

THE ANNUAL REPORT

— OF THE —

INSPECTOR OF MINES

— OF THE —

STATE OF KENTUCKY,

FOR THE YEAR 1896.

C. J. NORWOOD, Chief Inspector.
W. U. GRIDER, Assistant.

FOR GENERAL DISTRIBUTION.

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NOTE.

It may be noticed that in the table on page 41 the column intended to show consumption of powder per county is not filled out. Through oversight the figures were omitted from the copy submitted to the printer, and at this distance from the records I am unable to supply them. On page 33 the total consumption of powder is given. The proof sheets of this report having been read under disadvantages, I trust that the appearance of typographical errors will be pardoned.

C. J. NORWOOD.

Dahlonega, Ga., June 19, 1897.

LETTER OF TRANSMITTAL.

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

Sir: I have the honor to submit herewith the thirteenth report of this office, covering the calendar year 1896.

It is with pleasure that I greet the opportunity to again bear witness to the faithfulness and efficiency of Mr. W. U. Grider, Assistant Inspector. His record as an official is no less worthy of approval than his qualities as a gentleman are deserving of admiration. If a higher form of commendation be possible, I would be pleased to employ it, so well does he deserve it.

For yourself, Sir, I beg that you will accept my unfeigned thanks for the courtesy and consideration which have marked your treatment of me, both as an official and as an individual, during the time I have held under your administration.

Wishing you personal good fortune always, and trusting that this, my closing report as the head of this office, may receive your approval,

I have the honor to be,

Your obedient servant,

C. J. NORWOOD,
Chief Inspector of Mines, Etc.

Frankfort, Ky.

I.

PRELIMINARY.

With this report the writer ends his service as Inspector of Mines, having been in continuous commission for nearly thirteen years. He has endeavored to perform the duties of the office faithfully and with exact impartiality—scrupulously guarding the welfare of the employe, yet also recognizing in full the rights of the employer; and, not desiring to limit his efforts simply to the performance of specified duties, he has sought to render the office of general service as well to the State as to the mining public. He ventures to believe that his endeavors to encourage the adoption of better methods of mining than were in vogue when he entered the office, have been of some recognized value. The manifestations of confidence and approval he has received at the close of his service, from miners and operators alike, have therefore been a source of great gratification; and it is deemed fitting in this place to tender his frank and sincere thanks to all those interested, for the generous expressions of good will that have been conveyed to him.

In some respects this report is less comprehensive than had been planned. The intended treatment of certain special subjects has been omitted, upon the ground that possibly they may be discussed in a more elaborate way by the writer's successor, than can now be done. It was desired, for instance, to present a chapter on the mining methods followed in this State, indicating those best suited for the respective coals mined, and suggesting modifications, in accordance with topographic conditions, of the methods now pursued in certain localities. The writer is satisfied that the element of topography, for example,—the form of surface above the coal, its relation to the lines of pressure due to superincumbent beds, and its consequent bearing upon questions touching timbering, apportioning and drawing pillars, shooting top, and laying out the workings in

various parts of the mine—has not received the consideration that should be given it. He is convinced that trouble from treacherous top, and from creep and crush as well, could in many instances be minimized by following indications, with respect to timbering, character and direction of excavations, etc., afforded by the form of surface.

The disturbances in our coal-fields, the faults of the Western field especially, and their bearing on mining questions—touching extension of coals, drainage, development of fire damp, methods of winning the coal, etc.—are already beginning to demand attention. A discussion of them was under way, but could not be completed in time to be incorporated in this report. It is believed to be desirable that a careful study and exposition of the question shall not be long delayed.

The stone and clay industries will certainly, it is believed, in early future call for attention from this office. It was desired to present in this report descriptions of the more important quarries, with an account of the quarrying methods followed and of those that are required for certain classes of our economic stones. Much material has been gathered for this purpose, but in the absence of certain additional data necessary to give such a chapter a fair semblance of completeness, it is deemed best to leave the subject for the future.

AMENDMENTS SUGGESTED.

Attention is invited to the amendments proposed in the report for 1895, and the suggestions are respectfully renewed. They are:

1. A statutory requirement that all mine fatalities shall be investigated by coroner's jury.
2. A provision making receivers of coal mining companies, guilty of violating the mining law, subject to the same penalties that apply to others who are engaged in mining operations.
3. Extension of the coal mining law, so far as it may be made applicable, to clay mines.
4. A provision that would enable the office to collect statistics relating to the production of stone, iron, petroleum, natural gas and other minerals.
5. A provision prohibiting the sale, within this State, of miners' oil below a certain standard of purity. See discussion of this question in a succeeding chapter.

THE GEOLOGICAL DEPARTMENT.

The correspondence of the Geological Department was less than in preceding years—the decline being due, perhaps, to the unsatisfactory state of financial affairs. In consequence of the latter, the progress of the development of mineral properties was checked, there was less disposition, even where there was ability, to make investments, and inquiries concerning our mineral resources naturally grew less.

Among the most significant inquiries received were several relating to the water-powers of the State. Reports upon them were prepared, and it is hoped that they may lead, or at least open the way, to an increase of industrial establishments in the State. Information concerning petroleum regions was much sought. The chapter on the South-Central region contained in the 1895 report of this office proved very useful, and Dr. Orton's report on "Petroleum,

Natural Gas and Asphalt Rock," published by the Geological Survey, was serviceable. The essentially preliminary character of Dr. Orton's report, however, and the fact that his investigations were made in regions apart from the most promising oil districts, rendered his report less available than would otherwise have been the case. In a number of instances it was necessary to prepare special reports, founded upon personal observations made by the present writer several years ago. Considerable interest was manifested in our canals, and there is cause for a revival of hope that positive steps will be taken toward an early extension of railroad facilities to some of the more important fields. Consequent upon suggestions contained in the 1895 report of this office, prospecting for lime phosphate was undertaken in the chert regions along the Cumberland and Tennessee rivers, in the western part of the State. An encouraging preliminary report was made by the gentleman having the matter in hand, but no subsequent statement in verification of his first impressions was received.

The stream of requests for maps of the State, plain and colored according to geology, flows continuously. The supply of plain maps and of the large-scale geological maps is exhausted. All that remains is the edition of 1887, a small geological map necessarily lacking the detail of the larger map, and containing errors that were corrected in the large-scale edition of 1891. Since maps are issued by the Railroad Commission, another edition of the plain map published by the Geological Survey would doubtless be unnecessary; but there is urgent need for another supply of the large geological maps, with corrections. Attention was called to this matter in the 1895 report of this office. The suggestions therein contained are respectfully renewed. In addition, it may be suggested that it would be well for the State to print an edition of such geological maps sufficiently large to supply all the school districts, the maps intended for such purpose to be distributed by the Superintendent of Public Instruction.

During the past year, 287 specimens were received for identification—the largest number received since the curatorship of the Geo-

logical Department was placed upon the Inspector of Mines. They included iron pyrites (leading all others), micaceous rocks, lead and zinc ores, zinc, silver ore, limonite and hematite, garnets, copper ore, gold ore (three specimens, two or them probably from the Appalachian gold belt, and the other probably from the West), wad, lignite, calcite, quartz, barytes, material from decomposed peridotite, various examples of (usually) iron-stained rocks, etc. In a few instances qualitative analysis (occasionally wet but usually blow-pipe) was required; but in most cases the nature of the specimen was evident to the eye. Two of the most interesting specimens were sent by Hon. R. S. Triplett, of Owensboro. One of them superficially presented the typical appearance of a fine lithographic stone—very fine grained, smooth, even textured, quite free from specks or veins of any sort, but too soft and argillaceous for the lithographer's use. The other was an interesting commingling of copper sulphate and zinc blende. The latter, together with a specimen of galena, was found on Rough Creek, between Hite's Falls and the mouth of Caney, and doubtless was a vagrant. The "lithographic" stone appears, from Capt. Triplett's account, to be a member of the Chester Group. It may be well to examine into the occurrence and prevailing character of this rock with some care, since there is a demand for lithographic stone (notwithstanding the revolution in reproduction processes), and this country is now being searched over for available material to take the place of the Solenhofen stone.

Since a general laboratory has not been set up in the Geological Department, qualitative analyses are the only sort that can be undertaken, and even then the range of operations is limited. Five samples of clay and three of marl were received for analysis, but, for the reasons just stated, the latter could not be performed. If the union of the Geological Department with the office of the Inspector of Mines is to be continued indefinitely, a general laboratory should be set up, and a small annual appropriation made to meet the current expenses thereof. Practically all the necessary apparatus and chemicals are now at hand—brought from the former laboratory of the Geological Survey, at Lexington, and stored in the gallery of the

Museum. The south room, now used as an office for the Assistant Inspector, could readily be converted into a laboratory, and that official given a place in the room used by the Chief. It is not improbable that were the Curator authorized to charge a small fee for analytical work, the fee to be turned into the Treasury and placed to the credit of the Geological Department, the laboratory could be made nearly if not quite self-sustaining, so far as regards expenditures for chemicals and wares.

Attention has hitherto been called to certain manuscript reports that had been completed by officers of the Geological Survey, when appropriations for field work and other expenses were discontinued, and the office duties placed upon the Inspector of Mines as Curator. The reports have cost the State much money, but while lying unpublished represent only so much "dead capital"—of no service to the State, and in some respects losing value as the years pass by. The reports contain a deal of valuable information, for which the people have paid and which they are entitled to have in available form. As appears from the wording of the act creating the curatorship, the reports can not be published without authority from the General Assembly, and a special appropriation to cover the cost of printing. It is again earnestly recommended that provision be made for the publication of the reports. They are four in number, as follows: On Breckenridge county, by J. B. Hoeing; Meade county, by Dr. R. H. Loughridge; Livingston county, by Dr. R. H. Loughridge; Warren county, by M. H. Crump. Two or three of the reports need small revisions here and there, and possibly a small amount of field work either by author or, in his absence, by the Curator in charge of the publication, would be desirable now to round out certain portions, and this should be taken into consideration whenever an appropriation shall be made.

II.

GENERAL CONDITION OF THE MINES.

When coal mines stand idle any notable length of time their condition deteriorates: water accumulates, often affecting the pillars; falls of top occur which, not being attended to at once, lead to farther troubles with the roof; props break, or fall out through molding away of draw-slate, which, not being replaced or counter-matched in some way, causes a shifting of strains in the top, and consequent troubles of various sorts; air-courses become clogged with debris; the little items of daily deterioration of stoppings, doors, etc., cumulate through lack of the usual daily attention; and so on. Considering the long stoppages at most of the mines, occurring at intervals throughout a large portion of the year—work at many of them running only from four or five to eight or ten days per month within that period—the workings were maintained in a remarkably good average condition. Perhaps it may not be deemed out of place to attribute the result largely to the efforts of this office. That unusual difficulties were encountered in the effort to have satisfactory conditions maintained will, it is thought, be generally admitted. At the beginning of the year, and continuing into June, most of the mines were in excellent order; but when the season of depression came, poor business caused the cutting off of expense wherever possible, and in many instances the tendency was to do so at the expense of the mine's condition. Every dollar for betterment was, naturally, given grudgingly, and there was, in consequence, more than ordinary difficulty in having ventilation and drainage requirements duly complied with. There were delays in making break-throughs, and in cleaning ditches, failures to keep up stoppings and curtains, and a tendency to procrastinate in the matter of timbering, etc.

It is exceedingly gratifying, therefore, to be able to state that,

tonnage of coal produced and number of persons employed being considered, the accident record was better than any that has ever before been made. At the same time it must be said that, as might have been expected, (for the reason given at the beginning of this chapter), there was an increase in the number of total accidents from falls of roof. There was the same number of fatalities from that cause as in 1895, a smaller number of non-fatal serious accidents, but a notable increase in the non-serious ones.

There were six fatalities in and about the mines, five of them occurring underground. Two of them occurred simultaneously at one mine, due to a fall of slate.

The tonnage of coal raised per inside fatality, 636,696 tons, exceeded that raised in 1895 by 178,443 tons; and it exceeded that raised in 1892, the year showing the best previous record, by 31,237 tons. The product raised per fatality both in and out amounted to 530,579 tons. Comparisons might be made with records reported for other States, but it is questionable whether, save for large generalizations respecting mine casualties, such comparisons serve any really commendable purpose. It is sufficient to say that for several years our accident record has been improving, under the supervision provided for by the State; and that for some time Kentucky has stood foremost among the mining States with respect to the comparatively low fatality rate in the mines.

Following are brief fatality statistics for the calendar year 1896. A detailed report of all noteworthy accidents is given in a succeeding chapter.

FATALITIES FOR 1896.

DISTRICT.	Inside.	Outside.	Total.
Western	1	0	1
Southeastern	4	1	5
Northeastern	0	0	0
Totals	5	1	6

Maximum number of persons employed	9,852
Maximum number of persons inside	8,462
Total tons of product raised	3,183,479
Tons raised per inside fatality	636,696
Tons raised per fatality inside and out	530,579
Tons raised per fatal and non-fatal serious accident inside	144,704
Maximum persons inside per inside fatality	1,692
Maximum persons employed per death in and out	1,642
Tons raised per death from fall of top	795,870
Tons raised per fatal and non-fatal serious accident from fall of top	353,720

FATALITY RATES BY YEARS.

YEAR.	Tons of Product Raised	Fatalities Inside .	Tons Raised per Inside Fatality .	Maximum Persons Inside per Inside Death
1888	2,384,893	14	170,342	.. . . .
1889	2,246,259	12	187,188	.. . . .
1890	2,532,526	9	281,391	.. . . .
1891	2,950,136	13	226,933	540
1892	3,027,298	5	605,459	1,527
1893	3,302,250	11	300,204	843
1894	2,957,195	9	328,577	1,026
1895	3,206,364	7	458,253	1,262
1896	3,183,479	5	636,696	1,692

Accurate casualty statistics date only from 1888. Prior to that year there was no law requiring statistical returns from the mining companies.

In the reports of the present writer for the years 1890 and 1891, when he was without any assistance in the performance of the duties of the office, attention was called to the necessity for the appointment of an Assistant Inspector. In his report for 1892, when a bill to provide for an Assistant was pending before the General Assembly (subsequently passed at that session), the following promise was made: "Should this hope [that the bill would receive favorable consideration] prove well founded, I do not hesitate to promise that the work of the office will hereafter be performed more satisfactorily to all concerned, (to the Inspector especially), than has been possible for two or three years past. At present, the Inspector can not do justice to the miners, to the State or to himself; he is struggling under a burden of overwork, which limits the effectiveness of his efforts in all directions."

The Assistant did not begin his service until about July 1, 1893. It may be instructive, therefore, to compare the fatality record for the four years preceding 1892 with that for the four years succeeding it; bearing in mind that the Assistant was in service during only the latter half of 1893, and that the additional duties of Curator of the Geological Department were placed on the Inspector in that year. It will be found that the total number of underground fatalities for the last four years has been 32, against 43 for the four years preceding 1892—a decrease of 33 $\frac{1}{3}$ per cent. Moreover, as is shown in the statement of deaths according to causes, given on a following page, the fatal accidents from falls of top has fallen from 34 for the first four years, immediately prior to 1892, to 23 for the last four—a reduction amounting to 32.2 per cent. There are, unquestionably, too many accidents from falls of top; but it is nevertheless gratifying to know that, (even setting aside questions relating to improved ventilation, better drainage, etc.), the accident record itself well sustains the writer's pledge. That, under the system which has now been perfected, whereby, in addition to almost continuous field work by the Assistant, the Chief can spend the half or more of each month among the mines for the larger part of the year, the future should show even better results may reasonably be hoped.

Following is the table above referred to:

FATALITIES AND CAUSES, BY YEARS.

CAUSE.	1888	1889	1890	1891	1892	1893	1894	1895	1896
Full of top . . .	9	9	6	10	4	9	6	4	4
Fall of coal				1					
Fall of kettle-bottom			1						
Cars	1			2			1		
In slope (cars)								2	
In shaft					1	1			
Premature blast		1	1						1
Returned on hanging blast			1						
Flying coal from blast		1							
Drilling, missed shot	1					1			
Blown-through shot							1	1	
Ignition 3 kegs powder, suffocated by fumes	3								
Powder smoke and weak heart		1					1		
Totals	14	12	9	13	5	11	9	7	5

INSPECTIONS MADE.

All mines were inspected at least three times, except the few that either suspended after one or two inspections had been made, or which began operations too late in the year to receive more than two examinations. A number of the mines were inspected four times.

As should be expected, the larger number of inspections were made by the Assistant, with whose work, however, the Chief kept in close touch. All mines, save three or four of the less important ones, were also inspected by the Chief, some of them twice; and those mines in which danger might be apprehended from fire-damp were taken under his especial care. Inspections were made by the Chief

during the months of June, August, September, October, November, and December; earlier field work by him being prevented by delays in the printing of the 1895 report, while the unusually dull season rendered it unnecessary for more than one Inspector to take the field in July.

The number of inspection visits and their distribution was as follows:

By Whom.	Western Field.	Eastern Field.	Totals.
Chief Inspector	54	83	137
Assistant Inspector	120	144	264
Totals	174	227	401

There were 330 written notices given—78 more than in 1895; and 71 visits are recorded where no written notice was served—covering instances when either the mine was idle or verbal directions as to such minor defects as were noted were deemed sufficient. As indicated by the record of written notices and memoranda of visits, the proportion of field work performed by each official was as follows:

By Whom.	Written Notices.	Memoranda of Visits.	Totals.
Chief Inspector	111	26	137
Assistant Inspector	219	45	264
Totals	330	71	401

Copies of all notices served are on file in this office, subject to examination by any properly interested person. Their publication in full would serve no useful purpose.

SPECIAL IMPROVEMENTS.

The effects of increased competition in the Western Field is shown in the improvements made in screening machinery, and in the growth of machine mining during the year. Vibrating screens were substituted for the old type at the following Western mines: Crabtree, Cumberland, Hillside, McHenry, Mud River, Taylor, Trade-

water (Sturgis Shaft), and Williams; and the Sebree and New Empire, both new mines, were equipped with shakers. Nearly all important mines in the Western District have now been equipped with vibrating screens. Comparatively little special surface improvement was made in either of the Eastern Districts. The only noteworthy modification of screening arrangements was at the mines of the Bird Eye-Jellico Coal Co., in Whitley county, where a shaking screen was put in. In provisions for getting the coal, there were significant changes. Electric plants were installed at the New Empire (machines and motor), in Christian county; McHenry (machines), in Ohio county; Central (machines and motor), in Muhlenberg county; and West Pineville No. 2, (machines and motor), in Bell county. At the Render Mines, in Ohio county, where electric machines were already in use, an electric motor was substituted for mule haulage. All machines are of the chain-cutter type. At the Reinecke mine, Hopkins county, where compressed air is used, a change was made from the rotary-bar to chain-cutter type.

Perhaps the most interesting event of the year to Kentucky mining men, was the installation of a compressed-air haulage plant at the Rush Mine (No. 6), of the Ashland Coal & Iron Railway Co., in Boyd county. It is the first of the kind in the State. The plant was in full operation December 1st, and up to this writing (February 8th, 1897), has given entire satisfaction. The length of haul is 5,060 feet—the larger part of which is within the mines—and begins at a point on a side entry, known as the McKnight, 1,460 feet away from the Main. Following is a succinct description of the plant, based on a statement kindly prepared by Mr. E. C. Means, Superintendent, in response to queries that had been formulated by the present writer.

1. The number of cars hauled by the locomotive varies, but could be considered as an average of 60 for the last 3,600 feet, and 30 for the first 1,460 feet (the McKnight entry). Or say, estimating the weight of the loaded car to be 4,000 pounds, the locomotive starts in McKnight entry with 120,000 pounds, and on reaching the Main adds 120,000 pounds, and takes in all 240,000 pounds to the tipple—of which 180,000 pounds are of run-of-mines coal.

2. The grades encountered by the locomotive are as follows: Starts on a grade of 1.7 per cent. against the load, 767 feet; level, 495 feet; grade of 2.5 per cent. against the load, 198 feet, to Main entry. Then 1.5 per cent. grade descending, 462 feet; 1 per cent. ascending, 891 feet; 1 per cent. descending, 396 feet; level, 1,651 feet; and 1 per cent. descending, to tipple, 200 feet.

3. Locomotive, etc.—Baldwin, 9-inch by 14-inch cylinders. Gauge of track, 43½ inches. Weight of locomotive, 21,000 pounds. Length, 19 feet. Height, 5 feet. Width, 6 feet. Capacity of tanks, 140 cubic feet. Initial pressure, 600 pounds per square inch. Tanks, 3 in number, with auxiliary reservoir for reduced pressure. Pressure in auxiliary reservoir varies from 100 to 160 pounds per square inch, at will of the locomotive engineer.

4. Compressor.—Norwalk, 18-inch by 20-inch steam cylinder. Air cylinders, 13½ by 20 inches, 9 by 20 inches, and 5 by 20 inches. Capacity, 330 cubic feet of air per minute, 700 pounds pressure. Type known as "Locomotive Charger."

5. Boilers.—Made by Borger Bros., Columbus, O. Two in number, 66 inches by 16 feet, 100 H. P. each.

6. Pipe Line.—Made by American Tube & Iron Co.; 2,000 feet of 5-inch and 4,000 feet of 4-inch. Special make. Tested to 1,500 pounds.

7. The locomotive charges at tipple to 600 pounds in the tanks; at 3,500 feet again charges to 600 pounds; then makes a round trip of about 3,500 feet, and on return charges again, and goes to tipple. Usually from 200 to 300 pounds pressure remains in the tanks, showing that the charging stations can, later on, be separated a greater distance.

It is probable that the Ashland Coal & Iron Co. will also introduce, at an early date, from four to six pick mining machines, or from two to three chain-cutter machines, at the Rush mine; using a low pressure supply of air to be furnished by their present compressor plant, during the hours the locomotive is not in operation. Mr. Means states that he has been advised by the makers of the compressor that no changes will be required at the power house, ex-

cept to change from a 700-lbs. relief valve to an 80-lbs. one, and that would only be done in order to guide the engineer in running the compressor economically. It was expected that a test with mining machines would be made in March.

Other improvements at various mines are recorded in the descriptive notes given in the chapter "Notes on the Mines."

MINERS' LAMP OIL.

Prolonged exposure to bad air inevitably ends in depression of vitality. "If the food we take is not quite as nourishing or as good as it should be, the digestive process is sufficiently adaptable to select the good and reject the bad; but the lungs are infinitely more delicate in structure and function, and we can not with impunity inhale a vitiated air and expect our lungs to select the pure and reject the impure without permanent injury to our breathing apparatus as well as to our whole body. . . . There is such a thing as cumulative poisoning. White lead, for example, taken internally in minute quantities will in time produce the effect of a poisonous dose. Bad air is an example of cumulative poison."* When discussing the harmful gases encountered in mines, in a paper read before the Engineering Association of the South, the present writer commented as follows upon one of them: "By far more evil is wrought, more lives are shortened, more harm is wrought upon the health of miners, by carbonic acid than by the explosive gas. It is seldom that men are suddenly destroyed by it. It is insidious in its work, and those who daily toil in an atmosphere unduly loaded with it drown by slow degrees. Their vital forces are enfeebled, its cumulative effects are debilitating, the system is rendered more pervious to disease, the mental faculties are weakened, and the muscles are especially effected. This is the testimony of nearly all who have studied hygienic questions as they relate to mines. . . . Pulmonary troubles come from imperfect drainage and inadequate ventilation; air saturated with moisture, wet rooms, floating coal-dust,

*"The Air of Towns." Lectures by Dr. J. B. Cohen, Yorkshire College, Leeds, Eng. Smithsonian Collections.

vitiated air, do the work. Chronic inflammation of the joints and rheumatism result from wet workings and an impure atmosphere."*

Dr. Henry de Varigny, in an essay on "Air and Life," emphasizes the fact that carbonic acid gas is an essentially noxious compound, and that one-half of our respiratory function is concerned especially with the task of ridding our body of the substance, which is unceasingly generated in our tissues. Not only is it unfit for breathing purposes, but all animals and plants perish in a confined atmosphere when the proportion of the gas rises above a very limited ratio. An atmosphere which contains one per cent. of the gas is hurtful; even a smaller proportion may give rise to discomfort; and when the ratio is ten per cent. life is endangered and death only a matter of time. As stated by Dr. Varigny, "carbonic acid is of no use at all to the tissues, and when we breathe in an atmosphere where the gas is abundant, the blood corpuscles are not able, in the lungs, to get rid of the carbon dioxide they have collected in the body; so they keep it, and, keeping it, they can not take within them the amount of oxygen necessary for the cells and tissues." In other words, an excess of carbonic acid in the inhaled air not only weakens the supply of oxygen needed by the body, but checks the elimination of waste products from the system; hence it necessarily follows that continuous daily inhalation of an atmosphere surcharged with the gas inevitably leads to evil consequences.

Every oil illuminant, however good, yields carbonic acid and soot. Each product is harmful to the human system. It is usual to give greater consideration to the carbonic acid than to the soot, the soot being regarded rather as a discomfort than as a really harmful product. But, as has been remarked by Dr. J. B. Cohen, impure air, whatever may be the origin of its impurities, is injurious to health; it may arise "from bad gases, soot, or disease germs." The more volatile the illuminant (high in carbon), when used in a miner's lamp, the greater are the quantities of soot and carbonic acid given off. The loose wick supplies the flame with the combustible more rapidly

*"Mine Inspection," by C. J. Norwood. Publication No. 2 of Engineering Association of the South.

than it can be disposed of; a large part of the reduced carbon is not consumed, on the one hand, and an excessive amount of carbonic acid is yielded by the large flame on the other. Hence the use of mineral oil alone is not practicable in mines, and when vegetable or animal oils are adulterated with an excess of mineral oil the compound is detrimental to health. When they are still farther adulterated with pernicious carbons, the effects are intensified.

Compounded oils have now become one of the banes of a miner's life, and in each of the present writer's annual reports for recent years attention has been called to the poor quality of oil in general use in Kentucky mines. There are notable exceptions, since some of the companies insist upon having at least a fairly good article; but in general the oil is very poor, and often abominable. In the report for 1893 it was remarked: "Unless the operators themselves remedy the evil by ceasing to purchase the highly adulterated illuminants, a law requiring the use of good oil only should be enacted, as has been done in some other States." Since then the oil sold in this State has been growing worse and worse in quality, and the use of the inferior article is extending to mines hitherto in the excepted class. It is not the opinion of the writer that the mining companies are solely to blame; indeed, while it is probably true that there have been instances where, in consideration of reductions in mining rates, "concessions" in the price of oil have been made to the miner and, in order to make the "concessions" without cost to the company, cheaper and poorer oil was deliberately substituted for the better article that had been used, it is known that in many instances the mining companies themselves, have been the victims of the compounder—that prices have been paid for poor oil that should have secured a reasonably good oil. Unquestionably a law to cure the evil is needed.

The importance of the matter and the difficulties to be contended with are such, that the liberty is taken of reproducing some extracts from an article on the subject given in the last report (1895) of the Hon. R. M. Haseltine, Chief Inspector of Mines for Ohio. Aided by legislative enactments, and provided with facilities for so doing,

Mr. Haseltine has been able to make a thorough investigation of the subject, and his presentation of the results should prove useful in Kentucky no less than in Ohio. He says:

"Many compounders of oil regularly employ a corps of skilled chemists, who are constantly engaged in experimenting and preparing their goods for the market. It was soon discovered that in some instances their attention had been directed to the preparation of an oil that was intended to deceive the mining public and secure a handsome profit to themselves. Immediately following the passage of the act of March 29, 1892, the department set about to establish a test to which all oil should be subjected. Several methods were tried, all of which were lacking in their reliability. The 'Western Rule,' as it has been termed by the oil dealers, whereby the quality of oil is determined by its specific gravity, appeared to be the most efficient and was adopted as the best. The Tagliabue hydrometer was used. . . . By the 'Western Rule,' for each 10 degrees in temperature that the mercury indicates above or below the zero line, one degree is added to or subtracted from the reading on the limb of the hydrometer. By the dealers in oil this reading is taken as indicating the true gravity of the oil, and in commercial transactions it is relied upon without limit as to the temperature. After more than one year's experience, this rule proved to be wholly unreliable for the uses of the department, except when the temperature was confined within narrow limits. It is believed, however, when the rule is applied either to cotton seed or mineral oil in their purity, that it may possess fair reliability; but when they are met with in a compound, except within a small range of temperature, the rule can not be relied upon. This is thought especially true where the compound has not been made by the most approved methods or by persons skilled in the industry; as in these cases the oil will stratify and the hydrometer will present an incorrect reading. . . . In the report of that year (1894) attention was called to the fact that in a number of instances oil had been found which conformed to the law in its gravity, but gave off such a quantity of smoke as to cause apprehension as to the efficiency of the law. This oil was invariably found of a dark green color. The violet bloom which accompanies the excess-

ive use of mineral oil was wanting and the odor of petroleum was barely discernible. In many of the essential characteristics it was unlike any oil heretofore found in the State. . . . To determine the ingredient being used to adulterate the oil proved a most difficult undertaking, as but few chemists are skilled in the analysis of oil. College professors of wide reputation utterly failed to determine the ingredients of samples furnished them for analysis. To attempt to secure information from chemists in the employ of the compounders of oil was impracticable, even when they were being driven from the trade by their rivals, as the secrets which they had obtained while plotting to evade the law are to them a valuable portion of their stock in trade. Again, many of those who can successfully compound an oil can not analyze it after it has been compounded. From the color of the oil, the manner in which it burns, the price at which it is sold, and expressions overheard in the trade, the writer was led to believe that compounders, after inserting an excessive amount of mineral oil, were resorting to the use of mystic oil (as it is known in the trade) to reduce the gravity to that provided by law. Mystic oil, as described by Allen on organic analyses, 'Is rosin oil, an oil of low grade, more dense than any animal or vegetable oil and much more dense than any of the mineral lubricating oils. Its specific gravity is from 0.980 to 1.100, which equals 7.8 to 12.7 on the Tagliabue scale.' This oil burns with the avidity of turpentine, and throws off a volume of smoke equal, if not in excess of, that of any oil produced.* The method believed to be employed whereby the quantity of mineral oil could be increased and still prevent the product from exceeding the specific gravity provided by law, will easily be seen by the following formula: Sixty-five per cent. of the cotton seed oil having a specific gravity of 21.8 degrees will equal 14.17 degrees sp. gr.; twenty-two per cent. of a neutral oil of 300 proof of 38

*Rosin oil, a complex hydrocarbon derived from rosin by destructive distillation, is well known both as a lubricant and as an adulterant for fatty oils. Closely related to turpentine, it is unsuitable for lamps for one of the reasons that turpentine is, namely, on account of the high proportion of carbon (relative to its hydrogen) that it contains. Unless used in a lamp, therefore, capable of supplying an extraordinary volume of air, the oil (as does turpentine) burns with an excessively smoky flame, and gives out a tarry odor. It seems hardly necessary to mention the fact that a miners' lamp is as well constructed to supply a minimum quantity of air to the flame, as could well be contrived.—
C. J. N.

degrees specific gravity equals 8.36 degrees sp. gr.; and thirteen per cent. of rosin oil of 11.3 specific gravity will equal 1.46 degrees sp. gr." The resulting compound, it will be seen, has a specific gravity of 23.99 degrees,—an oil of lawful gravity, but unfit to burn in a confined compartment, much less in a mine. The motive which would prompt the compounding of such an oil for the trade will be seen when it is known that unpurified cotton seed oil has a commercial value of 30 cents per gallon, and that in its highest state of preparation for use in the mines it is worth 35 cents per gallon. By the above compound it is found that 65 per cent. of oil at 30 cents per gallon will amount to 19½ cents; twenty-two per cent. of mineral oil at 8 cents will amount to 1¾ cents; and thirteen per cent. of rosin oil, at 15 cents per gallon, is worth 2 cents. The total value of a gallon of the compound, after adding one cent for caskage, will be 24 cents. Thus netting to the compounder of the oil a profit of 11 cents per gallon, or \$5.50 a barrel.

"As before stated, for some time the ability of the department to demonstrate the presence of rosin oil in the compound was in doubt. The services of Mr. A. W. Burrell, 33 Atwater Building, Cleveland, Ohio, were finally secured, he being a chemist of rare skill and large experience in the analysis of oil. . . . After making a large number of analyses of oil received from different parts of the State, it was found that the use of rosin oil as an adulterant was seldom resorted to in the trade; and that the adulterant in most common use was a mineral oil which, when subjected to the above analysis, gave a dark waxy residue, strongly resembling that secured when rosin had been used. In its manner of burning and in many other ways it strongly resembled mystic oil, thus causing great delay in determining its true character. A more extended investigation developed it to be a heavy paraffine oil, a heavy distillate, but little better than the crude product. This oil was found to have a specific gravity of 28 to 30 degrees. Paraffine of this specific gravity, when burned in an open lamp, generates a volume of smoke equal to that of crude petroleum, and when compounded with cotton seed oil gives a flame resembling that of a wide-awake torch, the fumes of which are intensely offensive. The unconsumed carbon which is thrown off so

laden the air as to make respiration in a confined place quite difficult. It also greatly retards the ventilation by reducing the speed of the air current. It has been repeatedly noticed that the volume of air flowing in the morning would rapidly decrease as the day advanced, the power of the ventilating apparatus remaining the same. Compounders of oil, in order to produce an oil having the specific gravity required by law, used cotton seed oil having a specific gravity of 22½ degrees, which they compounded with paraffine oil of 28 degrees specific gravity, in the proportion of 75 per cent. of the former to 25 per cent. of the latter. Or by the use of 75 per cent. of 22-degrees cotton oil with 25 per cent. of 30-degrees paraffine oil, they secured a compound having the same specific gravity as the other compound, viz., of 24 degrees. At 30 cents per gallon for cotton seed oil and 6 cents per gallon for the paraffine oil, they would be able to produce oil at 24 cents per gallon; the same cost as if they had used the first formula, the compound netting them the same profit. . . .

"During the years that the members of the department have been condemning and preventing the use of unlawful oil in the State, no attempt has been made to conceal the fact that it was immediately shipped into the sister States, where no restrictions were placed upon the traffic. The Hon. C. J. Norwood, Chief Inspector of Mines in Kentucky, in his annual report for 1895, calls the attention of the General Assembly to the necessity of preventing its sale. . . . The Hon. Robert Fisher, State Inspector of Mines in Indiana, in his report for 1895, says that one of the most difficult matters to deal with is the inferior oil used for illuminating purposes in the mines. . . . He cites instances where miners have been compelled to abandon the mines on account of the effect of the smoke upon their lungs. This is especially true of those affected with asthmatic trouble. . . . It has been openly stated for two years by compounders of oil that they sent into the State of Illinois an article which contained but ten gallons of cotton seed oil to the barrel; that is, twenty per cent. of cotton seed oil and eighty per cent. of mineral oil."

The present writer repeats the suggestion made in his report for 1895: That the legislator who will secure the passage of an "oil

law," similar to that of Ohio, will render a genuine service to the miner; a service the beneficence of which is less in doubt than can be predicted of results following efforts to regulate the details of business management.

Following is the Ohio law on the subject:

SEC. 306. Only a pure animal or vegetable oil, or other oil as free from smoke as a pure animal or vegetable oil, and not the product or by-product of rosin, and which shall, on inspection, comply with the following test, shall be used for illuminating purposes in the mines of this State: All such oil must be tested at sixty degrees Fahrenheit. The specific gravity of the oil must not exceed twenty-four degrees Tagliabue. The test of oil must be made in a glass jar one and five-tenths inches in diameter by seven inches in depth. If the oil to be tested is below forty-five degrees Fahrenheit in temperature, it must be heated until it reaches about eighty degrees Fahrenheit; and should the oil be above forty-five degrees and below sixty degrees Fahrenheit it must be raised to a temperature of about seventy degrees Fahrenheit, when, after being well shaken, it should be allowed to cool gradually to a temperature of sixty degrees Fahrenheit, before finally being tested. In testing the gravity of the oil, the Tagliabue hydrometer must be, when possible, read from below, and the last line which appears under the surface of the oil shall be regarded as the true reading. In case the oil under test should be opaque or turbid, one-half of the capillary attraction shall be deemed and taken to be the true reading. Where the oil is tested under difficult circumstances, an allowance for one-half degree may be made for possible error in parallax before condemning the oil for use in the mine. All oil sold to be used for illuminating purposes in the mines of this State, shall be contained in barrels or packages branded conspicuously with the name of the dealer, the specific gravity of the oil, and the date of shipment.

SEC. 306a. Any person or persons, firm or corporation, which ships any oil contained in any barrel or barrels, package or packages, which are not branded as prescribed in section 306 said oil to be used for illuminating purposes in coal or any other mines, and any person or persons, firm or corporation, which sells any

oil other than that prescribed in section 306, to be used for illuminating purposes in coal or other mines, and any person or persons, firm or corporation, having in charge the operation or running of any mine, which, in a mine under his or its charge uses or permits the use of any oil other than that prescribed in section 306, and any miner or mine employe who uses, with a knowledge of its character, in any mine in this State, any oil other than that prescribed in section 306, shall be fined not less than five nor more than fifty dollars; and any individual, firm, company or corporation which sells any oil other than that prescribed in section 306 in quantity exceeding five barrels at one sale, to be used for illuminating purposes in coal or other mines, shall be fined not less than twenty-five nor more than one hundred dollars. Mayors and justices of the peace shall have jurisdiction to try any violations of this section, and their judgment shall be final. Every person who, after being once convicted of violating this section, shall be convicted of again violating any of the provisions of this section, may, in addition to the fine before provided, be imprisoned not less than ten days nor more than thirty days. On complaint, before a mayor or justice of the peace, of a second violation of this act involving the punishment of imprisonment, if a trial by jury be not waived, a jury shall be chosen and the case tried, after the manner provided in section 3718a of the Revised Statutes. All fines assessed and collected under prosecutions begun, or caused to be begun by the Chief Inspector of Mines, or any district inspector of mines, shall be paid by the court to the Chief Inspector of Mines, and by him paid into the State Treasury to the credit of a fund which is hereby appropriated for the use of the Chief Inspector of Mines in prosecuting violations of this section. Any excess of fines collected over the expenses incurred in prosecutions under this section remaining at the close of the fiscal year, shall be credited to the general revenue fund of the State.

MACHINE MINING.

A fraction more than 30 per cent. (957,329 tons) of the total bituminous product for 1896 was machine mined.

