting description of the territory and work of development, which I think well worthy a place in my report, and I give the same herewith under date of August 9, 1898. He says:

"Before entering upon a general description of this territory it may be well to mention a few circumstances that led up to the

development of this field. First, all known oil belts run in a north-east and southwest direction, and a line drawn on a United States map, commencing at Richburg or Boliver, New York (the extreme northeastern end of developments), and running to Rugby, Tenn., will be found to pass through all the rich producing fields of New York, Pennsylvania and West Virginia. It is nearly a 45 degree line, and embraces all of the developed territory where a high-grade oil has been found. There are, of course, breaks in the belt, where dry territory has been encountered, varying in extent from a few rods to several miles, but whenever the belt is again found it will be seen to adhere faithfully to the line. This grade of oil is always found in sand rock (so-called), oil sands, nearer in limestone or grit, like the cheaper Ohio and Indiana oils. A producing sand in one field may, and frequently does, outcrop in another equally productive district, but if it lines up satisfactorily other sands are drilled after and very often found, thus opening up another recess in nature's hidden storehouse.

"The portion of the great oil fields southwest of Pittsburgh, Pa., and passing through West Virginia, is known to the trade as the lower southwestern field, and draws its entire production (with few local exceptions), from what is known as the 'Big Injun Sand.' This sand, although extending over a large area of territory, first becomes productive at Tidioute, in Northern Pennsylvania. This sand becomes barren in Alleghany and Washington counties, Pennsylvania, only to reassert itself in Green county, Pennsylvania, where its great producing and staying qualities were thoroughly demonstrated by the conduct of the famous Foner well, and again at Sistersville, West Virginia, and with a few local exceptions where the stray 'Gautz Suee sands' are found, the production of the lower southwestern field is derived from the 'Big Injun Sand.' It will be seen that the line on our map crosses through Lawrence county, Kentucky, at a point near the present development. This in itself was important, but certain other indications had more influence. Geological facts were secured. The Ferriferous lime was located on the hill above Louisa, 750 feet above sea level. The

Pittsburgh coal outcrops between Louisa and Catlettsburg, Kentucky, the Pittsburgh salt sand was found at a well drilled at the mouth of the Big Blaine creek, and again at Louisa in a small gas well drilled on a town lot. With these facts before us and a perfect knowledge of the dip in certain formations per mile in certain directions, reduces the location of the oil sands, if they exist, to a mathematical certainty. We have used these rules making a hypothetical log of a well before drilling, and proved it by actual measurement after drilling the well to a degree almost surprising. In this manner we were able to identify the 'Big Injun Sand' in this field, as the one from which we derive our production, as well as from the general appearance of the sand itself. It will be noticed that the gravity of the Sistersville, West Virginia, oil is 46, while our oil shows at the well but 24. This is accounted for, we think, on the theory that the gases and lighter hydro-carbons have been escaping or seeking higher levels.

"There are three wells now down in this field. We completed our first well on January 7, 1898, and have been pumping it constantly, night and day, ever since. We have a well now drilling which will be done about the 20th inst. The average depth of these wells is about 400 feet, and from what is now known of the field we think it will extend over a considerable territory. The present developments are on the Big Blaine creek, about twelve miles southwest of Webbville, which is our nearest railroad point, from which place daily mails are received. Webbville is on the Eastern Kentucky railroad about forty-five miles from Riverton, the Ohio river end of the road.

"We are about ten miles southwest of the big coal vein on the Cats Fork of Blaine. That district also abounds in surface indications of oil and gas in addition to the largest and best vein of unworked coal (close to market), in the United States. The general character of the country is broken, but the bottom lands are very productive, the principal products of the farmers being corn and hogs (and perhaps a little corn whisky.)

"The oil developments of Kentucky are now in their infancy. It

is, from the very nature of things, bound to become a great industry. But little is yet known of the Blaine lubricating oil fields, and yet large sums of money have been and are being spent in developing the field. It is, beyond doubt, the finest grade of lubricating oil ever discovered, and commands a ready sale at 35 cents per gallon. We were forced to give up negotiations with a large Eastern railroad at better prices because we could not, at the time, contract to supply what oil they required, but we feel confident another season will find us able to fill all orders."

COAL COST SHEETS.

Successful mining must be brought about through intelligent and systematic effort. The primary considerations are methods and cost of production. These well guarded on all lines will maintain the cost of the product as a whole within limits that will insure it a living chance on the general market, where the sharpest competition must be met.

The operator that keeps merely a cash balance sheet or an account only of his gross receipts and expenditures will never know the economic, and losing parts of his business, and can never better it by lessons of experience he has failed to learn. But if he will prepare and carefully study a cost sheet on every line of mine work he will soon discover the abuses, if any exist, and be able to correct them wherever found, and can press his venture with assurance, or foreseeing the evil, withdraw before the day of disaster comes. Profits on one line that are needlessly set off by losses on another are doubly discouraging.

I append hereto an article and blank cost sheet prepared on this subject by Mr. J. J. Ormsbee, of Tracy City, Tennessee, and read before the "Engineering Association of the South," which no doubt will be of much interest, as follows:

"The value of cost accounts, or statements giving more or less in detail the cost of the various operations and items connected with mining and preparing the coal for market, is recognized by most colliery superintendents and mining engineers. Many in fact, consider the cost sheet almost as indispensable an element of the regular work as the cartridge for blasting down the coal. But there are some who are satisfied to remain in ignorance of what their product is costing them per unit, content so long as the monthly or yearly balance sheet shows a credit to profit and loss account. It seems

scarcely probable that such officials, if at all worthy of filling their positions, can ever have had experience with a properly made out cost sheet, its advantages being so evident that, once begun, its periodic calculation will never be abandoned. Except in the case of a very small mine it is impossible for a superintendent or engineer to have a personal acquaintance with every separate particular of expense. But an itemized cost account shows at a glance the variations in each department of the work and any unusual expense can be noted and the necessary investigation confined to the particular department concerned.

"As a check on mine foremen and under foremen, there is nothing better than a properly itemized cost sheet. They will watch most carefully all sources of expense when they feel that their superior officers have a means of knowing just where the money goes. Suppose in a large mine, that an increase is apparent in the cost of hauling for instance, and that an examination shows more mules and drivers to have been used than during a previous period. The reason for this can be asked for at once and an explanation of the additional expenditure secured. Or, again, suppose "dead work" costs more than usual. The explanation sought may show that one miner has met with an unusually hard rock in his entry, entitling him to more pay per yard; that another has been troubled with unexpected quantities of water; that perhaps it has been necessary to take town top to heighten a certain part of the haul-way and so on. These items separately might not seem worthy of special report by the foreman and probably would be unknown, in part at least, to the superintendent, but a call for an explanation of the increased cost of 'dead work' will bring them to light.

"To the general officials and to those directors who really interest themselves in the business they are supposed to direct these accounts are also of much value. Besides the information conveyed by the figures as to dollars and cents, the cost account may be taken as an instrument for measuring the capacity of their officers at the mine, giving due weight of course, to varying natural conditions at different places. A concern might have two mines, of ap-

proximately equal outputs, yet the profits at the two might be quite unequal. Good cost sheets will provide a means for determining whether this is due to incapacity of the officials at one of the mines, or to a difference in conditions at the two places. The man whose costs are the higher has an opportunity to show in detail just where and why his results are not so favorable as those at the other mine. An explanation based on cost sheets, the items having been methodically separated and reported regularly over a more or less lengthy period, is likely to carry more weight than a mere general statement without any such figures to back it.

"Another party, to whom the cost accounts would be of great interest, if not of real value, is the investor or stockholder in the operating company. But he as a matter of fact seldom sees any figures as to cost per ton and is more easily contented than any of the others mentioned, provided a satisfactory showing of the profits can be made. Occasionally a concern is found in whose annual report appears a detailed cost. But such an occurrence is so rare as merely to prove the rule that cost accounts generally are considered as secrets only to be confided to the inner circle of officials. Doubtless in some cases a general public knowledge of the figures as to cost of production might be disadvantageous to the mine or company. But in others the only reason for secrecy is the false conservatism that appears to consider the affairs of a stock company as concerning only its directors or higher officials.

"Cost sheets may be rendered at various intervals. As a rule, those presented to the stockholders by a few companies are annual statements. For the directors or general officials of a company it is customary to make them monthly. For the local officers, even where the value of cost sheets is recognized, it is seldom that they are made out at shorter intervals than this. The reason generally assigned is the cost of bookkeeping necessary. But this difficulty is more imaginary than real. By arranging the names in the time book conveniently and by a scheme of estimates for items not obtainable directly from the time book, daily cost accounts may be issued that will require certainly not over two hours' time of one clerk each

DAILY COST ESTIMATE.

"Blank" Coal Co.

Mine No. 189..

Day's				Month's			
Output..... tons.				Output..... tons.			
Cost				Cost			
Total		Per Ton		Total		Per Ton	
			Mining				
			Dead Work.				
			Timbering				
			Hauling..				
			Bank-work(outside)				
			Bankwork(inside)				
			Pumping				
			General Expense				
			Total Labor Items				
			Hauling - Fuel				
			Pumping- Fuel				
			Tools and Suppl's				
			General Expense				
			Grand Total.				

Remarks—

FIG. 1.

day. Balance this against the advantages to be derived from figures of cost which keep a superintendent closely in touch with the details of the different departments under his charge and the verdict must needs be in favor of a daily sheet. These may be so closely figured, with no more work than that mentioned, that when compared with the monthly cost accounts made up from the general books after all charges have been entered, the variation between the cost shown by the daily estimates and the more accurate monthly statement will be perhaps only a fraction of a cent.

"The form of the statements varies with the requirements of each concern using them. One essential is that the arrangement should be such that the information is plainly conveyed and the general result obtained at a glance. Figure 1 gives a form suitable for a daily estimate that has been tried and found satisfactory in practice. The total and itemized costs for the day are found in the left hand side of the sheet, while the costs from the first of the month to and including the date of report are shown in the right hand columns. It is usual to give the cost per ton in cents and decimals thereof and not in percentage of the total cost.

In making out monthly sheets it is interesting to give the cost of coal during the same month of the previous year, or of two years back, such comparison showing whether the progress towards a minimum cost is satisfactory or not.

ILLINOIS COAL IN 1898.

Following is a summary, prepared by the Labor Bureau, for the year ending June 30, 1898:

Number of counties producing coal	52
Number of mines and openings of all kinds	881
New mines or old mines reopened during the year	120
Mines closed or abandoned since last report	90
Total output of all mines in tons of 2,000 pounds	18,599,299
Estimated possible output with present equipment	41,082,925
Number of shipping mines	329
Output of shipping mines, tons	17,655,561
Number of mines in local trade only	552
Output of local mines, tons	943,388
Total tons of lump coal	14,208,795
Total tons of other grades	4,390,504
Total tons shipped	15,596,388
Tons sold to local trade	1,995,696
Tons consumed (or wasted) at the plant	1,006,715
Average days of active operation for shipping at mines	174.7
Average value per ton of all lump coal at the mines	\$0.918
Number of mines in which mining machines are used	57
Average home value of total product	\$14,567,598
Number of mining machines in use	398
Number of tons under-cut by machines	3,544,726
Average number of miners employed during the year	26,420
Average number of other employees	8,506
Total employees	35,026
Number of men at work underground	31,503
Number at work on the surface	3,423
Average price paid per gross ton for all hand mining	\$0.4409
Average price paid per gross ton for machine mining	\$0.3154
Number of kegs of blasting powder used	378,954
Number of men accidentally killed	75
Number of wives made widows	45
Number of children left fatherless	112

Number of men injured so as to lose a week or more time	438
Number of gross tons mined for each life lost	247,991
Number of employees to each life lost.	495.7

Comparative output by districts:

	Tons, 1897.	Tons, 1898.
First	2,937,980	2,209,362
Second	2,738,408	2,551,110
Third	575,199	721,846
Fourth	2,916,162	2,572,059
Fifth	5,009,102	3,925,690
Sixth	3,558,405	3,459,932
Seventh	2,337,502	3,159,300
The State	20,072,758	18,599,299

OIL AND GAS IN NORTHEASTERN KENTUCKY.

By G. H. DIMICK, of New Dominion Oil and Gas Co.

The future of Northeastern Kentucky, as to the production of petroleum and natural gas, seems to be full of promise.

During the past five years numerous test wells have been drilled from Knott county, on the southwest to Warfield on the northeast, and in every instance have either found considerable quantities of oil and gas or furnished indications favoring farther exploration.

A series of white sand rocks, with more or less conglomerate formation extends throughout the length of this district, and covers many miles in breadth. The evidence of the drill in passing through these rocks justifies the hope that oil and gas in paying quantities will be found at several different levels. The nature of the formations must necessarily give to the trade what is known as "Pennsylvania," or high grade oil.

Development thus far has shown the territory to be very prolific in salt water from rocks where the operator looks for the abode of petroleum; but this, instead of being a source of discouragement, only directs the selection of such localities for investment as furnish an uplift sufficient to carry the formations above the salt water horizons.

The prospective oil rocks belong geologically to the sub-carboniferous measures with the base of that group represented by a limestone usually about two hundred feet thick. Below this limestone, deep drilling has heretofore developed nothing of promise, and would seem to advise the operator that he must look for oil and gas in this field at depths ranging from seven to sixteen hundred feet below the surface of the valleys.

At the present time operations are being prosecuted by the

Triple State Natural Gas and Oil Co., The Corning Oil Co., and The New Domain Oil and Gas Co. Much the greater part of the work has been done by the latter corporation, it having drilled thirty-five wells with several more under way.

The district under consideration is very remote from railroad transportation, and would require a pipe line of a hundred and fifty miles to place it in connection with the general system which distributes oil for home and foreign consumption. Owing to these conditions oil can not be marketed until it is found in quantities sufficiently large to justify the building and maintaining of transportation for freight, by rail, into the country and the construction of a pipe line for the outgoing oil.

The situation also throws the burden of proof upon the shoulders of the force working at present in the country, for other operators want quick returns for successful work and will only go into such fields as promise instant market for the product of their wells.

Prolific oil territory thus far found has been confined to Right Beaver creek, extending from the mouth of Salt Lick several miles down the stream. With a market at hand this locality could doubtless be made to produce from three to five hundred barrels per day of 46 gravity oil.

Gas in very considerable quantities has been found at other points in Floyd and Pike counties; but the Triple State Natural Gas and Oil Co. proposes for the present to place in market the product only of Warfield and other points eight or ten miles distant. That company is approaching the completion of a ten-inch line reaching the Ohio river at Catlettsburg, and intended for the distribution of gas to the towns of the Ohio river from Huntington, West Va., to Ironton, Ohio, inclusive, with a probable extension to Portsmouth. The plant will cost about one million dollars.

The other companies have expended in actual development for oil and gas about two hundred and fifty thousand dollars.

The New Domain has erected two iron tanks of about sixteen thousand barrels capacity each on Right Beaver, and connected the same by three miles of pipe, with such of its wells as will flow.

They have put about fifteen thousand barrels of oil into this storage.

The Corning Oil Co. is holding a small amount of oil in wooden tanks at the wells.

From the degree of present success, and the lessons that are drawn from wells, which instruct while they fail, I am strong in the belief that the year 1899 will place Northeastern Kentucky in the list of profitable oil fields, with open markets and crowds of operators seeking for places to push the drill.

COMPRESSED AIR HAULAGE.

(As used by the Ashland Coal & Iron Co., in operating its No. 6 mine, at Rush, Boyd county.)

By JAMES HERON, Superintendent of Mine.

In the summer of 1896 the question of mechanical haulage for the above mine was taken up, and after investigating the various systems, wire rope, electric, and compressed air, the latter was adopted.

The plant, consisting of a Norwalk three stage compressor, 6,500 feet of pipe line, 3, 4 and 5 inch double strength pipe, and a locomotive engine, built by Burnham, Williams & Co. (Baldwin Locomotive Works), was installed by October, 1896. The air is compressed to 700 pounds in the pipe line and drawn off at two charging stations, one outside the other inside the mine, 2,500 feet from the portal.

The engine, which is of ordinary locomotive construction, has two cylinders, 9 by 14 inches, and is fitted with three high pressure, and one low pressure reservoirs. The high pressure tanks have a capacity of 140 cubic feet and are all connected by copper pipes. The connection between the high and low pressure tanks is fitted with a specially constructed valve, which regulates the pressure used by the piston, and which is seldom raised above 120 pounds per square inch, but it can be either increased or decreased at will, and instantly. The piston pressure of 120 pounds, or whatever amount is required, is steadily maintained until the air in the high and low pressure chambers are equal, when they fall equally until the air is exhausted.

The connection between the engine and pipe line is made by an

ordinary ball and socket joint, and the time used in charging the engine when the pipe line pressure is 700 pounds in one minute. The charge taken into the engine tanks depends on the work to be done, but we seldom charge above 550 pounds, and this is done in the time stated.

The haul is about one mile, with the grade against the load in some places $1\frac{1}{2}$ feet per 100 feet. An ordinary trip consists of about forty wagons, weighing a little over one ton each. The engine has taken out per day 750 tons of "run of mine" coal.

At the end of two years' constant use the only repair has been the turning down of the engine tires (with oil and waste), and the expense is covered.

The simplicity of this system of haulage is one thing to recommend it. An unskilled workman can operate it with as much safety and economy as an engineer. The results here have been satisfactory, so much so, that a second locomotive has been added, and the haul extended and will soon be covering a distance of two miles.

I would not advocate compressed air as a superior motive power to all others in mine haulage, but will say, with thick veins and moderate grades it will compare favorably with electricity. It is less costly to maintain. It does not require the attention of an expert to keep it in order.

While this may be said in its behalf in mines where the top and bottom are hard, the installation of electricity is less costly, as an electric motor of equal power can be built so much smaller, which, under certain circumstances, is a consideration not to be overlooked. Then again, on heavy grades and very thin veins both air and electricity may be shut out, and the "wire rope" overcomes all obstacles successfully but distance. The compressed air locomotive builder advocates the use of his engine as being a help in ventilation. This plea should not be too highly valued by him who contemplates the introduction of air. The engine, which must of necessity be large, comes so near filling the channel in which it is moving and at a velocity in excess of the ventilating current, it is impossible to maintain a steady flow of air, and on this account a

separate intake and return air way from the entry on which the engine travels is necessary to have a current moving continuously in the one direction.

The conditions of the mine have been favorable to the compressed mode of haulage and the results have justified the selection alike to safety and economy.

COMPRESSED AIR LOCOMOTIVES.

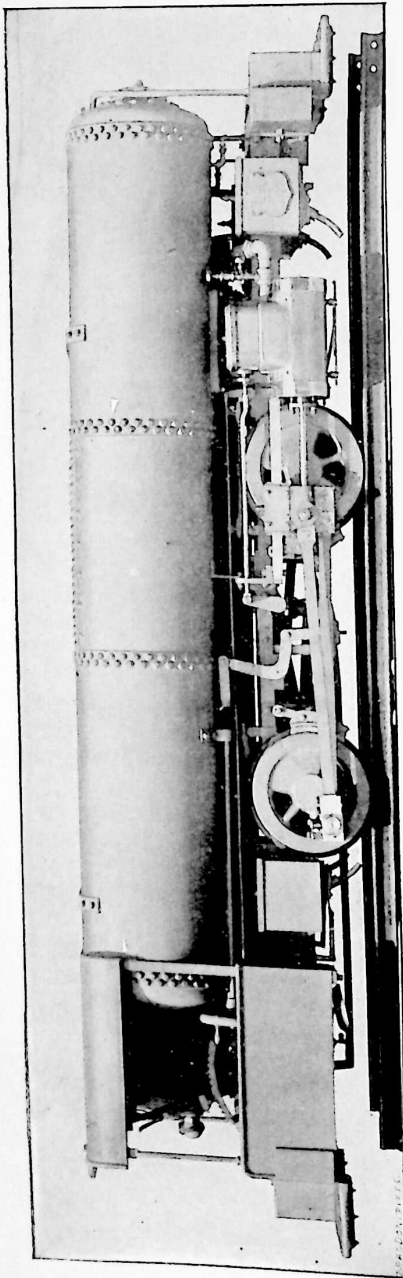
Opposite this article are photographs of two compressed air locomotives, manufactured by H. K. Porter & Co., Pittsburgh, Pa., and extensively used in the mines of that State.

The larger one is used by the Ashland Coal & Iron Co., at Rush mine, Boyd county, and its satisfactory work is described in an article contributed by Mr. James Heron, the mine superintendent, under the head of "Compressed Air Haulage."

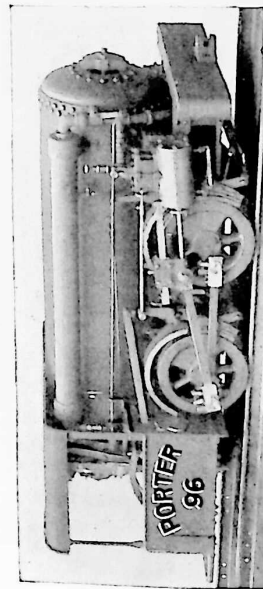
"Its cylinders are 9 inches in diameter by 14 inch stroke. It has four driving wheels 26 inches in diameter, and its total weight is about 24,000 pounds. Its gauge of tract is 43½ inches; height above rail, 5 feet, and pressure in main tank is 600 pounds."

The smaller one is used by the Peerless Coal & Coke Co., at Vivian, West Virginia.

Its cylinders are 5 inches in diameter by 10 inch stroke, and its weight is 10,000 pounds. Two of these locomotives take the place of mules for operating cross entries, gathering loaded wagons from the mine rooms and returning the empty wagons.



COMPRESSED AIR LOCOMOTIVE. PAGE 129.



COMPRESSED AIR LOCOMOTIVE, SMALL SIZE. PAGE 129.

MACHINE MINING.

The tendency among Kentucky mine operators is more and more toward machine mining. It is much faster than the pick method and operators claim that it produces a better grade of coal, that is more lump and less slack or waste. Where mines are well equipped it materially lessens the cost of the output without affecting the wages of the employees, though their number is lessened to the same production, but such is the inevitable effect of all successful machine labor, and they must be accepted as an important and fixed factor in coal mining.

During the year fifteen new mining machines were installed, embracing four mines, theretofore run altogether by picks. Thirteen of these are run by electricity and two by compressed air. Particular mention of all these are made in another chapter of this report under the head of "Mine Improvements."

Compressed air, as a motive power, still has the lead. Of the 171 machines in use at the close of the year, 122 were operated in that way. New plants are in contemplation and a larger per cent. of machine-mined output may be expected during 1899 than that of 1898.

Commencing with 1895 I now give the yearly tonnage and per cent. of the bituminous output produced with machines as follows:

YEAR.	Per Cent.	Tons.
1895.	Nearly 26	809,007
1896.	Over 30	957,329
1897.	Nearly 41	1,320,279
1898.	Over 43	1,524,063

The following list contains the names of the several mines where the mining was done in whole or in part with machines, together with the names of the counties where they are located, the number of machines in use, their mode of operation, and tonnage of coal thus produced:

MINES.	County.	No.	Power.	Tons.
Empire	Christian,	5	Electricity,	66,496
St. Bernard (5)	Hopkins,	42	Air,	499,108
Reinecke	"	8	"	150,683
Hecla	"	8	Electricity,	36,400
Monarch	"	3	"	38,881
Central	Muhlenberg,	6	"	82,489
Pierce	"	3	"	10,375
Hillside	"	2	"	6,365
Oakland	"	2	"	4,285
Render	Ohio,	5	"	62,383
McHenry	"	5	"	73,887
Echols	"	6	"	70,423
Taylor	"	15	Air,	72,363
North Jellico	Knox,	30	"	229,090
Ohio Valley	Union,	8	"	24,335
Trade Water	"	6	"	34,651
Rush	Boyd,	5	"	16,317
Bird Eye	Whitley,	8	"	28,840
West Pineville	Bell,	3	Electricity,	16,692
Straight Creek A	"	1	"	.....
Total		171		1,524,063

The machines were not installed at Pierce, Hillside and Oakland until October 20th, nor at Straight Creek A until late in December. The above figures represent also the cannel output of West Pineville, mine No. 2.