The increase in number of machine mines in the Western District

during the year—the complete equipment of the McHenry and Ren-der mines in Ohio county, of the Central in Muhlenberg, and of the New Empire in Christian—practically determines the future character of mining in that field. Nearly 44 per cent. of the total output of the district was mined by machine. There seems, indeed, little doubt that within a comparatively short time practically all the commercial coal mined in the district, except in especially favored places, will be got by machine. So far as relates to the more important mines, the end of pick mining is certainly not far distant. There will doubtless always be employment for a noteworthy number of picks, but mining rates and selling values will be governed by machine operations. Of the nine counties of the Western District producing commercial coal in 1896, machines control the output of three, namely, Christian, Hopkins and Ohio; and those counties produced nearly 66 per cent. of the total output of the field. Moreover, machines may be expected to control, within a comparatively short time, in Muhlenberg, where nearly 39 per cent. of the county's output was produced by the Central (now a machine mine); and also in Union, where 58½ per cent. of the output was mined by the Ohio Valley Coal & Mining Co. using machines in its principal mine. (70 per cent. of the Company's product). What this means should be carefully considered by both miner and operator. A readjustment of conditions in the district seems inevitable. Already there has been a movement toward a general reduction of mining rates at the pick mines, as a result of the fierce competition now going on irrespective of mining methods; a thing to be deplored, and from which, so long as output is made and trade sought at the expense of real value, the operators gain nothing, while the miners lose in any event. The writer believes that no one, acquainted with the situation, will question the statement that nearly the entire district is in a demoralized condition. Are there to be successive steps of a contest beginning with a struggle between man and machine and ending with one between machine and machine; the net result, through ill-regulated competition, simply being the exhaustion of coal properties, with practically nothing in return? Speculations as to the outcome of present tendencies, if unchecked, would be of little value here. Two facts, how-

ever, are plain: with or without machines, even present mining rates can not endure unless better and more uniform selling prices are obtained, and better prices can not be obtained unless the community of interests that should be recognized throughout the district is made effective in keeping competition within safe bounds.

What effect the introduction of machines at the Breckenridge and Pineville Syndicate's No. 2 (West Pineville) mine, in Bell county, is to have on mining operation in that region can not at present be well guessed. The seam is a compound bed of bituminous and cannel, and is wrought primarily for the cannel. Following is a bed section of the deposit:

- a. Bituminous coal, rashy at top 6 to 9 inches.
- b. Shale and coal rash (sometimes 6 inches), 2 to 3 inches.
- c. Bituminous coal, often with thin clay parting, usually a knife edge, at about 19 inches from top..... 34 inches.
- d. Cannel bed. Bottom 4 to 5 inches usually slaty, and often a cannel-like slate 17 to 19 inches.

It is expected that the machine cut will be made in the bituminous bench (c) immediately above the cannel, though an experiment will also be made in the underclay. According to recent report, it is expected to begin mining with machine about the last week of March.

The following table shows the types of machines used by the several coal companies and the amount of machine-mined product in 1896:

TOTAL MACHINE MINED COAL IN 1896.						
County.	Company.	Mines in which machines were used.	Type.	Power.	Per Cent of Bituminous Coal Mined by Machine.	Tons of Bituminous Coal Mined by Machine.
Christian	Empire	(a)	Chain	Electricity	76.3	None.
Hopkins	St. Bernard	4	Pick	Air	64.4	336,704.00
Hopkins	Hecla	1	Pick	Electricity	64.4	25,496.00
Hopkins	Reinecke	1	Rotary-bar and Chain	Air	100	115,375.56
Muhlenberg	Black Diamond	(b)	Chain	Electricity	11.9	4,260.40
Muhlenberg	Central C. and I.	1 (c)	Chain	Electricity	10	8,170.80
Ohio	Taylor	2	Pick	Air	97	77,816.85
Ohio	McHenry	2 (d)	Chain	Electricity	71.7	81,588.32
Ohio	Central C. and I.	1	Chain	Electricity	75	77,209.41
Union	Ohio Valley	1	Pick	Air	70	42,735.92
Western Dist.		14			43.7	769,386.76
Bell	Breck. & Pineville	(e)	Chain	Electricity	100	None.
Knox	North Jellico	2	Pick	Air	100	186,134.32
Pulaski	Richmond	*	Pick	Air		None.
Pulaski	Eagle	*	Pick	Air		None.
S. E. Dist.		2			17.6	186,134.32
Lawrence (N. E. Dist.)	Pench Orchard	1 (f)	Pick	Air	0.69	1,858.00

(a) Machines introduced at close of year.
 (b) Machines removed latter part of February, 1896.
 (c) Machines introduced latter part of year.
 (d) Percentage was 75 up to December 10th; after that, 95.
 (e) Installation not completed in 1896.
 (f) Used in Elizabeth Mine. Removed March 15th—mine on pillars. May be transferred to Annie mine.
 (*) Machines not used in 1895.

III.

STATISTICAL INFORMATION.

[Ton used is that of 2,000 pounds.]

There was a decrease in the output of commercial coal for 1896, compared with that for 1895, amounting to 24,291 tons, which was less of a decrement than, in view of the general depression of business, had been expected.

The production, according to grades, was as follows:

BITUMINOUS:	
Lump (including block),	1,024,228.82
Mixed lump and nut	484,714.50
Nut	339,237.08
Run of mines	655,128.17
Run of mines and "mixed"	1,971.48
Run of mines and steam	2,187.00
Steam	50,103.70
Lump, nut and egg	1,199.95
Lump, nut and pea	2,397.44
Round	1,410.25
Egg	15,147.05
Mixed egg	5,073.00
Nut and pea	8,417.01
Nut, pea and slack	10,751.50
Nut and slack	40,188.57
Pea and slack	12,491.82
Buckwheat	1,084.00
Pea	85,972.81
Slack	311,609.01
Various minor grades	75,505.00
Total bituminous	3,128,818.16
CANNEL	54,660.80
Total production	3,183,478.96

The foregoing was produced by 102 companies, operating 148 mines; a small increase in the number both of operators and of mines.

The bituminous product was disposed of as follows:

Loaded for shipment at mines	2,925,694.36 tons.
Sold to local trade, etc.	101,897.20
Total sold	3,027,591.56
Used for fuel at mines	55,447.39
Made into coke at originating mines*	45,779.21

Total bituminous product 3,128,818.16 tons.

Practically all the cannel product was shipped.

The decrease of output occurred in the Western and Northwestern Districts, principally in the latter. In the Southeastern District there was a substantial gain, the total output of that district having exceeded the production for any preceding year. Moreover, the loss was principally in cannel production, and here again the Northeastern District is chargeable with the larger part of the decrement—due to the exhaustion of the mines at Myrtle (in Johnson) and the suspension of the Stinson mines, in Carter county.

The following figures show the distribution of losses and gains in the total output (combined cannel and bituminous):

Western District, decrement	21,816.21 tons.
Northeastern District, decrement	59,348.29
Total decrement	81,164.50
Southeastern District, increment	56,872.97
Net decrease	24,291.53
In bituminous product alone the net decrement was small, thus:	
Western District, loss	25,243.01 tons.
Northeastern District, loss	47,234.11
Total loss	72,477.12
Southeastern District, gain	63,271.81
Net decrease	9,205.31
The losses in cannel production were distributed thus:	
Southeastern District, loss	6,398.84 tons.
Northeastern District, loss	12,114.18
Total loss	18,513.02
Western District, gain†	\$3,426.80
Net loss	15,086.22

*The total quantity coked amounted to 60,240.21 tons. Part of that tonnage (namely, 14,461 tons), was shipped from the mines producing it to the St. Bernard Coal Company, at Earlington; hence it is included in the tonnage reported as "loaded for shipment at mines." See "Production of Coke."

†The gain in the Western District was really somewhat less, since it appears that about 1,800 tons (estimated), of cannel were dug in Hancock county in 1895, which were not reported to this office in that year. See notes on Breckenridge mines under "Notes on the Mines."

Summarized according to variety of coal, the losses were, therefore, as follows:

Net loss in bituminous production	9,205.31 tons.
Net loss in cannel production	15,086.22
Total net loss	24,291.53

The following table shows the production, in tons, of each of the three Districts for the past five years:

DISTRICT.	1892	1893	1894	1895	1896
Western . . .	1,734,649.72	1,799,792.54	1,806,966.02	1,784,278.14	1,762,461.93
Southeastern . .	839,907.88	1,071,470.84	798,804.04	1,039,712.57	1,096,585.54
Northeastern . .	452,740.86	430,987.12	351,425.02	383,779.78	324,431.49
Total . . .	3,027,298.46	3,302,250.50	2,957,195.08	3,207,770.49	3,183,478.96

PERCENTAGES OF LUMP, ETC.

Nearly 93 per cent. of the total bituminous product was included in six grades. Compared with the proportions noted in 1895, there were some slight changes, as shown in the following:

GRADES.	Per Cent.	
	1895	1896
Lump (including block)	36.33	32.73
Mixed lump and nut	14.13	15.49
Nut	11.55	10.94
Run of mines	16.86	8.73
Pea	2.23	22.04
Slack	9.67	9.95
Other Grades	9.18	7.29

SELLING VALUE.

Since in nearly all instances average selling prices reported by the operators are based on the product sold, computations of the selling value presented in the reports of this office refer only to the product shipped and to that sold locally. It is believed that such treatment of the matter is of more service to those especially interested, than are figures given for the total output. The differences between average prices based on product sold and on the total product are small, it is true, but in these days of close competition small margins are significant. In consequence, too, of the wide difference between selling values of bituminous and cannel coal, the two products are treated separately.

Compared with that for 1895, there was a startling drop in the price per ton of the bituminous coal on board at the mine. The average value (per tonnage sold) was 74.57 cents, as against 80.58 cents in 1895. In many instances tonnage was made at the expense of value, and in some cases it can hardly be hoped that rents and store profits much more than offset losses on the coal. Indeed, when we consider that every ton of coal removed from an acre of land means the removal of a form of wealth that can never be replaced; that coal mining means a constant and permanent depreciation of ground, justification of which can only be found in the accumulation thereby of another form of wealth, and that rents and store profits belong to an account quite distinct from that of the mine; it is clear that, in the struggle for business during the past year, there have in many instances been no real profits, but a waste of property instead.

For the reason already stated, in the following table of average selling values of bituminous coal, the tonnage consumed at the mines for steam and heat and that converted into coke at originating mines is omitted.

SELLING VALUE OF BITUMINOUS COAL

For the Year 1896.

DISTRICT.	Total Product.	Tonnage Sold.	Total Value of Tonnage Sold.	Average Value per Ton in cents.
Western	1,759,035.13	1,690,979.79	\$1,158,934.876	68.53
Southeastern	1,056,463.74	1,028,638.48	862,179.977	83.91
Northeastern	313,319.29	307,973.29	246,833.353	80.14
For all Districts . .	3,128,818.16	3,027,591.66	\$2,267,948.206	74.57

Compared with prices for 1895, the figures show a decline in every district. For the Western District the decline amounted to 4.13 cents per ton; for the Southeastern it amounted to 9.08 cents; and for the Northeastern District the fall amounted to 4.14 cents. In the average value per ton for all districts there was a decline of 6.31 cents.

If the total bituminous product be considered, the average prices per ton for the respective districts were as follows: Western District, 69.13 cents; Southeastern District, 83.50 cents; Northeastern District, 80.12 cents.

The variations in selling values reported for cannel were greater than usual. Prices ranged through \$2.00, \$2.54, \$2.75, \$2.98 to \$4.00 per ton. The total value for all districts was \$146,501.74, and the average value was \$2.68 per ton.

The value of combined bituminous (sold) and cannel product was \$2,414,449.950, which indicates an average value of 78.33 cents per ton—a decline of 6.84 cents from the value reported for 1895.

Throughout the yearly reports received from the operators, in which reasons are given for the decline in selling value of the coal, three causes are conspicuous, namely, general depression of all business, overproduction, and intense competition. It is possible to, in some degree, regulate the last two causes, and it is to be hoped that it may, in some proper fashion, yet be done.

CONSUMPTION OF POWDER.

Complete statistics of the consumption of powder at the mines are difficult to obtain. The following returns for 1896, however, are believed to be approximately correct—coming, perhaps, within 800 or 1,000 of the real number of kegs used.

DISTRICT.	NUMBER OF KEGS.
Western	29,807
Southeastern	15,214
Northeastern	3,058
Total	48,079

The returns for the Western and Northeastern Districts are believed to approximate very closely to the correct numbers. They show a decrease of 1,705 kegs in the Western District, and a decrease amounting to 3,153 kegs in the Northeastern District, from the reports received for 1895. In each instance a decrease should have been expected, and that for the Northeastern District is not much greater than the history of mining operations for the past year would suggest as probable. The figures for the Southeastern District are too small by, perhaps, 500 or 600.

DETAILED STATISTICS FOR 1896.

The output of the several districts, according to disposition of product, for the calendar year 1896, was as follows:

DISTRICT.	Number of Companies.	Loaded for Shipment at Mines.	Sold to Local Trade and Employees.	Used for Steam and Heat at Mines.	Total Product.
Western	49	1,606,005.70	88,400.89	38,547.34	1,762,461.93a
Southeastern	39	1,057,704.22	11,056.06	11,554.05	1,096,585.54b
Northeastern	14	316,645.24	2,440.25	5,346.00	324,431.49
Total	102	2,980,355.16	101,897.20	55,447.39	3,183,478.96c

(a.) Includes 29,508.00 tons of coal coked at originating mines. (Total coal for this district converted into coke, 43,969 tons, part of which is included in coal shipped.)

(b.) Including 16,271.21 tons used for coke.

(c.) Including 45,779.21 tons of coal converted into coke at originating mines. (Total coal coked, 60,240.21 tons, part of which is included in coal shipped.)

The number of employes for all districts was as follows:

	In	Out.	Total.
Maximum number	8,462	1,390	9,852
Average number	6,563	987	7,550

For details relating to employes, see a succeeding table.

The output by districts, according to grades, was as follows:

WESTERN DISTRICT.

This district includes all mining counties in the Western Coal-field, but commercial coal, only, is reported.

CALENDAR YEAR 1896.

[In tons of 2,000 pounds.]

GRADES.	By 49 Operators; 59 Mines.
Lump	560,222.62
Nut	171,094.26
Mixed lump and nut	319,892.75
Run of Mines	304,547.62
Pea	26,956.88
Slack	246,045.98
Miscellaneous	130,275.02
Total Bituminous	1,759,035.13
Cannel	3,426.80
Total Product	1,762,461.93

Included in the "miscellaneous" are the following grades, designated as they were reported, and stated in tons: Lump, nut and egg, 1,199.95; lump, nut and pea, 2,397.44; lump nut and slack, 40.00; run of mines and mixed, 1,971.48; mixed, 26.35; steam, 28,807.96; nut and steam, 127.60; mixed egg, 5,073.00; egg, 15,147.05; nut and pea, 1,630.00; nut and slack, 16,026.84; pea and slack, 4,618.36; nut.

pea and slack, 1,056.80; fuel and local additional to that included in other grades, 52,152.19 tons.

The number of persons employed was as follows:

	In.	Out.	Total.
Maximum number	3,837	676	4,513
Average number	2,980	529	3,509

The average number of days worked was 144.2, a loss of 4 from 1896.

For details see a succeeding table.

SOUTHEASTERN DISTRICT.

Included in this district are the following counties in which commercial coal was mined in 1896: Bell, Knox, Laurel, Pulaski, and Whitley.

CALENDAR YEAR 1896.

[In tons of 2,000 pounds.]

GRADES.	By 39 Operators; 63 Mines.
Lump, (probably including some block.)	297,417.01
Nut	126,553.97
Mixed lump and nut	163,748.05
Block	8,312.92
Run of mines	280,721.88
Pea	56,331.08
Slack	42,573.03
Miscellaneous	80,805.80
Total bituminous	1,056,463.74
Cannel	40,121.80
Total Product	1,096,585.54

Included in the miscellaneous are the following grades, designated as they were reported, and stated in tons: Steam, 21,295.74;

nut and pea, 2,119.31; nut and slack, 24,065.73; pea and slack, 2,197.46; nut, pea and slack, 9,894.70; run of mines and steam, 2,187.00; round, 1,410.25; lump, nut, pea and slack, 26.00; unnamed, 6,684.50; fuel and local reported in addition to that included in other grades, 10,805.80 tons.

The number of persons employed was as follows:

	In.	Out.	Total.
Maximum number	3,478	559	4,037
Average number	2,720	366	3,086

The average number of days worked was 140.2, an increase of 11.3 over 1895.

For details see a succeeding table.

NORTHEASTERN DISTRICT.

Included in this district are the following counties, in which commercial coal was mined in 1896: Boyd, Breathitt, Carter, Greenup, Johnson, Lawrence, and Lee.

CALENDAR YEAR 1896.

[In tons of 2,000 pounds.]

GRADES.	By 14 Operators, 26 Banks.
Lump	158,276.27
Nut	41,588.85
Mixed lump and nut	1,073.70
Run of mines	69,858.67
Pea	2,684.85
Slack	22,990.00
Miscellaneous	16,846.95
Total bituminous	313 319.29
Cannel	11,112.20
Total Product	324,431.49

Included in the miscellaneous are the following grades, designated as they were reported, and stated in tons: Nut and pea, 4,667.70; nut and slack, 216.00; pea and slack, 5,676.00; buckwheat, 1,084.00; fuel and local in addition to that included in other grades, 5,203.25 tons.

The number of persons employed was as follows:

	In.	Out.	Total.
Maximum number	1,147	155	1,302
Average number	863	92	955

Average number of days worked, 191.5, an increase of 8½ over 1895.

For details see a succeeding table.

The following table shows the output of shipping mines located on railroads:

RAILROAD MINES. Output and Shipments for Year 1896.

District.	County.	Number of Companies.	Number of Banks.	Railroad.	Total Product.	Tons Shipped.
Western	Christian	1	2	Henderson & Nashville Division of L. & N.	13,123.68	12,177.68
"	Davies	1	1	"	3,232.24	807.24
"	Hancock	3	3	Louisville, Henderson & St. Louis	17,841.60	16,801.60
"	Henderson	3	3	"	96,992.25	92,417.25
"	Hopkins	9	10	"	595,692.24	530,030.44
"	McLean	3	3	Henderson & Nashville Division of L. & N.	181,489.71	180,719.96
"	Muhlenberg	7 ^a	4	Illinois Central (C. O. & S. W.)	24,075.96	22,221.96
"	"	4	3	Owensboro & Nashville Division of L. & N.	152,197.20	147,299.80
"	Ohio	3	3	Illinois Central (C. O. & S. W.)	102,748.27	100,031.27
"	"	3	4	Owensboro & Nashville Division of L. & N.	334,550.08	321,951.36
"	Union	5	6	Illinois Central (C. O. & S. W.)	33,544.36	31,915.52
"	Webster	2	8	Owensboro, Falls of Rough and Green River.	98,705.62	88,311.62
"	"	2	2	Ohio Valley	45,190.96	39,273.44
"	"	40 ^b	50	Providence Branch of L. & N.	1,698,384.17	1,583,968.14
Southeastern	Bell	6	6	Cumberland Valley Branch of L. & N.	89,533.96	69,093.75
"	Knox	5	7	"	217,039.83	211,175.83
"	Laurel	13	17	Knoxville Branch of L. & N.	288,493.96	285,724.10
"	Pulaski	5	8	Cincinnati Southern	72,537.12	71,414.12
"	Whitley	2	4	"	49,537.08	49,157.08
"	"	8	21	Knoxville Branch of L. & N.	379,443.59	371,139.34
"	Totals	39	63	"	1,096,585.54	1,057,704.22

Northeastern	Boyd	1	2	Newport News and Mississippi Valley	121,022.00	118,439.00
"	Breathitt	1	1	Lexington & Eastern	2,405.77	2,355.77
"	Cartor	4 ^c	10	Newport News & Mississippi Valley	125,754.40	125,128.15
"	"	2	2	"	10,311.60	10,311.60
"	Greenup	1	1	Eastern Kentucky	854.00	854.00
"	Johnson	2	2	"	6,762.40	6,762.40
"	Lawrence	1	2	Ohio & Big Sandy	47,474.00	43,097.00
"	Lee	3	6	"	9,847.32	9,697.32
"	Totals	14 ^d	26	Bentleyville & Cumberland Gap	324,431.49	316,645.24

^a. One of these Companies also operates in Ohio, and is also enumerated there. There are, therefore, 40 Companies, not 41.
^b. See preceding note.
^c. The Company reported in Boyd is also one of the 1 operating in this County. Hence there are 14 Companies, not 15.
^d. See preceding note.

District.	Number of Companies.	Number of Banks.	Tons of Total Product.	Tons Shipped.
Western	40	50	1,698,384.17	1,583,968.14
Southeastern	39	63	1,096,585.54	1,057,704.22
Northeastern	14	26	324,431.49	316,645.24
Total	93	139	3,119,401.20	2,958,317.60

OUTPUT BY COUNTIES.

According to production for the respective years indicated, the counties producing 100,000 tons and over have ranked as follows:

1893.	1894.	1895.	1896.
1. Hopkins.	1. Hopkins.	1. Hopkins.	1. Hopkins.
2. Whitley.	2. Whitley.	2. Whitley.	2. Whitley.
3. Ohio.	3. Ohio.	3. Ohio.	3. Ohio.
4. Muhlenberg.	4. Muhlenberg.	4. Muhlenberg.	4. Laurel.
5. Laurel.	5. Laurel.	5. Laurel.	5. Muhlenberg.
6. Knox.	6. Union.	6. Knox.	6. Knox.
7. Boyd.	7. Boyd.	7. Boyd.	7. Carter.
8. Carter.		8. Carter.	8. Boyd.
9. Union.		9. Union.	9. Henderson.
10. Henderson.			10. Union.

The table following shows the production of each county, the disposition of the product, and the number of kegs of powder consumed.

The table next succeeding shows the gains and losses in production of each county, compared with the returns for 1895.

OUTPUT BY COUNTIES AND CONSUMPTION OF POWDER.
PRODUCT REPORTED IN SHORT TONS.
CALENDAR YEAR, 1896.

County.	Companies	Loaded at Mines for Shipment.	Sold Locally and to Employes.	Used for Fuel at Mines.	Made into Coke at Originating Mines.	Total Tonnage.	Kegs of Powder.
Bell	6	69,098.75	3,412.00	757.00	16,271.21	89,533.96	.....
Boyd	21	118,439.00	1,568.00	1,000.00	.....	121,002.00	.....
Butler	2	22,097.56	5,206.36	1,200.00	.....	28,413.92	.....
Breathitt	1	2,357.77	.....	50.00	.....	2,407.77	.....
Carter	46	135,439.75	280.25	346.00	.....	136,066.00	.....
Christian	1	12,177.68	356.00	590.00	.....	13,123.68	.....
Davess	1	807.24	2,413.00	12.00	.....	3,292.24	.....
Greene	1	851.00	.....	.....	.....	851.00	.....
Hancock	3	16,801.60	800.00	240.00	.....	17,841.60	.....
Henderson	8	92,417.25	23,741.80	3,380.60	.....	119,539.65	.....
Hopkins	9	710,739.40	24,609.65	15,832.90	25,080.00	777,181.95	.....
Johnson	2	6,762.40	.....	.....	.....	6,762.40	.....
Knox	5	211,175.88	1,874.00	3,990.00	.....	217,039.88	.....
Laurel	13	285,724.10	1,330.81	1,439.05	.....	288,493.96	.....
Lawrence	1	43,097.00	477.00	3,900.00	.....	47,474.00	.....
Lee	3	9,697.82	100.00	50.00	.....	9,847.82	.....
McLean	3	22,221.96	668.00	1,186.00	.....	24,075.96	.....
Muhlenberg	48	217,331.07	4,818.72	4,118.40	.....	226,268.19	.....
Ohio	67	353,866.88	6,158.12	8,063.44	.....	368,094.44	.....
Putaski	5	71,414.12	289.00	834.00	.....	72,537.12	.....
Union	6	88,811.62	9,594.72	2,687.00	3,628.00	101,121.34	.....
Webster	4	89,273.44	10,031.52	1,231.00	.....	100,535.96	.....
Whitley	10	420,296.42	4,150.25	4,534.00	.....	429,980.67	.....
Total	102	2,980,355.16	101,897.20	55,447.39	46,779.21	3,183,478.96	.....

a. One of these Companies also operates in Boyd. b. One of these Companies also operates in Ohio. The total for the State is, therefore, 102 instead of 101. *Total Hopkins county coal converted into coke amounted to 10,441 tons. †Total coal converted into coke amounted to 60,240.21 tons.

GAINS AND LOSSES BY COUNTIES—1896.
IN SHORT TONS.

COUNTY.	1895		1896		Gains for 1896.	Loss for 1896.
	Mines.	Tons.	Mines.	Tons.		
Bell	4	79,373.94	6	89,533.96	10,160.02	20,166.91
Boyd	1	141,188.91	2	121,022.00	3,942.56	20,166.91
Butler	2	21,501.36	2	28,443.92	2,405.77	2,405.77
Brethitt	9	131,222.08	12	136,066.00	4,783.02	9,035.60
Carter	1	22,153.28	2	13,123.68	9,655.84	9,655.84
Christian	2	12,898.08	1	8,232.24	549.18	549.18
Davies	1	1,403.18	1	854.00	12,727.36	12,727.36
Greenup	2	30,568.96	3	17,841.60	40,426.52	11,254.57
Hancock	6	79,113.13	6	119,539.65	3,916.50	3,916.50
Henderson	15	788,436.52	14	777,181.95	31,305.19	8,439.00
Hopkins	3	10,678.90	2	6,762.40	54,855.91	33,465.49
Johnson	3	185,734.64	7	217,039.83	2,241.96	11,084.83
Knox	2	55,913.00	2	47,474.00	18,808.11	8,651.28
Lawrence	19	233,638.05	17	288,493.96	4,474.72	4,474.72
Laurel	6	43,312.81	6	9,847.32	3,505.82	3,505.82
Lee	3	21,834.00	3	24,075.96	643.24	26,322.15
McLean	8	267,353.02	8	256,268.19	154,270.01	178,561.54
Muhlenberg	9	386,902.55	9	368,094.44	104,121.34	50,538.96
Ohio	12	81,138.40	8	72,537.12	428,980.67	428,980.67
Pulaski	1	4,474.72	0	104,121.34	3,505.82	3,505.82
Rockcastle	1	100,615.52	7	50,538.96	643.24	26,322.15
Union	6	49,895.72	4	428,980.67	154,270.01	178,561.54
Webster	4	456,302.82	25	428,980.67	154,270.01	178,561.54
Whitley	19	456,302.82	25	428,980.67	154,270.01	178,561.54
Totals	138	8,207,770.49	148	8,133,478.96	154,270.01	178,561.54

THE CANNEL MINES.

The output of the cannell mines for 1896 which has been included in all tables given on preceding pages, was less than that for 1895 by 15,086.22 tons.

The following table shows the output by counties:

OUTPUT OF CANNEL FOR 1896.

COUNTY.	Companies.	Tonnage.
Bell	2	33,978.15
Carter	1	3,495.80
Greenup	1	854.00
Hancock	1	3,426.80
Johnson	2	6,762.40
Whitley	1	6,143.65
Total	8	54,660.80

Carter, Greenup, and Johnson counties lie within the Northeastern District. The combined output of the counties, compared with that for 1895 shows a decrement of 12,114.18 tons. Aside from the question of demand for the product, the falling off may be accounted for by the fact that the Stinson mines in Carter were idle all the year; that the Boghead was idle a considerable portion of the time, and that the mines in Johnson have been reduced to mere scrapping ground. As stated elsewhere, the Sandy River mine, at Myrtle, was abandoned, as exhausted, in October, and the White House is in the last stages of exhaustion. With a fairly good demand in 1897, the opening of new mines in Johnson and resumption of work at the Stinson mines in Carter should result in a considerable increase of the cannell output during the coming year.

The output of the Southeastern District (Bell and Whitley counties) was less than that for 1895 by 6,398.84 tons. There were no special reasons for the decrease apart from the course of business and the interruption of mining from various local causes.

SUMMARY OF COAL PRODUCTION BY YEARS.

The following table exhibits the output of the commercial mines for a series of years. For years preceding 1888 the amounts are only approximately correct, there having been no statutory provision requiring returns to be made by the operators prior to that year. Since 1888 much care has been taken to obtain complete returns, and the figures may be accepted with confidence.

FOR CALENDAR YEARS.

YEAR.	Bituminous.	Cannel.	Total Product.
1884	1,550,000	.....	1,550,000
1885	1,600,000	.....	1,600,000
1886	1,650,000	.....	1,650,000
1887	1,933,185	.....	1,933,185
1888	2,342,058	42,835	2,384,893
1889	2,205,434	40,825	2,246,259
1890	2,423,144	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

SHIPMENTS TO LOUISVILLE.

There was a loss in tonnage of commercial coal* sent from Kentucky mines to the Louisville market in 1896, amounting to 49,157 tons. In view of the prevailing depression in all business, a decrement was to be expected. The loss was in the amount brought from the Western Field, and there can be little question that it consisted most largely, if not altogether, of steam fuel. There was an in-

*This is the tonnage left after deducting coal carried by the railroad companies for their own use.

crease of 49,071 tons in the amount brought from the Southeastern District, most of which, doubtless, was domestic coal.

The following table, showing the tonnage brought to this market, was compiled from figures kindly furnished by S. R. Knott, Esq., First Vice President of the Louisville & Nashville Railroad; J. C. Welling, Esq., Vice President of the Illinois Central Railroad; and Geo. H. Lamkin, Esq., Auditor of the Louisville, Henderson & St. Louis Railway.

KENTUCKY COAL TO LOUISVILLE—1896.

COMMERCIAL COAL.

RAILROAD.	S. E. District.	Western District	Total Tons.
L. & N.	179,747	.....	179,747
Illinois Central (a) . . . . .	.....	262,410	262,410
L. H. & St. Louis (b) . . . . .	.....	30,931	30,930
Totals	179,747	293,341	473,088

(a.) The division formerly known as the Chesapeake, Ohio & Southwestern.

(b.) Formerly known as the Louisville, St. Louis & Texas.

Of the tonnage brought from the Southeastern District by the L. & N. railroad, 29,381 tons consisted of "Jellico" coal.

The L. & N. railroad also carried a small amount of Kentucky coke to Louisville; namely, 440 tons from the Earlington ovens and 16 tons from Pineville.

OUTWARD SHIPMENT AND HOME CONSUMPTION.

About 33 per cent. of the total product of our mines (cannel and bituminous) for 1896 was shipped to other States. Two companies, known to make outward shipments, failed to report the amounts so shipped by them, on the ground that they "kept no record." The aggregate of shipments from other mines was 1,035,086 tons, which was somewhat more than 32½ per cent. of the total product.

Following were the shipments reported according to districts:

Western District, tons	761,685
Southeastern District, tons	250,062
Northeastern District, tons	25,339

Total tons 1,037,086

The shipments of bituminous coal alone to other States amounted to about 993,903 tons, with reports from two mines missing. This was nearly 32 per cent of the bituminous product. Deducting the amount shipped to other States from the total product for 1896, we have 2,148,392 tons left as the amount consumed within the State.

A study of the statistics relating to outward shipments and coal consumed within the State for the last five years reveals the fact that there has been comparatively little gain in the home consumption of the product of our mines within that period. Neither has there been much of a gain in the total production within that time. But companies and mines have continuously increased. It is not probable that the total consumption of coal within the State has increased in any greater ratio than has the consumption of the home product. Under the circumstances, the sharp competition and consequent demoralization of prices is readily accounted for. To insure prosperity to our mining interests, Kentucky needs more manufacturing and other industrial plants.

The following tables show the annual outward shipments and home consumption of Kentucky coals for the past five years:

OUTWARD SHIPMENTS BY YEARS.

In Short Tons.

YEAR.	Western District.	S. E. District.	N. E. District.	Total Tons.
1892	695,134	168,567	91,356	955,057
1893 ^a	540,596	145,001	76,412	762,009
1894	694,141	184,557	119,680	1,000,378
1895	663,595	248,418	34,729	946,742
1896	761,685	250,062	25,339	1,037,086

(a.) In the Western District, 3,600 tons were estimated. In the Southeastern District, 75,615 tons were estimated.

The considerable decline in the Northeastern District is in part due to the decline in output of cannel within the last two years.

HOME CONSUMPTION OF KENTUCKY PRODUCT.

In Short Tons.

YEAR.	Western District.	S. E. District.	N. E. District	Total Tons.
1892	1,039,515	671,347	361,385	2,072,247
1893	1,259,196	926,470	354,575	2,540,241
1894	1,110,825	614,247	231,745	1,956,817
1895	1,120,683	791,294	349,050	2,261,027
1896	1,000,776	846,524	299,092	2,146,392

The shipments to other States for 1896, including both bituminous and cannel product, were made from the following counties:

COUNTY.	Tons.
Bell	30,872
Boyd (including one Carter County mine)	5,683
Carter	4,610
Christian. "No record."	
Hancock	1,765
Henderson	29,665
Hopkins	430,341
Johnson	5,556
Knox	2,000
Laurel	1,631
Lawrence	9,490
McLean	15,511
Muhlenberg	141,686
Ohio	98,196
Pulaski	1,888
Union	8,049
Webster	36,472
Whitley	213,671
Total shipped	1,037,086

PRODUCTION OF COKE

There was a small increase in the tonnage of coke made, the increment being attributable to an increase of production in Bell and Union counties.

The total amount of coal converted into coke was 60,240.21 tons. Of this, 45,779.21 tons were produced by mines operated by companies making coke, leaving 14,461 tons as the amount purchased from other companies and included by them in their reports of tonnage shipped. All purchased coal was from Hopkins county mines.

Following is a statement of the tonnage of coke made:

COKE MADE IN 1896.

COMPANY.	County.	Ovens.	Tons.
St. Bernard Coal Co	Hopkins . . .	104	17,971.40
Ohio Valley C. & M. Co	Union . . .	10	1,804.85
Pineville C. & C. Co	Bell	100	7,392.22
Totals		214	27,168.47

The following table shows the production of Kentucky coke from the establishment of the industry.

YEAR.	Western Field.	Eastern Field.	Totals Tons.
1887 ^a	4,000.00		4,000.00
1888 ^b	9,054.50		9,054.50
1889 ^c	7,447.81	1,892.25	9,340.00
1890	11,186.00	9,574.00	20,710.00
1891	22,166.80	10,527.00	32,693.80
1892	31,455.95	5,404.25	36,860.20
1893	34,813.65	11,334.10	46,147.75
1894 ^d	27,715.00		27,715.00
1895	25,261.11	197.85	25,458.96
1896	19,776.25	7,392.22	27,168.47
Totals . .	192,827.07	46,372.49	239,148.74

(a.) Made at the Clifton ovens, in Hopkins county.

(b.) Clifton ovens produced 2,500 tons; the remainder was made at the Earlington ovens of the St. Bernard Coal Company.

(c.) Clifton ovens idle. All coke in the Western Field was made at the Earlington ovens, from this year down to 1894.

(d.) The Ohio Valley Coal and Mining Company commenced producing coke at De Koven, in Union county. Its output was 1,707 tons. Remainder of the coke was made at the Earlington ovens.

TIME WORKED AND EMPLOYES.

There are from 11,000 to 12,000 mining operatives in the commercial districts of this State. During the past year the maximum number at work was 9,852 and the average number was 7,550. Compared with 1895, there was a decrease of 315 in the average number. The average number in 1895 represented nearly 74 per cent. of the maximum number; in 1896 the percentage rose to a fraction more than 76½.

The summer season of 1896 was the dulllest ever known to the mining industry in Kentucky, and yet the average number of days worked per mine during the year was 146½—a fraction more than in 1895.

The decrease in number of persons employed was in part due to the dull season, and the higher average number of days worked is largely accounted for by the smaller number of persons employed. At a number of the most important mines, the number of days worked fell much below the average.

The following tables exhibit the number of persons employed at the mines and the number of days worked during the year, reported according to counties:

REPORT OF INSPECTOR OF MINES.

COUNTY.	Number of Companies . . .	Number of Mines	MAXIMUM EMPLOYES.				AVERAGE EMPLOYES.				TOTAL EMPLOYES.		DAYS WORKED.	
			Inside.				Outside				Maximum	Average	Operations Reported Separately	Total Number of Days,
			Diggers	Day Hands . .	Boys	Outside								
Butler		2	69	16	6	17	56	13	108	86	2	188		
Christian		1	38	26	2	10	28	4	76	56	1	95		
Davies		1	5	1	2	2	4	1	8	6	1	85		
Hancock		8	97	25	4	13	72	14	139	99	3	187½		
Henderson		6	211	57	14	59	174	45	341	268	6	152		
Hopkins		14	511	706	70	243	399	628	1,530	1,292	11	124		
McLeen		3	54	10	7	11	38	7	82	59	3	124		
Muhlenberg		8	549	121	18	77	409	88	765	569	8	125		
Ohio		9	341	421	48	129	285	347	939	721	8	157		
Union		7	180	102	8	95	122	59	385	245	6	139		
Webster		4	97	17	6	20	69	16	140	108	4	124		
Western District		59	2,152	1,502	183	676	1,606	1,236	4,513	3,509	53	7,642		

REPORT OF INSPECTOR OF MINES.

(a). The "Clinton" mine (new) is omitted. Including that one, there are 26 mines in the district. NOTE.—In the column for "Day Hands" are included men, women, and children.

NOTE.—In the column for "Day Hands" are included nearly all the mining machine men employed in the Western and Southeastern Districts.

SUMMARY OF EMPLOYES, ETC.

Following are summaries of the details given in the foregoing table:

SUMMARY OF MAXIMUM EMPLOYES.

DISTRICT.	INSIDE.			Outside.	Total.
	Diggers.	Day Hands.	Boys.		
Western . . .	2,152	1,502	183	676	4,513
Southeastern .	2,576	726	176	559	4,037
Northeastern .	987	164	46	155	1,302
Totals . .	5,665	2,392	405	1,390	9,852

SUMMARY OF AVERAGE EMPLOYES.

DISTRICT.	INSIDE.			Outside.	Total.
	Diggers.	Day Hands.	Boys.		
Western . . .	1,606	1,236	138	529	3,509
Southeastern .	1,990	598	132	366	3,086
Northeastern .	706	125	32	92	955
Totals . .	4,302	1,959	302	987	7,550

SUMMARY OF DAYS WORKED.

DISTRICT.	Operations Reported Separately	Total Days Worked.	Average Days Per Mine.
Western	53	7,646	144.2
Southeastern	40	5,608	140.2
Northeastern	15	2,573	191.5
For State	108	15,827	146.5

ANIMALS EMPLOYED.

The following table exhibits the average number of animals employed at the mines during the calendar year 1896:

COUNTY.	ANIMALS.		Total.
	Inside.	Outside.	
Butler	8	3	11
Christian	7	4	11
Daviess	1	1	2
Hancock	10	3	13
Henderson	25	2	27
Hopkins	177	89	266
McLean	8	4	12
Muhlenberg	57	8	65
Ohio	78	37	115
Union	24	11	35
Webster	12	5	17
For Western District	407	167	574
Bell	20	11	31
Knox	26	14	40
Laurel	55	18	73
Pulaski	20	16	36
Whitley	102	40	142
For Southeastern District	223	99	322
Boyd	30	3	33
Breathitt	1	1	2
Carter	31	10	41
Greenup	?	?	?
Johnson	1	2	3
Lawrence	8	4	12
Lee	9	2	11
For Northeastern District	80	18	98

IV. ACCIDENTS.

Having to base conclusions on the usually brief reports that are made, it is not always easy to classify those accidents that are not serious—to distinguish the merely minor injuries from those that are of sufficient importance to record. In the following list, classification is based upon the rule set forth in the report for 1895, as follows: Serious non-fatal accidents are those in which an eye is destroyed, a bone is broken, or the person so badly injured as to be disabled and confined to bed for a considerable period; those which, though painful at the time, do not cripple and do not leave lasting effects may be classed as not serious. Minor accidents are such as cuts, mashed fingers and similar injuries that either do not cause any loss of time, or, if so, only for a few days.

During 1896 there were seventy-one noteworthy accidents, six of them fatal, in and about the mines under supervision. Sixty-six occurred under ground, five of them being fatal.

Following is a summary of the accidents, grouped according to causes:

CAUSE.	FATAL.		NON-FATAL SERIOUS.		NOT SERIOUS.		Totals.	
	In.	Out.	In.	Out.	In.	Out.	In.	Out.
Fall of Top	4	...	5	...	15	...	24	...
Fall of Coal	...	...	...	...	12	...	12	...
Cars	...	...	4	...	5	...	9	...
On Incline	...	1	...	...	...	...	...	1
Picking Missed Shot . .	1	...	...	...	1	...	2	...
Premature Blast	...	...	1	...	3	...	4	...
Comb. of Powder Smoke, . . .	...	...	1	...	...	...	1	...
Riding on Trip	...	...	1	...	...	...	1	...
Mining Machine	...	...	1	...	2	...	3	...
Playing with Car	...	...	1	...	...	...	1	...
Around Tipple	...	...	...	2	...	...	...	2
Water Box	...	...	1	...	...	...	1	...
Moving Loaded Car	...	...	1	...	...	...	1	...
Caught Between Cars . .	...	...	1	...	...	1	1	1
Mule Kick	...	...	...	...	1	...	1	...
Fell from Car	...	...	...	...	1	...	1	...
Air Pipe	...	...	...	...	1	...	1	...
In Break-through	...	...	...	...	1	...	1	...
Putting Car on Track . . .	...	...	...	...	1	...	1	...
Caught by Loose Cross-bar, . .	...	...	...	...	1	...	1	...
Struck by lump falling coal, . .	...	...	...	...	...	1	...	1
Totals	5	1	17	2	44	2	66	5

The fatalities occurred at the following mines:

	In.	Out.	CAUSE.
West Pineville		1	{ Found dead on incline. Supposed to have been riding a horse, which jumped track.
Diamond (Hopkins)	1		Picking missed shot. Powder burn.
North Jellico	1		Found dead in room on idle day. Draw-slate.
Manchester	1		Top loosened by shot. Badly directed hole.
Dowlis	1		{ Top. Had fired 2 shots. Returned to fire a third. Loosened horse-back fell.
Proctor	1		{ Slate. Had fired shot. Props knocked out. Returned before top had settled.
Totals	5	1	

It will be observed that at least two of the four fatalities from falls of top were attributable to returning too soon to places where shots had just been fired, and not to neglect of the roof. All fatalities from falls of roof occurred in the Southeastern District.

The inside fatalities according to districts were as follows:

Western	1
Southeastern	4
Total	5
Tons of product raised per death from roof fall, all Districts	795,869
Tons raised per death from roof fall in Southeastern District	274,146

In the following lists descriptions are based on statements made in the monthly reports of the company reporting.

BELL COUNTY.

Mary Hull Mine, of the Log Mountain Coal, Coke & Timber Co.—William Campbell, a boy. Kicked by a mule, January 28th. Not serious. (It is presumed that this accident occurred in bank. It may have occurred outside, and the injury may really have been a minor one.)

2.—Henry Meyer, a miner; an adult. Head badly but not seriously cut by a fall of breast coal, February 11th.

Straight Creek A Mine, of the Pineville Coal & Coke Co.—Richard Allen, a miner; an adult. Hands crushed by fall of coal, while mining, January 18th. Presumed to be not serious.

2. William Vaughan, a miner. Piece of slate fell on one of his hands, March 11th. Presumed to be not serious.

3. A. Dunman, a miner. While mining in a cut a piece of draw-slate fell on him, November 25th. Lost two weeks.

4. John Arnett, a driver. Bank car ran over his foot, November 30th. Lost one week.

West Pineville Mine, of the Breckinridge & Pineville Syndicate.—Henry Turnbull, a miner; an adult. While riding out of mine on loaded car was caught between car and roof. Struck shoulder and back was injured. Seriously hurt. April 22d.

2. William Hall (colored), a miner; an adult. Found dead on the incline, December 30th. Coroner's jury decided that he met death by accident while riding a "horse" down the incline. Skull was fractured. Single.

CARTER COUNTY.

Mt. Savage Mines, of the Lexington and Carter County Mining Co.—William Coy and James McCoy were hurt by a fall of slate, January 17th. They had fired a shot the night before which knocked out the props. They commenced work on the 17th without putting up posts, and slate fell on them. In neither case were the injuries serious, though at the time those of William Coy were supposed to be so.

2. John Marcum, a miner. Injured in September by failing to get away from his blast in time. Not serious.

3. John Marcum, a track-layer. Hurt by a piece of falling slate while pulling iron out of a room, the pillars of which had been drawn, December 19th. Not serious. Lost four days.

HENDERSON COUNTY.

Baskett Mine, of the Pittsburgh Coal Co.—Mike Jackson, a driver. Fell from car. Was cut about face and neck, and side bruised, by car running up on him. August 14th. Not serious. Lost ten days.

HOPKINS COUNTY.

Carbondale Mine, of the Carbondale Coal and Coke Co., Booth & Glover, Lessees.—C. R. Lewis, a miner. Struck on head by piece of top coal November 6th. Scalp wound. Not serious. Lost eight days.

2. John Penticost, a driver; an adult. Little finger cut off by being caught between car and prop, December 10th. Lost twenty-eight days.

Co-operative Mine, of the Co-operative Mining and Manufacturing Co.—Thos. Davis, a miner; an adult. Foot mashed by coal, September 10th. Not serious. Lost about ten days.

Diamond Mine, of the St. Bernard Coal Co.—Green Bailey (colored), a miner; an adult. Fatally injured in September. Was picking out a missed shot. The powder was ignited and he was so badly burned that he lived but three days. (Married or single not stated.)

2. Monroe Hobson (colored), a driver. Hand was injured by being caught between brake and rib, December 10th. (Presumed not to be serious.)

Eurlington No. 9 and No. 11 Mines, of the St. Bernard Coal Co.—Bud McGregor, a miner. Injured by flying dirt, caused by the bursting of an air-pipe, May 23d. Lost ten days. Apparently not serious.

2. F. D. Purcel, a loader. Foot bruised by fall of top, in August. Lost eight days.

3. Marion Hays (colored), a shooter. Hurt by fall of coal in September. Not serious.

4. Riley Williams (colored), machine runner. Frightened by a small fall of slate. Dropped behind his machine, which kicked back and regulating screw cut him in the mouth, November 18th. Lost seven weeks. (Though certainly painful and causing much loss of time, this accident would doubtless fall into the not serious class.)

5. John Dunlap (colored), a boy. Fell between cars and foot was hurt, November 21st. Off twenty days.

6. Hiram Bivens, a miner. Was hurt by another miner shooting a break-through too soon after notifying Bivens he would hold his fire until Bivens was ready, November 11th. Leg bruised, but not seriously.

7. J. W. Hansbro, a loader. Hand mashed. Was putting a car on track when driver carelessly hitched mule to car and started without notice. December 16th.

Monarch No. 9 Mine, of the Monarch Coal Co.—Peter Schwartz, a miner. Lump of coal fell on foot in February. Lost one week.

Reinecke No. 11 Mine, of the Reinecke Coal Co.—John Kennedy (colored), machine helper; an adult. Foot cut by machine, February 11th. Slight injury.

2. Eugene Garrett (colored), machine helper; an adult. Got hand caught in chain of mining machine, and ends of two fingers were cut off. September 18th.

St. Charles Mines, of the St. Bernard Coal Co.—Thos. Wright, a loader. In July was knocked down by a loose cross-bar—a supporting post of the latter having been knocked loose by a derailed car. Glass oil bottle broke and cut him badly but not seriously.

2. Charles Cruse, slack shoveler; a boy. Head bruised by fall of coal. Off six days, September 26th.

3. Joseph Bartlett, a water-bailer; a boy. Large bone of left arm broken by being caught between car and rib. "Carelessness on the boy's part, as he was playing with the car." March 14th.

KNOX COUNTY.

North Jellico Mines, of the North Jellico Coal Co.—H. H. Mullins, a miner; an adult. Injured by fall of slate January 25th. Not serious. Renewed work February 26th.

2. C. D. Shipley, a miner; an adult. Leg broken by fall of draw-slate March 11th.

3. James Mullins, tippie hand. Run over by gondola while the car was being dropped under the tippie. Badly injured about hips and head. April 7th. (In report for the month it is stated: "Has recovered sufficiently to be able to walk around.")

4. W. C. Holloway. Leg broken in June. Was at the tippie and got in way of an empty mine car.

5. Jerry Adkins, a loader. Was found dead in his working-place in bank at 4 p. m., on August 29th, with large block of draw-slate on top of him. Mine was not running that day and he had gone in alone to pull a shot of coal down. Left a widow and three children.

6. S. Ward, a miner; an adult. Leg broken by small fall of draw-slate, October 9th.

Whitsett Mine, of the East Jellico Coal Co.—William Johnson, a track-layer; an adult. Squeezed by being caught between mine car and timber, January 23d. Able to be out of bed in a week.

LAUREL COUNTY.

Daisy Mine, of the Daisy Coal Co.—Thos. Williams, a miner; an adult. Hurt by fall of draw-slate about December 15th. No bones broken.

2. Robert Williams. Ankle bruised or strained, about December 20th, by a fall of slate and coal.

Manchester Mine, of the Manchester Coal Co.—Hamilton Rice, a youth of 17. Neck broken October 8th, by fall of slate in a room, about 9 feet back from the face. Was working with his father at the time as a loader. (I examined the place October 15th. After it had been driven the usual width for 41 feet in from the entry, the room had been narrowed down to about 10 feet, and at the time of the accident had been carried the latter width for about 48 feet. At a point about 9 or 10 feet back from the face a slip occurred in the roof, proceeding from the right-hand rib and making in a slightly meandering way toward the left-hand corner of the room. In the course of driving the room a shot-hole had been drilled on the right-hand rib just beyond the slip. The hole was directed upward and penetrated the slate for about four inches, as could be plainly seen. The shot, of course, shook up the slate, and every shot subsequently fired contributed to the further loosening of the shale, until it finally gave way at the slip and peeled off toward the face—a somewhat triangular block thus falling on the unfortunate boy. The penetration of the drill-hole into the slate, in close proximity to the slip, undoubtedly had much to do with causing the fall. Whether the slate had given any warning, or whether it had been recognized as unsafe, could not be learned, the bank boss, who was with me, professing no information on those matters, and the boy's father not being at hand.—C. J. N.)

Victoria Mines, of the Victoria Coal Co.—J. B. Brace was bruised about the legs by fall of piece of top, while working in air-course, in July. No serious injury. (This may really have been a minor accident, but the report is too indefinite to determine.)

Star Mine, of the Star Coal Co.—Alexander Toby, a miner; an adult. Middle finger of right hand mashed by piece of coal falling on it, August 15th. Off work one month, but injury not serious.

McLEAN COUNTY.

Island Mine, of the Island Coal Co.—John McClelland, a miner; an adult. Leg bruised by fall of coal, February 24th. Not serious. (This may have been only a minor injury, but the report is too indefinite to determine.)

(Minor accidents to Brice Estin, who lost 4 days from being bruised by fall of coal, March 26th; and to Albert Estin, who lost 6 days in consequence of bank-car running over one of his feet, March 27th, were reported from this mine.)

MUHLENBERG COUNTY.

Central Mine, of the Central Coal and Iron Co.—James Vincent, a miner; an adult. Ankle sprained and leg bruised (presumably by fall of coal) while mining a standing shot, January 7th. Apparently not serious.

2. Charles Anderson, a miner; an adult. Hip and leg bruised (presumably by fall of coal), while mining a standing shot, January 9th. Apparently not serious.

3. T. C. Morris, a miner; an adult. Legs and ankles hurt by fall of coal when undermining a standing shot without setting sprags. Off work three or four weeks.

4. James House, a miner; a boy. Face and hands burnt by discharge of blast before he had gotten out of the way, November 13th. Soon recovered.

5. S. House, a miner; an adult. Injured in same manner and at same time and place as preceding. Soon recovered.

6. Joseph Nichols, a boy. Was pushing empty cars. Leg was caught between bumpers and was broken between ankle and knee, December 11th. Got well.

Hillside Mine, of the Hillside Coal Co.—John Wilkie, a miner; an adult. Injured January 28th. Report made was as follows: "Shot went off before he got out of the way. Coal struck him on the head. I think he will get over the hurt." From the last remark it is presumed that the injury was serious.

Mud River Mine, of the Mud River Coal, Coke and Iron Co.—Philip Smith, a miner; an adult. Hips hurt by fall of slate, November 18th. Not serious.

OHIO COUNTY.

Fordsville Block Coal Mine, of the Fordsville Block Coal Co.—James Fords (colored), a miner. Hips injured by fall of slate in October. Off work about three weeks.

McHenry Mine, of McHenry Coal Co.—Three minor accidents were reported from this mine as occurring to Daniel Kelly, a driver, ("sprained" ankle); Charles Corley, slack man, ("sprained" wrist); Thomas Austin, car-pusher, (mashed finger).

Render Mine, of Central Coal and Iron Co.—W. M. Everly, shooter; an adult. Trying to drill out an old standing shot. Powder exploded and burnt him. November 8th. Idle about ten days.

2. Henry Smith, cager at the tippie hoist (outside); an adult. Caught between bank-cars and bruised, December 4th. Idle only a few days.

3. John McMillen, a driver; an adult. Caught between cars and coal and bruised, December 12th. Idle a short time.

4. Thomas Watkins, cager at tippie-hoist; an adult. Struck on head by small lump of coal falling from the tower. Idle three days.

Taylor Mine, of the Taylor Coal Co.—Will Barrass, a driver; youth of 19. Jammed between roof timbers and water-box, March 27th. Back strained and muscles torn loose on back. Statement in the report: "Improving now rapidly. Will likely be off work three to six months."

PULASKI COUNTY.

Enterprise Mines, of the Enterprise Coal Co.—R. McAdoo, a miner. Small bone of leg broken by fall of slate, while driving entry, March 5th.

Indian Creek Mines, at the time leased by the Kentucky Coal Co., R. L. Bruner, Receiver.—William Heath, a miner; an adult. Injured by fall of rock over the road at face of room, September 30th. Statement of Company: "Caused by his negligence in not properly

propping it until his loose coal could be loaded out. Will lose two or three weeks' labor."

UNION COUNTY.

De Koven Mine, of the Ohio Valley Coal and Mining Co.—P. F. Vaughn, furnace-tender; a man. Legs broken by cars descending slope, December 22d. The report is as follows: "Was standing in slope and thought the cars going down were going to turn to east side of 1st Level. Saw they were going on down the slope and ran in ahead of them, to open door on slope, when cars struck him and broke both his legs. . . . Getting along nicely and should recover."

WEBSTER COUNTY.

Sebree Mine, of the Sebree Coal Co.—William Lee, cager; an adult. Bruised about the hips by fall of slate, May 23d. Not serious.

2. Walter Bell, day-hand. While moving a loaded car, December 11th, elbow struck a pillar. The car being "in motion against his hand," arm was broken.

WHITLEY COUNTY.

Birdeye-Jellico No. 3. Mine, of the Birdeye-Jellico Coal Co.—Robert Alexander, a miner; an adult. Head cut and hip bruised by a premature blast, May 12th. Not serious.

Central Jellico Mine, of the Central Jellico Coal Co.—H. B. Heart, a miner; an adult. Hip injured by falling rock, December 23d. Not serious. Stated in report, "Will be up in a few days."

Douglas Mine, of the East Tennessee Coal Co.—Richard Blanche, helper in an entry; an adult. Killed by fall of slate, May 13th. Single. Following is the report made by the General Manager, at the time of accident: "The deceased was working in an entry with A. C. Goynes as a helper. They had three shots to fire in the coal about noon; two of them went off, one missed fire. They went back to fire the one that had missed in about ten minutes after the other shots had gone off, and had not been there long before a large slate (horse-back), that was over the coal they had just shot out, fell on them, killing Blanche instantly, but not in any way injuring Goynes, although his body was caught under the slate."

Kensee Mine, of the Hywel Davies Coal Co.—John Murphy, a driver; an adult. Foot run over by bank-car and “sprained,” January 9th. Not serious.

2. Matthew Cook, miner; an adult. Injured by fall of slate January 10th. Not serious.

3. Homer Green, a driver. Toe severed by bank-car, January 18th.

4. William Hartnett, a miner; youth of 16. Leg broken by fall of slate, in room, January 17th. Following is the report of the accident, signed by the Superintendent, Wm. Jones; Bank-boss, Jack Burns; and Bank Committee, Frank Spinner and John Mullan: “We, the undersigned, examined the room No. 8 on No. 2 Left entry, New Mines, where William Hartnett, age 16 years, miner, was working on a pillar, and with his brother Tim Hartnett, Jr., aged 24 years, and met with an accident on January 17th, 1896, by fall of slate, catching the left leg of said William Hartnett, breaking it below the knee; and we report as follows: We found prop No. 1 eight feet from the face; No. 2, 9 feet from the face; No. 3, nine feet from the face; No. 4, four feet six inches from the face. Also found twelve props in the room not set. Size of rock, 12 feet long, four feet wide, tapering to two feet. Thickest part 20 inches.” In May the young man was getting about without crutches.

5. Dan Spears, track-layer; an adult. Burned by ignition of “powder smoke,” while firing a shot for a miner in a room-neck, November 17th. The entry was filled with smoke from shots that had already been fired, and his shot set fire to it. He had crossed to another entry before his shot went off, but the flame followed him. Following is the surgeon’s report under date of November 21st: “Right arm and shoulder severely burned. Hand less severely. Left arm, back, large surface burned, but superficial. It does not seem to have extended beyond the skin in any part. Face and neck burned superficially. Patient resting well. Have just found on second dressing, symptoms favorable for recovery without loss of motion in fingers or elbow joints.” In December advice was received that Mr. Spears was able to resume work.

Procter Mine, of the Procter Coal Co.—Michael Burns, a miner; an adult. Fatally injured by fall of slate at face of room, February 5th. Had fired a shot which knocked out props. Returned too soon before top had settled, and was caught by falling slate. Unmarried.

V.

STRIKES.

There was no serious, prolonged strike in any of the districts during 1896. Most of those that occurred were in the Western District, and were either against a reduction from the long established mining rates, or for the usual winter advance. Strikes against a reduction of the usual summer rate of 62½ cents to 50 cents were won; but those for the usual October advance to 75 cents failed as to specific demand, but were settled by compromise—usually based on “store concessions.”

Disregarding minor strikes, lasting only two or three days, strikes occurred at the following mines:

1. *Aetna Colliery*, Ohio County.—A strike occurred April 1st against a proposed reduction from the usual summer rate of 62½ cents to 50 cents per ton. Lasted thirty days. Miners won.

2. A second strike occurred November 1st, for an advance to the usual winter rate of 75 cents. Lasted 14 days. Settled on the 62½ cents rate. It is understood that concessions were granted.

2. *Barren Fork Mine*, Pulaski county.—A strike lasting 13 days occurred January 1st. Disagreement as to cleaning coal. Settled by allowing the men 5 cents per ton extra for coal having a band up to 5 inches in thickness, and 8 cents per ton extra for coal carrying a band from 5 inches up in thickness. On said basis the mining rates stood: For clean coal, 72 cents; for coal carrying a band up to 5 inches, 77 cents; for coal carrying a thicker band, 80 cents per ton.

3. *Breckenridge Mines*, Hancock county.—On April 2d the men went out in consequence of company’s refusal to discharge its weighmaster. Strike lasted 39 days. “Weighmaster was retained; the men employing a check-weighman, as provided by law, which check-weighman, however, they soon dispensed with.”

4. *Cumberland Mine*, Union county.—A strike of eight days oc-

curred, beginning December 1st. Based on a demand for an established pay-day, and for the usual winter rate of 75 cents per ton. An established pay-day was conceded but the mining rate was held at 62½ cents.

5. *Carbondale Mine*, Hopkins county.—A strike lasting five days occurred October 1st. Due to refusal to make the usual October advance in mining rate from 62½ cents to 75 cents per ton. Settled by granting minor concessions in prices of merchandise in company's store and retention of the 62½ cents rate.

6. *Diamond Coal Co.'s Mine*, Laurel county.—On May 1st a strike occurred against reduction of mining rate. Lasted one week. Settled by acceding to company's proposition of 50 cents per ton payable in cash every Saturday until September 1st, and 52½ cents per ton from that date to April 1st, 1897.

7. *Cogar Creek Mine*, of Etna Coal Co., Pulaski county.—A strike of 12 days began November 1st. Discharge of blacksmith and hire of another demanded. Won.

8. *Fordsville Block Coal Co.'s Mine*, Ohio county.—The company's statement is: "On February 1st (against) reduction of wages. Terminated in the men going in at the reduction. We didn't have any right-of-way and the owners of the land we were passing over sued us for trespass; and we ran no more until May."

9. *Hillside Mine*, Muhlenberg county.—A strike of short duration occurred about October 1st, for the usual winter advance from 62½ cents to 75 cents per ton. Settled, as understood by the present writer, by granting concessions in store prices and retention of the 62½ cents rate.

10. *Louise Mine of Thompson Coal Co.*, Ohio county.—A strike against reduction of mining rate from 62½ cents to 50 cents per ton occurred April 1st. Lasted 30 days. Won.

2. A second strike occurred November 1st, lasting 15 days. Men demanded usual advance to 75 cents. According to company's report the men lost. It is not improbable that store equivalent concessions were granted by company.

11. *Taylor Mine*, Ohio county.—A strike occurred October 27th. Lasted till November 25th. Company was putting in a new screen.

Disagreement as to mining rate for run of mines coal. The company reports: "Our proposition was to pay 60 per cent of former prices (for screened coal)." . . . After staying out 28 days the men accepted company's proposition and returned to work.

12. *Whitsett Mine*, Knox county.—A strike occurred February 15th. Company reports: "Cause—to organize a labor union. Duration about 15 days. Terminated by men failing to be recognized as an organization."

13. *Williams Mine*, Ohio county.—A strike lasting 15 days occurred October 1st. Due to company's refusal to make the usual advance of 12½ cents per ton for mining. (It is presumed that the strike terminated as under similar circumstances at other mines—i. e., by retention of the 62½ rate with store "concessions.")

MINING SCALES.

Following are the mining scales adopted in the Jellico District for the ending April 30, 1896, and for the year ending April 30, 1897:

JELICO SCALE FOR 1895-'96.

The following scale was agreed to at a joint meeting of operators and miners, held at Jellico on April 30, 1895:

GRADES OF COAL.

There shall be five grades of coal.

No. One—under 2½ ft.

No. Two—2½ ft. to 2 ft. 9 in.

No. Three—2 ft. 9 in. to 3½ ft.

No. Four—3½ ft. to 4½ ft.

No. Five—4½ ft. and over.

PRICES.

The price for No. One shall be 75 cents.

The price for No. Two, 70 cents.

The price for No. Three, 65 cents.

The price for No. Four, 60 cents.

The price for No. Five, 55 cents, per ton of 2,000 lbs. in weigh-box.

The price for No. Five shall only be paid when such coal screens 75 per cent of lump coal in weigh-box.

SCREENS.

Screens shall not exceed 72 superficial feet in area with $1\frac{1}{4}$ inches space between the bars. Pitch of screens to be so regulated from time to time, as the necessity arises, so that the coal will run over them.

MEASUREMENTS.

It is understood that only coal shall be measured and not impurities. The mining seam and sand band shall not be considered impurities if measured.

TRACKS.

The company shall lay all tracks.

CARS.

The company shall handle all cars in rooms; except in robbing back entries the miner shall deliver at a safe place on entries all coal mined in entry stumps, and such coal that be left in pillars for support of entry and airway adjacent to stumps, as directed by mine boss.

But any company to have the right to arrange with its miners to push coal for proper compensation where local conditions make it necessary, and that 5 cents per ton shall be the least price for it when it can be agreed upon between Bank Boss and miners. In case no agreement is made the Bank Committee shall be called in. This clause not to affect more than fifteen men in any mine at any one time.

YARDAGE.

The standard price for slate entries shall be \$2.15 per yard; but when both top and bottom are blasted the price shall be \$2.65 per yard. Rock, or sandstone entries, \$3.05 per yard. The company may blast any or all narrow work if price is not satisfactory. Entries, airways and all narrow work in coal when used for entries or airways shall be $87\frac{1}{2}$ cents per yard; but whenever the slate part-

ing occurs in the coal and no top or bottom is blasted, the price shall be \$1.30 in entries and airways when the slate is loaded out and does not exceed 9 inches; over 9 inches and up to 18 inches in entries and rooms 5 cents per ton extra on the coal shall be paid.

ROOM TURNING.

Turning rooms shall be \$2.00 in High coal.
\$2.25 in Medium coal.
\$2.50 in Low coal.
\$3.75 for double rooms in all coal when ordered.

TIMBER.

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

LABOR.

Ten hours shall constitute a day's work, and all day labor shall be paid for by the hour on the following scale:

	Cents.
Drum man	15 $\frac{1}{4}$ per hr.
Knucklemen	13 " "
Chute	13 " "
Head Trackman	19 $\frac{1}{4}$ " "
Ass't Trackman	15 $\frac{1}{4}$ " "
Drivers, men	15 $\frac{1}{4}$ " "
Drivers, boys	10 $\frac{1}{4}$ " "
Spike Team Drivers	17 $\frac{1}{2}$ " "
Trappers	4 $\frac{1}{2}$ to 5 $\frac{1}{2}$ " "
Oiler	4 $\frac{1}{4}$ to 6 $\frac{1}{2}$ " "
Couplers	11 " "
Furnacemen	13 " "
Pushers, men	15 " "
Pushers, boys	10 " "

RENTS.

All rents shall be same as last year.

HOUSE FUEL.

Lump coal to be \$1.50 per two horse wagon load.

Nut coal \$1.00 per two horse wagon load.

When an employe does not buy coal he shall pay 50 cents per month in the spring and summer and \$1.00 in the fall and winter.

Where the coal is thrown off from R. R. cars the price shall be \$2.00 per month in winter and \$1.00 in spring and fall and 50 cents for summer.

ARBITRATION.

There shall be a board of arbitration and conciliation to adjust all disputes arising under this agreement, composed of three on each side, with power to select an umpire, and their decision shall be final and binding on all parties to this agreement. The board shall consist of the following: J. C. Brooks, P. Francis, John Phillips, on part of operators; and on part of miners, Albert Owens, J. R. Horsfield and G. G. Young. Under no consideration shall work cease until the arbitration board decides on the question at issue.

In case of death in the family of any employe, or upon the death of any employe, the following rule shall prevail:

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

PICK SHARPENING.

40 cents per month; but if mine does not run over $\frac{1}{4}$ month, 10 cents; $\frac{1}{2}$ month, 20 cents; $\frac{3}{4}$ month, 30 cents.

PAY DAY.

Pay day shall be on the first Saturday after the 10th of each month for all work done in the preceding month, less charges; but on presentation of five days' notice by any employe he shall be entitled to full settlement at expiration of such notice.

WEIGHMASTER.

The weighman and checkweighman shall check off for dues from all who authorize them in writing to do so, not to exceed 75 cents per month from each man in excess of checkweighman's salary after medical and rents for current month are charged.

BLACK-LISTING.

No man to be black-listed who does not agree to have dues collected.

TIME OF CONTRACT.

This contract expires April 30th, 1896.

J. R. WOOLDRIDGE,

Jno. W. Cox,

Chairmen.

J. C. BROOKS,

J. R. HORSFIELD,

Secretaries.

JELICO SCALE FOR 1896-97.

The following scale was agreed to at a joint meeting of operators and miners, held at Jellico on April 28th, 29th and 30th, 1896, and ratified by the miners of the above named mines May 2d, 1896.

FIVE GRADES OF COAL.	PRICES.
No. 1, under $2\frac{1}{2}$ feet	75c
No. 2, $2\frac{1}{2}$ ft. to 2 ft. 9 in.	70c
No. 3, 2 ft. 9 in. to $3\frac{1}{2}$ ft.	65c
No. 4, $3\frac{1}{2}$ ft. to $4\frac{1}{2}$ ft.	60c
No. 5, $4\frac{1}{2}$ ft. and over	55c

The price for No. Five, shall only be paid when such coal screens 75 per cent. of lump coal in weigh-box.

The price for No. Five, shall only be paid when such coal screens 75 per cent. of lump coal in weigh-box.

SCREENS.

Screens shall not exceed 72 superficial feet in area with $1\frac{1}{4}$ inches space between the bars. Pitch of screens to be so regulated from time to time, as the necessity arises, so that the coal will run over them.

When screens are constructed in two sections, they shall be made as even as the construction of such screens will permit.

MEASUREMENTS.

It is understood that only coal shall be measured and not impurities. The mining seam and sand band shall not be considered impurities if measured. Bone coal when measured shall be loaded the same as coal, but if loaded when not measured, a penalty will be attached in accordance with *decision of Board of Arbitration in case of Procter Coal Co. v. Frank Ash.

TRACKS.

The company shall lay all tracks.

CARS.

The company shall handle all cars in rooms; except in robbing back entries the miner shall deliver at a safe place on entries all coal mined in entry stumps and such coal that be left in pillars for support of entry and airway adjacent to stumps, as directed by mine boss.

But any company to have the right to arrange with its miners to push coal for proper compensation where local conditions make it necessary and that 5 cents per ton shall be the least price for it when it can be agreed upon between bank boss and miners. In case no agreement is made the bank committee shall be called in. This clause not to affect more than fifteen men in any mine at any one time.

*For first offense, a notice, second offense, a dockage of 500 pounds on the car, third offense, the car load of coal to be cast away, and no credit to be allowed for that load, fourth offense, at the discretion of the company, which is subject to discharge, if the company orders so."

YARDAGE.

The standard price for slate entries shall be \$2.15 per yard; but when both top and bottom are blasted, the price shall be \$2.65 per yard. Rock or sandstone entries \$3.05 per yard. The company may blast any or all narrow work if price is not satisfactory. Entries, airways and all narrow work in coal when used for entries or airways shall be $87\frac{1}{2}$ cents per yard, but whenever the slate parting occurs in the coal and no top or bottom is blasted, the price shall be \$1.30 in entries and airways when the slate is loaded out and does not exceed 9 inches; over 9 inches and up to 18 inches in entries and rooms, 5 cents per ton extra on the coal shall be paid.

ROOM TURNING.

Turning rooms shall be \$2.00 in High coal.
\$2.25 in Medium coal.
\$2.50 in Low coal.
\$3.75 for double rooms in all coal when ordered.

TIMBER.

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

LABOR.

Ten hours shall constitute a day's work, and all day labor shall be paid for by the hour on the following scale.

	Cents
Drum man	15 $\frac{1}{4}$ per hr.
Knucklemen	13 " "
Chute	13 " "
Head Trackman	19 $\frac{1}{4}$ " "
Assistant	15 $\frac{1}{4}$ " "
Drivers, men	15 $\frac{1}{4}$ " "
Drivers, boys	10 $\frac{1}{4}$ " "

	Cents.
Spike Team Drivers	17½ per hr.
Trappers	4½ to 5½ " "
Oiler	4½ to 6½ " "
Couplers	11 " "
Furnacemen	13 " "
Pushers, men	15 " "
Pushers, boys	10 " "

RENTS.

All rents shall be same as last year.

HOUSE FUEL.

Lump coal to be \$1.50 per two horse wagon load.

Nut coal \$1.00 per two horse wagon load.

When an employe does not buy coal he shall pay 50 cents per month in the spring and summer and \$1.00 in the fall and winter.

Where the coal is thrown off from railroad cars the price shall be \$2.00 per month in winter and \$1.00 in spring and fall and 50 cents for summer.

ARBITRATION.

There shall be a board of arbitration and conciliation to adjust all disputes arising under this agreement, composed of three on each side, with power to select an umpire, and their decision shall be final and binding on all parties to this agreement. Under no consideration shall work cease until the board of arbitration decides on the question at issue.

DEATHS.

In case of death in the family of any employe, or upon the death of any employe, the following rules shall prevail:

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

PICK SHARPENING.

40 cents per month; but if mine does not run over ¼ month, 10 cents; ½ month 20 cents; ¾ month, 30 cents.

PAY DAY.

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

WEIGHMASTER.

The weighman and checkweighman shall check off for dues from all who authorize them in writing to do so, not to exceed 75 cents per month from each man in excess of checkweighman's salary after medical and rents for current month are charged.

BLACK-LISTING.

No man to be blacklisted who does not agree to have dues collected.

TIME OF CONTRACT.

This contract expires April 30th, 1897.

DR. A. GALLIFF,
JAS. L. JONES,
Chairmen.
J. C. BROOKS,
J. S. COUSINS,
Secretaries,

SCALE COMMITTEE, OPERATORS.

W. T. Lewis, B. W. Robinson, Phillip Francis, A. W. Schenck, J. C. Brooks, Jas. R. Wooldridge; miners, Wm. Hollis, J. L. Goins, James Gober, R. E. Turvey, G. G. Young, J. S. Bell, with Jas. L. Jones, president of D. A. No. 5, and P. J. Elliott as advisory committee.

VI. COMMERCIAL MINES.

The following lists include operators that were putting out coal during 1896, and three or four that may be expected to have their mines in operation in 1897. Mines which hitherto have been subject to supervision, but which have become exempt on account of reduction of working force or other causes, and which now contribute practically nothing to the commercial market, have been omitted from the lists. Such of them as contributed to the commercial output for 1896 are accounted for in the chapter "Notes on the Mines." It is possible that, with an improvement in business, some of them may again be subject to supervision.

The post office address following the name of each company is usually that of the mine, but it is not always that of the company. For the latter, see "Notes on the Mines."

WESTERN DISTRICT.

NAME OF OPERATOR.	Post-office.	County.	Number of Banks.	Character.
Aberdeen Coal and Mining Co.	Morgantown	Buler	1	Drift.
West Aberdeen Coal Co.	"	"	1	"
Empire Coal and Mining Co.	Empire	Christian	2	Shafts.
R. E. Overton & Co.	Owensboro	Davies	1	Drift.
Falcon Coal Co. (Hawesville)	Hawesville	Hancock	1	Shaft.
J. J. Eagan & Bros (Falcon)	Adair	"	1	Drift.
Breckinridge Cannel Coal Co.	Gloverport	"	1	Drifts.
Green River Coal and Mining Co. (Rankin)	Spottsville	Henderson	1	Shaft.
Henderson Mining and Manufacturing Co.	Henderson	"	1	"
F. Haug & Bro. (People's)	"	"	1	"
Lloyd and Wright	Corydon	"	1	"
Pittsburgh Coal Company	Baskett	"	1	"
R. S. Eastin & Co. "Spottsville"	Spottsville	"	1	"
Booth & Glover, Lessees (Carbondale)	Hamby's Station	"	1	"
Hoeft Coal Company	Earlington	Hopkins	2 (1 Idle)	Drift.
St. Bernard Coal Company	"	"	2	Shaft and Slope
"	Morton's Gap	"	2	Drift and Slope
"	St. Charles	"	2	Drifts.
J. L. M. Robertson & Son	Earlington	"	1	"
Woodstock Coal Company	Nortonville	"	1	"
Monarch Coal Company	Madisonville	"	2 (1 Idle)	Shaft.
Reinecke Coal Company	"	"	2 (1 Idle)	"
Co-operative Mining and Manufacturing Company	Barnsley	"	1	Drift.
Crabree Coal Mining Company	Isley	"	1	Shaft.
Island Coal Company	Island	McLean	1	Slope.
Alva Karnes	"	"	1	"
Field Coal Company (Chicago)	"	"	1	"
Central Coal and Iron Company	Central City	Muhlenberg	3 (2 Idle)	Shafts and Slope
Lessees Memphis Coal and Mining Company	Bevier	"	2 (1 Idle)	Shaft and Drift.
Mud River Coal, Coke and Iron Company	Mud River	"	1	Slope.
Black Diamond Coal Company	Drakesboro	"	3 (2 Idle)	Shaft and Slopes
J. Wm. Jones, Lessee	Paradise	"	1	Drift.
Hillside Coal Company	Mercer Station	"	1	Shaft.

WESTERN DISTRICT—Continued

NAME OF OPERATOR.	Post-office.	County.	Number of Banks.	Character.
Greenville Coal Company	Powderly	Muhlenberg	1	Shaft.
Sterling Coal Company	Central City	"	1	Slope.
Reynold's Coal Company	Reynold's Station	Ohio	1	Drift.
McHenry Coal Company	McHenry	"	1	Slope.
"	Echols	"	1	Shaft.
Central Coal and Iron Company	Render	"	2	Drifts.
Taylor Coal Company of Kentucky	Taylor Mines	"	1	"
Fordville Block Coal Company	Fordville	"	1	Drift.
D. Stewart Miller, Lessee of Actua Colliery	Actnaville	"	1	Shaft.
Williams Coal Co.	McHenry	"	1	Slope.
Thompson Coal Co.	Aethnaville	"	1	"
Lamb & Newcomb	Sullivan	Union	1	"
Ohio Valley Coal and Mining Company	DeKoven	"	2	Slopes.
Tradewater Coal Mines, (Syndicate)	Sturgis	"	2	Shaft and Slope
Cumberland Coal Company	"	"	1	Slope.
B. C. Davidson & Sons	Uniontown	"	1	Shaft.
Providence Coal Company	Providence	Webster	1	Slope.
T. L. Taylor	"	"	1	Shaft.
Sebree Coal Company	Sebree	"	1	"
R. L. Forsythe, Lessee. (Providence Shaft)	Providence	"	1	"

SOUTHEASTERN DISTRICT.