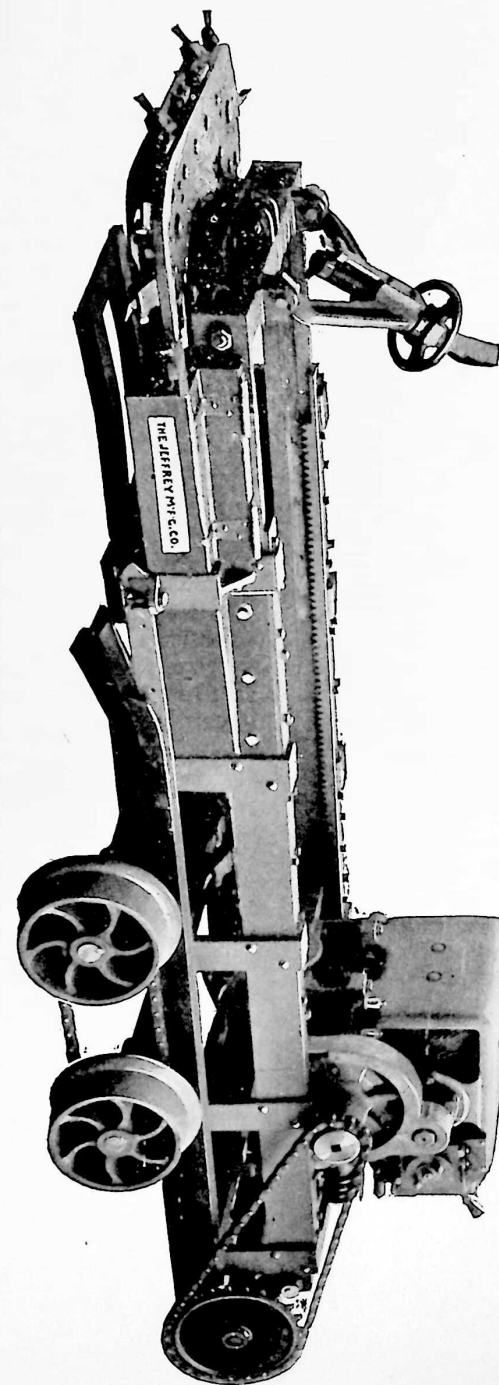
THE JEFFREY.

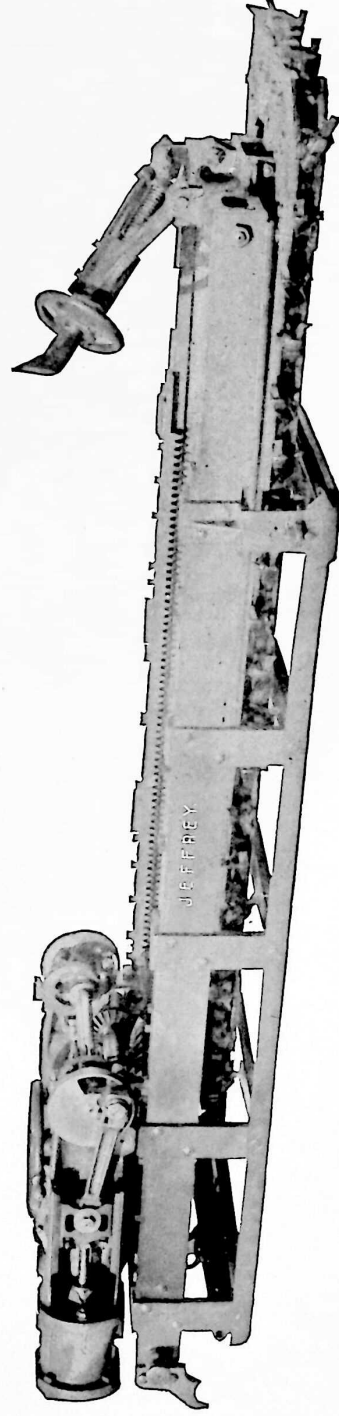
Since machine mining has become so prominent in this State, and the evident drift is still strong in that direction, I think it beneficial to publish photographs and descriptions of a number of the mining machines and other special equipments used by many of the Kentucky operators. All of the photos have been taken from cuts furnished by the companies represented.

The first three inserted are from the Jeffrey Manufacturing Co. (of Columbus, Ohio), that has sent us descriptions of the same as follows:

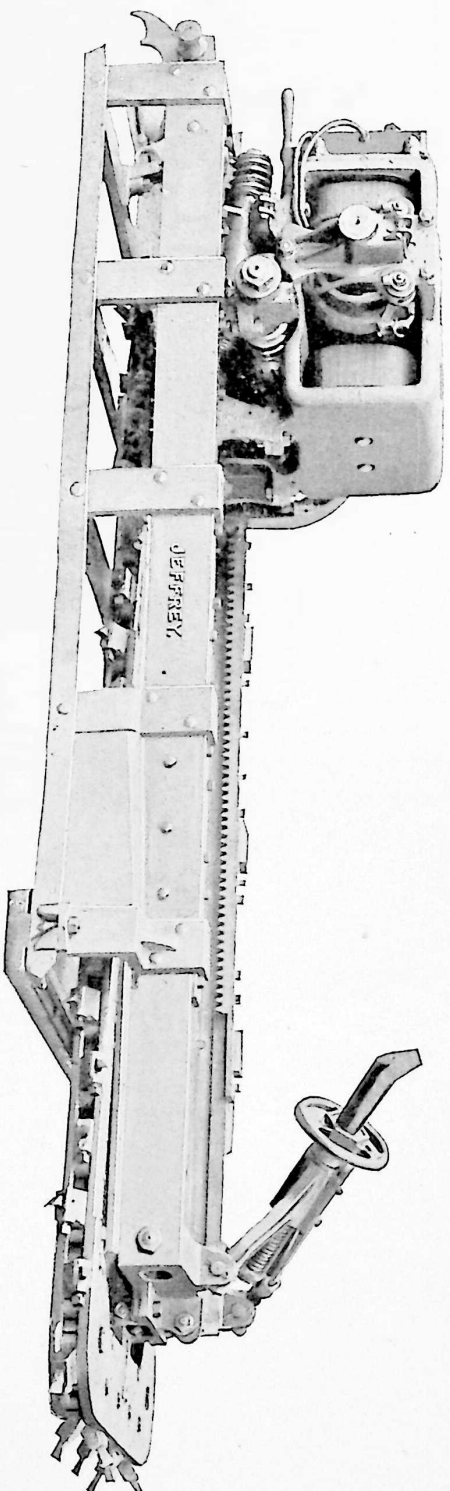
"The 17 A machine is the standard electric chain coal cutter; this machine is built very substantially, and the design has been based upon the experience obtained by the manufacturers, covering a period of a great many years. The machine consists of three parts: the motor, and carriage, inside and outside frame. The motor has been designed for this kind of work and is built very strong and durable, as well as compact and simple. It is of the multipolar type, having two field coils and iron clad armature. The field frame is of steel and is one solid casting. The two pole pieces carrying the field coils being bolted to the frame. This frame has feet cast on it, which rest upon and are bolted to the carriage; this carriage is provided with bearings and other necessary connections for the location of gears, through which the power is transmitted to the feeding and cutting parts of the machine. The outside frame consists of two channel bars on top and two angle irons on the bottom, held firmly together by means of steel cross ties. At the front end of this frame is a steel casting which forms the guide for the center rail of the inside frame. The rear end of the frame is held firmly in place by means of a steel housing; this housing carrying the bar on which the rear jack rests when the machine is in operation; to the steel casting or cross girt at the front of the machine is also attached the front jack. The carriage of the machine

JEFFREY MANUFACTURING COMPANY.





JEFFREY MANUFACTURING COMPANY.



JEFFREY MANUFACTURING COMPANY.

rests upon the slides in the channels of the steel channel bars and on the top of these bars is attached the rack for feed and pull back, these racks being made in sections and held in place by suitable cap screws.

The inside frame, or cutter frame, consists of a solid steel center rail extending the entire length of the frame. The frame is triangular in shape. At the front end of the center rail is attached the part which is called the cutter head. This consists of two steel castings which are accurately planed and milled and which are so formed that the chain passes round them easily and with little friction. At each corner of this cutter head is located an idler which takes the pressure of the chain at these points. These idlers are so arranged that they can be easily oiled and cleaned frequently. From the extremities of this cutter head the chain guides are carried to the rear of the center rail where attachments are made for carrying the chain from the sprocket wheel; at the rear end of the center rail is also a steel casting which is arranged to be bolted to the carriage in such a manner that the joint is flexible, so that the tension of the chain can be changed by a suitable arrangement at this point. The chain itself is made of cast steel solid links and drop forged strap links; these strap links have lugs forged on them which form a bearing on which the solid links run. Through these links is a hole in which a small rivet is placed which rivet holds the links together. With this arrangement the chain can be easily and quickly taken apart and no strain come upon the rivets.

"The 17 A machine with self-propelling truck is identical with the machine just described, with the exception that a clutch is arranged on the main drive shaft, so that the cutting part of the machine can be detached from the motor and when operating the truck no part of the machine is in motion except the armature pinion and the main spur gear. The power is transmitted from the motor to the truck by means of a chain. On the rear end of the truck is located a shaft which is driven, as stated above, by the motor; from this shaft the attachment is made to the wheels of the truck and in this manner the truck is propelled. A reversing switch

is placed upon the motor so that it can be run in either direction. This attachment has been found very valuable in economizing time, and due to the fact that it makes a machine independent of a driver, much time can be saved. The method of operating the truck is to attach the cable, which is the standard one used with machines of this type, to the main wires wherever it may be desired, the cable being carried ahead of the machine its full length. The power is turned on to the machine in the usual manner and it is then propelled wherever desired.

"The 16 D air chain machine is in general similar to the 17 A electric machine, the only difference being in the manner of applying the power.

"In place of the electric motor is an air engine. This engine, consisting of two cylinders, to which is attached a plain slide valve. These engines are built very compact and utilize a minimum space; the height over all of the machine is 21 inches, so that it is very well adapted to work in thin veins of coal, and has found quite a field for this kind of work. It is equally as strong as the electric machines and under the same conditions will do just as much work."

HARRISON.

The following article has been contributed by the Geo. D. Whitcomb Co., of Chicago, the manufacturers of the Harrison Mining machines, so extensively used in this and other States, there being about 1,700 of them employed in the principal coal fields of this country.

One of the first of these plants to be installed was in this State at the mines of the St. Bernard Coal Co., Hopkins county, where the machines have been in successful and continuous operation ever since, about forty of them being in use at its various mines at the present time. There are also several other plants of these machines in successful operation in this State.

Photos of the Harrison B. and F. machines, and of the "Air Receiver and Water Trap," follow the article, which is as follows:

"In order to meet the requirements of the different mining conditions, the Harrison machine is made eleven different styles, consequently will work in any strata where mechanical methods can be used. This machine can be used with equal facility for entry driving, rib drawing, shearing or under cutting in rooms.

"The Harrison machine requires only 66 cubic feet of free air per minute to run it efficiently. In order to attain this it has been necessary to have the valve movement of the machine uniform and reliable so as to cut off at less than half of the piston stroke, when the machine is being operated at speed of 190 to 200 strokes per minute, regardless of the position of the piston when the pick is stopped by contact with the coal. This has been successfully accomplished by the use of a valve motor, designed expressly for this work. It is entirely independent of the action of the piston, is very small, uses but little air, and operates the valve with a uniformity and certainty that secures an early cut-off; the expansive energy of the air and economy is not even approximately approached by other machines of its class.

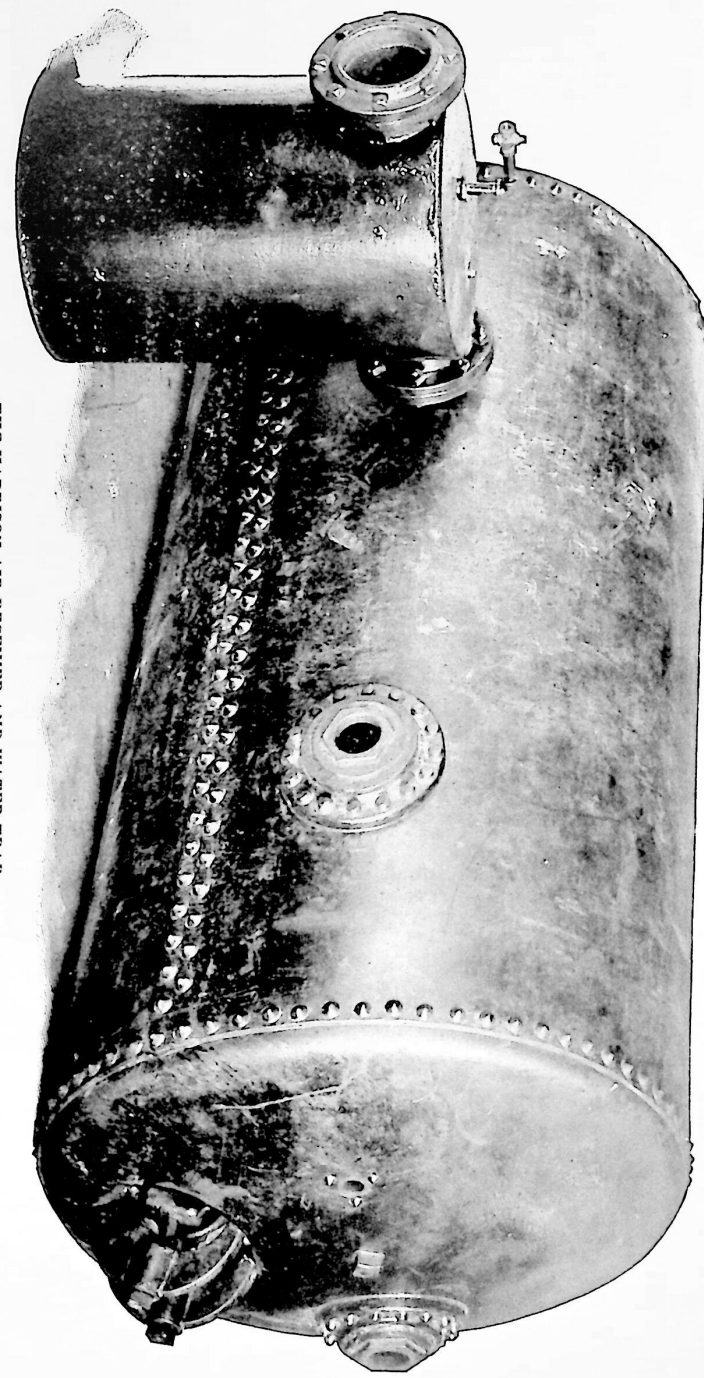
The working tool of a machine of this class is in principle a projectile, and the energy of the blow is based upon its weight and velocity, therefore, after having sufficient expansive energy back of the piston, which, with the pick attached, constitutes the working tool to give it the required velocity, it not only results in economy in the use of power to have the valve cut off the inlet of the air to the cylinder prior to half stroke but greatly reduces the recoil of the machine upon the operator, reducing his fatigue and enabling him to keep the machine in better and more efficient working position. It also admits of the machine being worked on a lower platform which is an advantage in working thin seams of coal.

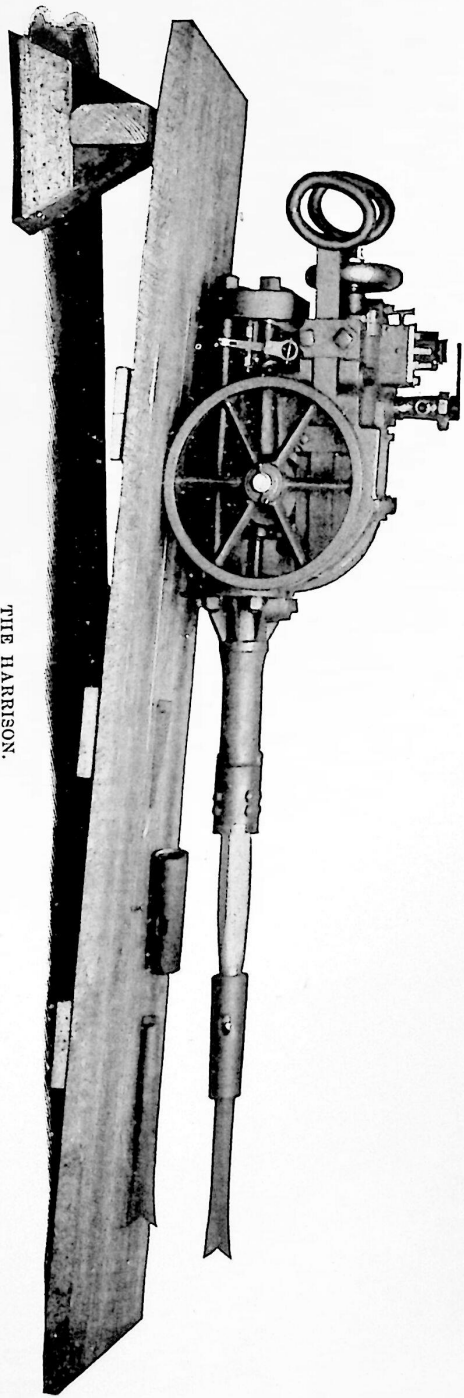
"The machines are so constructed as to be entirely under control of the operator. The speed can be varied at will, thereby making the blow light and rapid or hard and slow, as occasion and condition of mining require.

"The machine is mounted on platforms, which are so inclined to the face of the coal that the recoil of the machine is neutralized by gravity. The pick strikes from 190 to 210 blows per minute, as the operator may desire, and as it works under the coal the operator allows the machine to run forward down the platform. A helper shovels away the accumulated cuttings, using a special long-handle, flat shovel. Only two men are required to operate the machine, one skilled man, as runner, and an ordinary laborer as helper. Two platforms are used for convenience, so that when the machine has completed the cut on one it can be moved to the next without stopping, the helper shifting the platform as they are vacated. If desired, a cut to the full depth can be made to the full width of a room without stopping the machine.

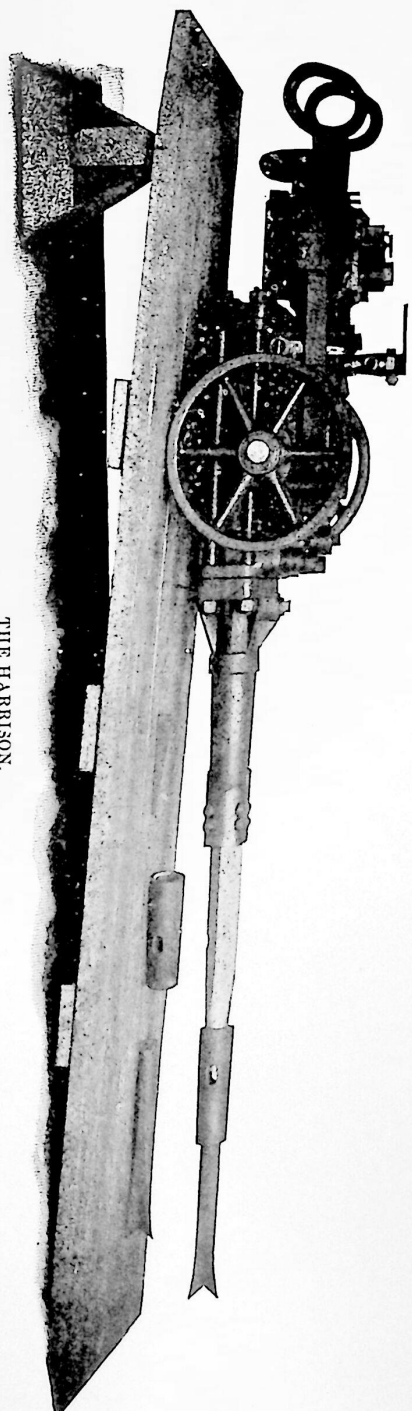
"The manner in which the Harrison mining machine attacks the coal is very much like that of a hand-miner. The cut can be made of any desired height or depth as the occasion demands; is generally from eight to ten inches in height in front and tapers to two inches in the rear, making an average of six inches in height. The depth can be made as desired, up to five and one-half or six feet.

THE HARRISON AIR RECEIVER AND WATER TRAP.





THE HARRISON.



THE HARRISON.

The cut, being 'V' shaped, leaves the coal in the best possible shape for blasting and loading, as, on being thrown down by a light charge of powder, it will roll over and cut off its original position and be free for attack by the loaders."

LINK-BELT.

The following article, reviewing the progress made in the installation of electric mining plants in this State, and describing some of the machinery used, has been contributed by Mr. H. E. Goodman, the manager of the mining department of the Link-Belt Machinery Co., of Chicago:

Electric Undercutting and Hauling Machinery.

"The use of electric undercutting and haulage machinery in bituminous mines in the State is rapidly increasing. In 1891 the Sperry Electric Mining Machine Co., of Chicago, installed for the Hecla Coal Co., at Earlinton, Ky., a plant which was the first attempt made to mine and haul coal by means of electricity in Kentucky. This plant is in operation to-day, though very much out of date as compared with the later appliances. The equipment consisted of an eighty horse-power Sperry dynamo, 6 direct blow machines, and 2 eight-wheeled Sperry locomotives. The various difficulties met with in adapting electrical machinery to underground work were experienced by this company, but notwithstanding the drawbacks and troubles they persevered in the use of the machinery, as its advantages to them were apparent. The last two years they have used this machinery on account of the familiarity of their men with its construction and use. They have done better work than during the year or two following its installation.

"The second plant to be installed in the State was at the mines of the Central Coal & Iron Co., at Render, Ky. This plant was installed in the summer of 1895 and consisted of one 15x16 McEwen engine, belt, switchboard and wire; one 100 K. K. mine type dynamo, which is illustrated in Figure 1, and four electric chain machines. These machines did good service from the start.

"About the same time the McHenry Coal Co., of Louisville, Ky.,

installed at its Echols mine a similar plant, the engine, generator, switch-board, etc., being identical, but using only three machines. This plant was equally successful and a year or two later the Central Coal & Iron Co. installed another plant at its Central City mines, and the McHenry Coal Co. another plant at its McHenry mines.

"In 1896 the Pineville Coal Co., of Pineville, Ky., contracted with The Link-Belt Machinery Co., of Chicago, for a complete electrical equipment. This was installed and started early in 1897 and consisted of a 150 horse-power McEwen engine, a 100 K. W. dynamo, a 35 horse-power locomotive and 3 electric chain undercutting machines. Some difficulties were experienced in arranging with the men to load after the machines at a satisfactory price, but finally all obstacles were removed and the plant put in satisfactory operation. It has continued to work successfully and recently this company have operated one of the machines in their No. 2 mine. In this mine the coal is only about 30 to 34 inches high and by the use of the machine they produce a much larger quantity of lump coal per room than by hand methods.

"One of the most recent installations is that at the mine of Anderson & Holloman at Madisonville, Ky. Mr. Anderson was the former secretary of the Hecla Coal Co., and for a number of years had an intimate acquaintance with the machinery installed at Earlinton. When he and his partner, Mr. Holloman, leased the Monarch mines they at once considered the advisability of equipping them with electricity, which was decided upon. A 50 horse-power dynamo at this place furnishes the power for three undercutting machines, same as are illustrated in Figure 2. The coal at this mine is exceedingly hard but moderately free from impurities. Messrs. Anderson & Holloman have made a marked success of this installation, which is frequently visited by mine operators desiring to see electric coal mining machines in operation.

"A general description of the dynamos as shown in Figure 1, in use at Pineville, Render, and McHenry, Ky., all of which are identical in size and pattern, as follows:

"This machine is of the bi-polar pattern and has been designed

especially for coal mine use, being the result of seven years' experience with electrical coal mining apparatus. It runs 700 revolutions per minute. It is built with as few parts as it is practicable to build a dynamo of this size, and each of the parts is of generous dimensions. The main casting includes the base, the magnets, complete, and the journal pedestals, and it weighs 13,000 pounds, while the completed machine weighs 21,000 pounds. This weight makes the dynamo perfectly steady under the most severe load, and in mining work the frequent and large variation of the load renders a solid, steady machine of the utmost value.

"The magnetic circuit of the field is entirely free from joints. The armature is thoroughly ventilated, a current of air passing constantly under the windings at the back of the armature, through the core, and out between the wires at the commutator end. This current of air is due to the motion of the armature alone, and does not require auxiliary apparatus of any kind. The armature shaft is 4 3/16 inches in diameter and is forged of solid machinery steel. The journals are 15 and 12 inches long respectively on the pulley and commutator ends, and are self-oiling and self-aligning. Clamped carbon brush holders are used and each set of carbon brushes presents 10 square inches of carbon surface to the commutator. The conductors from the brushes and from the terminals of both the shunt and the series field are led to a terminal board where the connections are always accessible and easily cared for.