NAME OF OPERATOR.	Post-office.	County.	Number of Banks.	Character.
Pineville Coal and Coke Company	Pineville	Ball	2	Drifts.
Breckenridge and Pineville Syndicate	"	"	2	"
Log. Mt. Coal, Coke and Timber Company	"	"	1	Slope.
Bennett's Fork Coal Company	Middlesboro	"	1	Drift.
O. Smith (Four Mile)	Pineville	"	1	"
Ely Blue Gem Coal Mining Company	Flat Lick	Knox	2	Drifts.
Webb Bros Coal Company	Artemus	"	1	Drift.
J. F. Gaddie & Co.	Flat Lick	"	1	"
North Jellico Coal Company	Grays	"	2	Drifts.
B. F. Gray	"	"	1	Drift.
East Jellico Coal Company	Artemus	"	1	Drift.
East Altamont Coal Company	Altamont	Laurel	1	Drift.
Litton & Thompson (Black Diamond)	East Bernstadt	"	1	"
Star Coal Company	"	"	1	"
Standard Coal Company	"	"	3	Drifts.
Thompson Coal Company	Altamont	"	1	"
Manchester Coal Company	"	"	1	Slope.
Diamond Coal Company	"	"	1	Drift.
Lily Coal Company	"	"	2	Drift.
Peacock Coal Company	Lily	"	1	"
H. C. Thompson, Lessee. (Union Mine)	Pittsburgh	"	1	"
Pittman Coal Company	"	"	1	Drifts.
Victoria Coal Company	"	"	2	"
Pittsburg Coal Company	"	"	2	Slope.
Laurel Coal Company	"	"	1	Drift.
Daisy Coal Company	East Bernstadt	"	1	"
J. H. Chew, (Enterprise Coal Company)	Greenwood	"	1	Drifts.
J. G. Parker, (Kentucky Coal Company)	Parker's Lake	Pulaski	1 Group.	"
Ena Coal Company	Flat Rock	"	2	Drifts.
Reinhold Coal Company	Alpine	"	2	"
Eagle Coal Company	Flat Rock	"	5	Drift.
Bryant Brothers	Pine Knot	Whitley	1 Group.	Drifts.
Bird Eye-Jellico	Halsey	"	3	"
			5	"

NAME OF OPERATOR.	Post-office.	County.	Number of Banks.	Character.
Ashland Coal and Iron Railway Co. (at Grant and Rush)	Rush	Boyd	1	Drift.
John Wirtz, Lessee, A. C. & L. Ry. Co's No. 8	Ashland	"	1	"
Davis & Wynn	Jackson	Breathitt	1	"
Ashland Coal and Iron Ry. Co. (Grant)	Rush	Carter	1	Drifts.
Lexington and Carter County Mining Company	Musc	"	1	"
"	Mt. Savage	"	1	"
Strait Creek Coal Company	Denton	"	1	Drift.
George Duncann, Lessee Lost Creek Mine	Willard	"	1	"
Star Furnace Coal Company	Rush	"	1	Drifts.
Kentucky Cannel Company	Grayson	"	1	Drift.
Eastern Kentucky Railway Company	Greenup	Johnson	1	"
White House Cannel Coal Company	Myrtle	"	1 (Done)	"
Sandy River Cannel Coal Company	"	"	1	"
Treacy Creek Cannel Coal and Tramway Company	"	"	1	Drifts.
Peach Orchard Coal Company	Peach Orchard	Lawrence	1	Drifts.
Kureka Beautyville Coal Company (Avent)	Beautyville	Lee	1	Drift and Slope
New Beautyville Coal Company	"	"	1	"
New Crystal Creek Coal Company	"	"	1	Drifts.

NORTHEASTERN DISTRICT.

NAME OF OPERATOR.	Post-office.	County.	Number of Banks.	Character.
Procter Coal Company	Red Ash	Whitley	6	Drifts.
East Tennessee Coal Company	Jellico, Tenn.	"	3	"
J. C. Stealy	Pleasant View	"	1	Drift.
Kentucky Jellico Coal Company	Halsey	"	1	"
Hywel Davies Coal Company	Kenese	"	1	Drifts.
Central Jellico Coal Company	Pleasant View	"	1	Drift.
Pine Knot Coal Company	Strunk	"	1	"
Jellico Coal Mining Company	Mountain Ash	"	2	Drifts.

SOUTHEASTERN DISTRICT—Continued.

VII. NEW AND OTHER MINES.

Sixteen new mines were opened during the year 1896, twelve of them by eleven new operators and four of them by three companies or firms that were already operating.

Three mines that had been idle were reopened. One mine which had been idle during nearly all the year was reopened by a new company the last of December, and is expected to be in operation during 1897.

Four mines were abandoned, as exhausted, work being transferred to other openings on the same property in two instances, while in a third all operations came to an end.

Following are

THE NEW MINES.

1. The Bennett's Fork Coal Co., a new company, has opened a new mine near Middlesboro, in Bell county. The first work on this mine was done by the Mingo Mining Co. (defunct), but so little excavation was made by that corporation that the opening of the mine may be credited to the present operators. See "Notes on the Mines."

2. Mr. O. Smith opened a new mine in Bell county, the "Four Mile." The first work was really done in 1895, but the mine is to be credited to the list of new mines for 1896. See "Notes on the Mines."

3. The Mt. Vincent Coal Co., a firm composed of George Williams, Charles Moreland and George Harrison, opened a new mine in Bell county, on the Cumberland Valley Branch Railroad, about two miles westwardly from West Pineville. The first work was done August 10th. Despite early hopes, operations failed to develop into satisfactory proportions, and it is understood that the company has dissolved. It is not improbable that the mine will

lie idle, or be worked only on a very small scale in 1897. See "Notes on the Mines."

4. The Ashland Coal & Iron Railway Co. opened a new mine (No. 8) in No. 6 coal, near Ashland, in Boyd county. The coal has been given the name "Clinton," and the mine is so designated in this report. See "Notes on the Mines."

5. Messrs. Davis & Wynn opened a new mine near Jackson, Breathitt county, in what is regarded as the equivalent of the "Elkhorn" coal. See "Notes on the Mines."

6. The Greasy Creek Cannel Coal & Tramway Co. has opened a new mine on Greasy Creek, in Johnson county, about six miles beyond Myrtle. This company and the Sandy River Cannel Coal Co., (which ceased operations at Myrtle in October), seem to be in some way connected, but the precise relation existing is not clearly understood by the present writer. The following reply (January 28, 1897) to a letter of inquiry, received from Mr. L. Q. Rousseau, Secretary of the Greasy Creek Cannel Coal & Tramway Co., (formerly Secretary of the Sandy River Cannel Coal Co.), is of interest:

"We are in receipt of your letter of the 20th instant with inclosures, and note what you say of having sent letters addressed to Mr. G. R. Bickford, who was formerly Superintendent of Mines for the Sandy River Cannel Coal Company when we were mining at Myrtle, Ky. That property we have now mined out and have closed down indefinitely. This same company, however, have also property in and about Buffalo Creek, Greasy Creek and Two Mile Creek, in Johnson county, Ky., that they are now contemplating opening up soon. . . . Now, with reference to the tramway: That is the property of the Greasy Creek Cannel Coal & Tramway Co.; the owners of the Sandy River Cannel Coal Co. are interested in the said Greasy Creek Cannel Coal & Tramway Co. . . . We can add, however, that the tramway is about seven and a half miles, and is intended to connect the coal property of the Greasy Creek Cannel Coal & Tramway Co., and also the Sandy River Cannel Coal Co., with the terminus of the road at Myrtle. The tram is about completed, with the exception of one tunnel not yet being put through, but all is expected to be in working order by March 1st, and we are going to attempt to

run the tram cars by means of a small engine. . . . The officers of the Greasy Creek Cannel Coal & Tramway Co. are: Mr. F. A. Stacey, President; J. P. Dieter, Treasurer; L. Q. Rousseau, Secretary; and J. S. Rittenhouse, Manager." [In 1895 the same gentlemen held the same official positions in the Sandy River Cannel Coal Co.]

7. The Blue Gem Coal Mining Co. opened two new mines, the "Blue Gem" and the "Brier Hill," in Knox county, near Flat Lick. See "Notes on the Mines."

8. J. P. Gaddie & Co. began opening a mine in Knox county, near Flat Lick. When the place was visited in early February of the present year work had been suspended, and it was not known by those at the mine when it would be resumed. The opening entry had been driven only about 150 feet. The coal is about 51 inches thick, with a parting of $1\frac{1}{2}$ to 2 inches near the middle. The seam lies at a level about 400 feet above the railroad track. A spur from the main line, about 350 feet yards (or somewhat more) in length, had been graded to the site selected for the tippie.

9. Messrs. Bert Webb and B. H. Webb, operating under the firm name of the Webb Brothers Coal Co., opened a mine near Artemus, Knox county. First shipments were made about July 1st. See "Notes on the Mines."

10. The Thompson Coal Co. opened a mine near Altamont, Laurel county. The first shipment was made on May 9th. See "Notes on the Mines."

11. A new mine was opened at Sullivan, Union county, and is operated by Messrs. Lamb & Newcomb. See "Notes on the Mines."

12. Two additional banks, No. 3 (or Patrick) and the South mines, were opened by Messrs. Bryant Bros., at their Tow Wad mines, near Pine Knot, Whitley county. These banks took the place of No. 1 and No. 2, which had been worked out and abandoned. See "Notes on the Mines."

13. The Bird Eye Jellico Coal Co. opened up a mine in the Dean Seam, on its property at Halsey, Whitley county. See "Notes on the Mines."

14. Mr. J. C. Steely obtained control of a small bank near Pleas-

ant View, Whitley county, and brought it into the commercial class. He began the opening of an additional bank. See "Notes on the Mines."

REOPENED MINES.

1. The Breckenridge and Pineville Syndicate reopened what was formerly known as Cumberland Valley Colliery, No. 2, in Bell county. The present company has named it West Pineville No. 1, the cannel mine, which has been in continuous operation, being known as the West Pineville No. 2.

2. The Lexington and Carter county Mining Co. has arranged to resume operations at its Stinson Creek (cannel) mines, which were idle all of 1896.

3. The Breckenridge Cannel Coal Co., a new organization (or reorganization of the old company), has reopened the Breckenridge (cannel) mines at Victoria, Hancock county. See "Notes on the Mines."

IDLE MINES.

The following mines were abandoned as mined out, during the year:

1. The Sandy River Cannel Coal Co.'s cannel mines at Myrtle, Johnson county. They were abandoned October 30th. The company will operate in the Greasy creek region, in Johnson.

2. The No. 1 or Old Mine of the New Crystal Creek Coal Co., near Beattyville, Lee county. The mine was abandoned in October or November. Operations are now confined to the No. 2 or New Mine.

3. The Old Standard No. 2, of the Standard Coal Co. (Pearl & Thompson), was closed down June 1st. No. 1 had been closed in 1895. The company has transferred its operations to the New Standard mines, (which for a time were also known as the Little Silver mines).

4. The Wilson Drift, of the Diamond Coal Co., in Laurel county, was shut down in March. The bank was a small one, worked in conjunction with the company's main mine, the Diamond.

VIII.

NOTES ON THE MINES.

In the following notes on the individual mines, the results of inspections made by each inspector are given in the order made and are grouped together under each mine to which they refer, but the work of each official is properly identified. Under conditions prevailing in the State, to separate the field work of the Chief Inspector from that of the Assistant, and have the latter present a special report of his inspections, would simply lead to confusion; though, it may be said, the Chief would thereby be saved some labor in the preparation of the annual report. It will be observed that, with three or four exceptions all mines were inspected by the Chief as well as by the Assistant.

NORTHEASTERN DISTRICT.

Output of bituminous coal, in tons, 313,319.29.

Output of cannel, in tons, 11,112.20.

Total coal shipped from mines, in tons, 316,645.24.

Employees for 1896: Maximum, 1,302; average, 955.

Average number of days worked, 191½.

BOYD COUNTY.

Output of Bituminous coal for 1896, in tons: Lump, 82,135.00; nut, 18,242.00; run of mines, 11,517.00; slack, 9,128.00. Total, 121,022 tons.

Through an error of the Inspector as to the meanders of the line between Boyd and Carter counties, the No. 7 (Grant) mine of the Ashland Coal & Iron Railway Co., was taken to be in this county, and its output has heretofore been credited to Boyd. The mine

proves to be in Carter county, however; hence, it is now placed with the mines of that county, and its output is included with that of the Carter county mines. This statement is made in order that no misunderstanding may occur as to the output of the county for 1896 when compared with that credited to it (in preceding annual report) for 1895. The combined output of the two mines (Rush and Grant) operated by the company in 1895 was 170,442.91 tons, of which 29,254 tons were produced by the Grant mine and should have been credited to Carter county. The combined output of the two mines for 1896 was 166,823 tons, of which only the output of the Rush mine, 119,485 tons is to be credited to this county.

Inspections were made both by the Chief and by the Assistant Inspector.

RUSH MINE.

At Rush.

P. O. Rush.

Transportation by Newport News & Mississippi Valley Railroad. (The Ashland Coal & Iron Railway, used by the N. N. & M. V., from Denton to Ashland.)

Operated by the Ashland Coal & Iron Railway Co., Douglas Putnam, President; John G. Peebles, Vice President; Robert Peebles, Secretary and Treasurer; E. C. Means, Superintendent; James Heron, Superintendent of Mines. Head office, Ashland, Ky.

Output of bituminous coal for 1896, in tons: Lump, 82,135.00; nut, 18,242.00; run of mines, 9,980.00; slack, 9,128.00. Total, 119,485 tons.

During the latter part of the year the company installed a compressed-air haulage plant. The first practical trip of the locomotive was made about the first of November. On December 1st the plant was in full operation, working smoothly and fully up to expectations. It is probable that, during 1897, from four to six pick machines or from three to four chain machines will be introduced at the mine, using the same compressor plant as that which now supplies the locomotive. The haulage plant has been described in a preceding chapter.

1. Inspected by Assistant, May 18th. The mine was well ventilated and in good condition generally.

2. Inspected by Assistant, August 22d. The mine was not running, but a number of men were in and there was a good fire in the furnace. A volume of 30,130 cubic feet of air was entering, well conducted to all working-places. The mine was also in good condition in other respects.

3. Inspected by Chief, November 24th. With the exception of three entries off of Simpson No. 2, practically all work consisted of drawing pillars and stumps. The question of timbering was given close attention during the inspection and the Inspector was much gratified to find that great care was being observed to keep the places well propped. In that respect the condition of the mine was quite satisfactory. The ventilation in a number of the entries, however, was defective. The supplies of air were insufficient in the following entries; namely, the Caesar, Helwich No. 5, and Simpson No. 3 (all off of Simpson No. 2), the Helwich No. 2 and Helwich No. 3 (off of the Main). A piece of dangerous roof was noted in Simpson No. 3, toward the head, which the bank-boss said would be remedied at once. Said entry needed better drainage, which it was said would be obtained by driving the entry to day light. The deficiency of air in the entries named was doubtless largely incidental to the installation of the haulage plant, work on a proposed shaft (for furnace), near the head of Simpson No. 3, having been postponed until the former was completed. Information was received from Mr. Means near the end of December that Mr. Heron was then sinking the shaft. With the completion of said shaft and its furnace, the ventilation of the mine should again reach the high standard of excellence that has been maintained for several years.

Note.—During the year the company opened a new mine (No. 8, or Clinton), in No. 6 coal, within about two miles of Ashland. On December 23d it consisted of one entry and parallel air-course about 225 feet long, and one room advancing. The mine has been leased for one year to Mr. John Wurtz. On November 24th only five persons were employed inside—two in the entry, two in the air-course, and one hauling. The output of the mine amounted to 1,537 tons, all run of mines.

BREATHITT COUNTY.

Output of commercial bituminous coal for 1896, in tons: Lump, 75.37; run of mines, 2,220.40; slack, 60.00; fuel and local not included in grades, 50.00. Total, 2,405.77 tons.

Inspections were made both by the Chief and by the Assistant Inspector.

JACKSON MINE.

Near Jackson.

P. O. Jackson.

Transportation by the Lexington and Eastern Railway. (Formerly Kentucky Union.)

Operated by the Jackson Coal Co., R. T. Davis, President; George Wynn, General Manager; R. D. Davis, Secretary.

Output of bituminous coal for 1896, in tons: Lump, 75.37; run of mines, 2,220.40; slack, 60.00; fuel not included in grades, 50.00. Total, 2,405.77 tons.

This is a new mine, opened in the summer of 1896. The entrance to the mine extends for a short distance through old workings of what had been a local bank. The present operators have made everything snug and safe through the old workings, and are driving their own work in the solid.

1. Inspected by Assistant August 28th. The Main entry was about 240 feet long with two rooms on each side. An air-shaft had been sunk and a stack built thereto, but a furnace had not yet been put in. No tip-house had been built, railroad cars being loaded by chute. Twelve persons were employed inside. No immediately dangerous top was observed, but propping in rooms was scant.

2. Inspected by Chief, December 29th. A furnace had been built with sufficient power to serve until the excavations of the mine shall have increased considerably beyond present proportions. But since it is shut off from the outside only by a door, much air was leaking directly to it from the outside, without having entered the mine. This should be remedied. The following notice was served:

"An ample volume of air enters the bank for the number of miners employed (21), when the furnace is fired, and the ventilation would be all right were the air-current brought up to within 60 feet

of the faces of all the workings. According to your stated plan of breaking off rooms at every 32 feet and widening them to 24 feet, you would ostensibly have an 8-foot pillar between them; but as Mr. Davis stated to be the case (and as we know is apt to be the case in driving rooms), the pillars are oftener apt to be about 5 or 6 feet through than 8 feet. I am strongly of the opinion that with 24-foot rooms, worked as you are working, with heavy roof and under a hill instead of a flat, the pillars in your coal should be not less than 10 feet thick, and I hope you will have them carried that thickness. Moreover, I think a longer stump than 22 feet ought to be left. A 34-foot stump, with 10-foot pillar, would be better. This would, with 10-foot neck (as you are making), cause rooms to be turned every 44 feet from center to center of necks—or from near corner to far corner; and I believe it would be well to widen rooms equally on each side, with track in center and the gob packed nicely on the sides. This may save something in the way of propping if the amount of gob is sufficient. A line of fore-set posts ought to be kept within 8 or 9 feet of the working face—closer when the nature of the roof is treacherous."*

CARTER COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 46,011.06; nut, 21,594.85; run of mines, 51,303.79; slack, 5,140.00; mixed lump and nut, 1,050.70; pea, 252.85; nut and pea, 914.70; pea and slack, 5,676.00; fuel and local not included in grades, 626.25. Total, 132,570.20 tons.

Production of cannel, 3,495.80 tons.

See note concerning the Grant mines under Boyd county.

Inspections were made both by the Chief and by the Assistant Inspector.

GRANT MINES.

P. O. Rush.

At Grant.

Transportation by the Newport News & Mississippi Valley Railroad. (The Ashland Coal & Iron Railway, used by the N. N. & M. V., from Denton to Ashland.)

*March 23d, 1897.—In a letter recently received from Messrs. Davis & Wynn, it is stated that the suggestion made in the notice quoted, concerning pillars, etc., has been followed.

Operated by the Ashland Coal & Iron Railway Co., Douglas Putnam, President; John G. Peebles, Vice President; Robert Peebles, Secretary and Treasurer; E. C. Means, Superintendent. Head office, Ashland. Superintendent of Mines, James Heron.

Output of bituminous coal for 1896, in tons: Lump, 29,573.00; nut, 7,684.00; run of mines, 6,234.00; slack, 3,848.00. Total, 47,338 tons.

These mines consist of five banks, known as the No. 1 Main, No. 2 Main, No. 2 Main in Second Hill, Vickers' Opening, and Joe Cordell Opening.

1. Inspected by Assistant, May 18th. Work was in progress on the Deaton and Locie entries in No. 1 Main, and on the Bates entry in No. 2 Main. The mines were well ventilated and in good condition generally.

2. Inspected by Assistant, August 21st. The mines were idle and no fire in furnace. In the No. 1 Main the Deaton entry had been pulled back to the third pillar. The No. 2 Main had been driven to daylight, and its extension into the second hill commenced. On the Bates entry, when working, 35 men were engaged on pillars and stumps. The ventilative arrangements and general condition of the mines were quite satisfactory.

3. Inspected by Chief November 23d and 24th. In No. 1 Main only 8 persons were employed. General conditions were satisfactory. In Vickers' Opening, consisting of a single short entry with rooms on each side, 7 persons were engaged. There was little more work to be done in the bank. With one or two small exceptions, the bank was in satisfactory condition. In the Joe Cordell Opening, consisting of a straight entry and air-course, 22 persons were employed. Cross timbers were needed at the mouth of the entry where the rock sets in. Head of the entry was too far ahead of the air. Otherwise, conditions were satisfactory. In No. 2 Main 26 persons were employed on the Bates entry, pulling pillars and stumps. Plenty of air was supplied and excellent care was observed in timbering. No. 2 Main in second Hill was in a satisfactory condition.

MT. SAVAGE MINES (2).

Near Mt. Savage.

P. O. Music.

Transportation by the Newport News & Mississippi Valley Railroad.

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

Output of bituminous coal for 1896, in tons: Lump, 287.90; nut, 379.90; run of mines, 32,352.83; slack, 1,293.00; pea, 185.00; fuel and local not included in grades, 176.25. Total, 34,674.88 tons.

During the year the mines were equipped with new screening plant, new railroad track-scales; tip-house and tippie remodeled; and an additional broad-gauge track under tip-house.

1. Inspected by Assistant, May 19th. The No. 3 bank was in good condition in all respects. The No. 4 bank was also in good condition.

2. Inspected by Assistant August 24th. Both mines were idle and furnaces cold. In each mine provisions for conducting the air were fairly good, and the banks in satisfactory condition generally.

3. Inspected by Chief, November 25th. *The No. 3 (or Old Hill) Mine.*—Plenty of air was entering the bank, but it did not reach the workings on the 3d Left entry, due, in part, to losses by leakage and in part to failure to close an important rear break-through. Timbering was good.

The No. 4 (or New Hill Mine.—The following statement was filed with the company: "On account of not knowing that the principal work is in this hill and that it is principally in the 1st and 2d Right entries, the inspection of the bank was made after that of the Old Bank, and the examination of the 1st and 2d Right entries was postponed until after the 2d Left had been examined. The consequence was that by the time they were reached shot-firing had begun and they could not be traversed on account of being filled with powder fumes. By making observations at the air-courses leading from them, however, it was ascertained that neither of the entries receives enough air—that the volume is deficient. More air must be supplied on said 1st and 2d Right entries (100 feet per minute per

person employed, after deducting the amount required for the men on the 2d Left), and it must be kept circulating within 60 feet or less of all working faces."

LOST CREEK MINE.

Near Willard.

P. O. Willard.

Transportation by Eastern Kentucky Railway.

Operated by George Duncan, Lessee under Eastern Kentucky Railway Co.

Output of bituminous coal for 1896, in tons: Lump, 1,902.70; nut, 178.95; run of mines, 267.00; pea, 67.85; nut and pea, 914.70. Total, 3,331.20 tons.

This mine is about exhausted. For the first three months of the year from 10 to 14 miners and 1 to 3 day-hands were employed. When inspected on May 25th, only 5 miners were employed. During June and July the bank was idle, and since resumption of work in August the force has usually consisted of 5 miners and 1 day-hand.

BOGHEAD 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; Sturgis G. Bates, Assistant Treasurer. Head Office, Riverton, Ky. I. P. Shelby, Jr., Contractor.

Output of bituminous coal for 1896, in tons: Lump, 2,433.90; mixed lump and nut, 1,050.70. Total, 3,484.60 tons.

Output of cannel for 1896, in tons, 3,426.80.

Aside from the building of six additional miners' houses, no special improvements were made during the year.

1. Inspected by Assistant May 25th. Since the preceding inspection a furnace had been built, but at the time of this inspection there was no fire in it. With furnace going ventilation would have been fairly good. The 5th Left entry was too wet; elsewhere drainage was good. Timbering and propping were satisfactory.

2. Visited by Assistant August 27th. The mines had been closed July 17th for an indefinite time.

The mines remained idle nearly three months. Work was resumed in October, but it was found impracticable to make another inspection before the end of the year.

STAR FURNACE MINES (2).

Near Kilgore.

P. O. Rush.

Transportation by the Newport News & Mississippi Valley Railroad. (Ashland Coal & Iron Railway, used by the N. N. & M. V., between Denton and Ashland.)

Operated by Star Furnace Coal Co., J. M. Logan, President and Treasurer; C. W. Logan, Secretary and General Manager.

Output of bituminous coal for the calendar year, 6,663 tons, all run of mines.

1. Inspected by the Assistant, May 20th. *The No. 1 Mine.*—Six miners were employed in this mine, which consists of a single entry, driven through the hill, with rooms on each side. Artificial means for ventilation had not been provided, but the air was not bad. The entry was quite wet, but the rooms were dry enough. Rooms were fairly well propped and no dangerous top was noted on entries. *The No. 2 Mine.*—Seven miners and two day-hands were employed. There was no ventilation, either artificial or natural. Drainage good. No dangerous lack of timbering was noted on entries, and rooms were fairly well propped.

2. Inspected by Assistant August 22d. The No. 1 Mine was reported as worked out. No one was in it. The No. 2 Mine had a second opening, and although artificial means for ventilation had not been provided, the air was not bad. There were twelve miners employed inside. There was some bad insecurely timbered top on the Right-hand entry.

3. Inspected by Chief, November 26th. There were five persons in the No. 1 Mine, finishing up two rooms near the mouth of the bank. Artificial means had not yet been provided for ventilation of the No. 2 Mine, in which there were 14 persons employed; the company was advised that it was subject to indictment for failure to provide lawful means, but it must be frankly stated that, since the workings were such a short distance from daylight, except for the

fact that provision had not been made for properly coursing the current, the ventilation would have been sufficient for the small number of persons employed.

STRAIT CREEK MINE.

Near Denton.

P. O. Denton.

Transportation by the Newport News & Mississippi Valley Railroad.

Operated by the Strait Creek Coal Co., M. M. Cassidy, President; W. T. Tibbs, Secretary and Treasurer; Kent Prichard, Superintendent. Head office, Mt. Sterling, Ky.

Output of bituminous coal for 1896, in tons: Lump, 11,813.56; nut, 13,352.00; run of mines, 5,786.96; pea and slack, 5,676.00; fuel and local not included in grades, 450.00. Total, 37,078.52 tons.

Inspected by Assistant, May 19th. Mine was not running and the furnace was cold. The furnace is known to have sufficient power to ventilate the mine well, if the current be properly conducted. The coursing of the air was defective in portions of the bank, especially on the right of Howe entry, where there were 23 rooms through which the air needed to be sent. Loose, dangerous slate was noted on 1st Right entry and on an entry broken off of it. Drainage was bad on the 1st Right and Howe entries.

2. Inspected by Assistant, August 24th. Again the mine was found idle. But little work had been done since preceding inspection. It was fairly well drained, timbered and ventilated, but there were some rooms into which the air needed to be turned.

3. Inspected by Chief, November 25th. Check curtains were needed on the 2d Right (2d Dusty) off of Howe, to give the rooms ventilation. Most of the air which entered the mine came through an opening at the head of that entry, which worked to the disadvantage of the 3d Dusty. The 3d Right (3d Dusty) off of Howe had very little ventilation, and on account of the exceedingly poor oil used in the lamps the atmosphere was very smoky and unhealthful. In the Greenhorn entry there was practically no ventilation for the workings on the upper portion—that which turns to the right and ends in a "push entry." Other conditions were fair though there was much water in places on entries.

GREENUP COUNTY.

The only mining of commercial importance in this county was on the Hunnewell cannel property of the Eastern Kentucky Railway Co., where a small number of men were engaged here and there. The total output of cannel for the year 1896 amounted to 854 tons.

JOHNSON COUNTY.

Output of cannel for 1896 was 6,762.40 tons.

SANDY RIVER MINES.

Near White House.

P. O. Myrtle.

Transportation by the Ohio & Big Sandy Railroad.

Operated until October 30th, 1896, by the Sandy River Cannel Coal Co.

Output of cannel for 1896, in tons, 3,150.40.

This mine has been worked out. It was abandoned October 30th, 1896.

1. Inspected by Assistant May 21st. Work was confined to the 1st Left entry, where 15 miners were employed in taking out pillars and stumps. Conditions were good.

2. Inspected by Assistant, August 25th. Work was still confined to 1st Left entry, where 25 or 30 persons were pulling pillars and stumps. Conditions were good.

3. On November 27th, when en route to inspect the mine, the Chief learned that the mine had been exhausted and abandoned—that the railroad side-tracks were then being pulled up. The Company, or a new company, composed in whole or part of members of the Sandy River Co., had begun operations on Greasy Creek, about three miles from Myrtle. Efforts have been made, without incurring the expense of a special trip to Greasy Creek, to obtain information concerning the character and importance of operations there, and when shipments might be expected to be made. At this writing no replies have been received to communications addressed to those supposed to be interested. It is not known whether expectations have been realized or not.

WHITE HOUSE MINES.

Near White House.

P. O. Myrtle.

Transportation, Ohio & Big Sandy Railroad.

Operated by the White House Cannel Coal Co., Dr. H. A. Wood (Buffalo, N. Y.), President; Jay H. Northup, General Superintendent and Treasurer; F. T. D. Wallace, Secretary. Head Office, Louisa, Ky.

Output of cannel for 1896, in tons, 3,612.

1. Visited by Assistant, May 21st. Only a few men, not more than three in any one place, were employed, getting out crop coal.

2. Visited by Assistant, August 25th. The mines were approaching exhaustion—a few men scattered among the openings getting crop coal. Circumstances considered, conditions were fair.

3. On November 27th, it was learned by Chief, en route to inspect the mines, that they were practically worked out. Work was distributed among five openings, taking out crop coal, and at no place was it far from daylight. According to a memorandum furnished through the courtesy of Col. Jay H. Northup, miners were distributed as follows: No. 1 Drift, 10 men, about 50 feet from mouth; No. 2 Drift, 3 men, 50 feet from mouth; No. 3 Drift, 2 men, about 150 feet from mouth; No. 4 Drift, 4 men, 30 feet from mouth; No. 5 Drift, 3 men, 40 feet from mouth. The Company expects to move to Greasy Creek during 1897.

LAWRENCE COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 26,125.00; nut, 1,123.00; slack, 8,580.00; pea, 2,432.00; nut and pea, 3,753.00; block, 1,084.00; fuel and local, not included in grades, 4,377.00. Total, 47,474 tons.

Inspections were made both by the Chief and by the Assistant Inspector.

ANNIE AND ELIZABETH MINES.

At Peach Orchard.

P. O. Peach Orchard.

Transportation by the Ohio & Big Sandy Railroad.

Operated by the Peach Orchard Coal Co., John C. Welty, President; H. P. Scott, Treasurer; H. H. Keys, General Manager.

Output of bituminous coal for 1896, was that given for the county, these mines being the only commercial ones operating in the county.

1. *The Annie Mine*.—Inspected by the Assistant, May 21st. The mine was idle, but there was a good fire in the furnace. A large volume of air (19,074 cubic feet per minute) was entering the mine, but brattices and other stopping leaked so badly that sufficient air did not reach the working portions of the bank. Rooms were very well propped. No bad top discovered on entries. Too much standing water was observed at a point on the Main and on the 6th Right. The Superintendent stated that such was not the case when the mine was running.

2. Inspected by Assistant, August 25th. Plenty of air (6,409 cubic feet per minute) was entering for the 41 persons in bank, and it was well conducted so far as concerned entries, but was not turned through any of the working rooms—the places where especially needed. Too much water was standing at the inner end of lie-way on the Main entry, and the 6th and 7th Right entries were too wet. Timbering and propping were adequate.

3. Inspected by Chief, November 27th. It is deemed well to present in full the notice served, which was as follows:

"As already stated to you verbally, you are subject to indictment and fine for failure to comply with directions heretofore given to comply with the law with respect to break-throughs and keeping the air within 60 feet or less of all working-faces.

"Break-throughs are not made between rooms and of course the air does not traverse them. I note your assurance that you will at once comply with the law, and action in the courts is therefore de-

ferred. The bank was idle and the furnace was cold, hence no determinations as to the volume of air supplied could be made. *Main Entry.*—There is a dangerous piece of roof just beyond the door on this entry. It should be taken down. The entry needs to be cleaned up from the lower end of the lie-way up to the 5th Right entry; it is too wet and muddy for men to have to travel. *'Draw-Slate.'*—The 'draw-slate' in this mine seems to be worse than in the Elizabeth, and it is clear that exceeding care must be taken not only in rooms but in entries to prevent accident from it. I do not believe it wise to work 40-foot rooms with pick-miners, and shall be glad if you finally determine, as you suggested, to run them narrower. Several places along entries where an occasional post or scaling of entry is needed, were called to the attention of Mr. Small, bank-boss."

In response to the foregoing, under date of December 5th, 1896, Mr. Keys wrote: "Have started in already to make the break-throughs and will keep them up in future." On January 6th, 1897, he wrote: "The break-throughs are most all up now and what remains yet to be done will be pushed as rapidly as possible. In future they will be kept right up."

1. *Elizabeth Mine.*—Inspected by Assistant, May 21st. The mine was reduced to stumps and pillars, and work was confined to the 7th Right, 7th Left and 8th Left entries. The mine was idle, but the fan was running and sending plenty of air into the bank, which was traveling the entries. A pond of water, said to be kept down by the pump when the mine was running, prevented a complete inspection of the 7th and 8th Left entries. Up to that point conditions were good.

2. Inspected by Assistant, August 25th. Work was in 6th and 7th Right and 8th Left entries. On 6th and 7th Right conditions were good. On the 8th Left there was too much water and the ventilation was only fair.

3. Inspected by Chief, November 27th. The following notice was served:

"The mine was idle (i. e., no coal was running over the tip), and the fan was not running, hence volumes of air supplied the various

workings could not be determined. An examination of the bank was made, however, and it seemed that as the work now stands (on pillars and stumps) the ventilation is sufficient, if the fan still supplies sufficient air—which it probably does. Particular attention was paid to the question of timbering where pillars and stumps are being drawn, and it was found satisfactory. There were some points along entries where the roof needs attention, to which the attention of Mr. Small, Bank Boss, was called during the inspection. Although the bank was technically 'idle,' yet men were filling empties, and since the fan was not running they were not receiving adequate ventilation. When men are at work in the mine, ventilation should be supplied on 'idle' days just as on any other."

LEE COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 3,929.84; nut, 629.00; run of mines, 4,817.48; slack, 82.00; mixed lump and nut, 23.00; nut and slack, 216.00; fuel and local not included in grades, 150.00 Total, 9,847.32 tons.

Inspections were made both by the Chief and by the Assistant Inspector.

AVENT MINES (2).

Near Beattyville.

P. O. Beattyville.

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

Operated (the last quarter of the year) by the Eureka Beattyville Coal Co., C. C. Early, President; Geo. J. Ogle, Secretary; J. C. Burnett, Treasurer; C. E. Hokenson, General Manager (Beattyville). Head office, 307 Fifth St., Louisville, Ky.

Output of bituminous coal for 1896, in tons: Lump, 507.00; nut, 96.00; slack, 60.00; nut and slack, 44.00. Total, 707 tons.

1. Visited by Assistant, May 27th. Both mines had been idle since January 10th. In March they were sold at Sheriff's sale, Mr. Logan Thomas being reported as the purchaser.

2. Visited by Assistant, August 29th. The mines were still idle. On October 1st, the present company began operations. There

being much to do in the way of cleaning up, etc., no coal was gotten out until November 18th.

3. Inspected by Chief, December 29th. *The Old or No. 1 Arent Mine.*—The following notice was served: "As you are aware, the work on the right-hand entry off of the 5th Left, known, I believe, as the 'Stamp' entry—the only entry on which mining was in progress—is without ventilation. I note the fact that work is in progress to send a ventilating current to it. Care should be taken to have the air pass within 60 feet of less of all working-faces—in rooms on both sides of entry, as well as face of entry. Much timbering is needed on the Straight Main entry (much of that which has been done, being only of a temporary nature, while many places yet need to be timbered), and the roof needs to be brushed in a number of places. This having been discussed with the bank-boss, he knows the places. On account of the vertical joints in the material forming the roof, with tendency of the latter to break close over props, the roof will require constant attention—frequent scaling of roof (often involving the re-setting of posts), and setting of additional props. Much care will have to be observed in rooms also."

The New or No. 2 Arent Mine.—The following notice was served: "No coal being run, there was no fire in the furnace, hence determinations of volumes of air supplied could not be made. I could see, however, that the air does not travel up to the work toward the head of the 1st Right entry, since the break-through to the air-course where the mine-pump sets, is open. Said break-through should be closed with a door so long as work is carried on on the 1st Right entry. Additional sets of cross-timber should be put in on the slope, in the space between the two courses near the mouth, and the roof of the slope needs to be scaled in a number of places. Additional posts should be set between the tracks at the lie-way on the 1st Right entry, opposite the break-through leading to the pump."

"The bank-boss, with whom I discussed the matter, will know the places to which I refer."

BEATTYVILLE MINES.

Near Beattyville.

P. O. Beattyville.

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

Output for 1896, in tons: Lump, 1,481.84; nut, 367.00; run of mines, 1,439.48; mixed lump and nut, 2,300.00. Total, 3,311.32 tons.

The mines were closed in March and were idle practically all the following portion of the year. In May they were purchased (or leased) by the Kentucky River Coal Co., T. H. Shaw, President; Robert Wallace, Vice President; J. P. Amsden, Treasurer. They are now (February, 1897) controlled by the New Beattyville Coal Co., an incorporated company, with the following stockholders, named in the articles of incorporation: A. B. Eldridge, Daniel Eldridge, Thos. S. Hays, G. W. McCready, Llewellyn J. Pryse, N. A. Richardson. President, D. Eldridge; Secretary, G. W. McCready.

When visited by the Assistant on May 27th, some prospecting was being done, but no mining. The No. 1 bank was reported as abandoned. Another visit was made by the Assistant on August 29th, but the mines were still closed. On December 29th they were visited by the Chief. Preparations were making for resumption of work in No. 2 bank. No. 3 was closed and since, according to H. C. Messer, bank-boss, that bank is "nearly all drawn out" it is presumed that no early effort will be made to re-open it. A general examination was made of the No. 2 bank. The only work in progress was the cleaning of ditches along the Main entry and draining of water away from the furnace—said work having been commenced on the preceding day. It was apparent that much timbering would be required on the entries to make them safe, on account of the manner in which coal had been taken out before the mine was shut down, but they had stood better than one might have expected—less slate down than the Inspector was prepared to find, though there were many dangerous places.

CRYSTAL CREEK MINES (2).

Near Beattyville.

P. O. Beattyville.

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

Operated by the New Crystal Creek Coal Co., C. Heaps, President; R. Birch, Vice President; W. W. Carr, Secretary and Treasurer.

Output of bituminous coal for 1896, in tons: Lump, 1,941.00; nut, 166.00; run of mines, 3,378.00; slack, 22.00; nut and slack, 172.00; fuel and local not included in grades, 150.00. Total, 5,829 tons.

1. Inspected by Assistant, May 27th. *The Old or No. 1 Mine.*—Eight persons were employed inside, all on the right of Main entry. No artificial means for ventilation had been provided, but the ventilation obtained by natural means was not bad. Other conditions were good.

The New or No. 2 Mine.—Eleven persons were employed inside, all on Main entry, on which five rooms had been turned. All rooms save the first were without ventilation. Drainage and timbering were good.

2. Inspected by Assistant, August 29th. *The Old or No. 1 Mine.*—Nine men were employed inside, drawing pillars and stumps on the right of Main entry. All things being considered, conditions were fair.

The New or No. 2 Mine.—The bank was idle. Most of the places were ahead of the artificial ventilation, but were getting some current from old works. Main entry was too wet. Other entries and the rooms were dry. No dangerous top seen on entries. Rooms fairly well propped.

3. Inspected by Chief, December 29th. *The Old or No. 1 Mine* was abandoned, as worked out, in October.

The New or No. 2 Mine.—Respecting this bank, the following notice was served:

"As you are aware, there is practically no ventilation in the workings on the 1st Right entry, especially toward the head, where the atmosphere is very bad and charged with black-damp from the

old workings. A strong current of air must be sent through the workings on that entry, so as to keep the air fresh and free from smoke and the deleterious effects of black-damp. One trouble about the ventilation of the mine, aside from insufficient quantity of air, is that gunny sacks are used for curtains, and of course the air passes through them as if through a sieve. Better cloth should be used, or at least the sacking should be treated with tar and sawdust and doubled. But whatever means may be resorted to, all the working parts of the mine positively must be given thorough ventilation."

SOUTHEASTERN DISTRICT.

Output of bituminous coal, in tons, 1,056,463.74.

Output of cannel in tons, 40,121.80.

Total coal shipped from mines, in tons, 1,057,704.22.

Employees for 1896: Maximum, 4,037; average, 3,086.

Average number of days worked, 140.2.

BELL COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 3,916.75; nut, 1,528.00; run of mines, 40,198.61; slack, 49.20; mixed lump and nut, 6,760.75; pea, 3,056.00; nut and slack, 590.00; pea and slack, 622.00; nut, pea and slack, 742.00; "miscellaneous," 22.50; fuel and local not included in grades, 770.00. Total, 55,555.81 tons.

Output of cannel for 1896, in tons, 33,978.15.

Tons of coke produced for 1896, 7,392.22.

BENNETT'S FORK MINE.

Near Middlesborough.

P. O. Middlesboro.

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

Operated by the Bennett's Fork Coal Co., J. F. Grant, President

and Treasurer; George Luke, Secretary; Hugh Drummond, Superintendent.

Output of bituminous coal for 1896, in tons: Lump, 243.75; nut, 106.00; run of mines, 162.50; net and slack, 195.00; fuel and local not included in grades, 90.00. Total, 797.25 tons.

This is a new mine, originally opened, in Mingo Mountain, about $2\frac{1}{2}$ miles from Middlesborough, by the East Mingo Coal Co. The present company acquired the property on May 20th, 1896. The mine is reached by the Middlesborough Belt Railroad. Mining operations have been confined principally to driving two parallel entries. Two visits were made to the mine. When visited by the Assistant, on June 9th, the entries had been driven only a short distance. No rooms had been opened. When examined by the Chief, on October 19th, the entries were about 200 or 300 feet long and two rooms had just been broken off. Five miners were at work. The bank is provided with a ventilating furnace.

FOUR MILE MINE.

At Four Mile.

P. O. Pineville.

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

Operated by O. Smith.

Output of bituminous coal for 1896, in tons: Lump, 460.00; nut, 116.00; run of mines, 1,150.00. Total, 1,726.00 tons.

This small mine was opened in 1895, but very little was done then—practically no output. It is essentially a new mine for 1896. The mine is connected with the railroad by a tramway, about three-fourths of a mile long.

1. Inspected by Assistant, March 11th. Fourteen persons were employed inside. There was only one entry, about 400 feet long, with 9 rooms, four on the right and five on the left. The bank had no ventilation and the atmosphere was very bad. An air-shaft had been started.

2. Visited by Assistant June 6th. The mine had been shut down and was expected to remain so for some weeks longer.

3. Inspected by Chief, October 20th. The condition of the mine

had been somewhat improved over what it was in March, since an air-shaft, with a so-called "furnace," had been provided. But, as shown by the notice served, there was no ventilation of consequence. Fortunately, there were only 8 persons employed inside. The Main entry was comparatively short, and the few rooms not very deep. Towards the head of the Main, or "Straight" entry, an entry was being driven to the left. It had gone but a few feet. It was the intention thereafter to break off side entries from that one, which would be known as the Main. Following is the notice served:

"The air-shaft should have a stack, and a fire should be kept in the shaft or 'furnace.' The air must be sent through the rooms on each side of the entry, that are up 60 feet or more, and kept within 60 feet or less of all working-faces. As the work stands, this will require the following: 1. Break-throughs between rooms at every 60 feet. 2. A door on the entrance to the shaft, so that the air will not go directly to the shaft from the Main entry. 3. Curtains on mouths of the rooms on the right of the entry. 4. And one or more (as the case may be) check-curtains on entries so as to start the air properly through the rooms. One of the curtains should be on the Straight entry, just beyond the first room working on the left."

MARY HULL MINE.

At Chenoa.

P. O. Chenoa.

Transportation by the Cumberland River and Tennessee Railroad ($12\frac{1}{2}$ miles), to connection with Cumberland Valley Branch of L. & N. Railroad.

Operated by the Log Mountain Coal, Coke and Timber Co., F. A. Hull, President; H. P. Wyman, Vice President; T. Cairns, Secretary and Treasurer.

Output of bituminous coal for 1896, in tons: Mixed lump and nut, 4,140.75; slack, 49.20. Total, 4,189.95 tons.

Output of cannel for 1896, in tons, 24,559.72.

1. Inspected by Assistant, March 9th. An abundance of air (13,440 cubic feet per minute) was entering the mine and, except that the faces of the slope and the Eleventh Level were too far

ahead of the current, the distribution was good. Rooms were well propped, and no lack of timbering was noted elsewhere.

2. Inspected by Assistant, June 8th. Work consisted only of driving the slope and Twelfth Level, and accompanying air-courses. Except that there was an excess of water on the slope, conditions were good.

3. Inspected by Chief, October 22d. It is deemed well to give in full the notice that was served, as follows:

"Work has been carried too far ahead of the air on the 12th and 13th entries (levels)—the head of the former being 98 feet and that of the latter 150 feet beyond the ventilating current. (Sec. 10 of M'g Law.) As I can testify from personal experience, fire-damp has made its appearance in this mine, and it will not do to carry work, either in entry or in room, farther beyond the ventilating current than is allowed by law. Standing gas was encountered in the 12th entry (level). See section 10 on this point. The volume of air sent to the working places toward the head in entries (levels) 11 and 12 should be increased. I found an undue amount of water standing in entries (levels) 11 and 12—too much for men to have to walk through when going to and from work. I was informed that it was usually kept down by bailing, etc. It certainly should be. (Sec. 3 of M'g Law.) As I have heretofore stated, accumulations of water should not be allowed in the side entries (levels) of this mine. They will certainly cause trouble in affecting the floor and allowing the roof to slide and the top benches of coal to run, sooner or later. Moreover, accumulations of water in the upper lifts of the mine menace the security of men working in the lower ones. This mine should have another outlet. One may readily be made. I have been under the impression that the Assistant Inspector had called your attention to the matter. (Sec. 9 of M'g Law.)"

Ky.

MT. VINCENT MINE.

At Mt. Vincent.

P. O. Pineville.

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

Operated by the Mt. Vincent Coal Co., composed of George Williams, Chas. Moreland, and George Harrison.*

This mine was opened August 10th. When visited by Chief on October 20th, the Straight entry was in about 150 feet. Only 4 miners were then employed, but it was possible to work 8 or 9, and the expressed intention was to increase the force later on.

The output of bituminous coal for 1896, in tons, was as follows: All run of mines, 5,160 tons.

STRAIT CREEK A MINE.

Near Pineville.

P. O. Pineville.

Transportation by the West Virginia, Pineville & Tennessee Railroad (2 miles) to connection with the Cumberland Valley Branch of the L. & N. Railroad.

Operated by the Pineville Coal & Coke Co., Lessee, S. S. Smith, General Manager. (No other officials were named in yearly report.)

Output of bituminous coal for 1896, in tons: Run of mines, 18,419.71; miscellaneous, 22.50. Total, 18,442.21 tons.

1. Inspected by Assistant, March 6th. An ample volume of air was entering for the 60 persons employed inside; and, except in seven rooms which had been broken off of what was essentially a cross-entry from the 3d Left, the ventilation was good. Said rooms (14 persons) had no ventilation, the air not having been turned into them. The new work was well drained and timbered, but the 3d and 4th Right entries (old work) were wet and poorly timbered. Five men were employed in rooms on these entries. It should be said that the condition of their working places was better than that of the entries.

2. Inspected by Assistant June 6th. Working rooms were fair-

*March 1st, 1897. This Company has dissolved, and it seems improbable that much will be done with the mine this year.

ly well propped. No dangerous untimbered top was discovered on the entries. Ventilation was fairly good. Too much water was standing near head of 2d Right entry; elsewhere drainage was good.

3. Inspected by Chief, October 22d. The roof of the Main was cracked and in dangerous condition in several places. Dangerous top was also noticed on the Argent (or 1st Left Cross) entry, near 1st Left, and also overhanging the mouth of first left room on 3d Left entry. The attention of Mr. S. S. Smith was called to the places during the inspection. The air was not reaching the working-places on the 3d Left entry. The 2d Left entry was temporarily idle. The air needed to be carried to the head when work should be resumed.

WEST PINEVILLE MINES.

Near West Pineville.

P. O. Pineville.

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

Operated by the Breckenridge and Pineville Syndicate, Ltd., R. Holmyard, General Manager; Alex. Cameron, Superintendent; Howard Welsh, Mining Engineer.

Output of bituminous coal for 1896, in tons: Lump, 3,213.00; nut, 1,306.00; run of mines, 15,306.40; mixed lump and nut, 2,620.00; pea, 356.00; nut and slack, 395.00; pea, nut and slack, 742.00; pea and slack, 622.00; fuel and local not included in grades, 680.00. Total, 25,240.40 tons.

Output of cannel for 1896, in tons, 9,418.43.

The Company now has two mines in operation, one in the "McGuire cannel" (West Pineville No. 2), and one in the Pineville Seam (West Pineville No. 1). The year's mining was nearly all in the former.

During the year an electric plant, including chain breast coal-cutting machines and a motor, was installed. The machines will work in the No. 2 mine. Several dwellings, including house for Superintendent, were erected.

1. *West Pineville Mine*.—Inspected by Assistant, March 7th. The mine was idle. No fire in the furnace. The furnace was known to have sufficient power to supply an ample amount of air. Except on the 3d Right entry—where ventilation was bad on account of a torn curtain in a break-through on the cross-cut from 3d to 4th Right entries—the conditions for ventilation were good. Dangerous top was noted at one place on the Main, but not on other entries. Much water was standing in a swale crossing 4th and 5th Right entries. This the bank-boss, Mr. George Williams, stated was kept down when the bank was working.

2. Inspected by Assistant, June 8th. The mine was idle and the furnace cold. The 5th Right and Left entries, involving two or three rooms on each, had been driven too far in advance of the ventilating current; air-ways were being pushed forward to remedy the defect. No dangerous untimbered top was discovered on entries, and rooms were reasonably well propped.

3. Inspected by Chief, October 20th. There had been a change of Superintendents and bank-bosses. The following notice was served:

"Although there is a large volume of air (16,800 cubic feet) passing through the furnace when there is a good fire in the latter, the quantity which circulates through the workings on the New Four and No. Three entries is too small. This may be due to accumulations of waste in the air-courses. The check-curtain on the Main, between 5th Right and 6th Right entries, is torn and allows too much air to waste direct to the furnace. A good curtain is required there. *Fifth Right Entry*.—There should be a check-curtain toward the head of this entry, to turn the current into and through the rooms on the right. *New Four Entry*.—As already stated, the volume of air coming to this entry is too small. The head of the entry has been carried too far (100 feet) ahead of the air. No working-face, whether in entry or room, is to be carried more than 60 feet beyond the air. (Sec. 10 of M'g. Law.) A check-curtain is needed toward the head of the entry, to turn the air through the rooms on the right. *No. 3 Entry*.—The head of this entry has also been car-

ried too far (100 feet) beyond the air. See preceding remarks on this point. *Crushed Pillars*.—As you are aware, New Four and No. Three entries are in an ugly and dangerous condition for a considerable portion of their respective lengths, due to crushing of pillars and heaving of bottom. If continued use is to be made of these entries, they must be closely and substantially timbered throughout all portions that exhibit the crush, without delay. Full sets of timber will be required—collars and sills—with considerable bottom spread to the legs, and it is not improbable that in some places inside sets will be required. I fully realize that this means great expense, and I suggest, (as in my conversation with you concerning the matter), that you will doubtless find it more advisable to set these entries aside, and work the coal that is ahead of them by a cross-entry off of the Fifth Right. I urgently request that you give this matter prompt attention—the entries are now in too dangerous a condition (especially for drivers traveling back and forth) to permit of delay. It is questionable whether you can prevent the New Four from closing in, even by using square sets and occasionally relieving the sides and bottom by removal of material; but if continued use is to be made of the entries an effort to protect them by substantial timbering must be made. I inclose a duplicate of this notice to be mailed to your General Manager at your discretion.”

In response thereto the following letter, dated October 30th, was received from Mr. James Roy, Bank-boss:

“Superintendent Richardson handed me your letter (duplicate) of the 24th instant. You say, ‘The check-curtain on the Main, between 5th and 6th Right entries, is torn and allows too much air to waste direct to the furnace.’ You surely observed a trap-door on the Main, just past New Four, and also another trap-door on the Main between 5th and 6th Right entries. There are only five men at work inside of that curtain, and any air that escaped through that hole went in Six Right, then over to Five Right and returned by New Four. The curtain you speak of is on the Main past Six Right, and between Six Right and Six Left. However, the curtain has been fixed. You speak of the volume of air coming to New Four and Three being too small. The trap-door on the Main at New Four

must have been partly open while you was in those entries, for there is an abundance of air there every day. Concerning the crushed pillars on New Four and Three, I will state that when I took charge of the mine July 1st, the pillars were being withdrawn as soon as a room was finished. I stopped all pillar drawing at once, and the mountain has got settled, so that those two entries are precisely the same for the last three months. My intention at first was to abandon those two entries and do as you have suggested, *i. e.*, drive across from Five Right to the head of those entries. I wish I had had the time while you was here to have gone through the mine, but I had an appointment in Pineville, so had to go.”*

The following reply, dated November 11th, was sent to Mr. Roy's letter:

“Upon my return from Western Kentucky I find your favor of October 30th. By reference to my note-book, I perceive the error as to location of the curtain as given in the notice; an error, however, of slight importance, since there is but the one curtain and you so readily identified it. As to the conditions on entries New 4 and No. 3, I see no reason to change my views as to those entries being in a dangerous condition, especially to drivers engaged in hauling coal, and must insist that, if continued use is to be made of them, they must be timbered so as to prevent accident from falls of roof, etc.”

Also the following, under same to date, to Mr. Richardson, Superintendent:

“I have a letter from Mr. James Roy, Bank-boss, with reference to notice served on you concerning condition of West Pineville Mine No. 2. In my reply to Mr. Roy I have insisted that entries New 4 and No. 3 are in a dangerous condition, especially to drivers engaged in hauling coal, and that, if continued use is to be made of them, they must be timbered so as to prevent accident from falls of roof, etc. Mr. Roy seems to be disposed to believe that the measures have settled and that there will be no further movement. Of course, since he is on the spot, watching the ground day by day, his

*The Inspector was accompanied by a young man, an employe, selected by Mr. Roy.

judgment should be better than mine; but from my observations I received the impression that the squeeze will continue—the bottom heaving and top and sides moving—and entries be lost unless fortified with timbering.”

West Pineville Mine No. 1.—This was formerly known as Cumberland Valley Colliery No. 2. When visited by Chief on October 20th, it was being re-opened, but up to that date the work consisted only of cleaning up, timbering, and the driving of a slope from above the old opening. It was thought that a month would elapse before regular mining would commence. The mine had stood up quite well during the long period during which it had been closed.

KNQX COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 59,193.88; nut, 11,286.48; run of mines, 19,658.84; slack, 15,343.48; mixed lump and nut, 75,268.11; pea, 30,378.52; block, 532.00; nut and slack, 4,722.52; fuel and local not included in grades, 656.00. Total, 217,039.83 tons.

Inspections were made both by the Chief and by Assistant Inspector.

ELY BLUE GEM AND BRIER HILL MINES.

Near Flat Lick.

P. O. Flat Lick.

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

Operated by Ely Blue Gem Coal Mining Co., J. P. Davis, President; E. T. Griffith, General Manager. The following persons were named in the list of incorporators: John P. Davis, Enoch T. Griffith, Y. B. Hall, R. Y. Hall, A. L. Herndon, J. B. Smith, Peter Gregory, and Lewis Gregory.

The company has two mines, one in what is regarded as the Jellico Seam, to which the name “Brier Hill” has been given, and one, known as the “Blue Gem,” in what is considered to be the ex-

tension of the “Blue Gem” Coal of the Jellico region. At this writing the mines are little more than straight entries.

Output of bituminous coal for 1896, in tons: Mixed lump and nut, 195.15; fuel and local not included in grades, 21.00. Total, 216.15 tons.

The first work at these mines was done in the spring of 1896. On June 10th, the Blue Gem entry had been driven only about 75 feet. Most of the year was spent in opening up, the first shipment being made on October 10th. In a letter bearing date November 4th, the company stated that only four men were working in the mines, “two in the Jellico and two in the Blue Gem, and they are only driving entries through the crop.”

NORTH JELICO MINES (2).

Near Gray's Station.

P. O. Gray.

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

Operated by the North Jellico Coal Co., J. B. Speed, President; I. P. Barnard, Vice President; C. S. Nield, General Manager, (P. O. Gray); W. A. Jones, Secretary and Treasurer. Head office, 415 W. Jefferson St., Louisville, Ky.

Output of bituminous coal for 1896, in tons: Lump, 55,138.88; nut, 7,344.48; run of mines, 3,911.48; slack, 14,512.48; mixed lump and nut, 72,472.96; pea, 28,031.52; nut and slack, 4,722.52. Total, 186,134.32 tons.

1. Inspected by Assistant, March 12th. There was an abundance of air on the entries and air-courses, but many of the rooms were without proper ventilation since, although they were more than 60 feet deep, the current had not been turned into them. There were four rooms on the 3d Left and 6 on the 2d Left entries off of 5th Main, especially, which had been driven too far ahead of the air. In other respects the mine was in good condition.

2. Inspected by Assistant, June 5th. The ventilation had been much improved—indeed, it was quite good. Drainage, timbering and room-propping were also good.

3. Inspected by Chief, October 17th. There are, essentially, two banks, opening on opposite sides of the tip-house; namely, "No. 4 Main Workings," and "No. 5 Main Workings," each bank having a furnace, its own distinct system of ventilation, and independent haulage.

No. 4 Main Bank.—This was in fairly good condition. Check-curtains were needed near the head in the 5th, 6th and 7th Left entries, to prevent air from spilling from rooms on the left and leaking through the room curtains on the right. A larger volume of air was needed at the head of the 8th Right—too much was being lost by leaks before the upper workings were reached. Shortly after the inspection had been made the air-stack burnt down.

No. 5 Main Bank.—During the dinner hour the air-stack of this bank burnt down, rendering a detailed inspection impracticable so far as concerned ventilation. From a measurement of what current there was flowing in the air-course of the 3d Left (amounting to only 2,900 cubic feet) after the destruction of the stack, it was clear that without the stack there would be not much more than a third enough air entering the bank.

4. Visited by Assistant, November 25th. The air-stacks had been re-built, each one 54 feet in height. The furnaces were doing good work, but on account of a broken anemometer volumes could not be readily determined.

WEST JELICO MINE.

Near Gray's Station.

P. O. Gray.

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

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

Output of bituminous coal in 1896, in tons: Lump, 40.00; run of mines, 15,637.36; fuel and local not included in grades, 238.00. Total, 15,915.36 tons.

About the only improvement of note during the year was a new

*Not to be confounded with an incorporated company of that name in Whitley county. The latter has not yet developed its property.

tipple (nearly completed at close of year) and trestle connecting tipple and foot of the incline leading from the mine.

1. Visited by Assistant, March 12th. The bank was idle, had been for more than a week, and it was not definitely known when work would be resumed.

2. Inspected by Assistant, June 4th. A furnace had been put in since last inspection, but the air shaft being quite shallow and not provided with a stack, the volume of air produced was insufficient. The Main entry (the only entry in the bank) was too far ahead of the air, and was rather too wet near the mouth. No insecure top was noted.

3. Inspected by Chief, October 17th. Two check-curtains were needed on the Main entry, to give the rooms ventilation. Directions to add a stack, 25 or 30 feet high, to the air-shaft were given.

4. Inspected by Assistant, November 25th. The curtains had not been hung and the stack had not been put up. Assurances were given by Mr. Gray that the curtain cloth had been ordered, and that they would be hung as soon as it arrived; that there had been some difficulty about lumber, but that the stack would be put up at once. Word was subsequently received that both matters had been attended to.

WHITSETT MINE.

Near Artemus.

P. O. Artemus.

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

Operated by the East Jellico Coal Co., D. P. Whitsett, President and Treasurer; R. G. Yingling, Vice President; F. G. Tice, Secretary; H. G. Whitsett, Superintendent.

Output of bituminous coal for 1896, in tons: Lump, 3,520.00; nut, 3,809.00; run of mines, 110.00; slack, 821.00; mixed lump and nut, 2,600.00; pea, 2,337.00; block, 532.00; fuel and local not included in grades, 397.00. Total, 14,126.00 tons.

No special improvements during the year.

1. Inspected by Assistant, March 10th. Timbering and room-propping were good. Drainage good except in two rooms on the

Main. Natural means were depended on for ventilation. Directions were given to provide lawful ventilating means.

2. Inspected by Assistant, June 10th. A furnace had been built and ventilation was good. Drainage was good, rooms were fairly well propped, and no lack of timbering was noted on entries.

3. Inspected by Chief October 21st. Two check-curtains were needed on Entry A, one to give proper ventilation to rooms on the right and one to direct the current into 2d Right off of A. There were three or four rooms on the "Belt Line" into which the air current needed to be turned. Following is an extract from the notice served: "In my judgment, unless adequate precautionary measures are observed, you will have trouble in this mine with the roof when development has proceeded farther, on account of the 'dirt-seam' beneath the top bench of coal, and the nature of the floor. Good pillars should be left, and care should be taken not to rob pillars too close up to the entries."

WEBB BROS' MINE.

Near Artemus.

P. O. Artemus.

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

Operated by the Webb Bros' Coal Co., composed of Bert Webb and D. H. Webb.

Output of bituminous coal for 1896, in tons: Lump, 495.00; nut, 133.00; slack, 10.00; pea, 10.00. Total, 648.00 tons.

This is a new mine, opened in the spring or early summer of 1896, about three-fourths of a mile from Artemus. Connection with the railroad is by a tramway about one-fourth of a mile long.

1. When visited by Assistant on June 10th, only a straight entry had been driven, about 200 feet long. It was then expected to open rooms and begin shipments about July 1st.

2. Inspected by Chief, October 21st. The bank consisted of a straight entry, with rooms on each side of it, and an entry turned to the right from it which was called the Main. The announced plan was to turn entries from each side of said "Main" entry. The bank was provided with an air-shaft arranged for a fire at the bot-

tom. The average number of miners employed was about eight. The number ranged from six to twelve. All things considered, the bank was in fair condition, except that the ventilating current needed to be carried closer to the head of the Straight entry, and through the rooms working on the left.

LAUREL COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 83,229.06; nut, 17,151.22; run of mines, 90,383.44; slack, 1,161.70; mixed lump and nut, 53,941.76; pea, 7,564.92; steam, 21,295.74; block, 7,780.92; nut and pea, 2,119.31; nut and slack, 1,156.03; fuel and local not included in grades, 2,709.86. Total, 288,493.96 tons.

Inspections were made both by the Chief and by the Assistant Inspector. Most of the mines were visited four times.

DAISY MINE.

Near East Bernstadt.

P. O. East Bernstadt.

Transportation by the Knoxville Branch of the L. & N. Railroad.

Operated by the Daisy Coal Co., J. C. Pritchard, Manager; W.

H. Litton, Secretary and Treasurer.

Output of bituminous coal for 1896, in tons: Lump, 2,446.00; nut, 432.00; run of mines, 818.00; nut and slack, 380.00; fuel and local not included in grades, 40.00. Total, 4,116.00 tons.

This mine, although opened in November, 1895, was essentially a new mine for 1896.

1. Inspected February 6th, by Assistant. Twenty-five persons were employed inside. An air-shaft had been sunk, but no furnace or other artificial ventilating means had been provided. Drainage was good. No lack of timbering noted.

2. Visited by Assistant, June 10th. The mine was closed, and had been, so it was stated, since May 10th.

3. Inspected by Chief, October 10th. Lawful means for ventilation had not been provided. On the Straight, or Main entry, there was no ventilation beyond the 1st Right entry. Better drainage was needed in that portion of the bank, for which a water-drain was being made at the time of the inspection.

DIAMOND MINE.

Near Altamont.

P. O. Altamont.

Transportation by the Altamont and Manchester Railroad to connection with the Knoxville Branch of the L. & N. Railroad.

Operated by the Diamond Coal Co., J. C. McKee, President; H. C. Thompson, General Manager; W. H. Thompson, Superintendent.

Output of bituminous coal for 1896, in tons: Lump, 14,920.40; nut, 1,098.00; run of mines, 5,561.00; slack, 180.00; pea, 2,002.00; steam, 6,292.36; nut and slack, 35.88; fuel and local not included in grades 55.23. Total, 30,144.87 tons.

1. Inspected by Assistant, February 5th. Sixty persons were in bank, 22 on 1st Right entry, drawing pillars. Ventilation of the mine was defective, and sufficient props were not set in rooms. Drainage good.

At this date there were 35 persons employed in the Wilson Drift—a single entry with rooms on each side opened near the Diamond, and at one time connected with it. The entry had been driven through the hill and an air-shaft sunk to a room about mid-way of the entry. There was no furnace, but ventilation was not very bad. No dangerous top noted. Drainage good.

2. Inspected by Assistant, June 15th. The mine was provided with sufficient ventilating power, but it had been rendered almost useless by falls on the 1st Right entry, where it was located. To correct this, an air-shaft had been sunk near head of 2d Right entry, to which the furnace was to be moved. Under the circumstances, ventilation would have been defective, even had the coursing of the air been good, which it was not.

At this date no work was going on in the Wilson Drift. It had been abandoned early in March.

3. Inspected by Chief, October 15th. The workings on the upper part of 3d Right entry needed more air. An ample volume entered the entry, but it was too greatly reduced by leakage before the upper rooms were reached.

4. Visited by Assistant, November 28th. The mine was idle and no one on the premises.

EAST ALTAMONT MINE.

Near Altamont.

P. O. Altamont.

Transportation by the Altamont & Manchester Railroad to connection with the Knoxville Branch of the L. & N.

Operated by the Green Bros., under the name of East Altamont Coal Co. The firm is composed of M. N. Green, Robert F. Green, and C. L. Green. The duties of Secretary and General Manager fall to C. L. Green.

The output of this mine is shipped through the Diamond Coal Co., and is accounted for in the output reported by that company. The output was small. In the early part of the year the mine was under the control of Wm. Welsh. About May 1st it passed back to the Green Bros. Work was stopped about May 1st and not resumed until about August 1st.

1. Inspected by Assistant, February 4th. Better drainage was needed near the mouth of Main entry. No bad top was discovered. Rooms fairly well propped. Provisions for properly conducting the air had been made, but there was no fire in the air-shaft. Twelve persons were employed in the bank.

2. Visited by Assistant, June 15th. The mine was idle. The underground force had been cut to 5 when Mr. Welsh gave up the mine.

3. Inspected by Chief, October 10th. Seven persons (including driver) were employed inside. The only work was on the 1st Right entry. Ventilation was sufficient for the few in bank, and other conditions, while not all that could be desired with reference to drainage of part of the entry, were, under the circumstances, good enough.

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.

Output of bituminous coal for 1896, in tons: Lump, 14,887.08; nut, 4,859.44; run of mines, 7,708.56; mixed nut and lump, 13,833.04;

pea, 990.48; fuel and local not included in grades, 800.00. Total, 43,078.60 tons.

1. Inspected by Assistant, March 24th. Bad, untimbered top was noted on the 3d Right entry; and on the Main, near 2d Right entry, there was loose slate that needed to be taken down. Rooms fairly well propped. Main entry from mouth to first lie-way was very sloppy. The 2d Right up to Cross-Cut to 1st Right and the Cross-Cut were much too wet. An abundance of air (13,864 cubic feet per minute) was entering the mine for the number of persons (72) underground, but there were 17 rooms on the 1st Right entry not ventilated, since the air had not been turned through them. A check-curtain was needed on 2d Right entry.

2. Inspected by Assistant, June 12th. No lack of timbering or of propping was discovered. Ditches along the entries, especially the Main, had been allowed to fill up to such an extent that drainage was bad. The volume of air entering was sufficient and it was well distributed, except as to 5 rooms on the 2d Right and 12 on the 3d Right, which were at least 60 feet deep, through which the current had not been directed. The rooms had break-throughs.

3. Inspected by Chief, September 9th. The notice served was as follows:

"The condition of the mine was discussed with Mr. J. W. Bastin, General Manager, on the day following the inspection. His attention was called to the fact that certain requirements contained in Notice No. 199, given on June 12th, by Mr. W. U. Grider, Assistant Inspector, had not been complied with, and that the company was therefore liable to fine. It was agreed to stay proceedings a short time upon the understanding that the requirements would at once be complied with, time being given until the mine should be visited again upon my return from Whitley county. This return visit will be made very nearly by the time this supplementary notice reaches you.

"The mine was in a very defective condition when inspected by me on the 9th instant, with respect both to drainage and to ventilation. I have never known it to be in quite so bad a condition.

"Main Entry.—This entry is much too wet and muddy beyond

the lie-way and between the door on the entry and mouth of 3d Right entry for men to have to travel through to and from their work. *1st Right Entry off of 2d Right (2d Right Cross.)*—A curtain was needed to send the air through the rooms on the right. A door on the 2d Right entry, which was hung to cause the air to pass into this entry, is kept propped open. The entry is much too wet for men to have to travel through going to and from their work. *2d Right Entry*.—The ventilation of this entry was defective. A check-curtain, possibly two, should have been hung to send the air into and continuously through the rooms on both sides of the entry. The entry was much too wet for men to have to travel going to and from their work. *3d Right Entry*.—The ventilation was quite defective, due to several causes, namely: There was no check-curtain toward head of entry to cause the air to travel through the rooms on the right—the air which comes from the 2d Right soon gets out to the entry; the curtains in some of the room-necks on the left are torn and some of the bratticing leaks badly; and the volume of air which reaches the working portion of the entry is too small. The entry was too wet and muddy toward the door for men to have to travel when going to and from their work. The shallow sump by the pump was full and overflowing. If there is any ditch leading from it, it was filled up, and as matters stood when water was pumped from the upper sumps it went right on to the entry. *6th Right Entry*.—Very little current was coming to this entry from the 5th Right. It is possible that the door on the Main by the 2d Right was open when I was in this entry, but it is also possible that the air was leaking to the Main before the 6th Right was reached. The head of the entry had been carried too far ahead of the air. *7th Right Entry*.—Here also there was practically no current, and the atmosphere was very smoky and unhealthful. *7th Left Entry and Air-Course*.—There was no ventilation here. A curtain was needed on the Main to turn the air into the air-course. *Note*.—One of the chief causes of the trouble with water on entries is that the ditches have been allowed to fill up with mud and rubbish. These matters were called to the attention of Mr. Roark, at

the time of the inspection, Mr. Roark being bank-boss and accompanying me during the examination."

4. Inspected by Chief, October 14th. The requirements as to ventilation had been fairly well complied with. Drainage, however, showed practically no improvement.

5. Before bringing the failure of the company to improve the drainage as required before the January grand jury it was determined to have another inspection of the mine. Accordingly the Assistant made an inspection on November 27th. He reported a material improvement of drainage—entries that were complained of quite wet, but the water in no place over the cross-ties, hence offering no inconvenience to men going to and from work. The object sought having been accomplished, the case has not been pressed.

MANCHESTER MINE.

Near Altamont.

P. O. Altamont.

Transportation by the Altamont & Manchester Railroad to connection with the Knoxville Branch of the L. & N.

Operated by the Manchester Coal Co., Jno. W. Harris, Treasurer and General Manager; C. R. Coleman, Secretary and Sales Agent.

Output of bituminous coal for 1896, in tons: Lump, 10,380.26; nut, 3,374.42; run of mines, 580.80; slack, 138.30; pea, 128.20; nut and pea, 2,119.31; nut and slack, 604.95; steam, 1,860.90; fuel and local not included in grades, 330.57. Total, 19,517.71 tons.

1. Inspected by Assistant, February 5th. Seventy persons were employed inside, on 1st and 2d Left entries. Plenty of air (18,032 cubic feet per minute) was entering the mine, but, on account of the door on Main entry leaking badly, sufficient air did not traverse the working places. Bad top, poorly timbered, was noted at one point on the Main. The mine is a wet one, but the water was fairly well controlled.

2. Visited by Assistant, June 15th. The mine was shut down on May 8th and had not been re-opened at time of this visit.

3. Inspected by Chief, October 15th. Work was on the 1st, 2d

and 3d Left entries. About 60 men were in bank. Ventilation was defective in all entries. In the 1st Left (6 persons), although plenty of air entered the entry, it did not reach the last working places; the same defect was noted in the 2d Left (40 persons), where although a volume of 10,218 cubic feet per minute was measured near mouth of entry, less than 700 cubic feet reached the last rooms—due to losses by leakage; and the 3d Left (6 persons) had no ventilation. Some dangerous top was observed on the 1st Left entry, to which the attention of Mr. Wilson, Bank-boss, was called during the inspection.

4. Visited by Assistant, November 28th. The bank was idle and no one on the premises.

NEW STANDARD MINES.

Near Altamont.

P. O. Altamont.

Transportation by the Altamont & Manchester Railroad to connection with the Knoxville Branch of the L. & N.

Operated by the Standard Coal Co., a firm composed of James M. Thompson and Jasper Pearl; J. M. Thompson, Manager. (P. O. of the Manager is East Bernstadt.)

Output of bituminous coal for 1896, in tons: Lump, 2,600.00; nut, 890.00; run of mines, 200.00; mixed lump and nut, 2,650.00; pea, 480.00. Total, 6,820.00 tons.

These mines, originally opened and named as above by the Standard Coal Co., during the last two months of 1895 and up to March 6th, 1896, were in the hands of Mr. A. M. Crooke, Lessee, operating under the name of Little Silver Coal Mining Co. By Mr. Crooke they were called the Little Silver Mines, and are so referred to in my report for 1895. They were shut down in January and remained closed until March, when they passed back to the Standard Coal Co. There are four distinct banks, but work in 1896 was in only three of them.

1. Visited by Assistant February 4th. Mines closed and a fence built across the track leading from the tip-house to them.

2. Inspected by Assistant June 15th. Work was confined to the No. 1 Bank. Twenty-five or thirty persons were employed inside.

An air-shaft had been sunk on the Main entry, near head, but furnace had not been built. An excessive amount of water had collected in a swag on the Main, to drain which a ditch was being made. Rooms were poorly propped.

3. Inspected by Chief October 10th. Work was going on in No. 1, No. 2 and No. 4 (called No. 3 in preceding inspections). In No. 1 there were 14 persons (usual force 16 to 18); in No. 2 there were 9, and in No. 4 there were 4. None of the banks had ventilation and drainage was bad.

4. Visited by Assistant November 28th. The mines were idle for the day and no one on the premises. Artificial means had not been provided, although assurances had been given in October by Caleb Litton, Bank-boss, that he was preparing to do so. It is manifest that this company can be effectively dealt with only through the courts.

OLD STANDARD MINE No. 2.

This mine, a short distance from the New Standard, was opened by the Standard Coal Co. (or Pearl, Thompson & Co.), and operated by it up to January, 1896. Some time in that month, it was understood, Mr S. L. Bastin took charge as Lessee, and operated it up to June 1st, when it was permanently shut down. (Old No. 1 was abandoned about the close of 1895.) Two visits were made to the mine, in February and in June, but since the place is closed it is unnecessary to report results of the single inspection (in February) that was possible.

Output of bituminous coal for 1896, in tons: Lump, 240.00; run of mines, 125.00; mixed lump and nut, 1,092.00. Total, 1,457.00 tons.

PEACOCK MINES.

Near Pittsburgh.

P. O. Pittsburgh.

Transportation by Knoxville Branch of the L. & N. Railroad.

Operated by the Peacock Coal Co., W. R. Letcher, President; G. F. Anderson, Secretary; Jno. E. Greenleaf, Treasurer.

Output of bituminous coal for 1896, in tons: Lump, 10,478.32;

nut, 2,029.04; run of mines, 7,537.84; slack, 89.56; mixed lump and nut, 11,699.28; pea, 909.24; fuel and local not included in grades, 114.50. Total, 32,857.78 tons.

1. Inspected by Assistant February 6th. In the Left-hand Bank there were but 6 men working on stumps and within about 100 feet of the mouth. Conditions were good. In the Right-hand Bank (the larger and longest worked mine) there were 73 persons. A volume of 10,500 cubic feet of air was entering the mine and was well distributed. Other conditions were also good.