"A sub-base which extends under the entire dynamo is furnished with each machine. An effective belt-tightener and a field rheostat are also included. The simplicity, substantiality and the solidity of this machine are its characteristics and it is the bi-polar construction that makes these possible. There is but one pair of field spools and one pair of brushes. The commutator and armature are extremely simple and both are entirely free from cross connections. The connections between the armature and the fields are also free from complications.

"These machines are over-compounded 10 per cent., and upon a continuous run of ten hours the armature wires will not rise in

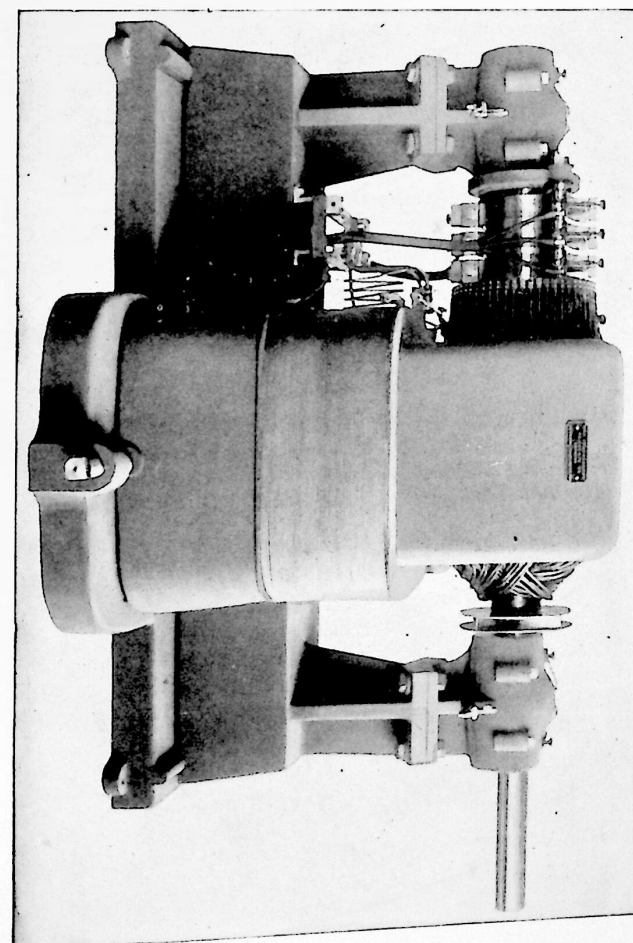
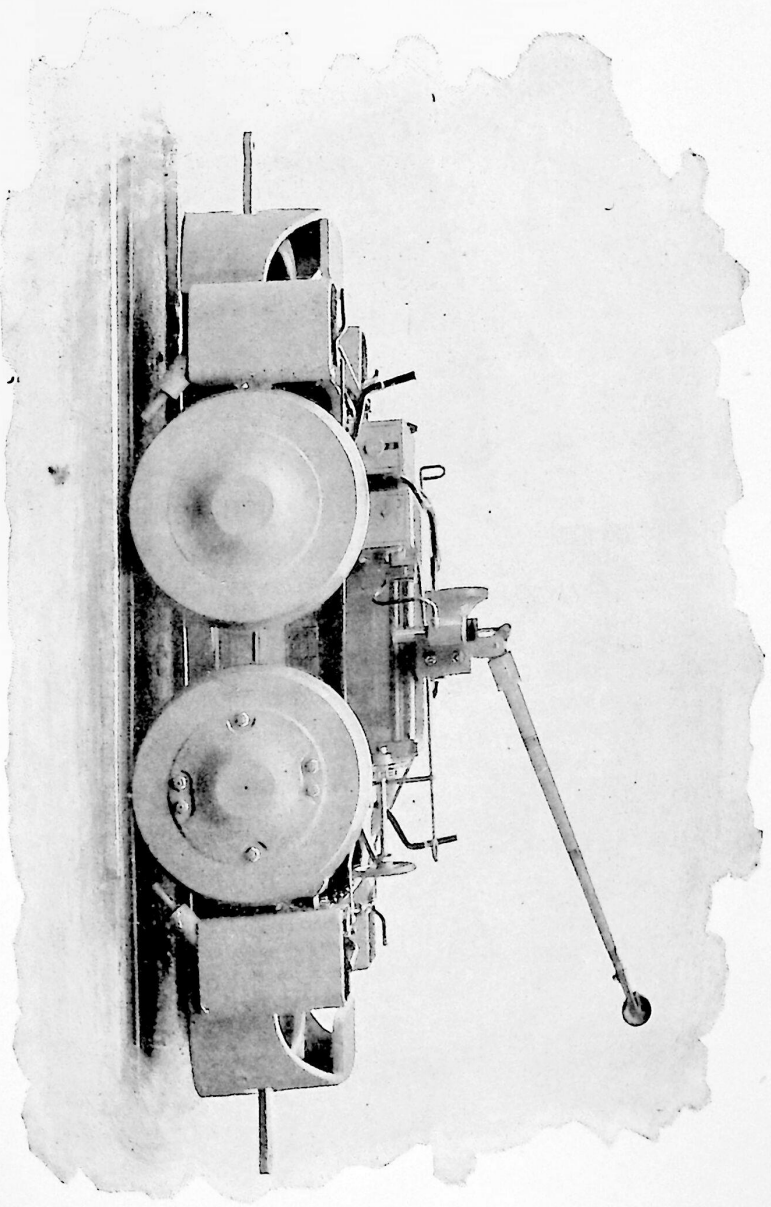
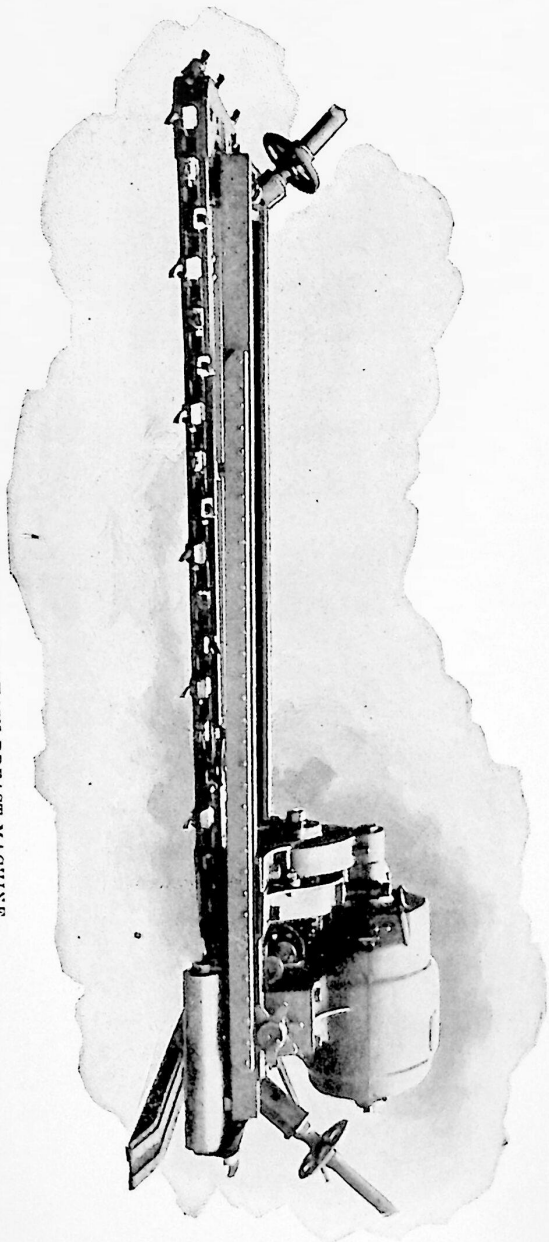


FIGURE 1. DYNAMO. PAGES 139-140



THE LINK-BELT "INDEPENDENT" 60 H. P. 4-WHEEL LOCOMOTIVE.

THE "LINK BELT" ELECTRIC CHAIN BREAST MACHINE.



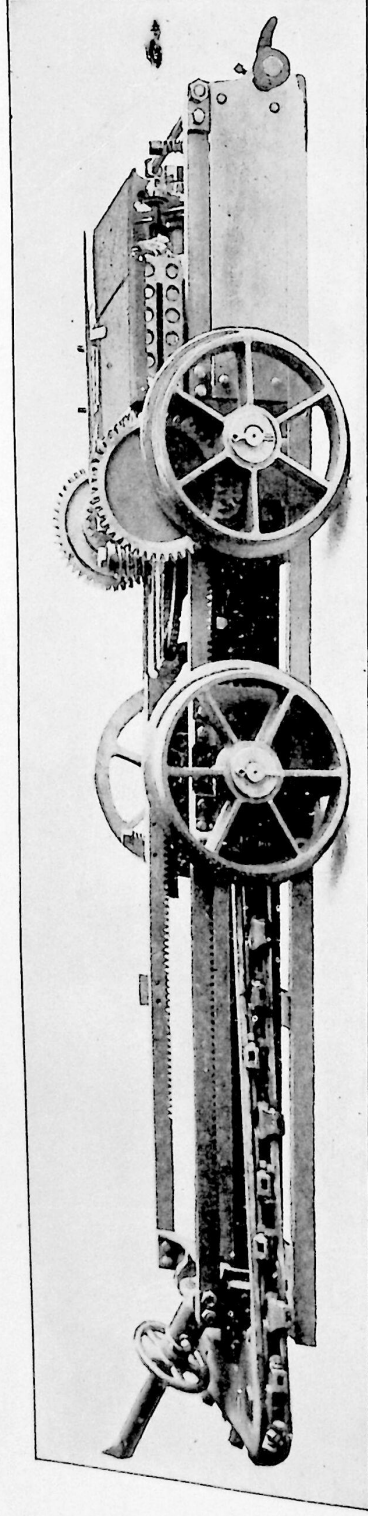
temperature to exceed forty degrees centigrade above the surrounding air, and the field wires not to exceed twenty degrees. The machine may be subjected to a temporary overload of 25 per cent."

Figure 2 represents the type of locomotive in use at Pineville, Ky., a general description of which is as follows:

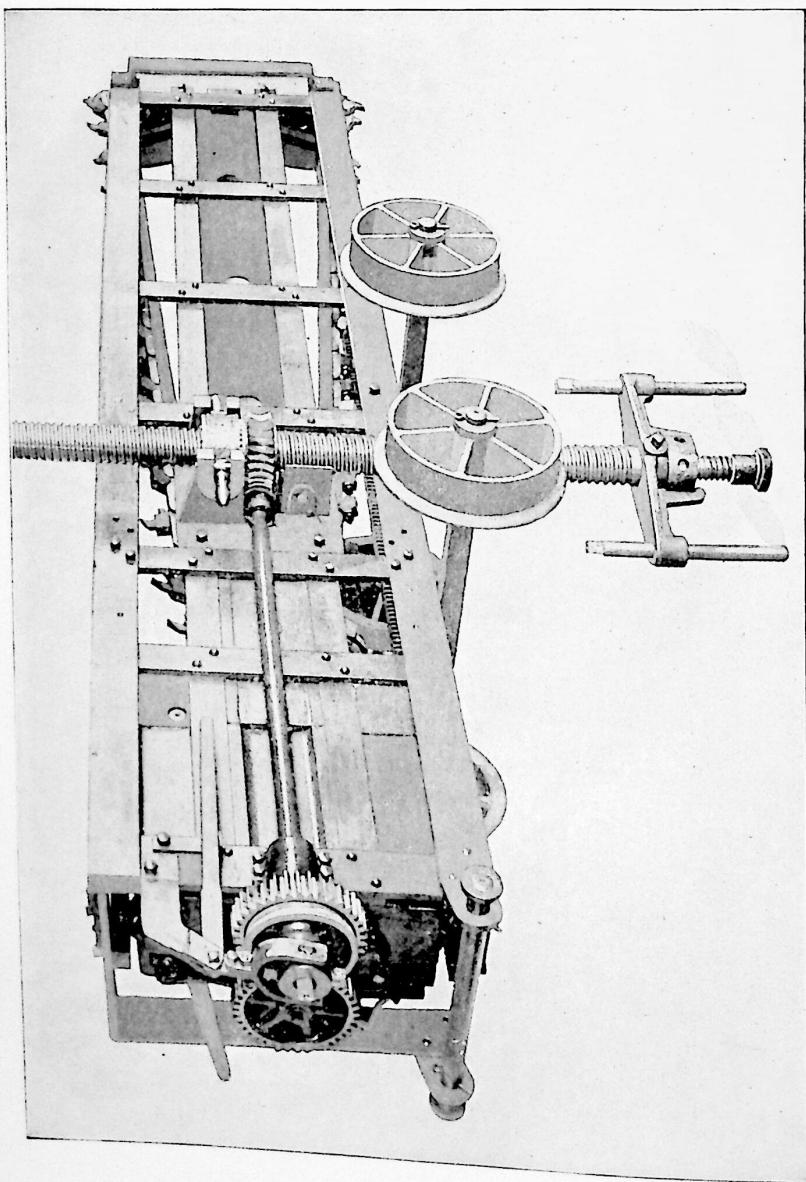
"These locomotives are made from 30 to 100 horse power and for 250 and 500 volts. They have a single armature lying lengthwise, of the machine, geared to both axles, making every wheel a driver, and utilizing the entire weight of the machine for traction purposes. The use of one motor insures that both axles shall revolve at the same speed, which is indispensable for the best tractive effects, and which is quite impossible where two motors are used, as two motors may not take the same current, and if one pair of wheels slip, the total tractive effect of this pair is lost. There is but one commutator, one set of brushes, and one set of connections to take care of, thus very much simplifying the machine, minimizing the number of parts and reducing the liability of repairs to the minimum. The bevel gears are cut out of the best obtainable cast and forged steel, and have proven during ten years' experience to be as durable as the spur gears commonly used on other types. All wheels are made of heavy cast iron centers, with heavy steel tires shrunk on. These tires have a much better tractive effect than chilled iron wheels, and these steel tires, taken in connection with the single motor, insures all wheels acting together and enables this locomotive to outpull to a considerable extent any two-motor locomotive of the same weight on the market. By placing the wheels outside of the frame the locomotive is made compact, and no part of it projects beyond the rails. It also greatly facilitates putting the locomotive back on the track when it gets off, as it will in nearly all cases pull itself back. This locomotive is double ended, having a cab at each end, with all controlling and operating levers and hand wheels, so that the locomotive is operated equally well from either end."

Figure 3 represents the improved Link-Belt machine, same as operated at the mine of Anderson & Holloman, Madisonville, Ky.

"In all cases, and particular in low coal, the making of the undercut as close to the bottom as possible is obviously desirable, and in high seams it leaves less bottom coal for the loader to take up, while in low coal it makes a larger part of the seam available for the market as lump coal. This is accomplished in the 'Link-Belt' machine, and in no other, by making the lower frame the chain carrying or traveling frame, and making the upper frame of the stationary or bed frame, which is firmly jacked in position in the regular way. By means of a system of rollers the machine is easily moved across the face of a room, thereby greatly increasing its capacity. The rear jack is attached to the machine at a convenient angle, and does not fall to the floor at the conclusion of each cut, as was the case with the old form; at the same time it is removable when props are so close as to make this desirable. The feeding mechanism is exceedingly simple, and is one form of the well-tried rack feed. Each machine sent out is adjusted to the character of the coal as regards speed of feed, the time of each cut varying from three and a half to five minutes, according to length of machine and character of coal. The longitudinal position of armature in this machine is a great advantage in facilitating the gearing to truck wheels when power truck is employed, and a wider use of the power truck may be looked for in the future."



MORGAN-GARDNER LOW VEIN CHAIN MACHINE. SELF-PROPELLING.



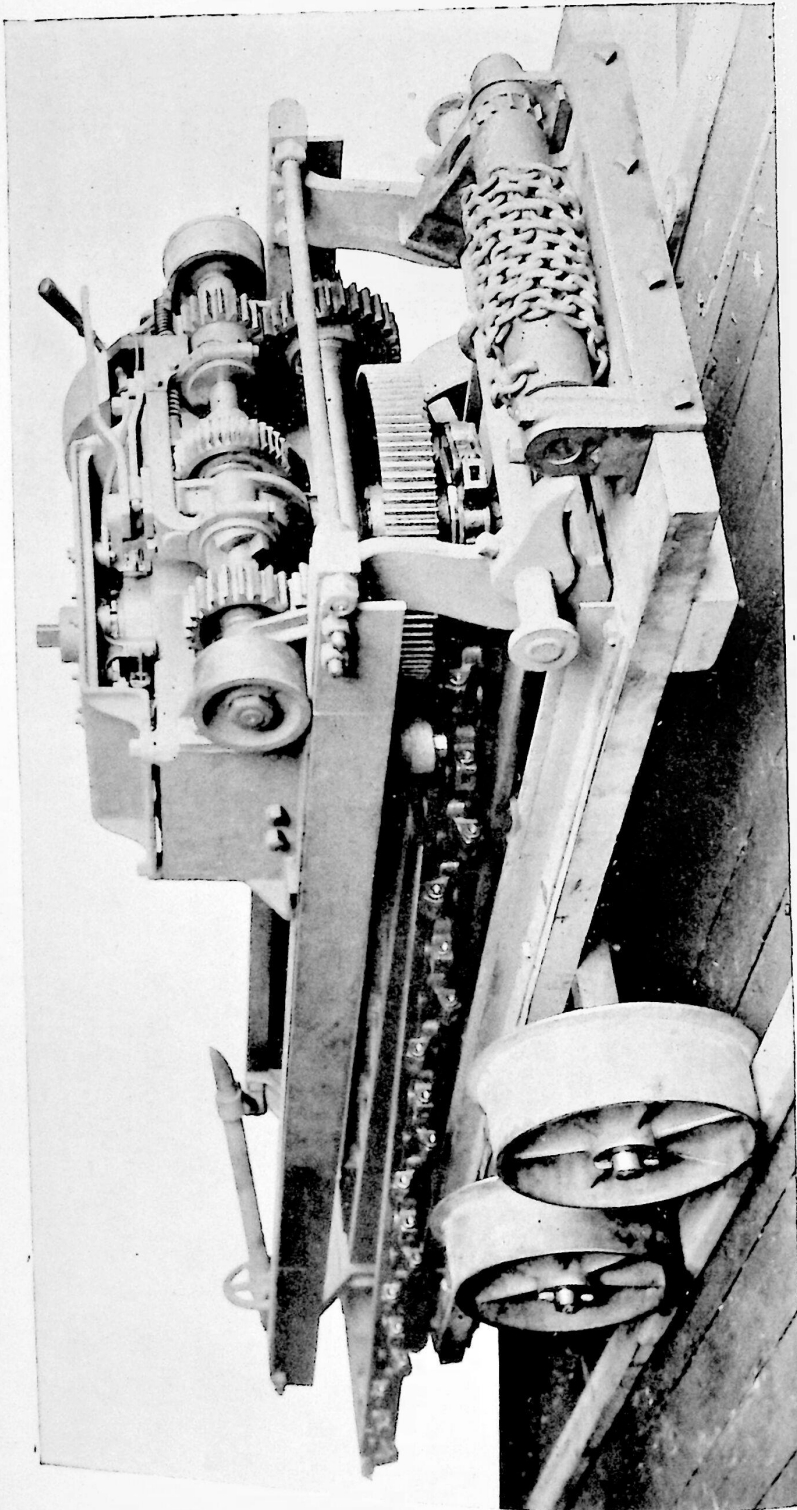
MORGAN-GARDNER SHEARING MACHINE.

MORGAN-GARDNER.

The three photos accompanying represent the machines of the Morgan-Gardner Electric Co., of Chicago.

Brief descriptions of the two plants installed by this company at Mercer Station and Drakesbore are contained in the chapter headed "Mine Improvements."

Of the fifteen new machines installed in the mines of this State during 1898, ten of them were installed by this company.



MORGAN-GARDNER CHAIN MACHINE.

THE INGERSOLL-SERGEANT.

Accompanying this are photos of side and end views of the new Class H coal cutter and air compressor of the Ingersoll-Sergeant Drill Co., of Cleveland, Ohio.

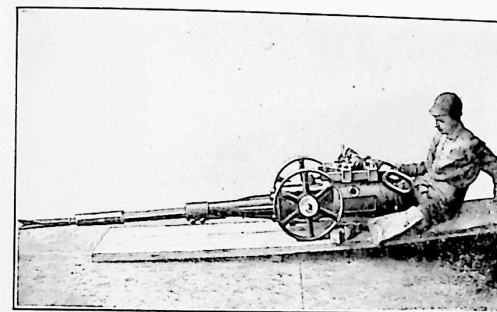
Description of the Ingersoll-Sergeant "Straight Line" air compressor, Class "A," with piston air inlet:

"The compressors are of the horizontal straight line steam actuated type, and are entirely self-contained, the shaft and both cylinders being carried on a solid bed.

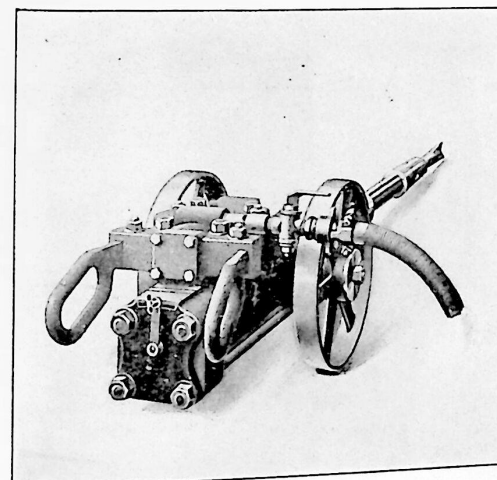
"This construction admits of great strength and capacity in small space, inexpensive foundations, and easy transportation. Every part of the machine is very accessible, and the piston can be removed from either cylinder in a short time, with ordinary tools, without disturbing the fly-wheels, shaft or valve connections, though it is seldom indeed that any attention is necessary, save an occasional oiling.

"This type of compressor is well suited for general mining and tunneling work, where a machine is expected to stand the most severe usage in regions remote from facilities for repair work, and its great capacity for hard and continuous service, together with its economy in steam consumption, has made it a deserved favorite for plants of a permanent character. We have patterns for many different proportions and modifications of the standard type, thus adapting it for work varying between wide limits.

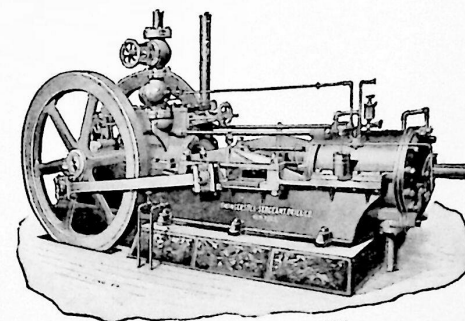
"These compressors are built on the lines which long experience has proven to be the best, i. e., power and resistance in straight lines, positive movement of air valves, cold induction air, cooling by complete surface jacketing, resulting in dry air, adjustable cut-off for the economical use of steam, smallest clearance spaces, automatic speed and pressure regulation, medium stroke, high rotative speed, crank pins, shafts, and slides of extra large bearing surfaces, and automatic lubrication throughout.



INGERSOLL-SERGEANT.



INGERSOLL-SERGEANT.



INGERSOLL-SERGEANT.

"In the design of this compressor the weight of the moving parts is so proportioned as to be about balanced by the air pressure at the completion of the stroke, thus securing uniform rotation, with smooth, even running.

"As the economy of an air compressor is to a considerable extent affected by the efficiency of the engine to which it is connected, this part of the machine has received more than ordinary consideration. We use a strongly ribbed and re-enforced bed-plate of the box pattern, with fly-wheels just far enough apart to span the flanges of the steam cylinder, which is placed between the shaft and cross-head. The connecting rods pass back past the sides of the cylinder, and this makes a short, compact and rigid machine. We are thus enabled to place the air cylinder at the farthest point from the heated steam cylinder, in the most favorable position for keeping it cool.

We applied the piston inlet features to our compressors after an extensive experience with air valves of the Poppet and other types, and designed the piston inlet cylinder to overcome the many and various objections inseparable from other patterns. This part of the machine has been gradually improved and perfected to a point quite equal to the best steam engine practice. Complete provision is made for surface cooling, while a full supply of cold air to the cylinder, positive movement of the air valves, with the smallest clearance spaces, and entire reliability are assured."

THE SULLIVAN.