2. Inspected by Assistant June 11th. The Left-hand Bank was done. The No. 2 Bank was in good condition.

3. Inspected by Chief October 14th. On account of the long, circuitous distance the current had to travel, there was not sufficient air going to the Goff, Frisby and Whitely Extension (Shepherd) entries for the number of persons employed on them. A direct connection from the Frisby to the Whitely Extension entry was being made to remedy the difficulties. Mr. W. C. Webb, Bank-boss, is to be commended for the satisfactory condition in which he has kept this mine.

PITMAN MINE (2).

Near Pittsburgh.

P. O. Pittsburgh.

Transportation by the Knoxville Branch of the L. & N. Railroad.

Operated by the Pitman Coal Co., W. A. Pugh, President; S. V. Rowland, General Manager; Wm. McNeil, Superintendent.

Output of bituminous coal for 1896, in tons: Lump, 11,692.84; nut, 2,241.00; run of mines, 15,253.08; mixed lump and nut, 1,227.96; pea, 2,423.00; block, 6,032.92; steam, 12,160.48; nut and slack, 135.20; fuel and local not included in grades, 362.00. Total, 51,528.48 tons.

1. *Pitman No. 1 (West) Mine.*—Inspected by Assistant, March 24th. The mine was idle and furnace cold, but provisions for conducting the current showed that when working the mine was well ventilated. (The furnace is known to have sufficient power to supply an ample amount of air.) Too much water was standing near

mouth of 3d Left entry; elsewhere drainage was good. Timbering and propping were good.

2. Inspected by Assistant June 12th. Thirty-two persons were employed inside, for whom a volume of 9,216 cubic feet of air per minute was entering. Ventilation was quite good. On part of the 4th Left and Main entries there was too much water; elsewhere drainage was good. Timbering was satisfactory.

3. Inspected again by Chief September 10th, and found in fairly good condition, except that some of the entries were too wet.

1. *Pitman No. 2 (East) Mine.*—Inspected by Assistant, March 24th. The mine was idle. No fire in furnace. It could be seen, however, that with the provisions that had been made for coursing the air the ventilation of the mine, when running, was good. (The furnace is known to furnish plenty of air at the intake.) Except a piece of loose slate on the Main between 2d and 3d Left entries, no bad top was seen. Rooms were fairly well propped. Drainage good.

2. Inspected by Assistant June 12th. Ventilation was quite good. (An intake of 10,500 cubic feet of air per minute, well distributed, for 51 persons.) In the entries on left of Main, where work consisted principally in drawing pillars, there was considerable water (sloppy), but the rooms were dry enough.

3. Inspected by Chief September 10th. Except that there was rather too much water in places, the mine was in fairly good condition.

PITTSBURG MINE.

Near Pittsburgh.

P. O. Pittsburgh.

Transportation by the Knoxville Branch of the L. & N. Railroad.

Operated by the Pittsburgh Coal Co., Jas. D. Smith, President and General Manager; W. B. Neal, Secretary. (No other officials reported.)

Output of bituminous coal for 1896, in tons: Lump, 3,142.28; ant, 500.36; run of mines, 31,172.00; slack, 753.84; mixed lump and

nut, 16,929.28; fuel and local, not included in grades, 598.96. Total, 53,096.72 tons.

1. Inspected by Assistant March 23d. An abundance of air was entering the mine to supply the number of men (77) in bank, but it was not properly coursed in some of the workings. There were five rooms on the 3d Right entry into which the current needed to be turned. A curtain was needed on the 2d Right to hold the air up to the break-throughs in rooms on the right; and the heads of the 3d Left entry and 1st Right off of 1st Right were too far ahead of the air. The Main entry from mouth to a sump between 2d and 3d Right entries was very sloppy, and there was too much water on 1st and 2d Right entries.

2. Inspected by Assistant June 13th. With about 70 persons in bank, there was an intake of 9,765 cubic feet of air per minute. The 1st and 2d Right and 3d Left entries and last two or three rooms turned on each were too far ahead of the air. There were 12 rooms on the 3d Left entry, more than 60 feet deep, through which the ventilating current had not been sent.

3. Inspected by Chief September 9th. The following notice was served:

"The mine was in a very defective condition with respect both to drainage and to ventilation. It was found, also, that certain directions that had been given in Notice 201, based upon an inspection made June 13th, had not been complied with, and your company stands liable to indictment and fine. If said directions are not at once followed, the matter will be placed in the hands of the Commonwealth's Attorney. This notice is served as supplementary to the one mentioned, to cover the condition of the mine as found on September 9th.

"*Main Entry.*—This entry was much too wet and muddy—especially between lie-way and 2d Right entry—for men to have to travel when going to and from their work. *1st Right off of 1st Right Entry.*—The rooms on the right have no ventilation. There was no break-through from room 5 to room 6 and none from room 7 to room 8 on the right, and there was no check-curtain on the entry to send the air into and through the rooms that did have break-throughs.

Break-throughs should have been made between the rooms designated and between all others that are up 60 feet or more. A check-curtain should be hung on the entry between rooms 3 and 4, and one between the last rooms that have break-throughs, so as to cause the air to flow through the right-hand rooms. On the air-course side the ventilating current, also by the use of check-curtains, must be kept flowing within 60 feet or less of the faces as the rooms are advanced. The entry was very wet—too much so for men to have to travel through. *2d Right Entry.*—The ventilation here was very defective, both because of weakness of the current and because proper provision had not been made for coursing the air. Curtains were needed in the mouths of the 10th, 11th, 12th and 13th rooms, counting back from the face of the entry, on the left, and the 14th and 16th room back from the face of the entry needed connection with the air-course on the left. Hence none of the places above the 17th room back from the head of entry had ventilation. There was too much water in places on the entry for men to have to travel through in going to and from work. *3d Right Entry.*—The volume of air coming to this entry was too small. There should be a volume of at least 9,200 cubic feet traveling here, but there is hardly any. A curtain is needed on the entry, between the last rooms back of the break-through into the air-course, to keep the air traveling properly through the rooms on the right. Mr. Grider gave directions for such a curtain to be put up in his Notice No. 201. *3d Left Entry.*—In this entry the current was very weak. There should have been at least 9,200 cubic feet of air traveling here, but there was hardly any. *Note.*—One of the chief causes of the excessive accumulations of water in the various places mentioned, is the fact that ditches and sumps have been allowed to fill up with mud and trash. The attention of Lon Delph, Bank-boss, was called to the matters here noted on the day of inspection, and directions were given to him then as to what was required to put the mine in proper condition. I trust that there will be no delay in complying with the directions."

In response to the foregoing, the following letter, dated September 26th, bearing the name of A. L. Delph, Bank-boss, as writer, was received:

"Your notice of the last inspection of this company's mine having been handed to me, I have carefully noted its contents and I will at once remedy the evils you complain of. I know our air is not as good as it should be, but we have a new shaft going down now which will be completed in a short time, and we intend to build a large furnace that will be sufficient for the mine. You speak of too much mud and water on Main entry between 1st and 2d Right entries. I presume you meant on 1st Right entry. On Main between 1st and 2d Right entry is very dry and has natural drainage. It is dipping at the rate of 4 feet to the 100 feet and the road is corduroyed with wood; consequently, there can't any water stand on that part of the entry. In your notice you state that on the 1st Right off of 1st Right there was no break-through between rooms 5 and 6 and none from 7 to 8. I desire to call your attention to the fact that you measured those rooms yourself and the furthest one in was 55 feet. The law says break-throughs shall be 60 feet apart, but there was a break-through from room 6 to 7. Room 5 was not working, but all those have been connected with break-throughs since you were here. I also desire to call your attention to your notice concerning the 2d Right entry. The rooms on this entry all break off from the air-course, consequently, they are already connected to the air-course, and rooms 15 and 16 had no curtain over mouth, but there was only a distance of 30 feet from mouth of room 15 to mouth of room 16; and I desire to call your attention to the fact that all the places from room 16 to the head of the entry has been worked out and abandoned for more than a year, and rooms 10, 11, and 12 had curtains over the mouth, and rooms 13 and 14 were not yet broke through from entry to air-course, consequently, there could not be curtains put up, nor did they need them. You also speak of mud and water in this entry. You are certainly mistaken about that, for it is as dry as a powder-house, with the exception of the length of two iron rails at the mouth of the entry, where it breaks off of Main entry. I desire to say that I will complete shaft and furnace as soon as possible, and will also hang curtains on entry where needed."

Except as to water on the Main and 2d Right entries, there is

less of denial in the foregoing letter than appears on the face. Mr. Delph is quite right as to the water question, granting that powder-houses are not entirely free from water. The entries that should have been named were the 1st and 3d Right. As to the rooms on the first right off of 1st Right referred to, the apparent differences between the letter and notice seem to be due to confusion of numbers—whether counted from the mouth or from the head of the entry. It was stated in the notice that there was no break-through from room 5 to room 6, and none from room 7 to room 8. Mr. Delph replies that there was one from room 6 to room 7, which is quite true and was not questioned by the Inspector. (It may be remarked here that on October 14th the "break-through" from the 6th room to the 7th, from head of entry, was found to be a hole about 12 inches square.) The room which, by the Inspector's measurement, was 55 feet deep was the 5th room from the head (being the 10th from the mouth). The 8th room referred to in the notice is mentioned in the Inspector's notes as "up at least 60 feet." As to the 2d Right, Mr. Delph says, "All the places from room 16 to head of the entry had been worked out and abandoned for more than a year, and rooms 10, 11 and 12 had curtains over the mouth." This is somewhat confusing. Mr. Delph doubtless counted from mouth of entry when referring to "abandoned" rooms, but seems to have counted from the head when referring to rooms 10, 11 and 12. The Inspector's notes plainly show that the last 8 rooms were idle ("to be worked out from the 3d Right"); that the last room working was the 9th from the head; and that rooms 10, 11, 12 and 13 from the head certainly had no curtains but "were open to the entry." But it was gratifying to find that Mr. Delph did not question the most important statements of the notice, namely, that the ventilation was very defective in all entries, and especially in the 3d Left (16 persons) and 3d Right (26 persons).

4. Again inspected by Chief, October 14th. The following notice was given:

"Changes required in Notice 30a have been made with these exceptions: 1. On the 1st Right entry off of 1st Right no check-curtain had been hung to send air through the rooms on the right.

The entry was still too wet and muddy at one point. 2. The volume of air supplied was not sufficient in any of the entries. I note that you are pushing to completion an air-shaft on the 3d Left; that you expect to have it completed by Saturday (17th) and will then have furnace built at once. When this work is completed, there will doubtless be no trouble about obtaining a sufficient volume. Under the circumstances, legal action is held in abeyance. It is proper that I should withdraw the statements concerning water on Main and 2d Right entries in Notice 30a. They were erroneous. The entries that should have been named are the 1st and 3d Right."

STAR MINE.

Near East Bernstadt.

P. O. East Bernstadt.

Transportation by the Knoxville Branch of the L. & N. Railroad.

Operated by the Star Coal Co., Jonathan McNeill, President; R. J. Morris, Acting Secretary and Treasurer; Geo. W. Harrison, Acting Superintendent. (Last two gentlemen not members of the firm.)

Output of bituminous coal for 1896, in tons: Lump, 5,582.88; nut, 940.96; run of mines, 737.16; fuel and local not included in grades, 188.60. Total, 7,449.60 tons.

1. Inspected by Assistant February 7th. An ample amount of air was entering for the 28 persons in bank. Except that the face of Herron entry and the three last rooms were too far ahead of the current, ventilation was good. Several sets of cross-timber were needed near the mouth of the Main entry. No other lack of timbering noted. Drainage was good, except in a swag near mouth of the Main, where water was standing over the track.

2. Inspected by Assistant June 16th. The mine was idle and had been, according to report, for more than a week. When the bank was running work was confined to working out the 1st Left entry, which was in reasonably good condition.

3. Visited by Chief, October 15th. Mine was temporarily idle and no one on the premises. (Lack of cars.)

4. Inspected by Assistant November 27th. The mine was idle

and no fire in the furnace. A break-through was needed from Main entry to the first room on left of the 1st Right entry, and a curtain was needed on mouth of the latter entry in order to give satisfactory ventilation. Drainage fair. No dangerous unsupported top was observed.

THOMPSON MINE.

Near Altamont.

P. O. Altamont.

Transportation by the Knoxville Branch of the L. & N. Railroad.

Operated by the Thompson Coal Co., a firm composed of H. C. Thompson and W. H. Thompson.

Output of bituminous coal for 1896, in tons: Run of mines, 5,532.00; fuel and local not included in grades, 180.00. Total, 5,712.00 tons.

This is a new mine, opened and equipped since March 1st, 1896. Mr. W. H. Thompson states that they "broke dirt the first day of March and on the 9th day of May mined and put on the cars 58 tons of mixed lump and nut coal." He rates the daily capacity of the mine now at about 150 tons. The mine consists of a single straight entry, with rooms on each side.

1. Inspected by Assistant June 15th. There were 19 men employed in bank. Artificial means for ventilation had not been provided, but an air-shaft having been sunk near the head of the entry, the air was not very bad. Several additional sets of timber were needed near the mouth. Drainage was fair.

2. Visited by Chief October 15th and 16th. Idle each day. (Lack of cars.) The mine was not expected to be running before the 19th. Water accumulates at the head of the entry, in consequence of dip of the latter, and is removed by steam pump. No fire in the shaft and no trustworthy determinations as to air-volumes could be made, under the circumstances. Rooms on the right of entry were closed by curtains, but those on the left were not so well provided.

3. Inspected by Assistant November 27th. Mine was idle and, according to report, had been so since the 19th. No fire in fire-basket. With a fire in the basket the supply of air was sufficient for the number of men (20) employed inside. Provision for conducting the

air properly through all working rooms, however, had not been made. Drainage good. Timbering adequate.

VICTORIA MINES.

Near Pittsburgh.

P. O. Pittsburgh.

Transportation by the Knoxville Branch of the L. & N. Railroad.

Operated by the Victoria Coal Co., L. Baxter, President; E. J. Cornell, Secretary; J. J. Hughes, Treasurer.

Output of bituminous coal for 1896, in tons: Lump, 6,859.00; nut, 786.00; run of mines, 15,158.00; mixed lump and nut, 6,510.20; pea, 632.00; block, 1,748.00; steam, 982.00; fuel and local not included in grades, 40.00. Total, 32,715.20 tons.

1. *No. 1 Mine (Old Bank)*.—Inspected by Assistant February 7th. but provisions for distributing the air properly seemed to be good. A dangerous piece of heavy, loose slate, insecurely supported by timbers, was noted on the Main entry, near 8th Left. The 8th Left entry showed bad roof, with little timbering, but no loose slate was noticed. Drainage good.

2. Inspected by Assistant June 16th. Again the mine was found idle. No fire in furnace, but it seemed that with a fire the ventilation would have been fair. No dangerous, untimbered top was noticed on entries. Rooms well propped. Drainage reasonably good.

3. Inspected by Chief October 15th. Ventilation was defective—none on the 9th Right entry, practically none on the 8th Left, and insufficient on the 8th Right; sufficient air was not supplied. A shaft was being sunk (nearly down) on the 9th Right entry, to remedy the trouble. Drainage was quite defective.

1. *No. 2 Mine (New Bank)*.—Inspected by Assistant February 7th. The mine was idle. According to report work was confined to the 1st Right entry when the bank was running. With a fire in the fur-

nace ventilation on that entry was good. Rooms on left of said entry were very wet. Other conditions good.

2. Inspected by Assistant June 16th. The mine was idle. When running work was confined to the 1st Right, upon which, there was reason to believe, ventilation was good. Drainage fairly good. Timbering and propping, satisfactory.

3. Inspected by Chief October 15th. Rooms on the 1st Right entry were not receiving proper ventilation—the air traveled straight down the entry to the furnace. The 2d Right entry had no ventilation. The volume of air entering the 1st Left entry was too small. It was suggested that it would be wise to sink a shaft at the head of this entry, to be used as an intake. Other conditions were fairly good.

PULASKI COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 14,820.56; nut, 27,009.80; run of mines, 10,350.44; slack, 4,435.60; mixed lump and nut, 11,733.00; pea, 791.56; pea and slack, 86.16; run of mines and steam, 2,187.00; fuel and local not included in grades, 1,123.00. Total, 72,537.12 tons.

Inspections were made both by the Chief and by the Assistant Inspector.

ALPINE MINES.

Near Alpine.

P. O. Alpine.

Transportation by the Cincinnati, New Orleans & Texas Pacific (Cincinnati Southern) Railroad.

Operated by the Richmond Coal Co., Theodore Richmond, President; A. S. Glover, Vice President and Treasurer; E. A. Foster, Superintendent. Head office, Chattanooga, Tenn.

Output of bituminous coal for 1896, in tons: Lump, 1,662.00; run of mines, 2,080.00; slack, 1,859.00; mixed lump and nut, 9,357.00; run of mines and steam, 2,187.00; fuel and local not included in grades, 100.00. Total, 17,245.00 tons.

Ten new buildings and a stable were erected during the year.

1. Inspected by the Assistant March 24th. *Mine No. 2* had no ventilation, and the atmosphere of the mine was very bad. An excessive amount of water was standing in a swag on the Main entry—an inch or so over the track; elsewhere drainage was good. A dangerous piece of top was noted on entry to right off of the Main. Sixteen persons were in bank.

Mine No. 4 was well ventilated. The Main entry was quite wet at the mouth, at the lie-way, and just past the furnace. Drainage was good elsewhere. In response to the notice served the following letter, dated April 10th, was received from E. A. Foster, Superintendent:

"I have your notice of April 1st, 1896, and in reply say that the bad drainage is caused by the heavy rains. However, I have given it my personal attention and the tracks are comparatively dry. You refer to a swag in No. 2. This water is caused by the heavy supply in the ground, and is more than the pump is able to handle. We sometimes abandon work on this account, which has been done in this case; the pump has dried the Main entry and we are ready to go to work again. As to the air in this mine, it will be remedied at our earliest convenience."

2. Inspected by Assistant July 3d. The *No. 2 Mine* was idle; had been so, according to report, for several days. No perceptible change had been made in its ventilation since last inspection. *No. 4 Mine* was also idle and the furnace cold. With a fire in the furnace the ventilation would have been fair. Drainage was much better than when inspected last, though Main entry was still quite wet.

3. Inspected by Assistant November 21st. The *No. 2 Mine* was again idle, and had been so, according to report, since October 30th. It was expected to resume work "in a few days." It was stated that 12 to 15 persons were employed inside when the bank was running. Artificial means for producing ventilation had not been provided, the Superintendent apparently not yet having found it "convenient." The matter has been placed in the hands of the Commonwealth's Attorney. According to report, no work had been done in *No. 4 Mine* since October 30th. The conditions were so unfavorable

that a complete inspection was not attempted. The chief trouble in this mine is the drainage on Main entry and at and near the lie-way.

BARREN FORK MINE.

At Barren Fork.

P. O. Flat Rock.

Transportation by Cincinnati, New Orleans & Texas Pacific Railroad. (Cincinnati Southern.)

Operated by the Eagle Coal Co., J. T. Slade, President; J. F. Jaeger Treasurer; W. L. Carter, Superintendent. Head office, Lexington, Ky. P. O. of Superintendent, Flat Rock.

Output of bituminous coal for 1896, in tons: Lump, 6,509.00; nut, 18,234.88; run of mines, 196.44; slack, 380.00; pea, 791.56; fuel and local not included in grades, 670.00. Total, 26,781.88 tons.

During the year the company thoroughly repaired most of the dwelling houses; built two new pump houses; repaired railroad trestles; and laid 2-inch pipe in all wet mine entries.

1. Inspected by Assistant March 28th. A volume of 8,320 cubic feet of air per minute was entering the mine, to supply 38 persons, and it was well distributed. Propping and general timbering were satisfactory. Working rooms were dry, but there was too much water on parts of 1st, 2d and 4th Right entries.

2. Inspected by Assistant July 1st. Drainage was fair. Ventilation was good. No dangerous, unsupported top was observed.

3. Inspected by Chief October 27th. The mine was in fairly good condition with following exceptions: *a.* The face of the Main entry was much too far ahead of the air; two rooms were also beyond the current. *b.* The head of the 4th Left entry, including a newly turned room, was too far ahead of the ventilating current.

ENTERPRISE MINES.

Near Greenwood.

P. O. Greenwood.

Transportation by the Cincinnati, New Orleans & Texas Pacific Railroad (Cincinnati Southern).

Operated by J. H. Chew, Lessee, under firm name of Enterprise Coal Co.

Output of bituminous coal for 1896, in tons: Lump, 2,869.56;

nut, 4,447.92; run of mines, 223.00; slack, 729.60; pea and slack, 86.16; fuel and local not included in grades, 75.00. Total, 8,431.24 tons.

As stated in the report for 1895, these mines, which consist of five or six separate drifts, are simply openings here and there to gather up scraps of coal left from the old "Greenwood" mines. Little systematic work had been done, or is possible, in any one drift, and while regular visits have been made to the mines, the fact has been recognized that for such work strict compliance with the letter of the mining law could not reasonably be expected.

1. Visited by Assistant March 29th. The old drifts were full of water, practically worked out. It was stated that other openings would be made near the old ones.

2. Visited by Assistant July 2d. There were five drifts working, with from 3 to 7 miners in each. None of the openings had been driven any considerable distance; most of them were just started. Conditions were fairly good, circumstances considered.

3. Visited by Assistant November 21st. An old entry, upon which no rooms had been turned, had been re-opened—the face of the entry having been tapped from the outside. The place was spoken of as a "new opening," and called No. 12. Twenty men were employed in it, all in shallow rooms. An inspection showed the ventilation to be good and the mine dry. It was doubtful, however, whether the bank would be dry in wet weather, since no arrangements for drainage had been made. Men were also at work, in small bunches, at other openings here and there.

ETNA (COGAR CREEK) MINES (2).

Wiborg Station, near Flat Rock.

P. O. Flat Rock.

Transportation by the Cincinnati, New Orleans & Texas Pacific Railroad (Cincinnati Southern).

Operated by the Etna Coal Co., W. C. Curd, President and Treasurer; C. H. Boyer, Vice President; S. L. Boyer, Secretary. (The company is successor to the Cogar Creek Coal Co. It was incorporated in 1896, with S. L. Boyer, C. H. Boyer, J. K. Boyer, J. W. Smith, John W. Frost, and Will C. Curd named as incorporators.)

Output of bituminous coal for 1896, in tons: Lump, 2,721.00; nut, 4,327.00; run of mines, 115.00; slack, 437.00; mixed lump and nut, 2,060.00; fuel and local not included in grades, 258.00. Total, 9,918.00 tons.

During the year the company rebuilt the incline from the mine to the tippie, and materially improved the equipment thereof, including a new boiler for hoisting engine, new drum and gearing and new hoisting rope. Houses were repaired, three tons of track iron were provided, and ten bank cars were added to the mine equipment. Knowing somewhat of the embarrassments under which this company has had to labor, the Inspector deems it not improper to remark that it deserves success.

1. Inspected by Assistant March 28th. In *No. 1 Mine* ventilation was fair, but in order to render it really good two break-throughs were yet to be made and two check-curtains (or doors) were needed. Rooms were fairly well propped, and no dangerous, untimbered top was noted on entries. Main entry was too wet, but working rooms were dry enough. Only seven men were employed inside at time of inspection. There were but 4 persons in *No. 2 Mine*, which consists of a single straight entry with rooms. Conditions were fairly good. One room was ahead of the air. In *No. 3 Mine*, a single entry with rooms on each side, only 5 persons were employed. Ventilation was bad—all working places too far ahead of the air.

2. Inspected by Assistant July 2d. In *Mine No. 1* there were 20 persons. An abundance of air was entering, and but for the fact that break-throughs throughout the mine were almost filled with rubbish the ventilation would have been good. Propping and timbering were, in general, satisfactory. Main entry too wet, but rooms fairly well drained. The *No. 2 Mine* was idle. When running only 4 persons were employed in it. *Mine No. 3* was also idle.

3. Inspected by Chief October 28th. By a connection from *No. 1* to *No. 2* the two banks have been converted into practically one mine, here spoken of as *Mine No. 1*. The following notice was served:

"1. The volume of air supplied to the mine is not sufficient in any of the entries. In *No. 2* entry the difficulty seems to be due in

part to a fall in the return air-way; but in the Hunnicut entry (i. e., the 1st Right off of 1st Left off of *No. 1*), the deficiency is most largely due to failure to have an adequate fire maintained at the air-shaft. More air must be supplied to both entries, and it must be carried to within 60 feet or less of the head of each—work toward the head now being much too far beyond the current. 2. Both entries (*No. 2* and the Hunnicut) need to be given better drainage, or at least to be kept cleaner and freer from water. On the Hunnicut the sump is allowed to overflow and back up into the entry. This should be remedied."

The *No. 3 Bank* was not subject to inspection.

INDIAN CREEK MINES (2).

Near Cumberland Falls Station.

P. O. Parker's Lake.

Transportation by the Cincinnati, New Orleans & Texas Pacific Railroad (Cincinnati Southern).

Operated till November 30th by the Kentucky Coal Co., Less e, or Receiver therefor; Ed. Bowen, President; J. D. Cain, Treasurer and Superintendent; R. L. Bruner, Receiver. On November 30th the property passed back to J. C. Parker, original owner, and during December was operated by him.

Output of bituminous coal for 1896, in tons: Lump, 1,059.00; run of mines, 7,736.00; slack, 1,030.00; mixed lump and nut, 316.00; fuel and local not included in grades, 20.00. Total, 10,161.00 tons.

1. Inspected by Assistant March 28th. An abundance of air (11,980 cubic feet per minute) was entering for the 33 persons employed inside, but some of the working-places were not sufficiently ventilated. On the 2d Main entry there were 10 working rooms, more than 60 feet deep, through which, although they had break-throughs, the current had not been sent; and the curtains on rooms on the 1st Main were in such bad order that ventilation was bad in the work on the upper part of the entry. Bad top, needing to be timbered, and some loose slate needing to be pulled down, were noted on the 2d Main. Near mouth of 2d Main and at 1st Right off of 1st Main there was too much water.

2. Inspected by Assistant July 2d. No dangerous untimbered

top was discovered in entries or rooms. Drainage fair in entries and rooms dry. The mine was idle and no fire in furnace. According to report work was confined to rooms on 1st Main and side entries when the bank was running. There was reason to believe that with a fire in the furnace ventilation there would have been sufficient.

3. Inspected by Chief on October 28th. The mine was idle (had been for three days) and furnaces cold. A squeeze had cut off the former workings on the upper portion of No. 2 Main, and work was confined to an entry driven to the right. Arrangements for distribution of the air were good (except that head of No. 1 Main including two rooms was too far ahead of the current), and there was reason to believe that with fire in the furnaces the ventilation (with exception noted) was good. Each Main was provided with a furnace, the workings on the two being quite distinct since the squeeze. The general condition of the then workings on No. 2 Main was good. On No. 1 Main side there was much water in the 1st Left, the accumulation of three days. It was stated that when bank was running the entry was kept clear of standing water. Otherwise the then workings on No. 1 Main were in fairly good condition.

WHITLEY COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 136,256.76; nut, 69,578.47; run of mines, 120,130.55; slack, 21,583.05; mixed lump and nut, 16,044.43; pea, 17,240.08; nut and slack, 17,597.18; pea and slack, 1,489.30; nut, pea and slack, 9,152.70; round, 1,410.25; lump, nut, pea and slack, 26.00; "miscellaneous," 6,662.00; fuel and local not included in grades, 5,666.25. Total, 422,837.02 tons.

Production of cannel, 6,143.65 tons.

Inspections were made both by the Chief and by the Assistant Inspector.

BIRD EYE-JELICO AND VANDERPOOL MINES.

At Halsey.

P. O. Halsey.

Transportation by Jellico, Birdseye & Northern Railroad to connections at Jellico.

Operated by the Bird Eye-Jellico Coal Co., E. T. Halsey, President; W. C. Nones, Vice President; Ben W. Robinson, General Manager; W. M. Graham, Secretary.

During the year the following noteworthy improvements were made: Shaking screen and new chutes for handling coal from the Vanderpool and No. 3 Jellico mines; new dummy trucks for the Birdseye incline; 30 new dwellings for miners. A new mine in the Dean seam was opened, and an incline from it down to the Vanderpool level was built.

Output of bituminous coal for 1896, in tons: Lump, 19,134.15; nut, 9,606.69; run of mines, 8,054.37; slack, 2,820.13; pea, 704.58; nut, 9,606.69; run of mines, 8,054.37; slack, 2,820.13; pea, 704.58; nut and slack, 2,701.78; nut, pea and slack, 440.70; pea and slack, 925.00; round, 1,410.25; lump, nut, pea and slack, 26.00; fuel not included in grades, 738. Total, 46,561.65 tons.

Output of Birdseye cannel, 6,143.65 tons.

The company operates three mines, namely, the No. 1 Birdseye (consisting of one group of banks), the No. 3 Jellico and the Vanderpool. In September an opening was being made in the Dean coal, (about 40 feet above the Vanderpool), with a view to the possible development of that seam.

1. A partial inspection was made by Assistant on March 20th. Except as to ventilation in the No. 1 Birdseye, the mines, while not up to the standard required by law, were not in very defective condition. Mr. Ben W. Robinson, who had recently taken charge as General Manager, was taking active steps toward remedying such defects as existed.

2. Inspected by Assistant June 22d. The No. 1 Birdseye was closed, and had been since May 1st. It was expected to resume work then about September 1st, possibly sooner.

In the No. 3 Jellico there were 59 persons. A volume of 7,650 cubic feet of air per minute was entering the bank, and the current was kept well up to faces of working places, except the faces of 2d and 3d Left and 2d Right entries. In said entries break-throughs toward the air-course had been made, but the air-courses were behind. The mine made much water, but the latter was being fair-

ly well controlled. Propping and timbering generally were satisfactory.

In the *Vanderpool Mine* an ample volume of air was entering for the number of persons employed inside, and the current was well up to working faces except in four rooms on 3d Left off of 2d Main; a check-curtain was needed to send the air into said rooms. Some loose slate, needing to be pulled down, was noted on 3d Left entry off of 2d Main. Elsewhere the top was good. Rooms were well propped.

3. Inspected by Chief September 18th. The condition of the respective banks was as follows:

1. *No. 1 Birdseye, Shop Entry Bank*.—In fair condition with the exception that a door was needed on Main entry, between the Bowdler entry and the break-through from the Main into the Bowdler air-course. Preparations for hanging said door were under way before the Inspector left the bank.

2. *Birdseye No. 2 Bank*.—In fairly good condition, except that there were four working rooms through which the ventilating current was not sent.

3. *No. 3 Jellico Mine*.—The ventilation was quite unsatisfactory. The supply of air was insufficient and on the second and third Right entries the current was not traveling steadily through the rooms within lawful distance of faces. In this bank it is particularly necessary to have a good volume of air flowing near the faces, on account of the rooms being quite low. Otherwise, the bank was in fair condition.

4. *Vanderpool Mine*.—An abundance of air was entering for the number of persons employed and with a few exceptions it was fairly well distributed. A check-curtain was needed on 3d Left off of 2d Main, between last two rooms; and the current needed to be turned into the rooms on the 3d Left air-course off of 2d Main. In other respects the mine was in good condition.

Subsequent to service of notices concerning the condition of the mines as indicated in a general way, above, the following letter was received from Mr. Robinson, under date of September 28th.:

"Your notices in regard to condition of mines received. We have

made the necessary changes in No. 1 and Vanderpool. In No. 3 or Jellico we are rushing the overhead air-way and expect to have it complete in two or three days. Have gone over all brattices and doors. Think when we have overhead air-way complete it will be all right for a while. Will do the best we can."

CENTRAL JELICO.

Near Pleasant View.

P. O. Pleasant View.

Transportation by Knoxville Branch of the L. & N. Railroad.

Operated by the Central Jellico Coal Co., J. P. Mahan, President; T. B. Mahan, Vice President; S. E. Mahan, Secretary; J. W. Siler, Treasurer. Superintendent of Mines, John Phillips.

Output of bituminous coal for 1896, in tons: Lump, 5,760.12; nut, 15,963.96; run of mines, 9,841.28; slack, 1,976.00; pea, 5,680.50; fuel and local not included in grades, 151.00. Total, 39,372.86 tons.

1. Inspected by Assistant March 21st. On account of a fall of slate in the air-way between the fan and entry 18, entries 18, 19 and 20 were not receiving sufficient air. Moreover, the heads of said entries were too far ahead of the ventilating current. Entries 14, 15, 16 and 17 were well ventilated. Dangerous, insufficiently supported top was noted on entry 17 where four men were pulling stumps. On Main entry between Entries 19 and 20 there was too much water.

2. Inspected by Assistant June 24th. Again there was too much water on Main between Entries 19 and 20. Doors and curtains throughout the mine were in bad condition. Supply of air was ample, but too much was lost by leakage. No lack of timbering on entries or of propping in rooms was noticed.

3. Inspected by Chief September 19th. It is deemed well to give the notice served in full, as follows:

"*No. 18 Entry*.—Another break-through should be made between room 28 and the preceding one, so as to bring the air closer to the face of room 28. A check-curtain should be hung on the entry between rooms 45 and 46, and the ventilating current carried through the rooms on the left and kept within 60 feet or less of the faces.

No. 19 Entry.—In room 36 more timbering should be set towards the

face. Another break-through should be made from room 34 and the rear one closed. The curtains on rooms 32 and 34 leak badly, and the current entering room 36 is in consequence too weak. Only 2,405 cubic feet of air are passing from room 30 to 32. Since No. 20 Entry is yet to be supplied, and the entire ventilating current is expected to pass this way, there should be about 5,000 cubic feet here. *No. 20 Entry.*—Rooms 22 and 24 having broken into rooms meeting them from No. 19 Entry, practically all the air comes directly through those rooms, leaving the preceding ones on this entry without adequate ventilation. Rooms 22 and 24 should be stopped off from connection with No. 19 Entry. The rear break-through between rooms 14 and 16 should be closed, so that the current will travel closer to the face of room 16. A larger volume of air should be sent to the workings on the upper part of this entry. A check-curtain should be hung on the entry so as to send the air into the rooms on the left, and doors or curtains ought to be hung on rooms 21 and 23 so as to give the current a good start down through the preceding rooms on the left. The attention of Mr. Hummel was called to two dangerous masses of sandstone topping the entry by rooms 1 and 9. Plugs should be driven in the hill-seam on left of the mass at room 1, and a heavy cross-brace or two should be set against the mass hanging over room 9, to serve as means of warning in case the masses tend to move. Mr. Hummel understands the matter. *No. 16 Entry.*—Plenty of air is coming for the two men now working here, but when a larger force is put in it will be necessary to first gather the air together so that a proper volume will travel the upper workings. Now only 464 cubic feet are passing from room 79 to 77. *No. 15 Entry.*—A large volume of air (11,148 cubic feet) comes to this entry, but most of it is lost before the upper workings are reached. Sufficient air does not reach the last working rooms. This should be remedied. The air should also be brought up through the working rooms on the left. This can readily be done by putting a door where the leaky curtain now is (*i.e.*, outside of room 30), and hanging a good check-curtain on entry between rooms 85 and 87 (or between 87 and 89 when the last room on left has a break-through into it from the preceding room). I suggested to Mr. Hummel that the proposed door by room 30 could take the place of the

door now at the mouth of the drift. If a door is now placed at room 30 then all the room-necks from room 30 up to the first working room on the left should be bratticed and a good curtain hung on entry between the last bratticed neck and first working room; with a second curtain above as already suggested. *No. 14 Entry.*—The ventilating current should be carried closer to the men who are pulling stumps. The matter was discussed with Mr. Hummel, and he understands what is to be done. An amply sufficient volume of air comes to the entry to give the men excellent ventilation. I notice that there is a great deal of weight following the retreating stumps—the roof not having broken well. Good props should be set in the entry to prevent accidents. *Corn-bread Entry.*—The three or four men pulling stumps on this entry are receiving all the air required."

4. Inspected November 23d. Ventilation was very good, though the curtains on Entry 15 were torn and there were some losses of air through brattices on the Main, between Entries 19 and 20. No lack of timbering or of propping was noted. Entry No. 15 was too wet near the mouth and just past the curtain on the entry. In two places, for short distances, on the Main between Entries 19 and 20 water stood over the track, but it was understood that usually the siphon kept it low enough.

DOWLAIS MINES (2).

P. O. Jellico.

At and Near Dowlais.

Transportation by the Knoxville Branch of the L. & N. Railroad.

Operated by the East Tennessee Coal Co. E. J. Davis, President; G. C. Richmond, Secretary; W. T. Lewis, General Manager. Main office, Knoxville, Tenn. Address of General Manager, Jellico, Tenn.

Output of bituminous coal for 1896, in tons: Lump, 16,716.00; nut, 2,679.00; run of mines, 19,562.00; slack, 1,539.00; mixed lump and nut, 2,205.00; pea, 4,923.00; miscellaneous, 6,662.00; nut, pea and slack, 469.00; nut and slack, 2,170.00; fuel and local, not included in grades, 1,363.00. Total, 58,288.00 tons.

1. *Old Douclais Mine.*—Inspected by Assistant March 17th. An ample amount of air (13,650 cubic feet per minute) was entering for the number of persons inside, but as a rule it was not kept close enough to the working faces. The mine was making much water, but the latter was kept down very well except in a swag on 3d Right off of 2d Main entry. There were eight rooms on left of 7th Right entry through which the air needed to be turned. The faces of the 1st and 2d Main entries were both too far ahead of the air. Rooms were fairly well propped. No dangerous, untimbered top was observed on entries.

2. Inspected by Assistant June 26th. The bank was idle; no fire in furnace. It was stated that when running work was now confined to No. 2 Entry ("Egypt") and entries turned off of it—distinct workings from those referred to above. The bank was wet but the water was being so controlled that the working-places were dry enough. It appeared that with a fire in the furnace ventilation would have been good. No dangerous lack of timbering or propping was observed.

3. Inspected by Chief September 12th. Work was still confined to "Egypt," work in the main part of the mine having been stopped some months before on account of excessive accumulation of water there, due to inefficient drainage arrangements. In justice to the present General Manager, Mr. W. T. Lewis, it should be stated that so well as could be learned he was in no wise responsible for the flooding of that part of the mine. At the time of this inspection he was having an entry driven from "Egypt" to drain the No. 1 Main, and thus recover the use of the entries thereon. Said drainage entry was intended to bring the water to this bank, after which work would be abandoned here. As outlined to the Inspector, the plans of Mr. Lewis for recovering the No. 1 Bank should prove effective and satisfactory. At the time of this inspection work in "Egypt" consisted of finishing rooms and drawing pillars on the Ross Entry (21 persons); driving one room to the left on the Conley Entry; and driving the above mentioned drainage (or Goins) entry, with a few rooms thereon. More air was needed on the Ross entry and a check-curtain (possibly two) needed to be hung there to cause the current

to flow through the rooms on each side. The roof of that entry needed trimming, and in some instances propping, in several places. The head of the drainage (or Goins) entry was too far ahead of the air, but a break-through to bring the latter up was being made.

4. Inspected by Assistant November 24th. The drainage (Goins) entry was, naturally, quite wet, but the water was under good control. It was expected that the No. 1 Main would be reached by about the middle of December. Ventilation of working places was good.

1. *New Douclais Mine.*—Inspected by Assistant March 17th. Ventilation was good. Some loose slate, needing to be pulled down, was noted on the Main near mouth of 2d Left entry; also on 2d Right, near room 6. Rooms were very well propped. In a swag which crosses all entries turned to right off of the Main, there were excessive accumulations of water on the 4th and 5th Right entries. To give satisfactory drainage, the 5th Right was being driven to daylight. At time of this inspection it was estimated that day-light would be reached within 60 or 70 feet.

2. Inspected by Assistant on June 26th. The mine was idle; no fire in furnace. Work was confined to the Main and to 4th Left and 5th Right entries. The condition of those entries had been improved since preceding inspection. A ditch was being brought from the outside to carry the water away from the 5th, which, when completed would give the mine good drainage. No trouble with water in the rooms or on roads leading to them. Excepting the absence of a necessary curtain in room 7 on 5th Right entry, and an unclosed rear break-through on Main, no defects were observed in provisions for conducting the air.

3. Inspected by Chief September 12th. The ventilation was defective. A check-curtain was needed on the 5th Right entry and one was needed on the 4th Left, to cause the ventilating current to travel the rooms on both sides. The face of the 5th Left entry was too far ahead of the air. Other conditions were satisfactory.

4. Inspected by Assistant November 24th. The check-curtains indicated as necessary on the 4th Left and 5th Right entries had not

been hung. Except for absence of those curtains, ventilation would have been good. In other respects the mine was in satisfactory condition.

KENSSEE MINES (2).

At Kensee.

P. O. Kensee.

Transportation by the Knoxville Branch of the L. & N. Railroad.

Operated by the Hywel Davies Coal Co., Bannen Coleman, President; R. H. Gayle, Secretary; Hywel Davies, General Manager.

Output of bituminous coal for 1896, in tons: Lump, 26,026.00; nut, 2,605.00; run of mines, 14,399.00; slack, 2,014.00; mixed lump and nut, 5,094.00; nut and slack, 11,823.00; fuel not included in grades, 479.00. Total, 62,440.00 tons.

1. *Old Kensee Mine*.—Visited by the Assistant on March 16th. The mine was closed and had been since January 1st.

2. Visited by Assistant June 29th. Mine was still closed. No work since preceding inspection.

3. Inspected by Chief September 11th. The following notice was served:

"All work here consists in pulling stumps on the Main and No. 19 entries. A current of air is entering the Main and traveling toward one of the Procter banks, when the latter bank is working. I measured a volume of 826 cubic feet of air at one point on the Main. It may be that under favorable circumstances as much as 1,000 feet of air enters. The men on the Main would then get sufficient air. But those on No. 19 do not. Moreover, it appears that when the Procter bank is idle the current is reversed or is nil, and black-damp forces its way into this bank. Apparently no effort is made to ventilate this bank. It should be done. The indications are that there will be work here for several months to come. On account of the flow of the soft clay parting in the coal here, under pressure, the coal works as the weight upon it increases, thus causing the roof to work and tend to ride pillars and stumps. It appears that the top hangs some time before breaking, hence the weight upon stumps accumulates. Care should be taken, therefore, to keep a good supply

of strong entry props set, and men making a deep mining should set sprags under the overhanging coal."

1. *New Kensee Mine*.—Inspected by Assistant March 16th. Mine was idle, but there was a fire in the furnace, affording a volume of 24,645 cubic feet of air per minute. Ventilation was quite good except in four rooms in 1st Left off of No. 1 Main and three rooms on No. 2 Main. Drainage was good. Rooms well propped. No lack of timbering noted on entries.

2. Inspected by Assistant June 29th. Mine was idle, no fire in the furnace. Comparatively little work had been done in the mine since preceding inspection, and the condition of the bank at this time was practically the same as it then was.

3. Inspected by Chief September 11th. Workings on both Main Entries (No. 1 and No. 2) were in defective condition as to ventilation.

No. 1 Main.—Part of the air for this bank was coming by way of the No. 2 Main, part was entering through a water-course extending from day-light to the 1st Left entry, and part was coming through a leaky door on the Main entry. The plan was to ventilate the workings of both No. 1 and No. 2 Main by one and the same current. With the number of persons employed, an intake amounting to at least 10,200 cubic feet per minute was required to come to the 1st Left entry of this bank. Somewhat more than that (10,638 feet) was found on the 1st Left, but it was not distributed properly. A check-curtain was needed on 1st Left to afford the rooms ventilation (the current being nearly all on the entry), and the head of the entry had been carried much too far beyond the air. Similar trouble was found with respect to the rooms on the 2d Left—sufficient air was found with respect to the rooms, in consequence of the lack of a necessary check-curtain (possibly two). The face of the entry was 115 feet beyond the air—almost twice too far. With respect to the 3d Left and 5th and 6th Right, it is deemed well to quote in full from the notice served, as follows:

"*Third Left Entry*.—There should be traveling here at least 5,800

cubic feet of air. Passing into the first room on the right that is open to the entry, however, I found only 1,912 feet. It may be possible that the door on the Main, just beyond this entry, was open at the time, since I subsequently found on the Main, between this entry and the 4th Right, 6,267 cubic feet. But there is undoubtedly a large leakage through the doors on the mouths of rooms on the outer stretch of this entry. This was shown by a measurement made in the last break-through from the Main air-course to the Main. I may note that complaint is that the doors on room-mouths on this entry are left open by pushers and others, so that the men in the rooms on the upper part of the entry are cut off from ventilation very often. Special rules should be made against this and enforced. (See section 11 of the Mining Law.) If the bank-boss and bank committee would co-operate in enforcing a rule against leaving the doors open—providing as a penalty the laying off of offenders, or some other effective penalty—much good would result. The face of the entry had been carried 130 feet beyond the air, and three rooms had been opened on that stretch. More attention must be paid to the law's requirement in that regard. *Sixth Right Entry.*—The air is not turned into the entry, dependence being placed on a tendency for the current to split here. But only a small split enters; not sufficient to meet demands for good ventilation. On account of conditions on the 5th Right entry, the larger part of the ventilating current should be turned into this entry, so that it will not only insure proper ventilation here, but will pass more satisfactorily through the rooms on the left side of the 5th Right. The head of this entry was 77 feet beyond the air. The latter should be brought up to it. *Fifth Right Entry.*—The rooms on the right are doubtless now getting all the air they require, but those on the left are not. As indicated above, the larger part of the current should be turned into the Sixth Right entry and from thence sent into the rooms that extend from this entry to that one. A check-curtain should be hung on this entry just back of the last room on the left, and break-throughs between rooms kept every 60 feet, so that the current will properly travel the rooms on the left; thus: (A diagram was given here.)

No. 2 Main.—Following is the notice that was served:

"Work here is at the mercy of conditions in No. 1 Main. Supposedly the entire intake of air for No. 1 Main first enters this bank, but in fact it does not do so. At least half of the current in the No. 1 Main enters from the water-course which leads from the 1st Left entry of that bank to day-light. A measurement showed a volume of 5,626 cubic feet of air entering No. 1 Main bank through said water-course. The ventilation of this bank is quite defective, especially in the upper part. The atmosphere was very foul with lamp-smoke and close beyond the tenth 'spout-hole' on the left. The current is not turned into the rooms on the right by a check-curtain; this should be done. A greater volume of air must be given to this bank, and it must be kept within 60 feet or less of all working faces."

Shortly after the preceding inspections, word was received from the Bank Committee that the condition of the mines had been very greatly improved.

KENTUCKY JELICO MINE.

Near Halsey.

P. O. Halsey.

Transportation by the Jellico, Birdseye & Northern Railroad to connection at Jellico.

Operated by the Kentucky Jellico Coal Co., successor to the Kentucky Birdseye Coal Co., E. B. Taylor, President and General Manager; G. W. Burns, Vice President; George Zoeller, Secretary and Treasurer. (New company was incorporated under the laws of Tennessee, May 6th, 1896.)

Output of bituminous coal for 1896, in tons: Lump, 2,814.90; nut, 673.60; run of mines, 692.80; slack, 512.75; mixed lump and nut, 548.43; nut and slack, 662.40; pea and slack, 564.30; fuel and local not included in grades, 148.25. Total, 6,617.43 tons.

This mine, which was idle the larger part of 1895, remained closed until the new organization began work, about March 16th, 1896.

1. Inspected by Assistant March 20th. The mine had not been fully cleaned up. No fire in the furnace. Doors and curtains were out of order, but were being repaired. With that done and a fire in

the furnace, it seemed that ventilation would be good. Other conditions were satisfactory.

2. Inspected by Assistant June 23d. Mine was idle; no fire in furnace. It was understood that 12 miners were employed when the bank was running, all on a long-wall face between 1st and 2d Left entries. It appeared that with a fire in the furnace the ventilation at said face would be good. There was too much standing water in a swag on 1st Left entry, but it was stated that when the bank was running the water was kept down.

3. Inspected by Chief, September 21st. An ample volume of air was entering for the number of persons (21) employed inside, and it was fairly well distributed, except on the 2d Left road off of 1st Left entry. The left-hand end of said road had been carried about twice too far (119 feet) ahead of the last break-through into the air-course. The face of the air-course was 98 feet behind that of the road. The right-hand end of the road had also been carried too far ahead of the air, but as there were but a few feet intervening before it would break into the air-course of the Main it was evident that the evil would soon be remedied. In other respects the bank was in fairly good condition.

MOUNTAIN ASH MINES.

At Mountain Ash.

P. O. Mountain-Ash.

Transportation by the Knoxville Branch of the L. & N. Railroad.

Operated by the Jellico Coal Mining Co., Arthur Groves, President and Treasurer; Chas. Ducloux, Vice President; H. J. Davis, Secretary; J. L. Williams, General Manager. Main office, 323 W. Clinch Ave., Knoxville, Tenn. Address of General Manager, Mountain Ash, Ky.

Output of bituminous coal for 1896, in tons: Lump, 22,838.00; nut, 8,301.00; run of mines, 17,111.00; slack, 2,861.00; mixed lump and nut, 248.00; pea, 4,087.00; fuel and local not included in grades, 824.00. Total, 56,270.00 tons.

1. *No. 3 Mine.*—Inspected by Assistant March 14th. Except in four rooms on Robinson entry, the faces of which were a few feet be-

yond the lawful limit ahead of the air, ventilation was good. The general condition of the bank was good.

2. Inspected by Assistant June 25th. The bank was idle; no fire in the furnace. With fire in the furnace ventilation would have been reasonably good. Drainage good. No lack of timbering on entries or of propping in rooms was observed.

3. Inspected by Chief, September 14th. Except that a check-curtain was needed on 1st Right off of Entry A, to give the rooms on left of said entry sufficient ventilation, the bank was in fairly good condition.

4. Inspected by Assistant November 23d. In consequence of anemometer being broken, no measurements of air were made, but the supply seemed to be sufficient and it was reasonably well conducted. Two places on Main entry were rather too wet. Otherwise the bank was in good condition.

1. *No. 4 Mine.*—Inspected by Assistant March 14th. The Butcher entry was somewhat too wet (but rooms on it were dry enough); elsewhere drainage was good. Rooms fairly well propped. No lack of timbering noted on entries. Excepting in three rooms which needed break-throughs, and three in which rear break-throughs needed to be closed, ventilation was good.

2. Inspected by Assistant June 25th. The bank was idle; no fire in furnace. The general condition of the mine was fairly good, and there was reason to believe that when the bank was running (with fire in the furnace) ventilation was good.

3. Inspected by Chief, September 14th. The air did not properly travel the upper rooms on left of the 2d Right off of Entry B, in consequence of a check-curtain back of room 10 being torn. A curtain was needed further up the entry than was the one in question. A curtain was needed in a break-through (used for haul-way) from Entry B into a room coming off of 2d Right entry. The face of Entry B was too far ahead of the air. In the 2d Left off of Entry B, room doors on the right leaked too much, and some of them did not close well. Sufficient air did not travel up to the last working-place on the right. The roof of the entry toward the head was dangerous,

requiring to be kept carefully propped. A check-curtain was needed in said entry to properly ventilate the rooms on the left. Except as noted, the mine was in very fair condition.

4. Inspected by Assistant, November 23d. In consequence of anemometer being broken, air-volumes could not readily be determined. The ventilation, however, seemed reasonably good. The mine having been reached late in the afternoon a very thorough inspection could not be made, but so far as it extended the general condition of the mine was satisfactory.

PROCTER MINES.

At Red Ash.

P. O. Red Ash.

Transportation by connections at Jellico with the Knoxville Branch of the L. & N. (North), and by the Southern Railway (South).

Operated by the Procter Coal Co., A. Gatliff, President; J. W. Siler, Vice President; H. F. Finley, Secretary and Treasurer; Philip Francis, Superintendent.

Output of bituminous coal from Procter mines for 1896, in tons: Lump, 13,634.00; nut, 7,993.00; run of mines, 24,257.00; slack, 3,823.00; mixed lump and nut, 2,303.00; pea, 275.00; pea, nut and slack, 2,132.00. Total grades, 54,417.00 tons.

Output from Grinstead mines for 1896, in tons: Lump, 17,784.00; nut, 5,600.00; run of mines, 8,251.00; slack, 2,933.00; mixed lump and nut, 4,544.00; pea, 1,570.00; pea, nut and slack, 5,911.00; nut and slack, 240.00. Total of grades, 47,033.00 tons.

Total grades of the two collieries, 101,450.00; fuel and local, not included in grades, 1,900.00. Total product, 103,350.00 tons.

1. *No. 1 Mine*.—Inspected by Assistant, March 19th. This bank is commonly known as "Short 1." Work was confined to two entries near head of the Main, at this time known as 1st Right and 1st Left entries, though they are not the first entries turned off of the Main. The head of the 1st Right, including two rooms, was too far ahead of the air; and the ventilating current needed to be sent through the first three rooms. On the 1st Left ventilation was good. The 1st Right was too wet; elsewhere drainage was good. Some loose slate needed to be pulled down near face of the 1st Left; elsewhere no dangerous untimbered top was noted.

2. Inspected by Assistant, June 27th. Work was confined to the Hall and Sornsberger entries. Timbering and propping were satisfactory. Two rooms were rather too wet (said to be kept dry when working); otherwise drainage was good. On Sornsberger entry doors were needed in necks of two rooms, to bring the air up within lawful distance of face of the entry. The air needed to be sent through the first four working rooms on Hall entry. Otherwise ventilation was sufficient.

3. Inspected by Chief, September 15th. The following notice was served:

"Hall Entry.—A break-through is needed between rooms 6 and 4 (on right side of entry), through which the air must be sent. In room 10 (on right), another break-through should be made to room 8 and the rear one closed. A check-curtain should be hung on the entry so as to turn the air into the rooms on the left, and cause it to flow steadily within 60 feet or less of all working-faces. Said curtain should be hung at or near to room 14. Care must be taken to have the air kept within 60 feet or less of the faces of all rooms, as the latter are advanced, and this can very easily be done. Most of the air coming to this entry is entering at the end which is open to day. A greater volume should be sent through the rooms on the left. *Sornberger Entry*.—The head of the entry and two working-places on left are too far beyond the air. The latter must be brought up. A check-curtain should be hung on the entry so as to send the air through the rooms working on the left, and the current should be kept within 60 feet or less of the faces as the latter are advanced. In the No. 1 entry, before the turn is made to the right, there is some bad roof which should be shot and timbered. It is dangerous. In Short 1 entry, the top needs further timbering beyond the present sets of timbers. Mr. Ratcliff's attention was called to the places and he will know where they are. The defects noted herein were called to the attention of Mr. Ratcliff at the time of inspection."

The No. 6 Mine.—Inspected by Assistant, March 19th. The volume of intake air was sufficient, but many working-places were far ahead of it—ventilation was bad. Many of the doors and curtains were in bad order, and additional break-throughs were needed. This

was especially true of the Jenkins, Ellington and Logan entries. The Main entry as far as the Ellington was quite sloppy; much water stood over the track near face of the Jenkins entry; at the face of the Woods entry and in the last two rooms there was much water; and on the Logan there were three swags full of water. Other parts of the mine were dry enough. The squeeze, noted in Annual Report for 1895, had continued along the Second Main, Logan and Smitty entries.

2. Inspected by Assistant, June 27th. The mine was not running, but some day-hands were at work and the furnace was going. Ventilation was defective in six rooms on the Jenkins and in 9 on the Ellington entry in consequence of failure to close rear break-throughs. No other defects in ventilation were noted. Three or four sets of timbers were needed on the Woods entry, to support some bad top near room 16. Second Main, Smitty and Logan entries were sloppy. Near mouth of Logan was a pond of water, which the bank-boss, Mr. Ratcliff, stated was kept bailed when bank was running. On 1st Main (or Straight 6) where there had been much trouble with water, drainage was good.

3. Inspected by Chief, September 15th. The following notice was served:

"The volume of air supplied is insufficient in nearly all places where needed. It scatters too much through old rooms, which of course not only increases the amount of friction to be overcome by the furnace, but affords many opportunities for leakage.

"Ventilation was especially bad in the following entries: 1. *The Ellington*.—1. Here there ought to have been at least 2,900 cubic feet passing into the entry from the last open room-neck on the left, but there was less than 800 feet. 2. *First Left off of 3d Right Entry*.—There was very little current here, and the atmosphere was smoky and unhealthful. 3. *Logan Entry*.—There was very little current where the work was in progress here, and the atmosphere was close and smoky and unhealthful. Thorough ventilation must be given all the working-places on the foregoing entries—a good strong volume of air and carried and kept within 60 feet or less of all working-faces. See sections 3 and 10 of Mining Law. There was too much

water on the following entries: Logan, Woods (upper part), Cross-Cut from Smitty to Logan, and the Smitty outside of the Cross-Cut. These entries are in a number of places too wet and muddy for men to have to travel them to and from their work, and the evil must be remedied. See section 3 of Mining Law."

Procter No. 12 Entry Bank.—On September 15th, it was found that preparations were making to put a small number of men at work in the old workings of this bank. An examination was therefore made by the Chief, and the following memorandum was filed with the company:

"When the inspection was made four (4) men were working in No. 12 entry finishing up rooms and drawing pillars, and preparations to do similar work on No. 15 entry were under way. Six men were in the bank on the day of inspection. Care should be taken not only to give these men an adequate volume of air, but to send such a volume as will dilute and drive out the black-damp."

Procter New Bank.—This is an opening opposite the open end of Short 1 of the Procter No. 1. It was started in August, and at the time of the Inspector's visit (September 15th) had been driven only about 100 feet. Two or three persons were employed. The roof was bad at the face and was recognized to be so by the men, who requested to be supplied with timbers, and by Mr. Ratcliff, Bank-boss, who promised to furnish them.

GRINSTEAD MINES.

P. O. Red Ash.

Near Red Ash.

Transportation by connections at Jellico with the Knoxville Branch of the L. & N. (North), and with the Southern Railway (South).

Operated by the Procter Coal Co. See Procter Mines.

For output, see Procter Mines.

Grinstead No. 1.—This mine consists of two practically parallel drifts, known as No. 1 Right or Shop Entry, and No. 2 Right or Ratcliff Entry (the latter extending past the former), with entries turned to the right from each. A single fan serves for both drifts—which are connected by a short cross-entry driven from the head of No. 1 Drift, and connecting with No. 2 back from the first entry turned

from the latter—but they are ventilated by independent currents.

1. Inspected by Assistant March 18th. An abundance of air was supplied for 49 or 50 persons employed inside, and except that the head of 2d Right (Williams) off of the Ratcliff was too far ahead of the air, the current was traveling well up to the working-faces. General condition of the mine was good.

2. Inspected by Assistant June 27th. The mine was idle, but the fan was started for purposes of inspection. A total intake of 28,170 cubic feet per minute was measured. Ventilation, drainage and timbering were all good.

3. Inspected by Chief September 16th. In the No. 1 Right Drift ("Shop Opening") an ample amount of air was started through the bank; but a check-curtain was needed on the Williams (3d Right) entry, and a rear break-through between that entry and its air-course needed to be closed, in order to give it proper distribution through all the workings. In other respects the bank was in first-rate condition. In the No. 2 Right Drift (Ratcliff Entry) plenty of air (21,768 cubic feet per minute) was traveling, and it was fairly well distributed. It was deemed best, however, that the amount of air sent to the 2d Right (Williams No. 2) entry, although then lawfully sufficient for the 8 persons in the entry, should be increased—to satisfy the really practical needs of mining.

Grinstead No. 2.—This mine consists of two practically parallel drifts, known as the No. 1 Left or Lillian Entry, and the No. 2 Left or Main Mallicott. They are served by one fan but have distinct currents.

1. Inspected by Assistant March 18th. An abundance of air was supplied for the 41 persons employed inside, and it was well distributed. Other conditions were also good.

2. Inspected by Assistant June 27th. The mine was idle, but the fan was running during inspection. A volume of 32,676 cubic feet of air per minute was entering, and it was well conducted. The condition of the mine was also good in other respects.

3. Inspected by Chief September 16th. In the No. 1 Left Drift there were only eight persons employed. Ventilation was good enough, except that the head of the entry (Lillian) had been carried

too far (80 feet) beyond the air. In the No. 2 Left plenty of air (22,094 cubic feet per minute) was entering, but improvements were needed in its distribution, as follows: On the Burton entry a check-curtain was needed, near mouth. (A curtain had been there, but it was gone at time of inspection.) On the Mallicott entry an additional check-curtain was needed, on upper part of the entry, and the first and second rooms needed better ventilation. On the Pickett entry, in consequence of a fall, the passage of the current from the entry was obstructed and the volume was small, about 1,400 cubic feet. The quantity was sufficient for the number of persons (6) then working in the entry, however, but would evidently become too weak as more ground should be opened.

It was suggested to the company by the Inspector that the fans be run when men were in bank "making coal" on idle days following a run at these mines, in order that the men might have ventilation. It is hoped that in a spirit of fairness, and as a matter of good policy, the company received the suggestion favorably.

STRUNK MINE.

P. O. Strunk.

Near Strunk's Lane.

Transportation, by the Cincinnati, New Orleans & Texas Pacific Railroad (Cincinnati Southern).

Operated by the Pine Knot Coal Co., A. McDonald, President and General Manager; W. H. Julian, Treasurer; W. B. Shropshire, Superintendent.

Output of bituminous coal for 1896, in tons: Lump, 4,533.00; nut, 5,633.00; run of mines, 17,652.10; slack, 1,806.00; mixed lump and nut, 1,102.00; fuel and local not included in grades, 63.00. Total, 30,789.10 tons.

1. Inspected by Assistant, March 27th. Sufficient air (7,200 cubic feet per minute) was entering for the number of men inside. The faces of the McElwain and Pilon entries were too far ahead of the air, and on the latter entry there were eleven rooms not sufficiently ventilated in consequence of the air not having been turned through them. Elsewhere ventilation was sufficient. The Yager and Fewell entries were too wet. In other respects the mine was in good condition.

2. Inspected by Assistant, June 30th. Mine was idle, had been so for several days and the fan was still. Doors and check-curtains throughout the mine were in bad condition—hence ventilation must have been poor. Entries quite sloppy. Timbering and propping, satisfactory.

3. Inspected by Chief, October 29th. In consequence of the very awkward way of designating entries followed by the bank-boss, when naming them for the Inspector, it is thought that matters may be simplified by giving in full the notice that was served; it is as follows:

"First Right Entry off of 1st Left off of 2d Right off of No. 2, (a 'Fewell' entry); 15 persons.—A check-curtain is needed on upper part of the entry to cause the ventilating current to flow systematically through the rooms on the left.

"2. First Right Entry off of 1st Right off of No. 3.—There are three persons toward the head finishing rooms. If work is to be continued there, more air must be sent to them. The small quantity now going there is much too small.

"3. First Cross Entry off of 1st Right off of 1st Right off of No. 2.—The head of the entry has been carried too far beyond the air. The latter should be brought up and kept within 60 feet or less of the faces.

"4. Second Left Entry off of above mentioned First Cross.—The head of the entry has been carried too far ahead of the air; the latter should be brought up and kept within 60 feet or less of the face of the work. The air must be carried systematically through the rooms on the left; it is not done now, being allowed to pass down the entry instead.

"5. First Left Entry off of above mentioned First Cross; 27 persons.—The check-curtain is poor and torn, and allows too much air to leak down the entry. The head of the entry and two rooms are too far ahead of the air. The latter must be brought up."

TOW WAD MINES.

Near Pine Knot.

P. O. Pine Knot.

Transportation by the Cincinnati, New Orleans & Texas Pacific Railroad (Cincinnati Southern).

Operated by L. E. and D. E. Bryant, under the firm name of Bryant Bros.

Output of bituminous coal for 1896, in tons: Lump, 6,896.59; nut, 10,523.22; run of mines, 30.00; slack, 1,298.17. Total, 18,747.98 tons.

1. Inspected by Assistant, March 27th. At this time the old No. 1 and No. 2 banks were worked out. No. 1 was used as haulage way from No. 3 (new mine), and No. 2 was entirely abandoned.

No. 3 Mine.—Artificial means for ventilation had not been provided and the air was very bad; and yet about 20 men were employed in the bank. An air-shaft was being sunk, and lacked but a few feet of being down. Main entry was very wet. No dangerous lack of timbering or propping was observed.

The No. 2 South Mine.—This is a new mine. The entries were very wet but the working rooms were dry enough. There were 25 persons in bank. Artificial means for ventilation had not been provided, but in consequence of an entry having been driven to daylight, the air under favorable circumstances was not very bad. Other conditions were fairly good.

2. Visited by Assistant, June 30th. The mines had been shut down about May 1st and were still idle.

3. Inspected by Chief, October 28th. Work was in progress in four banks.

No. 3 (Patrick Entry) Bank.—Natural means were being depended upon for ventilation. There were 23 rooms working on the Main (Patrick) entry, but no provision had been made for sending what air did enter the bank through them. That entry was also too wet and muddy. The Carson entry and work thereon was entirely without ventilation.

South Bank No. 1.—In notice served this was referred to as No. 3 Bank. Natural means were depended upon for ventilation. A door or check-curtain was needed to direct any current there might be into the Bradley entry. Too much water was allowed to accumulate on the latter, and the Main was too wet and muddy.

South Bank No. 2, (or Young Entry Bank).—The supply of air was quite inadequate. The small fire-basket used had not sufficient

power, with the short stack that had been built. Three rooms on the Young entry, just beyond the Cross (Cassiday) were without sufficient ventilation—air not sent through them. There were also three rooms on the Cross in the same condition. Two check-curtains were needed on the McRae entry to properly conduct the air through the rooms on the right. The Main (or Young) entry was too wet and muddy.

In response to notices sent concerning the condition of the mines, the following letter, under date of November 6th, was received from Messrs. Bryant Bros.:

"We have your three reports of 1.30.96., and have them arranged for. We have put a furnace on the McRae entry and Mr. Fewell, my bank-boss, is arranging some curtains where you told him. Regarding the wet entries, we do not know how to remedy them in this thin top. The only way we could suggest is to quit mining at all—a thing that will be highly profitable if this depression continues."

THE STEELY MINE.

At Pleasant View.

P. O. Pleasant View.

No track connection with the railroad (Knoxville Branch of L. & N.), but shipments are made nevertheless, cars being loaded by wagon.

Operated by J. C. Steely.

Output for 1896, in tons: Lump, 120.00; run of mines, 280.00. Total, 400.00 tons.

This is a small mine, known in the neighborhood as the Enoch Bird Mine, which entered the commercial list when Mr. Steely obtained control of it in the latter part of the year. The coal worked is the "Blue Gem" seam, the thickness of which ranges from 20 to 24 inches. There are two drifts, one of which, when recently examined, had been driven far enough to have four or five rooms on each side. The second drift had just been started. When recently inspected artificial ventilation had not been provided, although the attention of Mr. Steely had been called to the law upon that question, when it was learned that the mine had become subject of supervision. Very little timbering was being done, but at the time of the inspection no dangerous top was noted. The mine was dry enough.

WESTERN DISTRICT.

Output of bituminous coal, in tons, 1,759,035.13.

Output of cannel, in tons, 3,426.80.

Total coal shipped from mines, in tons, 1,606,005.70.

Emploves for 1896: Maximum, 4,513; average, 3,509.

Average number of days worked, 144.2.

BUTLER COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 12,374.44; nut, 3,859.76; run of mines, 7,627.68; slack, 2,998.32; mixed lump and nut, 62.76; nut and slack, 114.60; fuel and local not included in grades, 1,406.36. Total, 28,443.92 tons.

Inspections were made both by the Chief and by the Assistant Inspector.

ABERDEEN MINE.

At Aberdeen.

P. O. Morgantown.

Transportation, Green river.

Operated by the Aberdeen Coal & Mining Co., I. B. Wilford, President; J. D. Render, Secretary; E. P. Aspy, Treasurer and Superintendent.

Output of bituminous coal for 1896, in tons: Lump, 8,025.12; nut, 2,547.40; run of mines, 5,280.36; slack, 1,974.80. Total, 17,827.68 tons.

1. Inspected by Assistant May 4th. The mine was idle, hence there was practically no fire in the furnace. Arrangements were such that with a fire in the furnace the ventilation would be satisfactory. No dangerous top was discovered. No trouble with water.

2. Again inspected by Chief August 10th. With the exception that the faces of the 2d and 3d Left entries were too far, by a few feet, beyond the ventilating current, the condition of the mine was good. Proper notice was given.

3. Again inspected by Assistant October 9th. All conditions were satisfactory, directions given in August notice having been fully complied with.

WEST ABERDEEN MINE.

At Aberdeen.

P. O. Morgantown.

Transportation, Green River.

Operated by James F. Phillips, under the firm name of West Aberdeen Coal Co.

Output of bituminous coal for 1896, in tons: Lump, 4,349.32; nut, 1,312.36; run of mines, 2,347.32; slack, 1,023.52; mixed lump and nut, 62.76; nut and slack, 114.60; miscellaneous (fuel and local not already included), 1,406.36. Total, 10,616.24 tons.

1. Inspected by Assistant May 4th. All persons (18) employed in the mine were working on one entry, the 1st Left. All conditions there were good.

2. Again inspected by Chief, August 10th. The condition of the mine was defective—insufficient ventilation. Proper notice was given.

3. Again inspected by Assistant October 9th. The August notice had been complied with, except that the face of an entry driving from 1st Left to connect with one coming from daylight was still too far ahead of the air. In other respects the mine was in fair condition.

CHRISTIAN COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 7,298.52; nut, 1,578.00; run of mines, 1,997.16; slack, 1,304.00; fuel and local not included in grades, 946.00. Total, 13,123.68 tons.

All inspections were made by the Assistant Inspector.

EMPIRE MINES.

Near Empire.

P. O. Empire.

Transportation St. Louis & Nashville Division of the L. & N. Railroad.

Operated by the Empire Coal & Mining Co., Jno. D. Anderson, President; W. T. Rutland, Treasurer and Manager.

Output of bituminous coal for 1896, in tons: Lump, 7,298.52; nut, 1,578.00; run of mines, 1,997.16; slack, 1,304.00; miscellaneous (fuel and local not already included), 946.00. Total, 13,123.68 tons.

The company operates two mines. The opening of a new one was noted in the report of this office for 1895.

Old Empire Mine.—Inspected April 14th. The mine was idle and had been since the 9th of the month. Work was confined to the 2d Left and 5th Right entries off of Round-the-World entry, when the mine was running. Ventilation for said entries was secured by a fire-basket hung in a shaft connected with Round-the-World entry, and it appeared that with a fire in the basket, the ventilation should be fair. Rooms were fairly well propped. No dangerous, untimbered top was noticed on entries. There was an excess of water in places, on entries, due, however, to the pump being idle (on account of the bank being idle). There was reason to believe that, with the pump running, the drainage would be good.

2. Inspected again August 6th. Again the bank was idle. There was no fire in the fire-basket, (the sole dependence for ventilation, since the fan had been removed to the new mine), and other conditions were such that it was difficult to judge what the ventilation would be with a good fire. It seemed, however, that it would be only fair. Work consisted of drawing pillars and stumps and the bank-boss, Mr. Robinson, thought the mine would be wound up with in the ensuing two or three months. Drainage was fairly good. Working-places were well propped and no unsupported dangerous top on entries was observed.

3. Inspected again November 10th. Contrary to expectations, work was still in progress in the mine, on stumps and pillars. The date for the wind-up was set at January 1st, 1897. Work was confined to the Round-the-World entry, where 26 men were employed. No dangerous lack of timbering was noted on entries, and the working-places were quite well propped. Drainage reasonably good. Ventilation fair.

New Empire Mine.—This is a shaft mine, about one mile and a half northwardly from the old one. The mine is equipped with electric mining machines and motor, which at last accounts were giving satisfaction. Self-dumping cages and shaking screens are used.

When inspected on April 14th the Main entry had been driven

only 21 feet north and south. Five men were engaged setting timbers. The tip-house was being built.

2. Again inspected August 6th. No room mining was being done, but eight or ten men were laying track and sinking a sump. With the fan revolving slowly, the ventilation was good. Water in the mine was well controlled. No dangerous top was noted. Main entry and Air-course had been driven about 100 feet north and south from the shaft. No side entries or rooms had been broken away.

3. Inspected again November 10th. Twenty-two men were employed underground. A volume of 18,237 cubic feet of air per minute was flowing into the mine, and was well conducted. Rooms were well propped and no insecure top was observed on entries. The mine is quite wet, but the water was well controlled.

DAVIESS COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 1,285.24; nut, 431.00; run of mines, 1,099.00; slack, 405.00; fuel and local, not included in grades, 12.00. Total, 3,232.24 tons.

All inspections were made by the Assistant Inspector.

NEW HOLLAND MINE.

At Mattingly.

P. O. Owensboro.

Transportation, Louisville, Henderson & St. Louis Railroad.

Operated by R. E. Overton & Co., a firm consisting of R. E. Overton and J. F. Sommer. For part of the time the firm operated under name of the "New Holland Coal Co." In November the firm went into the hands of a Receiver, Mr. Thos. C. Blair being appointed. Mr. Blair resigned and Mr. J. Ed. Guenther, of Owensboro, was appointed in his stead.

Output of bituminous coal for 1896, in tons: Lump, 1,285.24; nut, 431.00; run of mines, 1,099.00; slack, 405.00; fuel, not already included, 12.00. Total, 3,232.24 tons.

1. Inspected April 29th. Work was concentrated in the last four rooms of 1st Left entry, where 8 miners were employed. Not much timbering was done on entries and not enough propping in the

rooms, but no bad top was observed. There was sufficient air entering the mine to afford good ventilation, but so much of it was lost through a poor curtain on the Main entry and through one on the Furnace entry, that sufficient did not reach the men. The Main entry was too wet and sloppy, but the working-places were dry.

2. Again visited July 17th. The mine was idle and no one on the premises. It was stated by a miner, living near-by, that only 4 or 5 persons were employed when the mine was running.

3. Again inspected October 14th. The bank was idle. It was stated by one of the proprietors (Mr. Sommer), that 6 miners were employed, all on 1st Left entry, when the mine was running. Conditions were reasonably good on said entry and in the rooms. The furnace being cold, no determination of air-volumes could be made. The Main entry was still rather too wet near the mouth.

HANCOCK COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 10,677.80; nut, 1,786.00; run of mines, 280.00; slack, 1,431.00; fuel and local, not included in grades, 240.00. Total, 14,414.80 tons.

Output of cannel for 1896, in tons, 3,426.80.

Inspections were made both by the Chief and by the Assistant Inspector.

FALCON MINE.

P. O. Adair.

Near Falcon Station.

Transportation, Louisville, Henderson & St. Louis Railroad.

Operated by J. J. Eagan & Bros. Members of the firm are, J. J. Eagan, (Superintendent); M. D. Eagan, T. H. Eagan, and J. B. Eagan. Prior to May 9th the mine was operated by the Hawesville Coal Co.

Output of bituminous coal for 1896, in tons: Lump, 8,981.40; nut, 1,194.00; run of mines, 80.00; slack, 989.00; fuel and local, not already included, 240.00. Total, 11,484.40 tons.

1. Inspected by Assistant July 15th. There were 34 persons employed inside, for whom an abundance of air (7,020 cubic feet per minute) was entering, and stoppings, checks and break-throughs

had been provided for conducting it reasonably well; but some of the break-throughs where the current was expected to pass were partially filled with rubbish, thus interfering with the ventilation. The 1st and 2d entries off of the Billy Ford were not provided with drainage and were very much too wet and sloppy. The rooms were fairly well drained. No dangerous unsupported top was observed.

2. Inspected again, by Assistant, October 16th. The drainage was somewhat better than when the mine was last inspected, but the Billy Ford and 1st and 2d Right entries off of it were still too wet. No dangerous lack of timbering was observed, either on entries or in rooms. There were 41 persons in bank, for whom a volume of 4,950 cubic feet of air per minute was entering, some of which, however, was lost through brattices on the Billy Ford (or, as sometimes called, "Main") entry. Curtains were needed on 2d and 3d Right entries off the Billy Ford and two or three of the check-curtains that had been hung were badly torn.

Note.—Subsequent to this inspection, the operators were advised that unless directions to properly drain the mine were complied with without further delay, action would be instituted in court against them. Under date of November 24th they wrote: "In regard to wet entry, we have 1st Right so we can drain it with two boxes every morning. We have cleaned 2d Right and raised it six inches; it is perfectly dry. We have placed curtains where we was ordered. Air is good."

3. Inspected again, by Chief, December 15th. All work had been stopped on the entries hitherto referred to, (the Billy Ford and entries turned from it), on account of water, which it seems was not as readily controlled as was expected, and a ditch to drain the water away from them was under way. The entries in question, being flooded at the time of the inspection, could not well be traversed. Preparations were making to put about 15 men in the 2d Right entry off of the Eagan (the Straight Main), which had been idle for many months. It had not been provided with ventilation. On the Bob Tindle and John Ford entries pillars and some stumps were being drawn. Fairly good precautions were being observed with respect to timbering, but ventilation was poor. Proper notice was served.