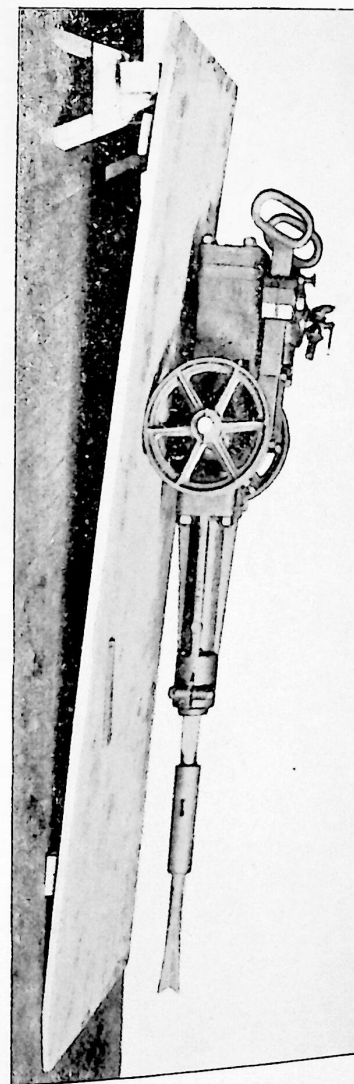
The following photograph represents the "Puncher," manufactured by the Sullivan Machinery Co., of Chicago.

In December last, two of them were installed at North Jellico mine, at Gray, Knox county, being the first introduced in this State. Thirty machines are employed in this mine, 18 Harrison, 10 Ingersoll-Sergeant, and 2 Sullivan.

The latter machine is made in four sizes, varying in weight from 550 to 900 pounds, and making an undercut of $4\frac{1}{2}$ to 6 feet.

In external appearance it does not differ materially from other machines of the same class. The marked variation comes in the valve motion and internal construction, in which the manufacturer claims to have superior advantage over other machines.

A test of its work will now be made in the same mine with the other machines named, when its merits will be practically demonstrated.



THE SULLIVAN. PAGE 146.

NOTES ON THE MINES.

Nearly four months of the year were employed in moving this office and its effects and the property of the Geological Survey from Frankfort to Lexington. These new duties were onerous and required my personal supervision, and made it impossible to do as much individual work among the mines as I otherwise would have done. The weather also was unusually bad during December and much of November, and this proved to be a great hindrance.

Often when mines are visited for the purposes of inspection it is found to be unnecessary or impracticable on account of local conditions, such as in cases of indefinite suspension or finding them flooded with water, so they can not be traversed. All such occasions are called visits.

During the year, Mr. Logan, Assistant Inspector, was very active and efficient in his work among the mines, and in many cases required radical changes and costly improvements in order to bring about safe conditions and enforce a compliance with the mining law. Some instances of the kind are briefly mentioned in the article written by him under the head of "General Mine Conditions."

The total number of mine inspections and visitations made by the officials of this office during the year were 302, or 28 more than were made during 1897.

Mr. Logan made 242 of this number, which are 14 in excess of the combined work of himself and Mr. Grider during 1897; however, during that year there was a vacancy in his office of one month.

In order to show the conditions of the several mines at the time of inspection and the action taken by the officials of this office to discover and remedy defects where found to exist, these notes are taken from the notices of inspection served on the operators as the result of the inspections made. In some instances, as indicated by the points, exact quotations are made, in others only the substance

is given, and sometimes only references are made to defects discovered and the action taken to cure them.

I have adopted the usual custom of dividing the State into three districts and have arranged the counties of each district in alphabetical order as follows:

NORTHEASTERN DISTRICT.

The output of this district is materially less than in 1897, and excepting 1896, it is less than for several years past. This is largely caused from its proximity to the productive fields of West Virginia, Ohio, and Pennsylvania. The following table gives the tonnage of the district each year since 1893.

Year.	Tons.
1894	351,425
1895	383,779
1896	324,431
1897	393,051
1898	347,168

BOYD COUNTY.

The total output of this county during 1898 was 138,694.65 tons, against 172,888 tons produced during 1897. It is the product of two mines, as follows:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Rush No. 6	145,391	208.33	256	130,499.65
Clinton No. 8	27,497	15.70	...	8,195.00
Totals	172,888	.....	...	138,694.65

Loss during 1898, 34,193.35 tons.

RUSH MINE (No. 6).

At Rush.

P. O., Rush.

Transportation by the Ashland Coal & Iron railroad to connection with the Chesapeake & Ohio railroad at Denton; also by Ohio river.

Operated by the Ashland Coal & Iron Co., Douglas Putnam, president; John G. Peebles, vice-president; Robert Peebles, secretary and treasurer; E. C. Means, general superintendent; and James Heron, superintendent of the mine. Head office, Ashland.

About 4 per cent. of the year's product was marketed outside the State, and about 9 per cent. of it was mined with machines, the Harrison and the Jeffrey being the ones employed.

The main improvement of the year was the installation of a compressed air locomotive for mine haulage. Its general construction and manner of operation are admirably described in an article contributed by Mr. James Heron, the mine superintendent. A photograph of the same appears in another column. This is the only company in the State that uses compressed air for mine haulage.

All inspections were made by the Assistant.

Inspected March 9th. "An ample volume of air was entering the mine for the number of persons employed under ground, which was fairly well conducted to the working places. Other conditions were also quite satisfactory.

Again inspected August 9th. "Ventilation reasonably good, except in No. 63 entry workings, where the air current at present is inadequate. However, the face of the entry is almost to daylight. With the completion of Sand entry the ventilation of the mine should again reach the high standard of excellence that has heretofore been maintained. Close attention was given to the timbering and propping, and the great care that is being observed in keeping the rooms well posted and the entries sufficiently timbered is quite gratifying. Drainage very satisfactory."

Again inspected November 9th. "Entry No. 63 had been opened to the outside. An abundance of air was passing into the bank for

the number of persons employed inside, which was distributed in a very satisfactory manner to the present workings.

"Conditions in other respects were also good."

CLINTON MINE (No. 8).

At Clinton.

P. O., Ashland.

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

The general blank was not returned. The number of days worked during the year was not fully reported. The mine was idle during July and August and most of June.

During the first six months of the year only an average of from three to six men were employed and the output of the mine was reduced more than two-thirds during the year. No special cause for the loss has been given.

Inspections all made by the Assistant.

Inspected March 30th. "As only three men are employed underground driving entry, a thorough inspection was not made, however, I think the mine is in fairly good condition."

Visited August 15th. Operations had been suspended for some time, with no immediate prospect of resumption and no inspection was made.

Inspected November 12th. The work was confined to driving two parallel entries and air courses. Conditions good as expected.

BREATHITT COUNTY.

The output of this county for the year is 17,982.97 tons, against 9,316.39 tons produced during 1897. It is all the product of the Jackson mine, operated during the year by Davis & Wynn.

Mining was done during every month of the year, from 14 to 21 days each, making an aggregate of 217 days of active operations.

During the year the mine was provided with a new furnace and air shaft, located much nearer the workings than the old ones, thus making the ventilation more effective and easy.

On February 24, 1899, a written notice was received from Davis & Wynn, notifying me that they had sold their mining interest to Dudley, Shelby & Co., who at once took charge of the mine and have since been operating it, retaining Mr. R. T. Davis as superintendent.

The mine was inspected on July 8th, and again on October 18th and again on December 8th. The general conditions were very good as to drainage and timbering, and with the exception of a little slackness in arranging for a better conduction of the air near the head of the main entry, the ventilation also was very good. Two or three additional doors were necessary and some brattices needed tightening. These defects were pointed out to the operators, who agreed to remedy them.

CARTER COUNTY.

The output for this county for the year, including cannell, is 114,836.02 tons, against 132,690.61 tons, produced in 1897.

It is the product of several mines, as follows:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Grant	44,366.00	92.00	199.00	50,809.12
Mt. Savage	32,656.82	65.00	199.00	12,045.45
Boghead	11,624.47	67.66	150.50	6,697.03
Star Furnace	5,742.00	11.10	176.00	2,330.00
Strait Creek	34,097.80	66.36	216.00	36,182.20
Willard	1,043.00	8.16	241.00	3,673.30
Earney and Hargis .....	.....	11.00	125.00	3,098.92
Lost Creek	1,196.00	.....	.....	.....
Stinson	1,964.52	.....	.....	.....
Totals	132,690.61	.....	.....	114,836.02

All inspections were made by the Assistant Inspector.

GRANT MINE.

At Grant.

P. O., Rush.

Transportation over the Chesapeake & Ohio, and the Ashland Coal and Iron railroads.

Operated by the Ashland Coal and Iron Co. (See Rush mine, No. 6).

The most notable improvement for the year was the addition of a steam locomotive for mine haulage.

The mine was idle during August and September. Its largest output was 9,351 tons during December.

Inspected March 29th. Ventilation good. Owing to extensive rains, drainage not as good as heretofore. Propping and timbering good.

Mine No. 9 consists of two new entries, and conditions are good.

Visited August 15th. Mine was shut down pending the installation of the new locomotive and the making of general repairs, and no inspection was made.

Inspected November 11th. "Work at present is on Bates, Loney and Stewart entries. Bates entry 16 men drawing pillars; conditions good as could be expected. A volume of 14,700 cubic feet of air per minute was traversing Loney and Stewart entries near working faces, for the 100 persons employed on same turning rooms. No lack of timbering or propping observed. Drainage good."

MT. SAVAGE MINE.

Near Mt. Savage.

P. O., Music.

Operated by the Columbia Finance & Trust Co., of Louisville, as receiver of the Lexington & Carter County Mining Co.

This entire mining property was sold in March under a decree of the United States Court, and the receiver above named became the purchaser. The mine was idle from early in July until the close of the year. (See chapter on idle mines).

Inspected April 2d. "An abundance of air (7,380 cubic feet per

minute) was passing into the mine for the 44 persons employed inside, which was fairly well conducted to the working faces."

Other conditions satisfactory.

STINSON MINE.

This is a cannel mine. It was idle all the year. It was sold with all its equipments in connection with the Mt. Savage mine, and purchased by the Columbia Finance & Trust Co., of Louisville.

BOG HEAD MINE.

Near Grayson.

P. O., Grayson.

Transportation by the Eastern Kentucky railway.

Operated by the Kentucky Cannel Co., W. T. Grant, president; B. M. Allison, secretary and treasurer; I. P. Shelby, contractor; James Pettrey, mine foreman.

Inspected April 4th. "Timbering and propping good. Drainage not good. I would suggest that the roadway of first right entry be cross-layed, as it is entirely too wet and muddy. An ample volume of air was entering the mine for the thirty persons employed inside, which is fairly well conducted to the working faces. There should be a door on mouth of sixth left room, off first right entry to throw the ventilating current near the face of entry."

Inspected August 8th. Ventilation is insufficient. Too much leakage occurs before the air reaches the principal workings. The stoppings, doors, etc., all in a dilapidated condition. There should be a break-through in second room on right from face of entry. There should be a door in second room neck on the left from face of the entry. The air way had too much gob thrown in it and it must be cleaned out. Drainage on entries not good, but working rooms were fairly dry. Propping and timbering reasonably good.

Visited November 15th. The mine had been idle from November 1, caused from lack of orders. Several hundred tons of cannel were then stocked, waiting sale. An inspection was considered of no practical value and none was made.

STAR FURNACE MINE.

Near Kilgore.

P. O., Rush.

Transportation by the Chesapeake & Ohio, and Ashland Coal and Iron railroads.

Operated by the Star Furnace Coal Co., J. M. Logan, president. But little coal was mined during the year owing to closing out the old mines and opening a new one. Extensive and costly improvements were made at the new mine an account of which is given in another chapter. The old mines, now exhausted and abandoned, were inspected at regular intervals during the year and all conditions were as good as could be expected, considering the character of the work. The new mine was inspected March 30th. The main entry was driven only about 60 feet and only four men working inside. No artificial ventilation had been provided, but the air was good.

Inspected August 17th. Only five men were employed inside. The work was confined to driving the main entry and to one room on the right and one room on the left.

Conditions were not bad.

Inspected November 12th. Only five men working inside. The mine as yet not subject to State supervision. Conditions satisfactory.

STRAIT CREEK MINE.

Near Denton.

P. O., Mt. Sterling.

Transportation by the Chesapeake & Ohio railroad.

Operated by the Strait Creek Coal Co., M. M. Cassidy, president; W. T. Tibbs, vice-president and secretary; Col. Kent Prichard, superintendent.

During the spring the tip house and machinery were burned, causing considerable damage and a month's suspension of mining. At another time the mine was badly flooded with water, which caused further damage and loss of time.

Inspected March 31st. Drainage fairly good, considering the recent excessive rains. Timbering good. Props fairly well up to working faces. An abundance of air was entering the mine for the number of persons employed inside, which was fairly well conducted to the working faces. First, left, off Howe entry, is driven 100 feet ahead of the ventilating current. There should be a door on air course and a break-through made from same to the entry to cause the current to traverse this entry.

Inspected August 16th. Grats work had four men employed on each side drawing entry stumps. Drainage reasonably good. No immediate lack of timbering observed on entries and rooms were fairly well posted. The first right entry is more than 60 feet in advance of the air current. A door should be placed on mouth of first left cross entry to throw the volume of air nearer face of first right entry.

The face of the first left cross entry is 130 feet in advance of the air current and 70 feet above where the first break-through from face is being made through to the air course. Instructions were given to start another break-through near entry face. The furnace is inadequate for the want of an addition of 15 or 20 feet to the height of the stack. With this made I am assured, from careful observation, the results would be most gratifying. I trust these deficiencies will be promptly obviated.

Inspected November 14th. "An ample volume of air was passing into the bank for the 70 persons working therein, which was fairly well conducted to the working faces, except face of first left entry, off first right, which is ahead of air. Doors should be placed in the second and third open break-throughs from face. First right entry is more than 60 feet in advance of the air current and a break through is needed to bring it up. Drainage on entries not good, but rooms are dry enough at faces. Propping and timbering satisfactory."

WILLARD MINE.

Near Willard.

P. O., Willard.

Operated by the Eastern Kentucky Railroad Co., Geo. Gibbs, superintendent of the mine.

Inspected April 2d. "Five men were employed underground drawing pillars and stumps. Conditions are good."

Inspected August 17th. Only five men working inside. Conditions not bad.

Visited November 19th. Only three men working inside, drawing pillars and stumps. No inspection was made and none was due.

STROTHER MINE.

Near Rush.

P. O., Rush.

This mine was operated the first part of the year by J. P. Strother, but later in the year by Barney & Hargis.

Inspected April 4th. "Drainage good. Timbering and propping not good, but badly needed from the mouth of Bear cross entry to mouth of second room on the right of same. Ventilation very defective, but when Bear cross entry shall be broken into old works the natural ventilation will be greatly improved. As the mine has no artificial ventilation the operators were referred to section 10 of the mining law."

Visited August 18th. The mine had been idle for several weeks, and there was no immediate prospect of resumption, and no inspection was made.

Inspected November 11th. No. 1 bank. Nine men drawing pillars and stumps. Conditions are as good as could reasonably be expected in such work.

No. 2 bank, only four men were at work.

JOHNSON COUNTY.

The output of this county for the year is 10,964.45 tons, against 7,488 tons produced during 1897. The output of the White House mine is included in both the above figures.

The output of the two mines is as follows:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
White House	4,005.00	29.50	268	4,962.60
Greasy Creek	3,483.00	52.33	291	6,001.85
Totals	7,488.00	....	...	10,964.45

WHITE HOUSE MINE.

At White House.

P. O., Louisa.

Transportation by the Ohio River & Charleston railroad, and by Big Sandy river.

Operated by the White House Cannel Coal Co.

Inspected April 6th. Drainage not good, but will be greatly improved when a ditch being dug shall be completed.

The mine has no artificial ventilation, and attention is called to section 10 of the mining law. Owing to connections with the outside the air current traverses the mine so as to give fair ventilation.

Inspected August 11th. Ventilation satisfactory, except near face of cross entry off Waddell entry, however, the break-through is being stopped, and the air course is being driven rapidly to within legal distance from face. Drainage at present is not good, on account of heavy recent rains, but the ditch and siphon are sufficient to make drainage good under ordinary circumstances. Propping and timbering satisfactory.

Inspected November 17th. The air in Waddell entry rather

smoky, but the same was attributed to an open door on entry. Hinkle entry is directed to hole through into some old works, and no air course is being driven. Unless connection is made at once an air course should be driven. Drainage good, except at sump on Waddell entry, and assurances were given that it should be bailed dry at once. No lack of posting or timbering was observed.

GREASY CREEK MINE.

Transportation by the Chesapeake & Ohio railroad.

Operated by the Greasy Creek Cannel Coal Co., J. S. Rittenhouse, general manager. P. O., Eliza.

Inspected April 7th. Drainage just reasonably good. Props are not well up to face of workings, but top is good. Timbering good. An abundance of air was entering the mine and it was fairly well distributed to the workings. Second left entry is more than 60 feet ahead of the air. Instructions were given to remedy this.

Inspected August 12th. The two head rooms on second left entry are more than 60 feet ahead of the air current, but connection is almost made with air way of first left entry. Full instructions were given regarding improving the ventilation. Rooms fairly well drained and posted.

Inspected November 18th. Ventilation at present satisfactory, as only 13 men are employed inside. If, however, the force shall be increased, a door should be placed on second left, below the air way to the first left to turn the air volume into the five rooms on the right, and the room necks should be closed and permit it to join the other air volume at the first right room. Some good timbering had been done on main entry. Propping and drainage good.

LAWRENCE COUNTY.

The output of this county for the year is 55,251.07, against 57,743.25 tons produced in 1897. The product of the White House mine is taken from both of the above figures, and included with that of Johnson county.

Three mines produced the amount, the Annie and Elizabeth, operated by the Peach Orchard Coal Co., whose output is combined, and the Torchlight mine.

The output of the mines is as follows:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Peach Orchard	57,505.00	86.33	152	50,600.00
Torchlight	238.25	15.63	186	4,657.05
Totals	57,743.25	....	...	55,251.05

ANNIE AND ELIZABETH MINES.

At Peach Orchard.

P. O., Peach Orchard.

Transportation by the Chesapeake & Ohio railroad.

Inspected April 5th. Timbering good. Props are not very well up to working faces. Drainage not good. Ventilation was good. Break-throughs should be made between first and second rooms off eighth and ninth right entries.

Elizabeth mine. Only five miners and one day hand working inside. Conditions satisfactory.

Annie mine, inspected August 10th. Ventilation in eighth and ninth right entries and in ninth left entry quite inadequate. No volume of air reaches these works on account of leakage, but when the Spurr entry shall be driven to the outside (about 60 feet further)

the ventilation will be readily improved. Drainage reasonably good, except a body of water on main entry near fourth left, which is conveyed to outside when siphon is running. Propping and timbering fairly good.

Elizabeth mine. Work is confined to drawing main entry stumps, and conditions are as good as could be expected.

Annie mine. Inspected November 18th. The face of eighth right entry is ahead of air, but not being driven at present. Main entry 80 feet ahead of air. The air current should be brought up. The second break-throughs, from face of eighth and ninth left entries, are open and should be closed. Ventilation otherwise good. Drainage on entries not good, but the rooms are dry enough at face. Props fairly well up to face.

Elizabeth mine. Work still confined to drawing pillars and stumps. Propping fairly well attended to. Drainage good.

TORCHLIGHT MINE.

Near Walbridge.

P. O., Walbridge.

Transportation by the Chesapeake & Ohio railroad.

Operated by the Reliance Coal Co., James Booth president; W. S. Booth, secretary; J. X. Hill, general manager.

Inspected April 6th. Drainage and timbering fairly good. Props are only fairly well up to face of workings. The mine has no artificial ventilation, but there are several openings, and the entries are not driven very far and several openings are made to daylight, and the air is not bad. Attention was called to section 10 of the mining law.

Inspected August 13th. Ventilation is reasonably good, and will be quite good when main entry shall be completed to the outside, a distance of 35 or 40 feet.

Entries are quite wet and sloppy, but working rooms are dry enough. In second room on right off main entry some very danger-

ous draw slate was discovered, which was then pulled down. Rooms were fairly well posted.

Inspected November 17th. Ventilation good, Entries too wet, but rooms dry.

LEE COUNTY.

The output of this county during the year is 9,439.50 tons, against 12,925.24 tons produced during 1897, and is the product of the following mines:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Avent	6,016.00	13.00	120	3,599.50
Beattyville	3,039.39	13.40	88	1,549.00
Crystal Creek	3,869.85	12.18	164	4,291.00
Totals	12,925.24	....	...	9,439.50

The Crystal Creek is entirely worked out and abandoned. Operations were carried on by Robert Birch. The mine was visited three times. Conditions were not satisfactory, but owing to the near completion of the mine and that the cost of remedying them would exceed the value of the mine, they were borne with until the mine was finished.

The New Beattyville Coal Co. operated the New Beattyville mine until June when work was stopped and the mine was idle during the remainder of the year. When visited it was found idle.

Avent mine was operated by the McGuire Coal Co., Walker Jameson, president and general manager, and Logan Thomas, secretary and treasurer.

The mine received three inspections or visits at intervals during the year, and was always found to be in fairly good condition. The

main trouble seems to have been in keeping but little or no fire in the furnace and the door on main entry open, so the air could not go to the workings on the left. Instructions were given to avoid these in the future.

SOUTHEASTERN DISTRICT.

The output of this district for the year is 1,123,892.94 tons, against 796,430.49 tons produced in 1897. The great gain is attributable to almost continuous work throughout the Jellico district, where the great strike of 1897 so long prevailed.

The tonnage of the district for the several years since 1893 is as follows:

Year.	Tons.
1894	798,804
1895	1,039,712
1896	1,096,585
1897	796,430
1898	1,123,892

BELL COUNTY.

The output of this county for the year is larger than in 1897, and comes from the following mines:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Bennett's Fork	11,507.40	14.25	188	9,746.87
Four Mile	150.00	13.00	...	3,168.40
Mary Hull	33,378.87	69.66	203	23,506.20
Straight Creek A	6,283.53	43.66	...	14,992.29
West Pineville	29,417.33	110.40	206	35,335.00
Excelsior .....	.....	20.00	14	143.00
Totals	80,737.13	....	...	86,891.76

All the inspections of the years were made by the Assistant Inspector.

BENNETT'S FORK MINE.

Near Middlesborough.

P. O., Middlesborough.

Transportation by the Knoxville, Cumberland Gap & Louisville and Cumberland Valley branch of the L. & N. railroad.

Operated by the Bennett's Fork Coal Co., J. F. Grant, president; George Luke, secretary; and Hugh Drummond, superintendent.

During the year a new furnace and air shaft were provided at a cost of \$200, and a new screen put up at a cost of \$50. 75 per cent of the output was marketed outside the State.

Inspected July 18th. Ventilation very unsatisfactory. The furnace is quite insufficient, but a new shaft has been sunk and a new furnace is to be built at once. With this done and some other plans discussed with the bank boss carried out, the ventilation will be readily improved. Other conditions fairly good.

Inspected October 24th. The new furnace was completed and a fire just built. The air volume was light but with a good fire, ventilation, I think, will be good. Conditions in other respects quite satisfactory.

FOUR MILE MINE.

At Four Mile.

P. O., Middlesborough.

Transportation by the Cumberland Valley branch of the L. & N. railroad. Operated by the Eureka Coal Co., composed of J. B. Robinson, W. O. Park, C. L. Whitsit, and D. P. Whitsit as general manager.

All inspections were made by the assistant.

Inspected in July and again in October. The face of first right entry was 105 feet ahead of the air. Instructions were given to have this remedied. One door and two curtains should be put up, and one break-through made at places designated. Other conditions were satisfactory.

MARY HULL MINE.

Transportation by the Cumberland River & Tennessee railroad to connection with the Cumberland Valley branch of the L. & N. railroad.

Operated by the Log Mountain Coal, Coke & Timber Co., T. Cairns, manager. P. O., Chenoa.

Inspections made by the Assistant as follows: July 17th 5,600 cubic feet of air per minute were going into the mine for 38 persons inside. Some break-throughs were needed, also 20 to 25 feet should be added to the stack of the furnace, which is inadequate at present. Drainage and propping fairly good. Some timbering was needed on main entry. The mine still had no second outlet. Notice was given that this must be made if operations were continued with more than ten men, else the matter would be placed in the hands of the Commonwealth's Attorney for prosecution.

Again inspected October 22d. There were 25 persons employed inside and 6,210 cubic feet of air per minute entering the mine, but it was much scattered before reaching the works, which consists mostly of drawing pillars and stumps. Some necessary timbering had been done on main entry, and more still necessary.

The second outlet, heretofore ordered, was not made. On account of the great difficulty and cost in making the same, the company was allowed 40 days in which to provide the same, notice of which was given to the Commonwealth's Attorney, who was asked to prosecute the company in case of failure, but by the expiration of the time given the outlet was made, of which the attorney was promptly notified, and he was requested to take no action. Further mention of the matter is made by Mr. Logan in the chapter on "General Mine Conditions."

STRAIGHT CREEK A MINE.

Near Pineville.

P. O., Pineville.

Transportation by the West Va., Pineville & Tennessee railroad to connection with the Cumberland Valley branch of the L. & N. railroad.

Operated by the National Coal and Iron Co., Louisville, Ky., Theodore Harris, president; A. E. Richards, secretary; James S. Ray, general manager. Office, Louisville Trust Co. Building, Louisville, Ky. Lee Sexton, mine foreman.

The important improvements for the year were the installation of one Link-Belt machine and the putting in of a complete set of shaking screens.

No mining was done during February, March and April. The present company took charge in May.

Inspections were made by the Assistant as follows:

July 20th. Ventilation very unsatisfactory. The second, third and fourth room necks from face to second right entry should be closed to bring the air current up within the legal distance of the face.

Fourth right entry was without ventilation entirely. Instructions were given to remedy these defects. Some break-throughs were necessary, also some doors and curtains were ordered to be put up.

October 21st. Drainage reasonably good. Props not close enough to working faces. An abundance of air was entering the bank for the 40 persons inside, but was not turned into first north cross entry off second right, the face of which is 160 feet ahead of the air current. Instructions were given where to place a door, and to make certain needed break-throughs, and to close some rooms in order to remedy this defect.

The first north cross entry off second left was driven 175 feet ahead of the air current, when not more than 60 feet are allowed in any case.

The second left entry face was about 200 feet in advance of the air. Directions were given to cure all these defective conditions at once.

WEST PINEVILLE MINES.

Near West Pineville.

P. O., Pineville.

Transportation by the Cumberland Valley branch of the L. & N. railroad.

Operated by the Pineville Coal Co., Robert Holmyard, general manager; E. A. Starling, assistant manager.

Inspected by Assistant as follows: July 20th. No. 1. Two open break-throughs from face of second right entry should be closed. This would make conditions satisfactory.

The mine was idle, and had been idle since the last of May, and no regular inspection was attempted.

Inspected October 20th. Mine No. 1. An abundance of air was passing into the mine for the number of persons inside, but improvement was needed in its distribution as follows: On 2d right entry, two room necks, near head, should be closed to bring the air up. The curtain on the mouth of second left entry badly torn and allows too much air to escape. The curtain on main entry near third right should be replaced by a door. Also three brattices are needed near head of main entry. Second left entry is going and two doors should be placed on room necks to bring the air current within the legal distance. Other conditions good.

Mine No. 2, inspected October 20th. Operations had just commenced after a several months' suspension. The conditions were as good as could be expected in such cases. Bad curtains caused leakage in the air current, and orders were given to repair them.

EXCELSIOR MINE.

This is a new mine, operated by the Excelsior Coal Mining Co., located near Middlesborough, a description of which is given in the chapter on "New Mines."

KNOX COUNTY.

The output of this county during the year was much larger than in 1897. The record of the several mines is as follows:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Brier Hill	697.20	14.00	98.00	816.88
North Jellico	115,718.00	279.40	263.25	237,399.82
West Jellico	19,442.00	41.16	193.00	20,646.08
East Jellico	25,958.46	69.16	165.00	25,524.61
Hemphill	3,067.04	4.80	94.00	934.26
Totals	164,832.70	....	...	285,361.65

All inspections in this county were made by the Assistant.

BRIER HILL MINE.

Near Flat Lick.

P. O., Flat Lick.

Transportation by the Cumberland Valley branch of the L. & N. railroad.

The mine was idle from March 1st to September 1st, when the present operator, J. J. Pursiful, took charge of it.

Visited July 21st. Bank had been idle so long that an inspection was useless, and none was made.

Inspected October 21st. Work was confined to a new opening, first left entry, and all conditions were satisfactory.

NORTH JELICO MINES.

Near Gray's Station.

P. O., Gray.

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

Operated by the North Jellico Coal Co., J. P. Sneed, president; I. P. Barnard, vice-president; W. A. Jones, secretary and treasurer; C. S. Nield, general manager; Alex. Frost, mine boss.

Head office, 415 West Jefferson street, Louisville, Ky.

This mine made much the largest output of any mine in the State. An account of its improvements is given in another chapter, under head of "Mine Improvements." About 96½ per cent. of the product was machine mined. 18 Harrison, 10 Ingersoll-Sergeant, and 2 Sullivan machines are employed. The Sullivan have just been introduced. Mining was done during every month of the year from 18½ days in July to 25½ days in December. The largest monthly output was 22,332.80 tons in March, and the next largest was 22,244.20 tons in December.

No. 5, inspected July 15th, and found to be in fairly good condition in all respects. One break-through needed closing, and one check curtain was necessary at a place pointed out, and tippie entry was more than 60 feet ahead of the air current. Instructions were given to remedy these deficiencies.

Inspected July 15th. A larger volume of air is needed near head of 6th left entry. Too much leakage at curtains. The door on main fourth entry should be rehung. It is about down. Two open break-throughs, near face of ninth right entry ought to be bratticed. Other conditions satisfactory.

No. 4, inspected October 10th. "An ample volume of air was entering the mine for the number of persons working therein, and arrangements were made for its proper conduction to the workings. However, a great loss in the air volume was sustained by leakage through curtains that were not in good condition, especially so of the air volume for the ninth right entry which was smoky near head, and the second break-through from face should be closed.

No immediate lack of timbering observed on entries, and rooms were sufficiently propped. Drainage conditions were excellent.

No. 5, inspected October 10th. 12,810 cubic feet of air per minute were passing into the bank, but its distribution was defective as follows: In head break-through, off third right entry, the volume was reduced to 2,720 cubic feet per minute, caused mostly from leakage at two brattices on main fifth right entry. A number of other curtains were bad and needed to be replaced by new ones, in order to control the air and carry it to the head workings, all of which were pointed out to the mine foreman. Conditions in other respects good.

WEST JELICO MINE.

Near Gray's Station.

P. O., Gray.

Transportation by the Cumberland Valley branch of the L. & N. railroad.

Operated until about August 1st by B. F. Gray, and after that date by Wm. Welch in the name of the North Point Jellico Coal Co.

Inspection July 16th. The furnace is insufficient. It ought to have new grate bars and an addition of 20 to 25 feet to its stack.

Instructions were given to make these repairs and overhaul the furnace generally, which will make ventilation good. Props not close enough to face of workings.

Inspected October 10th. All conditions except ventilation fairly good, except there was too much water in a swag in Brunk entry. A siphon was to be put in at once to drain this. Orders to that effect were given. The air volume going through the bank is insufficient. The furnace is inadequate. A wall should be built on each side and the grate bars elevated two feet. The distribution was also bad. Divers break-throughs and stoppings, etc., were ordered to be made and put up at once, in order to make the ventilation good.

EAST JELICO MINE.

At Coalport.

P. O., Coalport.

Transportation by the Cumberland Valley branch of the L. & N. railroad.

Operated by the East Jellico Coal Co., G. D. Jackson, president and treasurer; R. G. Yingling, vice-president; Fred. G. Tice, secretary; and S. Taylor Sheaffer, general manager.

The mine was operated only one day in May, four days in June, eight days in July, five days in August, and ten days in September, but ended the year with twenty-six days in December, and 4,501 tons output.

Inspected July 21st and all conditions found reasonably good, but ventilation will be improved when the over casts are made. This will prevent leakage in the air volume.

HEMPHILL MINE.

Near Artemus.

P. O., Artemus.

Transportation by Cumberland Valley branch of L. & N. railroad.

Operated by J. W. Hemphill. About 300 feet of pipes were laid to help drain the bank.

Inspected July 21st. Conditions generally were good. The bank was idle at the time.

Inspected October 19th. Conditions generally good.

LAUREL COUNTY.

The output for this county for the year is less than it was in 1897.
It was produced by the following mines:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Laurel	43,452.88	85.00	185.70	31,794.60
Star	9,557.28	25.50	153.00	4,947.92
Peacock	33,636.96	58.00	221.00	22,871.76
Manchester	17,159.70	48.00	120.50	13,888.25
New Manchester .....	.....	7.00	100.00	3,239.00
East Altamont	4,381.76	12.00	136.00	4,949.64
Lily	11,057.32	67.60	217.85	13,302.92
Kentucky	6,400.00	....	.....	17,242.95
Altamont .....	.....	71.00	67.25	12,724.52
Daisy	6,637.00	22.66	162.00	5,360.00
Swiss	5,263.28	21.25	239.50	7,913.24
Standard	15,180.00	64.00	198.50	16,920.00
Victoria	29,681.62	70.00	148.00	25,845.36
Pitman	52,964.13	83.66	141.50	44,806.85
Pittsburg	42,776.70	91.16	226.25	42,111.94
Totals	294,075.27	....	.....	272,918.95

Loss in 1898. 21,156.32 tons.

All the inspections were made by the Assistant Inspector.

LAUREL MINE.

Near Pittsburgh.

P. O., Pittsburgh.

Transportation by the Knoxville branch of the L. & N. railroad.
Operated by the Laurel Coal Co., Geo. Givens, president; J. W. Bastin, secretary and general manager.

Inspected July 11th. Propping not close enough to working faces. Drainage not good, especially on fourth right entry which is much too wet. Ventilation not very good.

The second break-through, from face of eighth left entry, should be closed. Full instructions were given.

Inspected October 3d. The roadways entirely too wet and sloppy, elsewhere the drainage is fairly good. Props generally neglected, but roof is good. Timbering satisfactory. 11,400 cubic feet of air per minute is going into the mine for 70 persons inside, but it is not well conducted to the working faces. Check curtains are needed on fourth right entry, between rooms one and two and nine and ten, to cause air to flow through the rooms on the left. The current has not been turned into the six rooms working on the right side. Another curtain is needed to remedy this.

The face of eighth right entry is 150 feet ahead of the air current. Instructions were given to stop work in the same until the air should be brought up to the legal distance, which the mine foreman assured would be done.

STAR MINE.

Near East Bernstadt.

P. O., East Bernstadt.

Transportation by the Knoxville branch of the L. & N. railroad.
Operated during the year by the Star Coal Co., which has since been succeeded by Samuel F. Bastin who still has charge of the mine. No mining was done during May and June.

Inspected July 13th. Work had just been resumed. Ventila-

tion very defective, as no air current was going through the mine. Instructions were given how to remedy the deficiency.

Inspected October 6th. Ventilation not satisfactory. The face of the third right entry is 124 feet in advance of the air current. Instructions were given to remedy this defect by the means of doors, curtains, break-throughs, etc. There was a swag of water near mouth of the bank that needed to be drained off. Timbering on entries and posting in rooms satisfactory.

PEACOCK MINE.

Near Pittsburg.

P. O., Pittsburg.

Transportation by the Knoxville branch of the L. & N. railroad. Operated by the Peacock Coal Co. C. D. Anderson, president; G. D. Anderson, secretary and general manager.

Inspected July 12th. Conditions quite satisfactory, except as to one break-through not finished.

Inspected October 4th. Work is confined to drawing pillars and stumps, and conditions in general as good as could be expected.

MANCHESTER MINE.

Near Altamont.

P. O., Altamont.

Transportation by the Altamont & Manchester railroad to connection with the Knoxville branch of the L. & N. railroad.

Operated until about July 18th by the Manchester Coal Co., John W. Harris, president. After that date, the mine was taken in charge by the Altamont Coal Mining Co.

Inspected July 14th. Conditions not good. Defects pointed out, but as the company was to surrender the mine within three days general repairs could not be made.

Visited October 5th. Four men had just been put to work to put the mine in good running order, and no general inspection was made.

EAST ALTAMONT MINE.

Near Altamont.

P. O., Altamont.

Transportation by the Altamont & Manchester railroad to connection with the Knoxville branch of the L. & N. railroad.

Operated by Green Bros., composed of C. L. and Robert Green.

No mining was done in April.

Inspected July 14th. No artificial ventilation. The second, third and fourth rooms from face of entry should be curtained to cause the air to go to the head workings. Only 12 men inside. Other conditions satisfactory.

Inspected October 5th. Conditions not improved since July, and instructions were given to provide better ventilation.

LILY MINE.

At Lily.

P. O., Lily.

Transportation by the Knoxville branch of the L. & N. railroad.

Operated by the Lily Coal and Coke Co., L. L. Parks, proprietor.

Inspected July 14th. General conditions fairly good. Some instructions were given as to ventilation and drainage of entries.

Inspected October 8th. This mine has just resumed work after an idleness of several weeks. Only 15 persons are now inside. Conditions in general are perfectly satisfactory considering the circumstances.

KENTUCKY MINE.

Near Pittsburg.

P. O., Pittsburg.

Transportation by the Knoxville branch of the L. & N. railroad.

Operated by H. C. Thompson, general manager.

This mine was idle all the year until about July 1st.

Inspected July 11th. Props not close enough to face of workings. Drainage and timbering fairly good.

Ventilation very defective. No air current whatever was traversing the mine. A shaft should be sunk near head of first left entry to act as intake, also as a second outlet, there being none at present. Another shaft should be sunk near sump for a pumping point. Some other minor defects were pointed out. The managers were warned that these instructions must be promptly carried out, or the matter would be taken to the courts for further action.

Inspected October 7th. Timbering not satisfactory. Drainage on entries not good, but rooms were dry and fairly well posted. The second outlet had not been made, though one could be easily made by placing a ladder up the shaft at the pump engine. Ventilation was inadequate. Various instructions were given in order to cure these defects and the managers was again urged to carry them out.

ALTAMONT MINE.

Near Altamont.

P. O., Altamont.

Transportation the same as the Manchester mine.

This is a new mine, operated by the Altamont Coal Mining Co., a description of which is given in the chapter on "New Mines."

DIAMOND MINE.

Near Altamont.

P. O., Altamont.

Transportation the same as the Manchester. Reopened during the year, after more than one year's suspension.

Operated by the Altamont Coal Mining Co.

Inspected October 5th. The furnace was insufficient and too far from workings, and the volume of air traversing the mine was inadequate. A new furnace is to be built, and should be done immediately. Other conditions fairly good.

GRANT MINE.

At East Bernstadt.

P. O., East Bernstadt.

Transportation by the Knoxville branch of the L. & N. railroad. Operated by W. R. Grant. Output reported with Kentucky mine.

Visited July 11th. The mine had been shut down since May, and no inspection was made.

Inspected October 7th. Various defects were discovered and pointed out, and instructions were given to remedy them.

DAISY MINE.

Near East Bernstadt.

P. O., East Bernstadt.

Transportation by the Knoxville branch of the L. & N. railroad. Operated by the East Bernstadt Coal Co., W. H. Litton, secretary; J. C. Prichard, manager.

Inspected July 13th. Mine idle and no fire. With a few repairs made, as suggested to the foreman, the ventilation would be fairly good. Other conditions satisfactory.

Inspected October 6th. New furnace is needed, and must be built when work shall be resumed on second right entry. Other conditions satisfactory.

SWISS MINE.

Near East Bernstadt.

P. O., East Bernstadt.

Transportation by the Knoxville branch of the L. & N. railroad. Operated by the Swiss Mining Co., which is a co-operative company.

Inspected July 13th. There were sixteen men in the bank, but no fire was in the furnace. Conditions generally reasonably good.

Inspected October 6th. Abundant air is going into the mine, but not so well distributed as desired. Instructions were given to cure the deficiency. Drainage not good. Timbering and propping satisfactory.

STANDARD MINE.

Near Altamont.

P. O., Altamont.

Transportation by the Altamont & Manchester railroad to connection with the Knoxville branch of the L. & N. railroad.

Operated by the Standard Coal Co. Jasper Pearl, president; J. M. Thompson, general manager.

The full output of the mine is not reported, because of the lateness of the December report.

Inspected July 14th. Drainage, timbering and propping reasonably good. Ventilation defective. Instructions were given how to make the same sufficient.

Inspected October 6th.

Bank No. 3 Twenty-seven men driving 8 rooms, and entry drawing pillars. Face of entry too far in advance of the air. Instructions were given as to curtains, break-throughs, etc., in order to improve the ventilation, which is not very good.

The old banks were about exhausted.

VICTORIA MINES.

Near Pittsburg.

P. O., Pittsburg.

Transportation by the Knoxville branch of the L. & N. railroad.

Operated by the Victoria Coal Co. W. A. Pugh, president; J. E. Carnell, secretary; J. J. Hughes, mine foreman.

Inspected July 11th. Drainage bad, especially on the cross entry off the fourth left, but rooms were dry. Numerous under-ground repairs were necessary to make the ventilation good. These were discussed with the mine foreman, who was instructed to put the mine in order accordingly, without delay.

Inspected October 5th. Entries needed drainage. Ventilation inadequate. The furnace is insufficient. It needs a wall on both sides, and its grate bars elevated two feet, from one side to the other. Other repairs were also needed as were discussed with the foreman, who was instructed to make them.

PITMAN MINES.

Near Pittsburg.

P. O., Pittsburg.

Transportation by the Knoxville branch of the L. & N. railroad. Operated by the Pitman Coal Co.

Inspected July 12th. Conditions generally good in both mines. Some minor hindrances to ventilation, in part of No. 1, was pointed out, and instructions were given to remove them.

Inspected October 3d. With a few minor exceptions, ventilation, timbering, etc., good. Drainage not very good. The roadways were quite wet and sloppy, but the working rooms were dry enough.

PITTSBURG MINE.

Near Pittsburg.

P. O., Pittsburg.

Transportation by the Knoxville branch of the L. & N. railroad.

Operated by the Pittsburg Coal Co., James D. Smith, president; C. S. O. Tintzman, general manager.

Inspected July 13th. The general conditions of the mine were good. Small defects were noted and discussed with the mine foreman, who promised to remedy them.

Inspected October 4th. "There should be a break-through between rooms 7 and 8 on fifth left entry, also, a curtain is needed between these rooms to throw the air current into the working rooms. The furnace should be cleaned out and renovated, to cause a stronger air volume to traverse the bank. With these done, the ventilation will be readily improved.

"Drainage is not as good as it should be, however, preparations were being made to improve same. Some well-directed timbering had been done on main entry near trap door. Propping sufficient."

PULASKI COUNTY.

The output of this county for the year is materially larger than that of 1897. It is the product of several mines as follows:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Alpine	5,975.00	25.90	89.70	6,577.87
Barren Fork	15,965.00	116.25	201.60	52,849.36
Enterprise	11,037.00	....	....	2,112.00
Cogar Creek	12,438.00	....	....	7,035.60
Indian Creek	4,104.03	24.00	159.75	10,860.00
Totals	49,519.03	....	....	79,434.83

ALPINE MINE.

Near Alpine.

P. O., Alpine.

Transportation by the C. N. O. & T. P. railroad.

Operated by J. M. Ramsey, lessee of the Richmond Coal Co.

The mine was idle during April and May.

Inspected February 4th. Drainage on entries not good. Ventilation only fairly good. A new shaft is just completed, and a new furnace must be built. From the location of the same, with the proper stoppings, etc., when in operation, the ventilation will be sufficient.

Visited in May, but idle and no inspection was made.

On the last round of inspection from reliable information received, an inspection was not deemed necessary and the mine was not visited.

BARREN FORK MINE.

At Barren Fork.

P. O., Flat Rock.

Transportation by the C. N. O. & T. P. railroad.

Operated by the Eagle Coal Co., J. T. Slade, president; W. L. Carter, general manager.

Inspected February 3d. With the exception of too much water on the first and fourth right entries, all conditions were satisfactory.

New mine, inspected May 21st. But little mining had been done and conditions were good.

Visited December 7th. The mine had been idle several days on account of boiler explosion. The fan was not running, and an inspection was considered of no practical value and none was made.

ENTERPRISE MINE.

This mine is near Greenwood. It was operated occasionally during the year by J. H. Chew, and the same is now exhausted and stricken from the list of mines. It was inspected in February and found to be so nearly worked out that no more care was taken of it.

COGAR CREEK MINE.

Near Flat Rock.

P. O., Flat Rock.

Transportation by the C. N. O. & T. P. railroad.

Operated from September 14th by the Pulaski Coal Co., S. H. Taylor, manager. The mine was idle much of the year before September.

Inspected February 3d. Drainage not very good. Other conditions fairly good.

Inspected May 21st. Drainage and ventilation not good. Instructions were given to remedy these conditions, so as to make them conform to the mining law.

Inspected December 7th. All conditions except drainage reasonably good. There was entirely too much water on the entries, and the manager was advised to drain the same off.

INDIAN CREEK MINE.

Near Cumberland Falls Station.

P. O., Parker's Lake.

Transportation by the C. N. O. & T. P. railroad.

Operated by J. C. Parker, under the name of the Commercial Coal Co.

Inspected February 3d. The work is confined to several openings, and is principally near the crop. Conditions not bad.

Visited May 21st. Strike on hand. Mine idle, no inspection.

Inspected December 7th. Conditions generally good, except as to drainage. There was too much water in the main entries for man or beast to travel in. The mine foreman was instructed to drain these entries at once.

WHITLEY COUNTY.

The output of this county for the year is 396,309.75, against 197,732.95 tons produced during 1897. The record of the several mines is as follows:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Whitley	106,046.90	65.66	276.00	33,929.10
Central Jellico	10,457.00	....	.....	.....
Dowlais	25,337.00	105.50	148.00	43,527.00
Kentucky Jellico	6,632.25	27.20	59.20	3,478.37
Mt. Ash	24,791.00	106.25	141.00	45,281.00
Proctor	32,147.00	119.50	192.00	77,548.00
Grinstead	18,678.00	90.00	187.00	61,148.00
Strunk	13,930.00	92.00	176.15	35,827.00
Tow Wad	15,045.80	95.66	195.25	28,006.48
Mt. Morgan	12,180.00	71.00	137.75	46,068.00
Kensee	22,478.00	72.50	87.00	21,496.80
Totals	197,732.95	....	.....	396,309.75

All inspections in this county were made by the Assistant Inspector.

BIRDEYE JELICO.

At Halsey.

P. O., Halsey.

Transportation by the Jellico, Birdseye & Northern railroad to connection with the L. & N. at Jellico.

Operated by the Whitley Coal Co., John B. Atkinson, of the St. Bernard Coal Co., Hopkins county, president; E. T. Halsey, vice-

president; S. H. Newbold, secretary; Ben W. Robinson, manager and treasurer.

No. 1 and 2, visited July 22d, under the circumstances an inspection was deemed of so little use that none was made.

No. 3, inspected July 22d. Conditions reasonably good, except the air current was not properly conducted to the head workings on main entry.

Inspected October 15th. Ventilation near head of third left entry greatly interrupted by a fall. Connection will soon be made with second left entry, which will readily improve matters in this respect. Other conditions satisfactory.

DOWLAIS MINES.

At Dowlais.

P. O., Jellico, Tenn.

Transportation by the Knoxville branch of the L. & N. railroad.

Operated by the East Tennessee Coal Co., E. J. Davis, president and treasurer; F. O. Richmond, secretary; W. T. Lewis, general manager. Head office, Knoxville, Tenn.

Mine No. 1, inspected July 22d. Ventilation very defective, but with the repairs made that were discussed with the mine foreman, it will be greatly improved. Other conditions fairly good.

No. 2, visited July 22d. Under the circumstances of the bank and its work an inspection was not deemed important, and none was made.

No. 1. Inspected October 13th. Drainage, except some water on sixth right entry, fairly good. Ventilation not satisfactory. Quite a number of repairs were necessary to make it good. All were pointed out to the mine foreman and he was directed to have them done at once.

No. 2. Visited October 13th. The work is confined to drawing pillars and an inspection was not considered of any value and none was made.

KENTUCKY JELICO.

Near Halsey.

P. O., Halsey.

Transportation the same as for Birdseye mine.

Operated until May by the Kentucky Jellico Coal Co., when the mine was abandoned during the rest of the year.

The mine was visited in July and found idle.

MOUNTAIN ASH MINE.

At Mountain Ash.

P. O., Mountain Ash.

Transportation by the Knoxville branch of the L. & N. railroad.

Operated by the Jellico Coal Mining Co., E. J. Davis, president; Chas. Ducloux, vice-president; Arthur Groves, secretary and treasurer; and J. L. Williams, general manager.

No. 4. Inspected July 25th. All conditions except as to ventilation were reasonably good. Instructions were given to improve the ventilation, which was very inadequate, especially on third right where there were no indications of an air current.

Many deficiencies contributed to the defect. They were fully discussed with the mine foreman and directions given him how to bring about good ventilation.

No. 3. Inspected July 25th, and all conditions found to be reasonably good.

Inspected No. 3, October 17th. Conditions reasonably good.

No. 4 also inspected October 17th. All the instructions given at previous inspection had not been carried out, but it was the intention to do so. The overcast had not been made, nor had the addition to the furnace stack been made. With these done it is thought that the ventilation will be good.

PROCTOR MINE.

At Red Ash.

P. O., Red Ash.

Transportation north by connection at Jellico with the Knox-

ville branch of the L. & N. railroad, and south by the Southern railroad.

Operated by the Proctor Coal Co., A. Gatliff, president; J. W. Siler, vice-president; H. F. Finley, secretary and treasurer; and Philip Francis, superintendent.

Inspected July 21st. Many working places were more than 60 feet ahead of the air, and the ventilation was not good. Many curtains were torn. Drainage not good. Some break-throughs were needed. General instructions were given to put the mines in good working condition.

Inspected October 12th. Drainage not good. Various repairs were needed, and full instructions were given.

GRINSTEAD MINE.

Operated by the Proctor Coal Co., and has the same transportation. Inspections were made in July and October. Conditions in general were satisfactory.

STRUNK MINE.

Near Strunks Lane.

P. O., Strunk.

Transportation by the C. N. O. & T. P. railroad.

Operated by the Pine Knot Coal Co., A. McDonald, president, and general manager; H. H. Taylor, secretary.

Inspected February 1st.

Drainage not good, and ventilation very insufficient. Full directions were given how to remedy these defects.

Inspected May 20th. Drainage and ventilation still defective. Numerous instructions were given.

Inspected November 3d. There are still some defects in the ventilation, but the mine conditions were much improved.

TOW WAD MINES.

Near Pine Knot.

P. O., Pine Knot.

Transportation by the C. N. O. & T. P. railroad.

Operated by Bryant Bros.

Inspected February 2d. Conditions except ventilation generally good. Full instructions were given.

Inspected May 19th. Drainage needs attention, and ventilation defective. Further instructions were given.

Inspected November 3d. General conditions much improved, but the mines still need attention.

MT. MORGAN MINE.

At Williamsburgh.

P. O., Williamsburgh.

Transportation by the L. & N. railroad.

Operated by the Mt. Morgan Coal Co., J. P. Mahan, president; S. B. Mahan, vice-president; John T. Philips, secretary; Geo. Humble, general manager.

Inspected July 25th. Conditions except as to ventilation reasonably good.

Numerous instructions were given in order to bring about good ventilation.

Inspected October 18th. Ventilation reasonably good, except on second entry where the air is quite smoky. Further instructions were given.

KENSEE MINE.

At Kensee.

P. O., Kensee.

Transportation over the Knoxville branch of the L. & N. railroad.

Operated by the Hywel Davies Coal Co.

No mining was done during April, May, June and July.

Visited in July, but the mine having been idle for about 90 days, no inspection was made.

Inspected October 14th. Conditions generally were good.

WESTERN DISTRICT.

The total output of this district for the year is 2,071,070.42 tons, against 2,114,571.41 tons produced in 1897. The decrease was occasioned by the many strikes detailed in the chapter on that subject, but for which there would probably have been a notable increase.

The output of the district for the several years since 1893 is as follows:

Year.	Tons.
1894	1,806,966.02
1895	1,784,278.14
1896	1,762,461.93
1897	2,114,571.41
1898	2,071,070.42

BUTLER COUNTY.

There is a slight increase in the tonnage of this county over 1897, as may be seen from the following table:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Aberdeen	18,405.32	55	139.60	17,856.44
West Aberdeen	12,106.38	52	118.00	14,842.36
Totals	30,511.60	....	....	32,698.80

Gain over 1897, 2,187.20 tons.

ABERDEEN MINE.

At Aberdeen.

P. O., Morgantown.

Transportation by Green river.

Operated by the Aberdeen Coal and Mining Co., I. B. Wilford, president; J. D. Render, secretary and superintendent.

All the inspections were made by the Assistant.

Inspected June 22d. Drainage fairly good. Props not close enough to working faces. With the exception of a leakage on air way, called to the attention of the mine boss, and a second break-through from face to second entry that ought to be bratticed, the ventilation is satisfactory.

Inspected September 12th. Ventilation fair. Other conditions reasonably good.

Inspected December 19th. Drainage good. Abundant air, but its distribution was hindered by some open break-throughs. Some new break-throughs were needed. Instructions were given to cure these deficiencies.

WEST ABERDEEN MINE.

At Aberdeen.

P. O. Morgantown.

Transportation by Green river.

Operated by the West Aberdeen Coal Co., James F. Philips, president; E. P. Aspley, secretary; G. Forsythe, treasurer; and A. A. Mann, superintendent.

Inspected June 22d. Drainage, propping and timbering good. An ample volume of air was entering the mine, but it was not well conducted through the workings. When the Davis entry shall be connected with the entry to the right of the furnace entry, the ventilation will be greatly improved. The second break-through from face of main entry to air course, is open, and should be bratticed if the entrance shall be continued.

Inspected September 12th. Props not close enough to working faces. Drainage fairly good. Timbering reasonably good.

Ventilation is inadequate, caused from lack of sufficient furnace power. There should be an addition of 15 to 20 feet to the furnace stack. Too much gob in air ways, which obstructs the flow of the air current. The face of second north entry is 110 feet ahead of the air course. With these and other designated matters attended to the ventilation will be sufficient.

Inspected December 19th. Some dangerous top was discovered near face of first left entry. Props reasonably well up to working room faces. Drainage not good. An ample current, 12,200 cubic feet per minute, was entering the mine but it was not properly distributed. Air ways are still too much obstructed. A break-through and a curtain were needed at places pointed out to the mine foreman, who was instructed to provide them.

CHRISTIAN COUNTY.

Only one mine, the Empire, was in operation during the year. Its output was increased from 36,325.64 tons in 1897 to 66,496.32 tons in 1898.

The mine is located near Empire, on the Henderson division of the L. & N. railroad, and is operated by the Empire Coal and Mining Co., John D. Anderson, president; W. H. Buttorff, vice-president; W. S. Carroll, secretary; W. T. Rutland, manager; and Thomas Robinson, mine foreman.

Inspected by Assistant, April 21st. Face of first west entry, on south side, 85 feet ahead of the air, and must have a break-through.

Face of second west entry too far ahead of air current. On north side the second break-through from face in first and second west entries are open and should be closed. There should be a door on mouth of first west entry. Except as noted, the mine is in good condition.

Inspected August 25th. There was an abundant air current going into the mine, but it was not well distributed to all the workings. On north side a door was needed at the mouth of the first and second west entries. On second west there ought to be a curtain between rooms thirteen and fourteen to turn the air into the rooms, instead of inclining down the entry. There are three open break-throughs nearest the face of this entry, between it and the air course. These, except the last one, ought to be bratticed so as to force the air to the head. A curtain was also needed on this entry, and one on second west on the south side, at places designated. Otherwise the mine was in good condition.

Inspected November 23d. Conditions on the north side, except as to the break-throughs mentioned, about the same as found at time of former inspection. The door for the mouth of the entry was made and ready to put up.

South side. First west entry. The second break-through from face was open, and it ought to be closed. A curtain ought to be placed across this entry between rooms eighteen and nineteen, to force the air into the rooms on the south side. Other conditions good.

DAVIESS COUNTY.

There was only one mine in operation in this county during the year, the New Holland, located on the Louisville, Henderson & St. Louis railroad. It is operated during the year by the New Holland Coal Co.

The output was increased from 3,549.20 tons in 1897, to 7,140.80 tons in 1898.

All inspections were made by the Assistant.

Inspected May 2d. Conditions satisfactory.

Inspected August 28th. "Conditions in all respects satisfactory."

Inspected November 28th. "The air is not bad, but will be im-

proved when the furnace is built at the new shaft, as the air way to the present furnace is nearly full of water and stagnates the air current to a great extent. Props not close enough to working faces, however, the roof is good. No immediate lack of timbering observed. Drainage satisfactory in working places."

HANCOCK COUNTY.

There was a material decrease in the output of this county during the year, as compared with 1897, caused chiefly by the shut down of the Hawesville mine, it being so flooded with water all the year that mining could not be done.

The Victoria cannel mines were practically exhausted before the close of the year, and they were permanently shut down.

The Falcon mine, at Adair, is the only one now in operation.

The record of the mines for the year is as follows:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Victoria	3,231.07	16.00	210.50	2,480.00
Hawesville	9,245.44	....	.....	.....
Falcon	7,425.16	26.66	223.00	6,955.44
Totals	19,901.67	....	.....	9,435.45

Loss during 1898, 10,466.23 tons.

FALCON MINE.

At Adair.

P. O., Adair.

Transportation by the Louisville, Henderson & St. Louis railroad.

Operated by M. H. Enright, Owensboro, Ky.

Inspected May 2d. Ventilation fairly good, but will be improved when certain doors, curtains, etc., are put up. Fire in the furnace much neglected. This is positively forbidden. Too much water in main haulway. Other conditions satisfactory.

Visited August 31st. Men on a strike, and mine had been idle for several days and no inspection was made.

Inspected November 28th. Drainage quite good except a swag of water on main entry. Props not set close enough to working faces. Ventilation, except near head of Egan entry was reasonably good. Improvement on this entry, also on Dixon entry, was needed, and instructions were given to supply the deficiency.

The Hawesville mine was visited May 3d, but was found flooded with water. This condition continued throughout the year.

Three visits were made to Cloverport during the year to inquire into the condition of the Victoria mine. Information received seemed not to justify inspections, as the mine was so near exhaustion and the conditions were represented by some of the miners to be as good as could be expected considering the character of the work, and no inspections were made.

HENDERSON COUNTY.

The output of this county for the year is 89,594.72 tons, against 121,223.72 tons produced during 1897. This material decrease was caused by serious strikes at the Basket and Rankin mines.

The output of the several mines is as follows:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Corydon	4,087.20	7.00	211.00	5,367.60
Henderson	14,408.60	38.66	.....	11,245.44
Peoples	4,726.24	8.00	149.20	3,516.44
Basket	58,224.44	78.33	113.00	39,836.60
Rankin	39,778.16	....	.....	29,628.64
Totals	121,223.72	....	.....	89,594.72

Loss in 1898, 31,629 tons.

All inspections made by the Assistant.

CORYDON MINE.

At Corydon.

P. O., Corydon.

Transportation by the Ohio Valley division of the Illinois Central railroad.

Operated by Lloyd & Wright.

Visited April 28th. Only three men were inside and an inspection was not made.

Only four men being employed during August, when the second round of inspection was made, the mine was held not to be subject to State supervision, and no inspection was given it.

Inspected December 2d. Conditions, as to ventilation, drainage, propping, and timbering, all very satisfactory.

HENDERSON MINE.

At Henderson.

P. O., Henderson.

Operated by the Henderson Mining and Manufacturing Co., C. W. Wilson, president; C. W. Rankin, secretary; and W. H. Lee, superintendent.

Inspected April 26th. Drainage, timbering and propping good. There should be break-throughs between rooms three, four, five and six, off first cross entry. They are more than 60 feet ahead of the air current. Otherwise the ventilation is satisfactory.

Inspected August 31st. There were only 12 men employed in the mine, and 5,350 cubic feet of air per minute going in it, and it was well distributed. Timbering and propping fairly good and drainage reasonably good.

Inspected December 3d. Ventilation fairly good. Too much leakage at curtain in mouth of first left entry. This should be replaced by a new one. Other conditions satisfactory.

PEOPLES MINE.

Near Henderson.

P. O., Henderson.

Operated by Haag Bros. F. Haag, general manager; Miss Cora Quinn, secretary.

Inspected April 25th. The mine was idle, but the fan was running. All conditions were fairly good.

Inspected August 30th. Some timbering was needed on main entry, and a check curtain was needed at the mouth of main entry air course, and the one across main entry below the same ought to be taken away. Otherwise the conditions were good.

Inspected November 29th. Conditions all fairly good, except a torn curtain on first cross entry permitted too much air to escape. Orders were given to repair this.

BASKET MINE.

At Basket.

P. O., Basket.

Transportation by the Louisville, Henderson & St. Louis railroad.

Operated by the Pittsburg Coal Co., Thomas C. Blair, superintendent.

Inspected April 26th. "Drainage and timbering good. Props fairly well up to working faces. I would suggest that you sprinkle some of your main haulways, especially first right entry on north side, and first left entry on south side, where there is entirely too much dust for safety. You must provide safety catches for your shaft cages that are used by men. Also the west cage should be covered."

The air in the mine is abundant but not well conducted to the working faces. There is not enough air going to the workings on the south side of the shaft, but this will be remedied when connection shall be made by means of first right entry which is being driven.

South side on fourth cross entry off first left, break-throughs should be made between rooms one, two and three, which are more than 60 feet ahead of the air.

There are also defects in second, third and fourth cross entries. Special instructions were given covering all these defects, that the mine be thoroughly ventilated.

"There is positive danger of fire-damp" in this mine unless this is done.

Inspected August 30th. Drainage good. Timbering and propping somewhat deficient. Ventilation fairly good. Curtains need repairing and a better grade of oil should be used. The haulways too dry and dusty, and needs to be kept well sprinkled. Cages need safety catches. The company was warned against a continuance of these conditions.

Inspected November 29th. First right, on north side and first left, on south side, too dry and dusty and should be sprinkled often

enough to keep the dust down. Men must not be permitted to ride on west cage until safety catches are provided. Props not close enough to working faces.

Various defects in the ventilation were discovered and pointed out, and instructions were given to repair them at once.

RANKIN MINE.

Near Spottsville.

P. O., Spottsville.

Transportation by the Louisville, Henderson & St. Louis railroad and by Green river.

Operated during most of the year by the Green River Coal and Mining Co., but at the present time by Rankin Eastin.

The mine was idle during September, October and much of November, on account of the strike among the employees spoken of in another chapter.

Inspection April 27th. Ventilation very defective. A number of smaller hindrances were discovered and pointed out, but the main one was the air course to the air shaft was closed, which shut off all ventilation, and made the second outlet to the mine inaccessible. In relation to this the following notice was served on the company.

"As reported in inspection notice, No. 221 of November 27, 1897, this mine has only the one way of egress and ingress. The manway which also serves as an air shaft being closed, the volume of air entering the mine so light that I could not get a reading on first right cross entry, which is direct from air shaft to the workings, and is the only course by which the ventilating current for the mine can travel.

"As provided by section three of the mining law, I extend to you 20 days (until June 1st), to provide a second outlet to this mine.

"Unless you comply with directions to make the second outlet, you make yourself liable to a fine of \$50 per day. I positively insist that this mine shall be thoroughly improved in strict accordance with the mining law, and the requirements of safety unless directions are complied with I shall feel compelled to enforce the law

without further discussion, but I trust you will see the necessity of intelligent and vigorous action. Very respectfully,

C. W. LOGAN,

Assistant Inspector of Mines."

Failing to hear from the company within the time specified, a letter of inquiry was written to learn what action had been taken, when the following answer was received, giving assurance of the company's earnest efforts to comply with the terms of the notice:

C. W. Logan, Inspector:

Dear Sir. We have your letter dated the 1st inst. at hand and contents noted. In reply to you will say that we have been at work on both ends of our air way ever since we received your first letter and we have every reason to believe that we will have the way open from one end to the other inside of three or four days' time, as we have worked the two ways close enough together to locate a sound. We are crowding the work as fast as we possibly can on both ends of this air way, and if you will kindly extend the time for us until the 15th of the month we will then have the way open without a doubt. Hoping you will favor us with the extension of time we have asked, we remain,

Yours truly,

Green River Coal and Mining Co.

By Rankin Eastin.

The extension was granted, and the work was completed within the time specified. The mine being a large one and having a working force inside of from 60 to 80 men, and also being a shaft of considerable depth, made the case one of serious importance.

The next inspection was made August 31st, when the mine was found in excellent condition. There were then only 45 men working inside and a volume of 14,600 cubic feet of air per minute was entering the mine, and making its way to the man-way and air-shaft. A few curtains were out of order and some needed to be moved to other places to aid in the better distribution of the air, and instructions were accordingly given.

Inspected December 3d. Work had just been resumed after several week's suspension, and conditions were as good as could be expected under such circumstances. Some minor defects were pointed out to the foreman, who promised to repair them.

HOPKINS COUNTY.

This is the banner coal producing county of the State, its annual production being more than double that of any other county. Fully 75 per cent. of the year's output was mined with machines, and more than 60 per cent. of it was marketed outside of the State.

While the western district, as a whole, sustained a loss of 43,500 tons, as compared with 1897, this county made a slight gain, the output of the year reaching 961,716.92 tons, against 961,412.24 tons mined during the previous year. This slight gain is quite significant when we consider that there was an abnormal gain in 1897, over 1896, of 184,000 tons, occasioned largely by the prolonged strike that prevailed in 1897 throughout the adjacent Indiana coal fields, which condition did not exist in 1898.

The mines in this county have been remarkably free from strikes. Only one occurred during the year, and that was at Carbondale, and was of short duration. Both operators and employees are to be congratulated for constant harmony, and almost constant work. Fourteen hundred employees, engaged at satisfactory wages in this one industry, and feeding seven or eight thousand people, and stimulating the trade of the entire county, and all at peace is a most desirable condition for any community, and is incalculably better than to have strikes and strife, and the want and suffering that they produce. The mines generally work ten hours a day. The "Central City Agreement" has been nowhere adopted in the county.

The record of the several mines for the year is as follows:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
St. Bernard (9 and 11) ..	297,125.00	367.08	253.75	281,597.52
Diamond	163,577.00	166.50	231.50	154,548.79
St. Charles	98,863.00	177.16	247.50	132,216.04
Monarch	46,100.60	77.00	255.00	51,841.20
Reinecke	146,916.36	188.00	247.50	150,683.02
Crabtree	61,691.36	106.33	147.75	60,910.84
Carbondale	44,374.36	81.00	158.00	41,129.89
Hecla.....	47,165.48	59.25	163.75	38,315.75
Co-Operative	46,082.40	92.00	.....	37,861.43
Oak Hill	9,516.68	28.50	127.00	12,611.24
Totals	961,412.24	....	.....	961,715.92

Gain in 1897, 303.68 tons.

The output of the Diamond for 1897 includes about 17,000 tons, the product of the old Diamond, that was exhausted by the close of that year.

EARLINGTON NO. 9.

At Earlington.

P. O., Earlington.

Transportation by the Henderson division of the L. & N. railroad.

Operated by the St. Bernard Coal Co. John B. Atkinson, president; George C. Atkinson, secretary; Wm. Day, mine foreman.

All inspections were made by the Assistant Inspector.

Inspected April 18th. "Conditions in all respects were satisfactory."

Inspected September 5th. "Conditions in all respects quite satisfactory."

Inspected December 6th. "29,500 cubic feet of air per minute was passing into the mine, to supply the 90 persons inside. The check curtains, between rooms forty-two and forty-three, and fifty-two and fifty-three on third west entry, are torn and should be repaired, to cause a stronger air volume to travel near the working room faces. Elsewhere ventilation was splendid. Conditions in other respects quite satisfactory."

EARLINGTON NO. 11.

This mine is also at Earlington, and is operated by the St. Bernard Coal Co., and has the same railroad transportation as No. 9. J. Evans is mine foreman.

All inspections were made by the Assistant Inspector.

Inspected April 20th. "With the exception of a check curtain that was needed on eighth west entry, between rooms eight and nine, to throw the air current nearer the working faces, which were too far ahead of the air, the mine was in a satisfactory condition."

Inspected September 6th. "Timbering fairly good. Drainage good. Props reasonably well up to working room faces."

"Plenty of air, 16,195 cubic feet per minute, was entering the bank for the number of persons (eighty) employed inside, but improvement was needed in its distribution as follows:"

(1) 2d north entry. Very smoky at head of first two rooms. There ought to be a break-through between room 1, near face, and the air course.

(2) The curtain opposite room forty, between fourth east entry and air course, is badly torn, and permits too much leakage in the air that is intended for the head workings.

(3) On the sixth east entry, the air current is inadequate in ten rooms, from eight to eighteen. A check curtain is needed on same between nine and ten.

(4) Ventilation is made somewhat deficient by falls in a few of the rooms, which, to some extent, obstruct the air current, but as

soon as more connections are made with rooms, soon to be made, the air volume will be stronger and adequate.

Inspected December 7th. All conditions reasonably good.

DIAMOND MINE.

At Morton's Gap.

P. O. Morton's Gap.

This mine is operated by the St. Bernard Coal Co. Head office at Earlington, and has the same railroad transportation as the Earlington mines. James Blanks is mine foreman.

On the basis of employees, output and accidents, this mine is the banner one of the state for the year.

An average of 166½ men working for 231½ days, and producing 154,548.79 tons of coal, without any accident whatever, is a record without a blot, and is worthy of special notice, and those who made it may justly feel proud of the achievement.

Inspected by Assistant, April 20th. "Ventilation satisfactory. Conditions in other respects were also good."

Inspected August 4th. All conditions were excellent."

Again inspected November 17th, and the usual good conditions were found to exist.

ST. CHARLES MINES.

Near St. Charles.

P. O. St. Charles.

These mines are operated by the St. Bernard Coal Co. Head office at Earlington, and transportation is provided by the Illinois Central railroad. Geo. Fauls is mine foreman.

Inspected by Assistant, April 22d.

New mine. The check curtain across 6th west entry, between rooms ten and eleven, should be moved to between thirteen and fourteen. Otherwise, the mine was in good condition.

Old mine. Conditions good.

Inspected August 5th. I note the completion of a new man

way to the new mine on the south side. The general conditions of both mines were very good.

Again inspected November 23d. Both mines were found to be in very satisfactory condition.

MONARCH MINE.

Near Madisonville.

P. O. Madisonville.

This mine is operated by Anderson & Holloman, as lessees of the Monarch Coal Co., and is located on the Henderson division of the L. & N. railroad.

All inspections were made by the Assistant Inspector.

Inspected April 16th. Drainage and timbering good. Props not set close enough to working faces. The haulways ought to be sprinkled every day enough to keep the dust down.

An ample volume of air was entering the mine for the number of persons inside, but it was not well conducted to the working faces. The company was warned that the mine yields fire damp, and that there was great necessity of preventing its accumulation, and of keeping the mine well ventilated. Numerous repairs were suggested and ordered to be made for the better ventilation of the mine.

Inspected September 5th. All conditions, except ventilation, reasonably good. The air volume was abundant, but its distribution at the head workings was generally deficient. Several defects were discovered and discussed with the mine foreman, and instructions were given to make repairs accordingly.

Inspected December 7th. "23,400 cubic feet of air per minute were entering the mine for the eighty-five persons employed inside, which was fairly well conducted to the working faces. The face of the third west entry was not going, because a break-through was needed, which was almost made. A very bad piece of slate was noticed before room nine on third west entry. Instructions were given to pull it down at once. Propping reasonably fair. Drainage good.

REINECKE MINE.

Near Madisonville.

P. O. Madisonville.

This mine is located on the Providence branch, Henderson division of the L. & N. railroad, and it is operated by the Reinecke Coal Co. Conrad Reinecke, president; I. Bailey, secretary and general manager; and Louis Feger, superintendent of the mine.

Extensive and valuable improvements made, and in course of construction, at this mine are mentioned in other chapters of this report.

Inspected April 16th. All conditions were satisfactory.

Inspected August 25th. All conditions were good.

Again inspected November 22d. The former good conditions continue to exist throughout the mine.

CRABTREE MINE.

At Crabtree.

P. O. Ilsley.

Transportation by Illinois Central railroad.

Operated by the Crabtree Coal Mining Co. A. Howell, president; R. M. Solomon, secretary and treasurer; John Harlan, mine foreman.

Inspected by Assistant, April 21st. "Except that the break-throughs, between thirty-nine and forty, off No. 1 east entry, should be bratticed, and a check curtain placed on No. 5 west entry, between rooms thirteen and fourteen, to turn the ventilating current into the working rooms, conditions were fairly good."

Inspected August 6th. With a little improvement in the drainage in some parts of the mine, all conditions would be very satisfactory.

Again inspected November 15th. Except on the seventh and eighth west entries, the ventilation is good. It is very deficient on these entries, caused from leakage at various places. Mr. Harlan promised to find and remedy these at once. The second break-

through from face between these entries was found open, and needs to be closed. A part of the seventh west entry was very wet, and badly needs drainage. This will also be done at once. In other respects the mine is in good condition.

CARBONDALE MINE.

Near Hamby Station.

P. O., Hamby Station.

Transportation by the Illinois Central railroad.

Operated by Booth & Glover, lessees of the Carbondale Coal & Coke Co.; W. E. Booth, general manager.

Inspected by Assistant, April 22d. There is entirely too much water in a swag on third west entry near room four, but when the ditch is completed the drainage will be good. Other conditions are fairly good.

Inspected by Stone, August 6th.

I note marked improved conditions as to drainage, as compared to time of my inspection last year. In fact, drainage is now very good, and all other conditions very satisfactory.

Again inspected November 16th.

All essential mine conditions are highly satisfactory.

HECLA MINE.

Near Earlington.

P. O., Earlington.

This mine is located on the Henderson division of the L. & N. railroad, and is operated by the Hecla Coal Co. J. F. Ford, president; J. T. Alexander, secretary; Wm. Garret, mine foreman.

Inspected by Assistant, April 19th, and all conditions were found satisfactory.

Inspected by Stone, August 6th. The mine was found to be in a very safe and satisfactory condition in all respects.

Again inspected November 16th. General conditions very good, except the air is too much scattered at the head workings, which will soon be remedied.

CO-OPERATIVE MINE.

At Barnsley.

P. O., Barnsley.

This mine is located on the Henderson division of the L. & N. railroad, and is operated by the Co-Operative Mining & Manufacturing Co. Thomas Williams, president; R. L. Ferguson, secretary.

Inspected by Assistant, April 19th. A proper volume of air was not traversing the rooms off fourth west entry, on account of a fall that occurred from rooms ten to nineteen, but when the cut-off entry shall be connected, as intended, the ventilation will be good. A check curtain is needed between rooms twenty-nine and thirty on third west entry. Other conditions fairly good.

Inspected by Stone, August 4th, and the mine was found to be in good condition generally.

On January 29th, there was a bad fall covering about four acres, and shutting off about thirty working rooms, including those at the head. A force was at work making an entry to the right of the fall, intending to reach the crop, and then make a new entry in advance of the fall.

Again inspected November 18th, and found to be in very satisfactory condition in all respects.

OAK HILL MINE.

Near Nortonville.

P. O., Nortonville.

This mine is operated by the Oak Hill Coal Co. J. H. Trathen, general manager; W. H. Hall, Jr., secretary.

The mine was idle from some time in April until in August, when the present company took charge of it. Visits were made in April and August, but the first time it was idle, and the last time repairs were being made. The present company found the mine flooded with water and out of repair generally, but by November 18th, the date of inspection, all conditions had become very good, except the air current was not well conducted to the head workings. Suggestions were made to improve this defect, and the mine foreman

readily agreed to comply with the instructions. This coal vein is five feet thick, and under the present management, I shall expect in the near future to see a splendid mine at this place.

McLEAN COUNTY.

There was a material decrease in the output of this county during the year, as only 21,515.20 tons were produced, against 30,852.84 tons in 1897. It is the product of two mines as follows:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Island	14,245.24	22	49	4,200.00
Field	16,607.60	25	168	17,315.20
Totals	30,852.84	....	...	21,515.20

Loss in 1898, 9,337.64 tons.

ISLAND MINE.

At Island.

P. O., Island.

This mine is located on the Owensboro division of the L. & N. railroad.

It was idle most of the year. It was operated during January and February by the Island Coal Co., and during some of the fall months by the Poplar Block Coal Co., that ceased to operate it on November 18th. About the end of the year, the present operators, the Bryant Coal Co., took charge of the mine.

The mine was idle on the first and second rounds of inspection, and none were made. On the last round, made in November, it was also idle, pending the putting in of a new boiler, and as there had

been no pumping for several days, there was much water in the mine, and an inspection was impossible, and of no value, and none was attempted.

FIELD MINE.

This mine is also at Island, and has the same railroad transportation as the Island mine. It is operated by the Field Coal Co. C. L. Field, president; W. P. Draker, general manager; Frank Buckley, mine foreman.

Inspected by Assistant June 11th, who suggested the sinking of an air shaft near the head of the third south entry, which shall also be used as a second outlet to the mine. Several minor defects were discussed with the foreman, who promised to remedy them.

Inspected by Stone, August 11th. On most of the entries there was too much mud and water, and drainage was badly needed. The furnace was weak, and if the force shall be increased, then better ventilation will be needed. Some other small defects were discussed, and repairs were promised accordingly.

Again inspected November 11th. As compared to August, conditions were much improved, except on third north entry, which was still too muddy and wet. Instructions were given to drain this. Some improvement in the ventilation was also needed. Some neglect in propping.

MUHLENBERG COUNTY.

The output of this county for the year is 268,507.40 tons, against 261,783.32 tons, produced in 1897.

It was produced by the following mines:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Central	112,055.02	230.75	179.15	109,984.76
Powderly	23,935.40	.....	113.00	25,847.68
Hillside	31,779.96	49.50	99.00	24,073.96
Oakland	936.20	24.66	107.00	11,833.60
Memphis	39,431.06	113.50	131.45	4,622.32
Mud River	24,641.84	71.33	93.50	19,699.60
Pierce	23,982.68	80.60	122.95	30,345.48
Sterling	4,769.76	.....	.....	.....
Paradise	251.40	.....	.....	.....
Bevier .....	.....	15.00	26.00	700.00
Totals	261,783.32	.....	.....	268,507.40

Gain in 1898, 6,724.08 tons.

All the inspections were made by the Assistant Inspector.

CENTRAL MINE.

At Central City.

P. O., Central City.

This mine has tiple connection with the Illinois Central railroad, and with the Owensboro division of the L. & N. railroad. Operated by the Central Coal & Iron Co. T. D. Dupont, presi-

dent; R. R. Hathaway, vice president; Spalding Coleman, secretary, and Hywel Davies, general manager.

Extensive and costly improvements were added during the year, the particulars of which are given in another chapter.

Inspected June 13th. Except some timbering that should be done near fourteenth south entry, the mine was found to be in a satisfactory condition.

Inspected September 7th. No criticism as to propping, timbering and drainage.

Ventilation in many respects deficient, caused mainly by the return air way to the fan being nearly closed by a big fall. A check curtain was needed on air course of main entry, between thirteen and fourteen north entries. The air volume was too weak in the rooms of the eleventh south entry. There should be a curtain placed on this entry between rooms ten and eleven.

The second break-through, from face of eleventh and twelfth south entries, is open and should be closed, to throw the current nearer the entry faces.

Inspected December 10th. It was quite evident that the usual amount of air was not passing through the mine, caused by the fan engine not being in good condition, but a new one has since been installed, which makes the mine ventilation excellent. Another outlet has also been provided at the fan shaft, as detailed in the chapter on "Mine Improvements."

The year closed with all mine conditions very satisfactory.

POWDERLY MINE.

At Powderly.

P. O., Powderly.

This mine is located on the Illinois Central railroad, and is operated by the Greenville Coal Co. Lewis Reno, president; E. D. Martin, vice president; C. H. Hamilton, secretary and superintendent.

No mining was done during April, pending the making of repairs.

Inspected June 15th. Props too far from working faces. Drain-

age not good. The volume of air supplied the workings is quite insufficient. This is caused by the furnace being too far from the workings to be of much service, and the air way to the furnace is also choked up by falls. "This deficiency in the ventilation can and must be remedied by sinking an air shaft. I would suggest a point near head of second north entry."

The company was warned of the necessity of speedy action, and of the legal penalty for failure.

Visited September 8th. The hoisting drum was broken and torn out since August 28th, and an inspection was impracticable, and none was made. A new fan was nearing completion.

Inspected December 16th. Timbering and propping fairly good. Drainage very good except at face of main entry air course. Hoisting drum has no brake.

"Natural means is the dependence for ventilation, which is inadequate. A new air shaft had been sunk near the head of first left entry, which is properly located for a furnace or a fan." The fan is recommended as preferable. Good ventilation can be speedily provided by either a fan or furnace as suggested above, one of which must be made at once.

HILLSIDE MINE.

At Hillside.

P. O., Mercer Station.

This mine is located on the Illinois Central railroad, and is operated by the Hillside Coal Co. J. W. Lam, secretary and treasurer; Walter Russell, mine foreman.

A complete electric mining plant was installed during the year, as detailed in another chapter.

Inspected June 15th. Propping not very good. Timbering and drainage fairly good. Air current in the mine abundant, but not well distributed to the working faces. Instructions were given how to remedy this defect.

The mine has but one outlet, and the urgency of another, as required by law, was pressed upon the company, and twenty days

were allowed to provide the same, under penalty of prosecution for a failure to do so.

Inspected September 8th. The second outlet was about completed. Instructions were given as to some repairs necessary to aid in the ventilation.

Inspected December 15th. Improved conditions were noted; however, several minor defects were pointed out and ordered to be repaired at once.

OAKLAND MINE.

Near Mercer Station.

P. O., Mercer Station.

This mine is located on the Illinois Central railroad, and is operated by the Oakland Coal Co. Wm. Eades, president; J. W. Lam, secretary and treasurer; George Miller, mine foreman.

Inspected June 15th. Ventilation very defective. No air current whatever was traversing the mine. The remedy is a second outlet. Instructions were given.

Inspected September 8th. Ventilation improved. Timbering and drainage satisfactory. Props too far from face of workings.

Inspected December 15th. Conditions, except ventilation, reasonably good. Instructions were given to improve the latter.

MEMPHIS MINE.

At Bevier.

P. O., Bevier.

This mine is located on the Owensboro division of the L. & N. railroad, and is operated by J. W. Moores and others, as lessees of the Memphis Coal & Mining Co.

Inspected June 14th. With but a few minor defects discussed with the foreman, the mine conditions are fairly good.

Inspected September 8th. Ventilation fairly good, and when connection with the air shaft shall be completed, it will be greatly improved.

Inspected June 14th. Conditions generally were fairly good. Other conditions were good.

Inspected June 14th. Conditions generally were fairly good. Some minor defects were discussed and ordered repaired.

Inspected December 12th. Drainage and timbering satisfactory. Props too far from working faces. Some deficiencies in ventilation, and instructions were given as to them.

MUD RIVER MINE.

At Mud River.

P. O., Mud River.

This mine is located on the Owensboro division of the L. & N. railroad, and is operated by the Mud River Coal, Coke & Iron Co. John C. Gordon, president; A. G. Hunter, vice president; E. S. Rundle, secretary and manager; Jas. McIntire, mine foreman.

Inspected June 16th. Work at present confined to drawing pillars and stumps, and conditions are good as could be expected.

Visited September 10th. The mine had been idle since about August 4th, and an inspection was not made.

Inspected December 13th. Considering the character of the work, all conditions were reasonably good.

age of loss.

PIERCE MINE.

At Drakesboro.

P. O., Drakesboro.

This mine is located on the Owensboro division of the L. & N. railroad, and is operated by the Black Diamond Coal Co. James T. Pierce, president; W. W. Bridges, secretary and general manager.

The company lost more than three months mining on account of a strike, as detailed in another chapter.

An electric mining plant was added, which is giving great satisfaction.

Visited June 14th, but the strike was on, mine idle, and no inspection was made.

Inspected September 10th. Work had commenced after the long

suspension. Conditions not as good as they ought to be, especially as to ventilation, and general instructions were given.

Inspected December 4th. Fan was not running, but conditions generally good.

BEVIER MINE.

At Bevier.

P. O. Bevier.

This is a new mine, located on the Owensboro division of the L. & N. railroad. See chapter on "New Mines."

THE SILVER CREEK MINE.

The Silver Creek mine, operated during 1897 by the Gold Standard Coal Co., suspended at the close of that year, and has been idle ever since.

OHIO COUNTY.

This county has been the second in production for two years past, and is likely to remain so for some years to come. On the combined basis of employees, output and accidents, its record for the year is the best in the state. The mining and shipment of 436,518 tons of coal, without an accident to any employee, is marvelous, and its like, perhaps, has never been before, and such an achievement will be remembered with praise and honor to the men who made it, whether working in or out of the mines.

The production of the year is over 24,000 tons less than in 1897, but was caused by the six months strike at Taylor mines, where there is a decrease of over 62,000 tons. The total output of the year is 436,518.68 tons, against 460,693.06 tons produced in 1897. Over 60 per cent. of the product was mined with machines, and about 27 per cent. of it was marketed outside of the state.

The record of the several mines during the year is as follows:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Echols	80,007.63	123.66	165.70	80,422.92
McHenry	73,306.35	135.00	166.00	86,926.36
Render	93,227.99	162.33	193.00	103,972.40
Williams	37,552.81	96.33	151.00	38,794.76
Taylor	138,932.12	157.56	121.60	76,172.28
Dean	13,976.80	49.50	176.50	27,546.36
Thompson	15,101.00	28.33	124.80	10,631.00
Fordsville	5,603.36	13.33	192.00	7,535.00
Jamestown	2,920.00	8.16	244.00	4,567.50
Reynolds	65.00	....	....	....
Totals	460,693.06	....	....	436,518.68

Loss in 1898, 24,174.38 tons.

McHENRY MINE.

At McHenry.

P. O., McHenry.

This mine is located on the Illinois Central railroad, and is operated by the McHenry Coal Co. W. G. Duncan, president; H. McEskridge, vice president; C. W. Taylor, secretary and superintendent; P. C. Roll, mine foreman. Head office, 456 West Main street, Louisville, Ky.

Inspected by Assistant, June 17th. Ventilation fair, but some break-throughs were needed. Other conditions satisfactory.

Inspected by Stone, August 8th. Drainage good. Only about half the rooms propped close enough to the face. The ventilation was bad. There was an abundance of air going into the mine, but

it was not conducted through the working rooms. There were numerous open break throughs that ought to be closed, and curtains torn down or out of order, which left the working rooms, on most all the entries, without an air current. These were all discussed with the mine foreman, who promised to remedy all defects at once.

Again inspected November 9th. I note general improved conditions, ventilation being now very satisfactory, the air being under control and carried to the working faces. Some repairs on curtains needed.

ECHOLS MINE.

At Echols.

P. O., Echols.

This mine is located on the Illinois Central railroad, and is operated by the McHenry Coal Co. Head office, 456 West Main street, Louisville, Ky. William Williamson, mine foreman.

Inspected by Assistant, June 13th. Ventilation not satisfactory. The air current was ample, but its distribution was very deficient. There was need of an overcast, and of numerous break-throughs, brattices, etc. All were discussed with the mine foreman, and instructions were given to make all needed repairs to make the ventilation good.

Inspected by Stone, August 10th. Some timbering needed near mouth of entry. Propping much neglected. Ventilation bad. Enough air was entering the mine, but it was not circulating through the workings. The furnace is weak. No care had been taken to maintain the air courses, so as to force the air to head of entries and through working rooms. Conditions, both north and south, were alike. The entries and rooms mostly open, break-throughs open, curtains down or torn until worthless. Full instructions were given to remedy the defects.

Again inspected November 11th. No improvement made since the August inspection. The mine foreman admitted that nothing had been done to better the ventilation. In fact, the conditions

were made worse from use of bad oil, which made the mine very smoky.

Complaint was made to the company, and assurances were given that all these defects should be remedied at once.

RENDER MINES.

At Render.

P. O., Render.

This mine is located on the Illinois Central railroad, and is operated by the Central Coal & Iron Co. T. C. Dupont, president; R. R. Hathaway, vice president; Spalding Coleman, secretary; Hywel Davies, general manager, and Simon Jones, mine foreman. Head office, 410 West Main street, Louisville, Ky.

Inspected by Assistant, June, 18th.

No. 2. Conditions generally good.

No. 1. Ventilation improved since last inspection, and will still be better when a new shaft shall be sunk, which ought to be done.

Inspected by Stone, August 9th.

Old mine. Ventilation not as good as it ought to be, but will be better when the air course shall be connected with the head of the eleventh north entry, which is to be done.

No. 2. The mine was found to be in general good condition.

Again inspected November 10th.

No. 2. "The mine is well drained. Ventilation fair. Other conditions good."

No. 1. The air current was not well conducted to the head of the twelfth north entry nor entry through the adjacent rooms. Too much leakage before reaching these points.

WILLIAMS MINE.

Near McHenry.

P. O., McHenry.

Transportation by the Illinois Central railroad.

Operated by the Williams Coal Co. E. T. Williams, president; J. S. Williams, secretary and general manager; F. E. Harris, mine foreman.

Inspected by Assistant, June 20th. Ventilation reasonably good. A brattice was needed across third west entry air course, below where room twenty-six, off second west entry, breaks into same, to force the air current through the room twenty-six into second west.

Inspected by Stone, August 9th. Propping deficient. Air very good. The main defect is leaving pillars between rooms too thin. Many of them are not over two, three and four feet thick on all these entries. This should cease at once. There should be a change made in location of some of the curtains, as discussed with the foreman.

Visited and partially inspected November 10th. No fire in the furnace. Mine not running. Was satisfied with its general conditions.

TAYLOR MINE.

At Taylor Mines.

P. O., Taylor Mines.

Transportation by the Illinois Central railroad.

Operated by the Taylor Coal Co. J. P. Speed, president; I. P. Barnard, superintendent; W. A. Jones, secretary and treasurer; Nicholas Barrass, mine foreman.

Visited by Assistant, June 20th. Strike on, and mine idle, and no inspection was necessary, and none was made.

On the second round of inspection, the strike was still on, and no inspection was made.

Inspected November 9th, and found to be in thorough good condition in all respects.

DEAN MINE.

At Deanfield.

P. O., Aetnaville.

This mine is located on the O. & F. division of the Illinois Central railroad.

Operated by Guy M. Dean. No mining was done during June.

All inspections by the Assistant. Inspected June 9th. The

mine had been idle for several days, and was very wet. Other conditions are only fairly good. Instructions were given.

Inspected August 27th. Drainage not good, especially on second north entry. Props too far apart and not close enough to working faces. There was no brake attached to the hoisting drum. Air volume ample, but not well conducted to the working faces. Some minor matters were also discussed and general instructions were given.

Inspected November 26th. An addition of twenty-five feet needed to be the furnace stack, which will aid in the ventilation. Drainage not good. Roadways too wet and sloppy. Attention again called to lack of a brake on hoisting drum.

LOUISE MINE.

At Deanfield.

P. O., Aetnaville.

This mine is located on the O. & F. division of the Illinois Central railroad, and is operated at present by J. C. Thompson. The mine was idle most of the time from March until September.

All inspections by Assistant. Inspected June 9th. Mine idle. Furnace cold. Instructions were given as to a door and brattice, etc.

Inspected August 27th. Work confined to first west entry and to three rooms on second west. There is no second outlet, except by way of the furnace, which is not safe, and a better one must be provided, else a fan must be substituted for the furnace.

Inspected November 26th. The air volume reaching head of first west entry inadequate. An iron ladder is needed up the air shaft to act as a second outlet.

JOHNSON MINE.

Near Fordsville.

P. O., Fordsville.

This mine is located on the O. & F. division of the Illinois Central railroad, and is operated by the Fordsville Block Coal Co. W. S.

Gaines, president and general manager; C. E. Ford, vice president, and J. C. Adair, secretary.

All inspections made by the Assistant.

Inspected June 9th. Only five persons working in the mine. Ventilation only fairly good. Drainage not good.

Inspected August 26th. Ventilation inadequate. Drainage just fairly good. Timbering reasonably good.

Inspected November 25th. Ventilation very defective. This matter fully discussed and instructions how to remedy the same were given. Other conditions just reasonably good.

JAMESTOWN MINE.

At Jamestown.

P. O., Livermore.

Located on Green river.

Operated by the Jamestown Coal Co. F. O. Coffman, president; W. F. Coffman, vice president; W. S. Trunnell, secretary; Wm. Potter, manager and mine foreman.

The mine, during about half the year, was not subject to state supervision, working only five men or less inside; as a consequence was not visited on the second round of mine inspections for the district.

Inspected June 11th. The mine has no artificial ventilation. A furnace is ordered to be provided. Drainage not good. General instructions were given.

Visited by Stone, November 12th. The mine is soon to be abandoned, and a new opening made around to the left, so as to have better haulage and ventilation, and under the circumstances, only a partial inspection was made.

UNION COUNTY.

The output of this county for the year is 123,351.62 tons, against 117,732.95 tons produced in 1897. The amount would have been much larger but for strikes of four months at the DeKoven, and the Trade Water mines. Five mines contributed to the output as follows:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
DeKoven	50,845.48	109.37	111.00	32,447.52
Trade Water	34,719.48	101.10	75.00	34,651.78
Cumberland	25,572.04	83.50	165.80	49,980.88
Davidson	4,972.48	11.00	195.00	5,190.80
Sullivan	1,622.84	3.66	69.00	1,080.64
Totals	117,732.32	....	.....	123,351.62

Gain in 1898, 5,619.30 tons.

All the inspections were made by the Assistant Inspector.

DEKOVEN MINE.

Near DeKoven.

P. O., DeKoven, Ky.

This mine is located on the Ohio Valley division of the Illinois Central railroad, and is operated by the Ohio Valley Coal & Mining Co. S. S. Brower, Pittsburg, Pa., president; S. P. Sturgis, DeKoven, Ky., secretary and general manager.

No work was done from August 26th to the close of the year, on account of the strike detailed in another chapter.

Inspected April 28th. The three break-throughs from second west entry are open, and the two furthest from the fact must be closed if more work shall be done in the entry. The curtain between rooms one and two should be taken away and a door placed there. The face of the second east entry is more than sixty feet ahead of the air current and should have a break-through. The mine was idle and furnace cold. There ought to be a slight addition to the stack, and I think ventilation would be good. Conditions in other respects were satisfactory.

Visited September 1st. The strike was on, and no inspection was made.

Visited again November 1st. The strike was still on and no inspection was made.

TRADE WATER MINES.

Near Sturgis.

P. O., Sturgis.

This mine is located on the Ohio Valley division of the Illinois Central railroad, and is operated by the "Trade Water Coal Mines," an incorporated company. J. L. Frankel, secretary and treasurer; W. L. Gordon, Jr., Manager; James Burns, mine foreman.

No mining was done during June, July, August and September; during which time extensive repairs were being made.

Inspected April 29th. Only a few men were employed underground driving entries and making repairs. General conditions under the circumstances were as good as could be expected.

Visited September 1st. Strike was on and no inspection was made.

Inspected November 30th. Plenty of air was going into the mine, but it was not well conducted to the face of the workings. Three rooms in Hancock entry need break throughs, also, a curtain should be placed on short entry, to force the air into the room. No. 10 entry, off Short, should be bratticed. A number of rooms off Short entry are too far in advance of the air current. A door, instead of a curtain, is needed on main entry air course. General instructions

were given to remedy all these defects. Conditions in other respects reasonably good.

CUMBERLAND MINE.

Near Sturgis.

P. O., Sturgis.

This mine is located on the Ohio Valley division of the Illinois Central railroad, and is operated by the Paducah Coal & Mining Co. T. J. Flourney, president; D. A. Brooks, superintendent. Head office, 118 North Third street, Paducah, Ky.

Inspected April 29th. The face of fifth west entry is eighty feet ahead of the air, and another break-through is needed. There should be a brattice between air course and main slope entry, near sixth west. A cross timber on main slope now down should be reset. Except as noted, the mine is in fairly good condition.

Inspected September 1st. 9,679 cubic feet of air per minute were passing into the mine for the seventy-seven persons employed inside, which was fairly well conducted through the workings. Props rather neglected and are not set close enough to working faces. Timbering just fairly good. Drainage satisfactory, except near face of slope. A gasoline pump is being installed for better drainage.

Inspected December 1st. A door is needed on main slope entry between seventh right entry and air course. A curtain ought to be placed on sixth right entry, at a place designated to the mine boss. Otherwise, the ventilation is fairly good. Props in rooms too far from faces. Entries fairly well timbered. Drainage satisfactory.

DAVIDSON'S MINE.

Near Uniontown.

P. O., Uniontown.

This mine is located near the Ohio Valley division of the Illinois Central railroad, and is operated to supply local trade by B. C. Davidson & Sons.

Inspected April 30th. Props set too far from working faces. With the break-through made between main straight and first southwest entry, the ventilation will be good.

Inspected September 2d. Ventilation good. Not much timbering done, but with the narrow rooms, thick pillars, and limestone top of this mine (No. 11 vein), less than the average is needed.

Inspected December 2d. Ventilation and drainage reasonably good. Timbering and propping too much neglected. Instructions given to improve these.

SULLIVAN MINE.

At Sullivan.

P. O., Sullivan.

This mine is located on the Ohio Valley division of the Illinois Central railroad, and is operated by James M. Lamb. No work was done the first six months of the year, and not much during the last six months.

The mine was not really subject to state supervision, but as it had been subject, and may be again, it was retained on the list.

Visited in April and found idle. Less than six men being employed during the remainder of the year, no further inspections were made.

WEBSTER COUNTY.

The output of this county for the year is materially less than in 1897, and was produced by the following mines:

MINES	1897	1898		
	Tons	Av. Em.	Days	Tons
Providence	51,962.12	58.00	168.00	35,581.48
Providence Shaft	1,580.00	....	....	....
Sebree	8,498.80	21.00	133.00	9,445.82
T. L. Taylor	8,544.88	17.00	....	9,068.20
Totals	70,585.80	....	....	54,095.50

Loss in 1898, 16,490.30 tons.

The output of Providence Shaft was small, and is included with that of the Slope mine.

PROVIDENCE SLOPE MINE.

At Providence.

P. O., Providence.

This mine is located on the Providence branch of the L. & N. railroad, and is operated by the Providence Coal Co. W. A. Nisbit, president; W. J. Nisbit, secretary and manager, and Jake McIntosh, mine foreman.

Inspected by Assistant, April 23d. A check curtain was needed between rooms four and five on seventh right entry. With this done, conditions would be satisfactory.

Visited August 3d. Mine idle. But little mining being done during the summer months, and but few men employed.

Inspected December 8th. Ventilation good except in tenth entry

and air course. A curtain should be placed on main entry between them to turn the air up the entry. Drainage and timbering good. Some neglect in propping.

PROVIDENCE SHAFT MINE.

Visited April 23d. Found idle, and no one there, and nothing was done.

Visited, and again found idle, August 3d.

Inspected December 8th. The work was confined to fifteen rooms on second right entry, with twenty-two men inside. The air current does not reach rooms at all. A check curtain on first right entry badly torn, and ought to be repaired. Other conditions reasonably fair.

SEBREE MINE.

At Sebree.

P. O., Sebree.

Transportation by the Henderson division of the L. & N. railroad.

Operated by the Sebree Coal Co. S. F. Powell, president; J. A. Powell, secretary, and Alf H. Jones, general manager.

Inspected April 25th. The mine was temporarily idle, pending the sinking of a new shaft. Drainage and propping good. The shaft for fan and second outlet is discussed in another chapter.

Inspected September 3d. The mine virtually suspended for past ninety days during the making of the second outlet.

Inspected December 5th. A check curtain was needed on third south entry to throw the air into second south entry through the first room off third south. Otherwise the ventilation was good. Other conditions reasonably good.

T. L. TAYLOR MINE.

At Providence.

P. O., Providence.

Transportation same as for Providence mines.

Operated at intervals during the year by T. L. Taylor. The mine

closed down in October, and no more mining was done during the remainder of the year.

Inspected April 23d. The mine was in fairly good condition. The shaft cage had neither safety catches nor cover, which were ordered to be put on.

August 3d, inspected and no improvement as to condition of cage. Mine in fair condition.

The mine being shut down indefinitely on third round of inspection, none was made.

LAWS RELATING TO MINING, ETC.

THE MINING LAW.

AN ACT to provide for and regulate the ventilation of coal mines in this State and for the better protection of miners, enacted by the General Assembly of 1891-3, and amended at the session of 1894.

Be it enacted by the General Assembly of the Commonwealth of Kentucky: SECTION 1. That there shall be appointed by the Governor, with the advice and consent of the Senate, an Inspector of Mines, who shall hold his office for four years, and until his successor is appointed and qualified; but he shall be liable to be removed by the Governor for willful neglect of duty or malfeasance in office. Any vacancy in the office of Inspector which may occur when the Senate is not in session shall be filled by appointment of the Governor till the close of the next session of the Senate. Said inspector shall have a practical knowledge of chemistry, geology and mineralogy, and shall also possess a practical knowledge of the different systems of working and ventilating coal mines, and of the nature and properties of the noxious and poisonous gases of the mines, especially fire-damp and he shall also have a practical knowledge of mining and engineering; and said inspector shall, before he enters upon the discharge of his official duties, be sworn to discharge them faithfully and impartially, which oath shall be subscribed on his commission, and certified by the officer administering it, and his commission so indorsed shall be filed with the Secretary of State in his office; and said Inspector shall give a bond in the penal sum of five thousand dollars, with surety, to be approved by the Governor, for the faithful discharge of his official duties.

SEC. 2. Said Inspector shall give his entire time and attention to the discharge of the duties of his office, and it shall be a part of his

duty to visit and inspect, as often as may be necessary, all the coal mines in actual operation in Kentucky and to see that the provisions of this act are complied with by the owners, agents and superintendents of all the mines in this State.

SEC. 3. Said Inspector shall have power to visit and inspect any mine to which this act applies. He shall examine into the condition of such mine with respect to ventilation, drainage, timbering and general security; and if, upon inspection, he finds that such ventilation, drainage, or timbering as the health or safety of the persons employed in the mine would require has not been provided, or should he find the mine insecure in any part, or should he find that sufficient means of ingress and egress have not been provided, said Inspector shall at once notify the agent, superintendent or owner of the mine as to the unsafe or unwholesome condition of such mine, and require him to put the mine in a safe and wholesome condition, and such mine shall forthwith be rendered safe and healthful. For a failure to comply with the directions of the Inspector to render such mine safe, and to provide such ventilation as is sought to be secured by this law, and to provide safe and suitable means of ingress and egress within *twenty* days from the date of inspection, the agent or superintendent and owner shall be liable to a fine of fifty dollars per day for every day that such mine shall be suffered to remain in such unsafe or unhealthful condition after the expiration of the *twenty* days above provided in which the required improvements should be made, which fine may be collected by indictment by the grand jury of the county in which such mine is situate; but in cases in which the Inspector is satisfied, from personal investigation, that, even if due diligence is observed, the required improvements can not be completed within the *twenty* (20) days above provided, he shall have authority to extend the time for not more than *twenty* days longer; but when the time is thus extended, the agent, superintendent or owner who is delinquent after the expiration of the additional time, shall be subject to indictment and fine as above provided; and as a cumulative remedy in case of failure of any owner, agent or superintendent to conform to the provisions of this law, after notice from

the Inspector, within the time provided by this section, any circuit court, or the judge in vacation, may, on application of the inspector, by civil action, in the name of the State, enjoin or restrain, by writ of injunction, the said owner or agent or superintendent from working or operating such mine with more than five persons until it is made to conform with the provisions of this law. But before such writ of injunction shall issue, the owner, agent or superintendent shall have at least three days' notice of such contemplated action, and shall have the right to appear before such court, or the judge in vacation to whom the application is made, who shall hear the same on affidavits and such other testimony as may be offered in support, as well as in opposition thereto. It shall be the duty of the Commonwealth's attorney of the district, and of the county attorney of the county in which the mine lies, to prepare and prosecute proceedings upon said application. [This section is in accordance with amendment approved March 3, 1894.]

SEC. 4 The Inspector of Mines shall keep an office in the State House at Frankfort. He shall be provided with all necessary stationery, to be supplied by or through the State Librarian as other offices are supplied; and he shall keep a record of all the inspections made by him, and shall furnish a certified copy of his report of the inspection of any mine inspected by him to the Commonwealth's attorney of the district in which the mine is situated, on application therefor, which copy shall be admissible in evidence in any court in this Commonwealth, and shall be *prima facie* evidence of the truth of recitals therein contained.

SEC. 5. Such Inspector, while in office, shall not act as agent, or as a manager or mining engineer for, or be interested in operating any mine, and he shall annually, on or before the tenth day of February, make report to the Governor of his proceedings for and during the calendar year ending on the thirty-first day of December, and of the condition and operation of the coal mines in this State, enumerating all accidents which shall have occurred in or about the same, and giving such other information as he may deem useful, and making such suggestions as he may deem important as to further legis-

lation on the subject of mining. The Inspector shall also report the number of persons employed in and about the mines, and the amount of coal mined; and, for the purpose of enabling him to make such report as is required by this section, the owner, lessee, agent or superintendent of every mine to which this law applies is hereby required to give, each month, accurate information, on blanks to be furnished by the Inspector, as to all accidents occurring in or about the mines, the number of persons employed, and the amount of coal mined during the preceding month; and the owner, lessee or superintendent refusing or failing to furnish the Inspector such information for sixty days after application therefor has been received, shall be liable to a fine of fifty dollars, to be recovered in the county in which the mine concerning which such information is refused is situated. The Inspector is authorized to extend his observations, so as to be prepared to report upon the mining possibilities and mineral resources of the counties to which he is called in the prosecution of his duties as Inspector. One thousand copies of the Inspector's annual report shall be printed for general distribution.

SEC. 6. The Inspector shall receive an annual salary of eighteen hundred dollars, payable monthly, and shall likewise be allowed and paid his necessary traveling expenses when absent from his office on business connected with his department; and he shall keep on file in his office maps and plans of all coal mines in operation in this State, which maps, plans, and all the books, records, and apparatus of his office, he shall carefully keep and turn over the same, with all official correspondence pertaining to his office, to his successor; and upon application of the owner, agent, lessee, or superintendent therefor, he shall make out a duplicate of any map on file in his office of any mine owned or operated by the owner, agent, lessee or superintendent making such application, for the making of which duplicate a fee of five dollars must be paid, and which fee shall, within thirty days after its reception, be paid into the State Treasury by the Inspector receiving it.

SEC. 7. There shall be provided for said Inspector all instruments and chemical tests necessary for the discharge of his duties under

this law, which shall be paid for on the order of the Inspector, and which shall belong to the State.

SEC. 8. The owner, agent, lessee or superintendent of every coal mine in this State, to which this law applies, shall annually, within sixty (60) days after the first day of January, make or cause to be made, an accurate map or plan of the workings of such mine, on a scale of not more than one hundred feet to the inch, showing the area mined, and the form of the excavations up to the said first day of January, together with the location and connection with such excavations of the lines of all adjoining lands, and the name or names of each owner or owners so far as known, marked on each tract; a true copy of which map the said owner, agent, lessee or superintendent shall deposit with the Inspector of Mines within seventy days after said first day of January, and another copy of which shall be kept at the office of such mine. But, after the making and filing with said Inspector of the first map of the mine, as required herein, the owner, agent, lessee or superintendent shall only be required to annually make and file with said Inspector, within the times herein specified, such additional map and statement as may be necessary to truly show the progress of the workings and the amount of excavation of said mine from the date of the preceding map or survey up to the first day of January as provided herein. The Inspector shall annually, on or before the first day of January, give warning notice that said map is required; and upon the refusal or failure of the agent, owner, lessee or superintendent receiving such notice, to make, or cause to be made, such map within the sixty (60) days, and deposit the same with the Inspector within the seventy (70) days, specified herein, said owner, agent, lessee or superintendent shall be liable to a fine of five dollars (\$5) a day for each day elapsing until said map is made, said fine to be recovered in the county in which the mine to be mapped is situated. The correctness of each map provided for by this section shall be certified to by the person making such map; and the Inspector may reject any map as incomplete, the accuracy of which is not so attested.

SEC. 9. It shall not be lawful for the owner, agent or superin-

tendent of any coal mine, worked by a shaft, slope or drift, herein fifteen thousand square yards have been excavated, to employ more than ten persons to work therein, or to permit more than ten persons to work in such mine, unless there are to every seam of coal worked in each mine at least two separate outlets, separated by natural strata of not less than one hundred feet in breadth, by which shafts or outlets distinct means of ingress and egress are always available to the persons employed in such mines; but it shall not be necessary for the two outlets to belong to the same mine; and every shaft opened after the passage of this act shall have two such separate outlets, after fifteen thousand square yards shall have been excavated; and to all other mines, whether slopes or drifts, to such openings or outlets shall be provided within twelve months after the passage of this law, provided fifteen thousand square yards have been excavated at or before the passage of this law, or if not, then within twelve months after that extent has been excavated. In case any coal mine has but one shaft, slope or drift for the ingress or egress of the men working therein, and the owner thereof does not own suitable ground for another opening, such owner may select appropriate associate adjacent surface ground for that purpose, and have the same condemned, and appropriate the same by proceedings in the county court of the county where the mine is situated, similar to proceedings now allowed by law for securing a private passway.

SEC. 10. The owner, agent or lessee of every coal mine, whether slope, shaft or drift to which this act applies, shall provide and maintain for every such mine an amount of ventilation of not less than one hundred cubic feet of air per minute per person employed in such mine, which shall be circulated and distributed throughout the mine in such a manner as to dilute, render harmless, and expel the poisonous and noxious gases from each and every working place in the mine, and no working-place shall be driven more than sixty feet in advance of a break-through or air way; and all break-throughs or air ways, except those last made near the working-face of the mine, shall be closed up and made air-tight by brattice, trap doors or otherwise, so that the currents of air in circulation in the mine may

sweep to the interior of the excavations where the persons employed in the mines are at work; and all mines governed by this statute shall be provided with artificial means of producing ventilation, such as suction or forcing fans, exhaust steam, furnaces, or other contrivances of such like capacity and power as to produce and maintain an abundant supply of air. All mines generating fire-damp shall be kept free from standing gas, and every working place shall be carefully examined every morning with a safety lamp, by a competent person or persons, before any of the workmen are allowed to enter the mine. And at every mine operated by a shaft there shall be provided an approved safety-catch, and a sufficient cover overhead, on all cages used for lowering and hoisting persons, and at the top of every shaft a safety-gate shall be provided, and an adequate break shall be attached to every drum or machine used in lowering or raising persons in all shafts and slopes.

SEC. 11. Any person employed in any mine governed by this statute who intentionally or willfully neglects or refuses to securely prop the roof of any working-place under his control, or neglects or refuses to obey any order given by the superintendent of the mine in relation to the security of that part of the bank where he is at work, and whoever knowingly and willfully does any act endangering the lives or health of the persons employed in a mine, or the security of the mine or machinery, shall be liable to a fine of not less than ten dollars nor more than fifty dollars, to be recovered in the county in which the mine is situate.

SEC. 12. Coal mines in which not more than five persons are employed at one time shall be exempt from the provisions of this law.

SEC. 13. On account of the emergency hereby declared to exist, in that it is necessary for the employees in mines to receive the protection of the provisions of this law in timely season, this law shall be in force from its approval by the Governor.

Approved February 15, 1893,

CURATOR OF GEOLOGICAL DEPARTMENT.

EXTRACT from Resolution 61 of General Assembly of 1891-92-93, as amended in Chapter 78 of Acts of General Assembly of 1894.

1. That the Inspector of Mines, in addition to his duties as such Inspector, shall be Curator of the Cabinet and other property of the Geological Survey or Department, and all the records, documents, collections, instruments, apparatus, books, maps and other property of the Survey are hereby confided to his care and keeping; and, as such Curator, he is hereby required to attend to all correspondence and respond to all requests concerning the mineral resources of the State that come to him in his said capacity; to attend to the distribution of all published maps, and reports in his hands intended for distribution, and to perform all the duties usually devolving upon such a Curator, so far as is applicable in this case; and he shall, whenever the General Assembly shall direct and provide therefor, cause to be printed, under his supervision, any or all of the unpublished reports of the Geological Survey that may be in his custody. He shall be allowed and paid fifty dollars per month as compensation for his services as such Curator, and shall give bond for the faithful performance of his duties as such Curator, with surety to be approved by the Governor.

ASSISTANT INSPECTOR.

AN ACT to increase the efficiency of the Inspector of Mines, and more fully provide for the protection of the lives and health of persons employed in the coal mines of this State, enacted by the General Assembly of 1891-92-93. Approved December 3, 1892, and June 9, 1893.

Be it enacted by the General Assembly of the Commonwealth of Kentucky: 1. Every mine subject to the provisions of the act providing for the inspection of the coal mines, shall be inspected not less

than three times each year, the inspection to be, as nearly as possible, not more than four months apart, and as many more times as the facilities of the office will permit.

2. In order that the requirement of section one above may be carried out, there shall be appointed by the Governor, with the advice and consent of the Senate, an Assistant Inspector of Mines, who shall hold his office for four years; but shall be liable to be removed by the Governor for willful neglect of duty or malfeasance in office. Said Assistant Inspector shall have a practical knowledge of the different systems of working and ventilating coal mines, and of the nature and properties of the noxious and poisonous gases of mines, especially of fire-damp, and he shall also have a practical knowledge of mining properties of the noxious and poisonous gases of mines, especially of his official duties be sworn to discharge them faithfully and impartially, which oath shall be subscribed on his commission, and certified by the officer administering it, and his commission so indorsed, shall be filed with the Secretary of State in his office, and said Assistant Inspector shall give bond in the penal sum of two thousand dollars, with surety, to be approved by the Governor, for the faithful discharge of his official duties.

2. Said Assistant Inspector shall give his entire time and attention to the duties of his office, which shall consist of aiding, under the direction of the Inspector of Mines, in carrying out the provisions of this and all other acts relating to the inspection of coal mines.

4. Such Assistant Inspector, while in office, shall not act as agent or as a manager or mining engineer for, or be interested in operating any coal mine in this State. He shall receive an annual salary of \$1,200 (twelve hundred dollars), payable monthly, and shall likewise be allowed and paid his necessary traveling expenses when absent from his office on business connected with his department. He shall have his office with the Inspector of Mines in the State House at Frankfort, and shall keep a record of all inspections made by him, and make a monthly report of the same to the Inspector of Mines for said Inspector's use when preparing his annual report.

5. (As amended and approved June 9, 1893.) For the reason

that the number of mines in this State, subject to the law requiring inspection is now so great that it is impossible for one person charged with the duties of Inspector of Mines to give all of them the immediate, detailed and frequent attention they require, and, in addition, discharge the other duties of his office, an emergency is hereby declared to exist, and this act shall be in force from its approval by the Governor; but the term of said Assistant Inspector of Mines provided for herein, and his salary, shall begin only with the date of his appointment.

(Act went into effect June 9, 1893.)

TO PROVIDE FOR A CHECK-WEIGHMAN.

Chapter 1251 of Acts of General Assembly of 1885-86.

Be it enacted by the General Assembly of the Commonwealth of Kentucky: SECTION 1. That when a majority of the miners engaged in digging or mining coal at any coal mine in this State, at which as many as twenty men are employed, request the owner or owners, or operator or operators, of any of said mines to allow said miners to employ, at their own expense, a person to inspect the scales at said mine, and see that the coal digged and mined by said miners is properly weighed and accounted for, and do and perform such other duties as will insure that said coal is properly weighed and correctly accounted for, said owner or owners, or operator or operators, shall permit such person to be employed by said miners making the request: *Provided*, The person so employed has the reputation of being an honest, trustworthy, discreet and upright man. The appointment, under the provisions of this act of each Inspector and assistant weigher, shall be approved by the judge of the county court of the county wherein the same is made.

SEC. 2. The person appointed and employed by miners to perform the duties set forth in the first section of this act shall, at all times, have free access to the scales at the mines, and the said person so employed by the miners shall not be hindered or prevented from a proper performance of his duties by the person who weighs coal

for the operator or operators of any mines, nor any of the agents or employes of said operator or operators. Said person employed by the miners shall in no way prevent the weighman or other employes of said operator or operators from performing their duties in a proper manner.

SEC. 3. Any person violating any of the provisions of this act shall be fined not less than ten nor more than fifty dollars, and each day on which any of the provisions of this act is violated shall constitute a separate offense.

SEC. 4. This act shall take effect and be in force from and after its passage.

Approved May 18, 1886.

[By oversight this law was omitted from the Kentucky Statutes compiled by Barbour & Carroll, 1894.]

ROADS FROM MINES.

Section 815, Kentucky Statutes, 1894.

SEC. 815. Any person engaged in operating a mine or stone quarry within three miles of any navigable stream or railroad may, for the purpose of transporting material to and from such stream or railroad, and such mine or quarry, construct and operate a line of railroad from such mine or quarry to the most convenient and accessible point on such stream or road, and may, under the general laws, condemn such land as may be necessary, not exceeding fifty feet in width for each track necessarily constructed, and not exceeding two acres of land at such railroad or stream for the purpose of necessary buildings. The owner or operator of such road shall be, so far as they are applicable, governed and controlled by the laws relating to other railroads, and shall have the same rights and privileges granted to corporations owning and operating lines of railroad.

WAGES—PAYMENT IN MONEY—STATUTORY REQUIREMENT—CONSTRUCTION.

Kentucky Statutes, Chapter 36, Section 1350—Wage-earners—Penalty for Not Paying in Money.

That any corporation or person or persons having the ownership or control of any factory, mine or workshop in this Commonwealth, who shall violate the provisions of section 244 of the Constitution, reading as follows: "All wage-earners in this State employed in factories, mines, workshops, or by corporations shall be paid for their labor in lawful money," shall be guilty of a misdemeanor, and, on trial and conviction, had in any court of competent jurisdiction, shall be fined not exceeding five hundred dollars for each violation thereof.

Kentucky Statutes, Chapter 36, Section 1386—Notes of Incorporated Banks Only to be Circulated.

It shall not be lawful to make, offer to pay, or to pass or offer to pass any note, bill, order or other thing passing by delivery, as a circulating medium, in lieu of or as the representative of money, unless it be the note or bill, of not less than five dollars, of some banking institution legally incorporated in the United States, or currency of the United States. If a note, bill, order or other such thing, be of the denomination of less than five dollars, it shall be presumed to have been made, paid or passed, or offered in violation of this section, unless the contrary be shown.

CONSTRUCTION.

Case in Point.—The Avenet Beattyville Coal Co., Lee county, was convicted of not paying its wage-earners in lawful money, and appealed. Reversed.

In Brief.—A mining company paid its employees once each month in lawful money for the past month's labor, and at any time

during the month, upon their application, issued checks to them, payable in merchandise at the company's store. The amount of checks so issued to each man was deducted from his wages on every pay-day, and he was paid the balance in cash, but no money was paid for outstanding checks. *Held*—That such arrangement was not in violation of Constitution, section 244, and Stats. of Ky., section 1350, providing that wage-earners shall be paid for their labor in lawful money. (Opinion delivered by Judge Hazelrigg, December 1, 1894. Published in full in report for 1894.)

SESSION 1898.

AN ACT concerning employees and servants in mining work or industry in this Commonwealth.

Be it enacted by the General Assembly of the Commonwealth of Kentucky: SECTION 1. That all persons, associations, companies and corporations employing the services of ten or more persons in any mining work or mining industry in this Commonwealth, shall, on or before the sixteenth day in each month, pay for the month previous, such servant or employee, on his or their order, in lawful money of the United States, the full amount of wages due such servant or employee rendering such service. But if such person, corporation or company, after using due diligence, is unable to make said payment as above required, he or it shall, within fifteen days thereafter, make out a pay-roll and statement of amount due each employee, and also a due bill for said sum, bearing interest from said sixteenth day of the month, and deliver same to each of said employees.

SEC. 2. It shall be unlawful for any person or persons, association, company or corporation employing others, as described in section 1, either directly or indirectly, to coerce or require any such servant or employee to deal with or purchase any article of food, clothing or merchandise of any kind whatever, from any person, association, corporation or company, or at any place or store whatever. And it shall be unlawful for any such employers as described

in the first section, to exclude from work, or to punish or blacklist any of said employees for failure to deal with any other, or to purchase any article of food, clothing or merchandise whatever, from any other or at any place or store whatever.

SEC. 3. Any person or persons, company or corporation described in the first section that shall violate any of the provisions of this act shall be guilty of a misdemeanor, and on conviction shall be fined not less than fifty dollars nor more than one hundred dollars for each offense, and the doing or failure to do any act or thing required by this act shall constitute a separate offense.

J. C. WICKLIFFE BECKHAM,
Speaker of House of Representatives.

W. J. WORTHINGTON,
President of Senate.

Became a law without the Governor's approval, he having failed to sign or return it to the House in which it originated within the time prescribed by the Constitution.

CHAS. FINLEY,
Secretary of State.