HAWESVILLE MINE.

Near Hawesville.

P. O. Hawesville.

Transportation, Louisville, Henderson & St. Louis Railroad.

Shipments might also be made by the Ohio river.

Operated by the Falcon Coal Co., R. B. Pierce, President; N. B. Chambers, Secretary and Treasurer; John S. Adair, Superintendent.

Output of bituminous coal for 1896, in tons: Lump, 1,696.40; nut, 592.00; run of mines, 200.00; slack, 442.00. Total, 2,930.40 tons.

The entire equipment of this mine, a shaft, was provided in 1896. The mine makes much water, which, however, has so far offered no unusual difficulties. Only one cage is (according to rules) used for hoisting and lowering men. It is provided with cover and catches.

1. Inspected, by Assistant, July 15th. The mine was without artificial means for ventilation, though 8 men were employed inside. The bank was making much water, but the latter was very well controlled, and the working-places were dry enough. No insecure top was noted. The coal is reached by a shaft.

2. Inspected again, by Assistant, October 16th. The mine was still making much water, which, however, was well enough controlled. Ten persons were employed inside. None of the rooms were more than 20 feet deep. Artificial means for ventilation had not yet been provided. There was no cover on the cage used for lowering and hoisting men.

Note.—Subsequent to said inspection the company was advised that unless directions that had been given to provide artificial means for ventilation were complied with without further delay, the matter would be carried into court. On November 23d the company wrote that a 10-foot fan was being installed.

3. On December 15th the mine was inspected by Chief. The fan mentioned above had been put up, placed at one side of the hoisting shaft, a compartment having been bratticed off from the latter to serve for ventilating purposes. But, on account of the fan-compartment being open to the hoisting compartment of the shaft, at the bottom, and because of an obstructing sheet of iron (placed over the mine-pump) at the bottom of the brattice (nearly shutting off the

air-course that leads from the bottom of the shaft), the fan was practically doing no good. The air was simply churning down the fan-shaft and immediately up the hoisting-shaft. There was, therefore, practically no regular ventilating current in the mine. This defect was easily remedied and doubtless has been. But even had there been a large volume of air entering the mine, it would not have traveled where needed because of lack of doors or check-curtains and because some of the entries and air-courses had not been connected. The west cage had neither safety-catches nor cover, and directions were given that so long as it was not provided no one should be allowed to ride in it. The east cage was provided with cover and safety-catches; the latter were not up to the best standard, but were not condemned. This mine would doubtless have been found in better condition had not the company met with some discouragements with respect to thickness of coal in driving some of the entries, and was inclined rather to "prospect" for awhile than to go to much expense in the way of mining.

BRECKENRIDGE MINE.

At Victoria.

P. O. Cloverport.

Transportation, Louisville, Henderson & St. Louis Ry. Shipments may also be made by the Ohio river.

Operated by the Breckenridge Cannel Coal Co., Limited, H. V. Harris, Manager; A. Heron, Superintendent. Head office, 351 West Main Street, Louisville, Ky.

Output of cannel for 1896, amounted to 3,426.80 tons.

The re-opening of this mine was noted in the report for 1895. At the time it was not understood that there had been any output in 1895, but later information is to the effect that work of cleaning, preparatory to resumption of regular mining was begun in May, 1895, and that about 1,800 tons of cannel were put out in 1895. It may be well to state that the Breckenridge mines consist of about 16 drifts, some of which have for years been idle and regarded as worked out, while in some of the others pillars and stumps had been drawn, so that any effort to re-open them required that much fallen work be passed through.

1. Inspected July 14th. Mining was confined to Drift No. 6, where 8 persons were employed. Two or three men were employed in other drifts, but they were "prospecting" rather than "mining." Artificial means for ventilation, as required by law, had not been provided for Drift No. 6, but some air was entering from "Old No. 6," and the atmosphere was not very bad. The rooms were dry, but the entry leading to them was very wet and sloppy. No insecure top was observed. Notice to ventilate the mine according to law was given.

2. Again inspected October 15th. Twelve persons were employed in Drift No. 6, but artificial means for ventilation had not been provided. Drainage conditions were about as before—rooms dry but entries wet and sloppy. At this time there were 4 men in Drift No. 4; 2 in Drift No. 5; and 2 in Drift No. 14; all of them being at work within a few feet of daylight.

3. Subsequent to this inspection the attention of Mr. Harris was called to the fact that his company was subject to indictment for failure to give Drift No. 6 lawful ventilation, and he was advised that unless it was done without further delay, the matter would necessarily go before the court. He responded as follows, under date of November 25th:

"I had understood from our Superintendent that on his last visit to the mines, your Mr. Grider had been satisfied that we were doing everything in our power to reach the air-shaft in Old No. 4 Entry, and that in the meantime we were getting some air through old No. 6, and also through the workings of old No. 5, so that, even under present conditions, there was no lack of good air for the number of men employed in No. 6 Entry. However, we have no desire nor intention to evade the law in any way, and I have given positive instructions that no more than five men shall be worked in this entry hereafter until we have succeeded in providing artificial means of ventilation."

Under the circumstances, the mine was not visited in December, as has been intended, the inspection being deferred until early in 1897.

HENDERSON COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 53,036.09; nut, 17,818.88; run of mines, 28,937.22; slack, 13,322.10; pea, 1,593.36; nut and slack, 38.52; pea and slack, 597.88; fuel and local not included in grades, 4,195.60. Total, 119,539.65 tons.

Inspections were made both by Chief and by the Assistant Inspector.

CORYDON MINE.

At Corydon.

P. O. Corydon.

Transportation might be obtained by the Ohio Valley Railroad, but the mine is run for local purposes only, and has no connection with the railroad.

Operated by the Corydon Coal Co. (otherwise Lloyd & Wright), W. H. Lloyd serving as Manager and Jno. Wright as Secretary. Prior to May 9th the mine had been operated (as for several years past) by B. M. Powell.

Output for 1896, in tons: Lump, 2,609.04; nut, 459.80; run of mines, 97.60; slack, 239.04; fuel, 263.80. Total, 3,669.28 tons.

1. Visited by the Assistant, April 27th. Only two men were then employed, and they were engaged in re-timbering the shaft; hence no mining was in progress, and the mine (entered by a single shaft) could not be inspected.

2. Again visited by Assistant July 21st. The mine was idle. The statement was made by Mr. Jno. Wright that when the bank was running four miners were employed, who were engaged in driving a Main entry, and air-course northeast from the shaft. Heretofore work had been carried on southwest of the shaft.

3. Visited again by the Assistant, on October 20th. The mine had been shut down in order to clean the boiler and repair machinery; hence the bank could not be entered.

As stated above this mine is run only to supply local consumption, and since there is but one means of entrance and exit (a shaft about 185 feet deep), no more than 10 men may legally be employed in it at one time.

Since Messrs. Lloyd & Wright took charge they have, as has been intimated, opened up entirely new workings; and they have enlarged the pit-eye so as to increase the daily hoisting capacity of the bank.

HENDERSON MINE.

At Henderson.

P. O. Henderson.

Transportation might be obtained by the St. Louis & Nashville of the L. & N. Railroad, and by the Louisville, Henderson & St. Louis Railroad, the shaft being within a comparatively few feet of each road. The mine, however, is operated only for local trade.

Operated by the Henderson Mining & Manufacturing Co., C. W. Wilson, President; A. B. Sights, Secretary and Treasurer; W. H. Lee, Superintendent.

Output of bituminous coal for 1896, in tons: Lump, 3,075.28; nut, 2,538.28; run of mines, 5,098.64; slack, 1,237.56; pea, 1,278.40; fuel, 1,512.00. Total, 14,740.16 tons.

1. Inspected, by Assistant, April 27th. The mine was in good condition in all respects.

2. Again inspected, by Assistant, July 20th. Ventilation, drainage, and timbering were all good.

3. Inspected again October 20th. Work was confined to rooms on 1st Left entry and air course. The mine was in excellent condition.

PEOPLE'S MINE.

P. O. Henderson.

Near Henderson.

Transportation might be obtained over the St. Louis & Nashville division of the L. & N. Railroad, the mine being within a comparatively few feet of the road, but it is operated only for local trade, the larger part of the output being hauled to Henderson by wagon.

Operated by F. Haag & Bro., who purchased it at Receiver's sale and took charge August 7th. During the first months of the year it was operated by the H. G. Jorris Mining Co., and then under an arrangement with the Receiver therefor, namely, the Ohio Valley Banking and Trust Co.

Output of bituminous coal for 1896, in tons: Lump, 1,892.72; nut, 984.20; run of mines, 1,332.88; pea, 5.48; pea and slack, 597.88; fuel, 324.80. Total, 5,137.96 tons.

Since the Messrs. Haag have had control the mine and surface works have been greatly improved, as, indeed, was imperative. The hoisting rig, including engine and drum, has been overhauled; the tip, screens, and scales repaired; a new casing built for the ventilating fan; buildings repaired, etc. Underground, roads and air-courses have been improved, much timbering done, and the mine generally put into better condition than it had been in for a long time before. The shaft, however, still needs retimbering.

1. Inspected by Assistant, April 27th. The ventilation had been improved since last inspection, and was satisfactory. Some bad and insecurely supported top was noted on the Main and the 1st and 2d Left entries. With one exception the rooms were fairly well propped. Drainage good.

2. Visited by Assistant, July 24th. The mine was idle and no one on the premises—no steam up—hence it could not be inspected. The property was in the Receiver's hands and was to be sold July 27th.

3. Inspected, by Assistant, October 19th. Work was confined to the 1st Left entry and air-course, upon which 6 miners and 2 day-hands were employed. A volume of 1,050 cubic feet of air per minute was traversing the entry and air-course, but was not sent into the working rooms, four of which were more than 60 feet deep. Timbering of roads and rooms was fairly good. No trouble with water.

4. Inspected by Chief, December 12th. It is deemed well to reproduce the inspection notice in full, as follows:

"The curtain on the Main entry should be replaced by a door. It allows too much air to leak directly to the fan. The air-course that leads, on the right, from the Main around to the fan-shaft* should be fortified by strong timbering, in order to save it from being closed in by pressure coming from the old workings. The block of coal, around which the air-course passes, should not be touched.

*A compartment bratticed off from the hoisting shaft. There is but one opening to the mine.

(Mr. Simpson spoke to me of driving a narrow air-course through it, on account of the precarious condition of the present air-course). The mine has been much bettered—it is in better condition than I have found it in for a long time—but there is still much timbering to be done along the Main, at points indicated to Mr. Simpson, in order to save the bank from future damage by crush and creep. I observed a tendency to run the rooms too wide. This must be guarded against. Extra wide rooms and resulting thin and irregular pillars caused the loss of the older part of the bank, with accompanying loss of coal. Since this mine has but one opening and is, at best, a precarious place for men to work in, especial care should be taken to leave large pillars and to keep all excavations thoroughly well propped. The coal will not withstand much pressure, on account of vertical plates of lime that occur in it (causing it to slab off on the smallest provocation), and because of the soft and sulphurous bottom. Rooms should not be driven more than 18 or 20 feet wide, and there should be a pillar of at least 18 feet between them, leaving an entry stump of 30 feet. Bearing in mind that there is but one way of ingress and egress to the mine, and that extra precautions should therefore be taken to make it as safe as possible, it would be better to have the room pillar even larger, the safer plan being to take out 7 yards for room and leave 9 yards of pillar, and cut off the rooms every 60 feet with a road. I only make this as a suggestion, however; but insist upon the first statement as to width of rooms and pillars, and the timbering. I observed quite a prominent bulge in the lining of the shaft, to which the attention of Mr. Simpson, Bank boss, was called. That place should be examined critically, and if any decay is discovered new boards should be put in. I also noticed one place where the lining is gone. It should be re-lined."

BASKETT MINE.

P. O. Baskett.

At Baskett.

Transportation, Louisville, Henderson & St. Louis Railroad.
Operated by the Pittsburgh Coal Co., Thos. C. Blair, Superintendent. (No other officers reported.)

Output of bituminous coal for 1896, in tons: Lump, 31,904.25;

nut, 6,840.00; run of mines, 1,462.50; slack, 11,745.50; fuel and local not already included, 2,095.00. Total, 54,047.25 tons.

During the year many improvements, both surface and underground, were made at the mine. Underground improvements consisted principally in widening and cleaning up air-ways, in timbering, the laying of steel rails on main entries, the opening of an important new air-way, and the making of two new lie-ways on the South entry. The mine cars have been overhauled and re-ironed, and the tipple, screens and chutes have been improved in various ways. A nice lot of brick workingmen's houses was built and all others were repaired. Mr. Blair has, indeed, done much for the security and betterment of the property, and for the greater comfort of those employed thereon.

1. Inspected by Assistant April 28th. North of the shaft, ventilation was good. South of it there was so much leakage through the stoppings along the air-course that sufficient air did not reach the men. No trouble with water. Sufficient propping was not being done. A good deal of poorly supported top was noted north of the shaft, on Cross-Cut, Main and Last East and West roads. Proper notice was served.

2. Again inspected by Assistant July 18th. Some much-needed timbering had been done since last inspection; but more timbering was needed at outer end of the lie-way on the Cross-Cut, and for several yards in on the 1st Right and Left roads off of Main South entry. An ample supply of air was entering the mine, but the check-curtains were in bad order, and in some places where needed there were no checks at all. In no place, however, was the air very bad. Notice 267 was served.

3. Inspected by Assistant October 17th. Since last inspection some important timbering had been done, but still more was needed. On the Cross-Cut (North Side), about 40 feet back of the lie-way, and on Main North entry at and near roads leading to right and left near its head, there was bad and insecurely timbered top. The supply of air entering the bank was ample for the number of persons underground, but it was not kept well up to the men. Additional

curtains were needed and several of those already up were badly torn. No trouble with water. Notice 345 was served.

Note.—Subsequent to the foregoing inspection (on November 21st), the following letter was sent to the company:

"Upon an examination of notices served on you by the Assistant Inspector of Mines (No. 267 in July and No. 345 in October), I find that you are subject to indictment and fine of \$50 a day for failure to comply with directions to keep the air within legal distance (60 feet or less) of the working faces. (See sections 3 and 10 of Mining Law.) I hope you will remedy the evils complained of at once, and strictly comply with the requirements of the law as to keeping the air within 60 feet or less of the men at work, so that it may not be necessary to take action against your company at the next court. Fire-damp in explosive quantity is liable to develop in your mine at any time, and unless the requirements of the law and directions in pursuance thereof given by this office are fully complied with, you run the risk of an explosion, as well as heavy fine."

In response thereto the following letter was received from Mr. Thos. C. Blair, Superintendent, under date of November 23d:

"I am in receipt of yours of the 21st instant. Was very much surprised at its contents, as I assure you if there is anything I purpose doing it is to keep this mine in good condition. Upon receipt of your letter, I sent and investigated the matter and found my mining boss had taken the necessary steps to remedy the complaint, and can state that when your Assistant comes around things will be better."

4. On December 14th a general inspection of the North side of the mine was made by the Chief Inspector. The condition of that side was being bettered. More timbering was still needed, however, especially on the 1st Right Cross, and the air was not traveling close enough to some of the working-faces. Following is part of the notice served: "I regret that you continue the present plan of working the bank. It is far from being a suitable method for the coal you are mining. I refer you to remarks on the subject in my report for 1894, page 127. Under the plan you are now following it is

difficult to properly ventilate the mine, and yet, on account of fire-damp (which, if not detected within recent months, certainly has manifested itself in the mine on a number of occasions and may do so again in large volume at any time), thorough ventilation is absolutely necessary in order to insure safety as well as health to the miners."

It is proper to say that Mr. Blair had been in charge of the mine only about eighteen months and was not familiar with the prior history of the workings. Hence, in response to the foregoing, the following request was received from him: "You refer to fire-damp manifesting itself in the mine on a number of occasions. Will you kindly give me the date of some of the occasions, as I desire to file them. I have tried to keep everything in as good a shape as possible, and I am always pleased to look over your report to catch suggestions."

The following reply was sent: "It is not a new thing for me to refer to the fact that fire-damp has been detected in the Baskett mine. It is probable, or ought to be, that you will find among the papers of the company at Baskett copies of notices wherein such references are made. . . . I can not give you exact dates of all manifestations of fire-damp in the mine, but doubtless you will find memoranda on that point among the mine papers. There may be miners still working with you who have seen it in the mine. On January 8th, 1891, I detected it with lamp-flame, heard it singing, and saw it flash at a drill-hole where a foolish miner was determined to demonstrate its presence. The then bank-boss, Mr. Robert Duncan, told me he had noticed it in a number of places in the mine, and he was quite uneasy when I was there on account of disadvantages he was then working under. In the notice served after that inspection, occurs this paragraph, (Rep. 1891, p. 113): 'Note: Gas (fire-damp) having exhibited itself in this mine, it is particularly essential that an abundance of air shall be sent in, and carried through all the workings, close to the faces. Also, great care should be observed in firing shots, and on very dry, dusty entries it will be well to sprinkle roads. Attention is called to examinations required where fire-damp has manifested itself.' In April,

1892, I again detected fire-damp in the mine, and commented upon it in notice served. See page 172 of 1892 report. See also page 206 of 1893 report. You will also find comments on method of mining and on propping on that page. On February 13th, 1893, I saw the gas burn in a drill-hole, as I find from note-book, but made no comment in notice served. For said notice see page 212 of 1893 report. In 1894 I inspected the mine only once, the other visits having been made by the Assistant. I find no reference to fire-damp in my note-book and none occurs in the Inspection Notice, so I presume that I did not observe any. But I find a memorandum in my note-book to the effect that a miner told me, while awaiting the train at Baskett, 'that a little gas still appears in drill-holes occasionally.' I did not get to the mine in 1895, all inspections of it being made by the Assistant. I find no reference to the gas in his notices, and he 'does not remember having noticed any.' This is sufficient, however, to put you on your guard, I presume, and since it appears that you were not aware that fire-damp had manifested itself in the mine, I am glad you made the inquiry. No mine in which the gas has once appeared can ever thereafter be treated as free from it. In my opinion, not a few of the gas explosions have resulted from failure to bear that fact in mind. The gas is liable to at any time appear in explosive volume, and is so exceedingly treacherous that no chances may be taken with reference to it."

SPOTTSVILLE MINE.

P. O. Spottsville.

Near Spottsville.

Transportation, by Green river and by the Louisville, Henderson & St. Louis Railroad.

Up to February 25th the mine was operated by R. S. Eastin & Co. On that date the firm made an assignment to the Ohio Valley Banking & Trust Co. (Henderson), and the mine was shut down, remaining so throughout the year.

• Output of bituminous coal for 1896, in tons: Lump, 1,773.16; nut, 719.80; pea, 309.48; nut and slack, 38.52. Total, 2,840.96 tons.

A visit was made to the mine on April 28th, before the fact that

an assignment had been made was known, and three other visits were made at intervals throughout the year, upon the supposition, in each instance, that operations might have been resumed.

RANKIN MINE.

Near Spottsville.

P. O. Spottsville.

Transportation by the Louisville, Henderson & St. Louis railroad, and by Green river.

Operated by the Green River Coal and Mining Co., composed of Gwat Rankin, Thos. Lowery and Rankin Eastin.

Output of bituminous coal for 1896, in tons: Lump, 11,781.64; nut, 6,276.80; run of mines, 20,945.60; slack, 100.00. Total, 39,104.04 tons.

1. Inspected, by Assistant, April 28th. Ventilation was fairly good, and there was no trouble with water. No dangerous broken top was noted, but both entries and rooms were carried 20 feet wide, while very few props were set.

2. Inspected, by Assistant, July 17th. The mine was idle and the fan not running. From the disposition of the stoppings, etc., however, and the known effectiveness of the fan, it appeared that ventilation should be good when the fan was running. No loose slate or especially dangerous top was noted.

3. Inspected, by Assistant, October 19th. The Main entry and Air-course were fairly well timbered, but in other entries and in rooms very little propping was done. No loose slate was observed, however. Drainage was all right. For 41 persons employed underground a volume of 4,538 cubic feet of air per minute was entering, which was kept up well to the faces of entries and air-courses, but was not being kept within 60 feet or less of the room-faces. The passway to the air-shaft, which is the second outlet, was so obstructed by falls of top that it was difficult if not impossible to get through it. Notice 347 was served.

4. Inspected, by Chief, December 14th. The brake on the hoisting drum was worthless, since there was no lever to it and no means by which it could be brought into action. The fact that the fly-wheel of the engine had a brake seemed to be deemed sufficient.

Several cogs on the gear wheels of the drum were broken (due, it was understood, to over-winding in consequence of the engine running away), and in event of farther breakage the engineer (with no drum-brake) would have no control whatever over the drum and shaft-cages. Peremptory directions to correct the evil were given. There were no gates at the first landing for either compartment of the shaft on the river side; and on the engine side there was none at the right-hand compartment. Sufficient air was not traveling the working portion of the bank. This was largely due to a squeeze that had come from the "Old Leiter" workings toward and extending for a distance beyond (to the left of) the 1st Right entry. The falls of top in the way leading to the air-shaft, noted in preceding inspection, were due to this advancing squeeze, and its continued advance had rendered matters worse. At the time of this inspection the ground seemed to have become quiet, but of course the way to the second outlet was no longer as safe and available as the law requires. Work was in progress toward obtaining another outlet, which would also afford better means for ventilation. The company was warned that unless more regard was paid to supporting the roof, an extensive squeeze is pretty certain to set in in time that will cause loss of pillars and other damage to the bank, if not injury to men.

HOPKINS COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 238,381.00; nut, 88,705.80; mixed lump and nut, 135,462.96; run of mines, 142,874.72; lump, nut and pea, 2,397.44; lump, nut and slack, 40.00; steam, 802.00; nut, pea and slack, 134.80; nut and slack, 14,215.72; pea and slack, 3,255.48; egg, 575.00; pea, 10,410.36; slack, 114,314.76; sold to local trade and employes (miscellaneous), not already included, 18,147.01; used at mines (steam and heat), not already included, 9,464.90. Total, 779,181.95 tons.

Coke produced for 1896, in tons, 17,974.

Inspections were made both by the Chief and by the Assistant Inspector.

HECLA MINE.

Near Earlington.

P. O. Earlington.

Transportation by the St. Louis & Nashville division of the L. & N. Railroad.

Operated by the Hecla Coal Co., Jo. F. Foard, President; J. T. Alexander, Secretary; Wm. Wendel, Treasurer.

Output of bituminous coal for 1896, in tons: Lump, 12,892.96; nut, 5,326.48; mixed lump and nut, 3,876.60; run of mines, 9,219.16; slack, 5,719.40; miscellaneous (consumed at and near mines), 2,491.56. Total, 39,526.16 tons.

1. Inspected, by Assistant, April 15th. The mine was idle for the day, but a few men were in bank and the fan was running. The usual number of men employed underground was 29, all work being in the 1st West entry. All conditions on said entry were good.

2. Again inspected, by Chief, August 17th. Work was in progress in the 1st and 2d West entries. The ventilation was not satisfactory on either entry. In other respects there was no complaint to make. The 1st and 2d East entries, temporarily idle, needed better provisions for ventilation whenever work should be resumed in them.

3. Again inspected, November 12th. The mine was temporarily idle, and the fan was being repaired; hence no determinations of air volumes could be made. Work was confined to 1st and 2d South and 1st and 2d East entries. All conditions were good.

EARLINGTON No. 9 MINE.

At Earlington.

P. O. Earlington.

Transportation, by the St. Louis & Nashville division of the L. & N. Railroad.

Operated by the St. Bernard Coal Co., John B. Atkinson, President and Treasurer; Geo. C. Atkinson, Secretary. Head office, Earlington, Ky.

The output of this mine is consolidated with that of No. 11 Mine in reports made by the company. Output of the two mines for 1896, in tons: Lump, 79,166.48; nut, 27,027.04; mixed lump and nut, 39,

230.00; run of mines, 53,547.16; nut and slack, 40.00; pea, 510.00; pea and slack, 38.00; slack, 32,280.56. Total, 231,839.24 tons.*

1. Inspected by Assistant, April 22d. Timbering, ventilation and drainage were quite good.

2. Inspected by Chief, August 17th. Again found in good condition.

3. Inspected, by Assistant, November 11th. Found in very good condition in all respects.

EARLINGTON No. 11 MINE.

At Earlington.

P. O. Earlington.

Transportation, by the St. Louis & Nashville division of the L. & N. Railroad.

Operated by the St. Bernard Coal Co., John B. Atkinson, President and Treasurer; Geo. C. Atkinson, Secretary. Head office, Earlington, Ky.

The output of this mine is consolidated with that of No. 9 Mine, which see.

1. Inspected, by Assistant, April 16th. With the exception of a North entry turned off of the 1st West, in which about 25 diggers were employed, to ventilate which natural means were being depended upon, and a number of rooms on the 2d and 4th East entries the faces of which were too far ahead of the air, the mine was in a satisfactory condition.

2. Again inspected, by Chief, August 18th and found to be in excellent condition.

3. Inspected again, by Assistant, November 11th, and again found in excellent condition.

DIAMOND MINES (2).

Near Morton's Gap.

P. O. Morton's Gap.

Transportation, by the St. Louis & Nashville division of the L. & N. Railroad.

Operated by the St. Bernard Coal Co., John B. Atkinson, President.

*The coal sold locally and consumed at the five mines of this company—namely, Earlington No. 9 and No. 11, Old and New Diamond, and St. Charles—is reported together and is included in the grades reported. It amounted to 11,950 tons.

dent and Treasurer; Geo. C. Atkinson, Secretary. Head office, Earlington, Ky.

Output of bituminous coal for 1896, in tons: Lump, 27,766.92; nut, 14,586.76; mixed lump and nut, 26,215.92; run of mines, 21,738.28; lump, nut and slack, 40.00; nut and slack, 2,573.44; pea and slack, 1,992.48; slack, 22,263.20. Total, 117,177 tons. (See foot-note under Earlington No. 9 Mine.)

New Diamond.—This is an exclusively machine mine, only a few hand-miners being employed for special purposes.

1. Inspected, by Assistant, April 16th. With the exception of ten rooms more than 60 feet deep on the 1st Right entry, into which the ventilating current had not been turned, the mine was in a satisfactory condition.

2. Again inspected, by Chief, August 18th. There were some open break-throughs that needed to be closed; a check-curtain was needed on the Main entry, and two break-throughs and some bratticing were also needed to give certain rooms on the upper part of said entry adequate ventilation; and the ventilating current had not yet been turned into 8 rooms, more than 60 feet deep, on the 2d North entry—necessary break-throughs between rooms not having been made. Otherwise the mine was in good condition. It is proper to state that work on the break-throughs in question was under way at the time of inspection.

3. Again inspected, by Assistant, November 7th. With a few minor readily remedied exceptions, the mine was in excellent condition.

Old Diamond.—This mine, in which hand-miners exclusively have been employed, is about "wound up." Work throughout the year has been directed toward its final abandonment by the beginning of 1897.

1. Inspected, by Assistant, April 16th. Thirty-nine persons were employed, practically all of them in rooms broken off of the Main Air-course. An abundance of air was entering, but it was not properly traversing 17 of the rooms. Propping in rooms was rather scant. Other conditions were fairly good.

2. The mine was visited by Chief, August 22d. The bank was

idle, no one connected with it was present, and through a misunderstanding representatives of the company from the New Diamond and the Inspector missed each other. Hence no inspection could well be made. When the mine was running 20 persons were employed.

3. Inspected, by Chief, November 7th. Excepting the ventilation of three rooms, and the necessity for some additional posts at an extraordinarily large "break-through" between two rooms, the bank was in a fairly good condition—quite good when the fact of the near approach of its final winding up is considered.

ST. CHARLES MINES.

At St. Charles.

P. O. St. Charles.

Transportation, Illinois Central Railroad (the line formerly known as the C., O. & S. W.).

Operated by the St. Bernard Coal Co., John B. Atkinson, President and Treasurer; Geo. C. Atkinson, Secretary. Head office, Earlington, Ky.

Output of bituminous coal for 1896, in tons: Lump, 42,818.64; nut, 15,183.36; mixed lump and nut, 1,527.64; run of mines, 10,171.68; nut and slack, 10,710.00; pea, 443.00; pea and slack, 590.00; slack, 10,796.92. Total, 92,241.24 tons. (See foot-note under Earlington No. 9 Mine.)

There are two mines, or banks, here, known as the Old or No. 1 and the New or No. 2 Mines.

1. *Old Mine.*—Inspected by Assistant, April 17th, and found in good condition in all respects.

2. Inspected again, by Chief, August 20th. Practically all work was on the 7th East, at the time of inspection, taking down slate. A check-curtain was needed on the 6th entry, a stopping on the North Air-course, and some curtains (or doors) elsewhere to cause the ventilating current to travel the working-places when general work should be resumed; for all of which arrangements had been made.

3. Again inspected, by Assistant, November 14th, and found in very good condition.

1. *New, or No. 2 Mine.*—Inspected, by Assistant, April 17th. The mine was in very good condition.

2. Again inspected, by Chief, August 20th. Some bad top, needing to be scaled and in places timbered, was noted on the 3d Left entry, and a check-curtain was needed on the entry. On the 4th Left entry two check-curtains were needed; and one was needed on the 2d East entry. Otherwise the bank was in fairly good condition.

3. Inspected again, by Assistant, November 14th, and found in very good condition.

CO-OPERATIVE MINE.

At Barnsley.

P. O. Barnsley.

Transportation, by the St. Louis & Nashville division of the L. & N. Railroad.

Operated by the Co-operative Mining & Manufacturing Co., H. H. Sheton, President; Jas. H. Green, Superintendent; Alf H. Jones, Secretary and Treasurer.

Output of bituminous coal for 1896, in tons: Lump, 9,574.56; nut, 2,072.60; mixed lump and nut, 6,679.52; run of mines, 6,124.12; nut and slack, 296.76; nut, pea and slack, 134.80; pea 25.00; slack, 4,696.00; consumed at and near mines, 894.24. Total, 30,497.60 tons.

1. Visited by Assistant April 22d. The mine was idle and had been so since the 10th of the month. Water had accumulated on the entries so that a satisfactory inspection was impracticable.

2. Inspected by Chief August 18th. The ventilation of the mine was defective, in that the current was not sent through the rooms, but, instead, was allowed to travel the entries exclusively. Check-curtains were needed on the 1st and 2d Right entries off of the "Brown" or Green entry, and a new one was needed on the Bottom entry. The roof of the Line entry needed scaling in many places, and in several places, where the roof was badly broken, timbering was needed.

3. Visited by Chief on November 7th. The day's run was over, if, indeed, there had been any run during the day, when the mine

was reached; no one was present to identify working-places and an inspection was impracticable.

4. Inspected by Assistant November 12th. Timbering and drainage were satisfactory. A brattice was needed on the left of the Furnace entry, between 2d and 3d Right entries, and a curtain was needed on the 2d Right, in order to bring the ventilation up to legal requirements.

CRABTREE MINE.

At Crabtree.

P. O. Ilsley.

Transportation, Illinois Central Railroad (the line formerly known as the C. O. & S. W.).

Operated by the Crabtree Coal Mining Co., A. Howell, President; R. M. Salmon, Secretary and Treasurer. Main office, Ilsley.

Output of bituminous coal for 1896, in tons: Lump, 13,744.64; nut, 6,474.84; mixed lump and nut, 33,153.12; run of mines, 268.48; slack, 10,862.52; consumed at and near mines, 457.70. Total, 64,961.30 tons.

A notable addition to equipment during the year was an improved shaking screen, over which ten different grades of coal may be made.

1. Inspected by Assistant April 23d. Drainage and timbering were satisfactory. A super-abundance of air was entering the mine. Because of leaks through brattices on the road between 1st and 2d East entries, however, the supply of air for those entries was not quite sufficient. With those leaks stopped, the ventilation would have been good everywhere.

2. Inspected by Chief August 21st. With a few readily remedied exceptions, the bank was in fairly good condition.

3. Again inspected by Assistant November 13th. Drainage was fairly good and timbering and ventilation were satisfactory.

CARBONDALE MINE.

Near Hamby Station.

P. O. Hamby.

Transportation, the Illinois Central Railroad (the line formerly known as the C. O. & S. W.).

Operated by Booth & Glover, Lessees of Carbondale Coal & Coke Co., a firm composed of W. E. Booth and W. J. Glover.

Output of bituminous coal for 1896, in tons: Lump, 8,346.76; nut, 3,460.96; mixed lump and nut, 4,305.04; run of mines, 1,073.04; steam, 773.00; nut and slack, 595.52; egg, 575.00; pea and slack, 635.00; slack, 4,210.80; consumed at and near mines, 312.05. Total, 24,287.17 tons.

1. Inspected by Assistant April 23d. The mine was idle and the furnace was cold. With a fire in the furnace, arrangements were such that the ventilation would have been good. Timbering was satisfactory and drainage good.

2. Inspected again by Chief August 21st. A check-curtain was needed on the Main entry between rooms 35 and 36, and rear break-throughs between said rooms needed to be closed, in order to give the ten rooms then working on said entry proper ventilation. On the Main air-course rear break-throughs between rooms 26 and 27 needed to be closed, in order that the ventilating current should travel through the rooms toward the furnace properly. In other respects the mine was in fair condition. The bank being idle and furnace cold, no determinations of air-volumes could be made.

3. Inspected again by Assistant November 13th. Timbering, drainage and ventilation were satisfactory.

OAK HILL MINE.

Near Nortonville.

P. O. Nortonville.

Transportation, St. Louis & Nashville division of the L. & N. Railroad.

Operated by the Woodstock Coal Co., Adolph Bennowitz, President; S. Platt, Secretary; Robert Whinnie, R. Mercy, Joseph Lavanne, Directors.

Output of bituminous coal for 1896, in tons: Lump, 1,374.32; nut, 494.08; run of mines, 12,918.00; slack, 1,791.40; consumed at and near mines, 568.48. Total, 17,146.28 tons.

1. Inspected by Assistant April 15th. Ventilation, timbering and drainage were good in the portions of the mine where men were employed.

2. Again inspected by Chief August 22d. The bank being idle for the day, there was practically no fire in the furnace; hence, determinations of air-volumes could not be made. Two break-throughs between the 1st and 2d West entries needed to be closed. Otherwise the air seemed to be coursed well enough. The roof of the Main entry needed to be scaled up to the 1st East, cross-timbering being required in places. There was dangerous draw-slate at several points on said entry. In other respects the mine was in fairly good condition.

3. Again inspected by Chief November 7th. The mine was in good condition, with some minor exceptions, to which the attention of the foreman was drawn during the inspection.

REINECKE (No. 11) MINE.

Near Madisonville.

P. O. Madisonville.

Transportation, Providence Branch, and St. Louis & Nashville division of the L. & N. Railroad.

Operated by the Reinecke Coal Co., Conrad Reinecke, President; Inkerman Bailey, Secretary and General Manager; Louis Feger, Superintendent.

During the past year the company substituted six Jeffrey chain cutter machines for the eight cutter bar (Jeffrey) machines that had been used theretofore. Mr. Bailey reports that the chain cutters do more work, with less repairs, than the rotary bar, and the dust made by the latter is avoided by the use of the former. The superiority of the chain cutter over the cutter bar, for such coals as are mined in our Western Field, is manifest. The company had added a Pollack's patent boiler to its battery of six, but removed it during the past year.

Output of bituminous coal for 1896, in tons: Lump, 31,632.84; nut, 10,993.80; mixed lump and nut, 18,475.12; mixed lump, nut and pea, 2,397.44; run of mines, 12,422.20; slack, 11,435.24; consumed at and near mines, 18,586.56. Total, 115,375.56 tons.

1. Inspected by Assistant April 21st. The mine was in excellent condition in all respects.

2. Again inspected by Chief August 19th, and again found in satisfactory condition.

3. Inspected again by Chief November 6th. The mine was in admirable condition in all respects. This mine is a dry one, and the coal yields fire-damp in variable quantities. Mr. Louis Feger, Superintendent, is to be commended for the care taken by him to provide against explosions from either gas or dust. Large volumes of air are kept flowing through all the working-places, well up to the faces; and the mine is sprinkled to keep down the dust.

MONARCH (No. 9) MINE.

Near Madisonville.

P. O. Madisonville.

Transportation, the St. Louis & Nashville division of the L. & N. Railroad.

Operated by the Monarch Coal Co., Chesley Williams, President; C. E. Morton, Secretary and Treasurer; R. S. Dulin, Superintendent.

Output of bituminous coal for 1896, in tons: Lump, 10,434.80; nut, 2,863.32; run of mines, 15,392.60; steam, 29.00; slack, 10,258.72; consumed at and near mines, 4,301.32. Total, 43,279.76 tons.

1. Inspected by Assistant April 21st. This mine is dusty and the coal yields fire-damp. At the time of inspection it was well sprinkled, and the only notable exhibition of gas was at the face of the Main North entry. Timbering of entries was satisfactory. In five rooms on the 2d East and in three on the 2d West props were not close enough to the faces; other rooms were well propped. A large volume of air was sent into the Main and it was kept well up to the faces of the entries and rooms.

2. Inspected again by Chief August 19th. Rear break-throughs between rooms 6 and 7 on 1st East entry needed to be closed, and a larger volume of air sent through the last break-through. Following is an extract from the Inspection Notice served: "Fourth East Entry.—The face of this entry was 63 feet ahead of the last break-through and was still being driven ahead. Gas was singing in the face at a lively rate. Another break-through was just being started from the air-course at the time of the inspection. Such delays in getting air to advancing faces should not be allowed. As

I have hitherto given warning, a gas explosion in your mine will be avoided only by observing the utmost vigilance, and I still think it would be wise to prohibit the use of naked lights when driving narrow work." Except as noted, the mine was in good condition.

3. Again inspected by Chief November 6th. With a few readily corrected exceptions, verbally called to the attention of Mr. Trathen, Bank-boss, the mine was in very good condition. It was observed, however, that naked lights were still used when driving entries; so it is presumed they will continue to be used until an "object lesson" is furnished—but which, it is sincerely hoped, may be indefinitely deferred.

ROBERTSON MINE.

This small mine, near Earlington, which hitherto has figured among commercial producers has dropped out of the list. Three or four visits were made to it during the year, but on each occasion it was idle. It seems to have been operated in a desultory way, but, so well as could be learned, was not subject to supervision. A small amount of coal may have been shipped from it, but the bulk of its product was sold locally. Accurate statistics of its output could not be obtained; 628.08 tons of lump and 222.56 tons of nut (a total of 850.64 tons) were reported.

MCLEAN COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 7,990.86; nut, 1,682.86; run of mines, 6,436.40; slack, 2,248.80; mixed lump and nut, 2,771.24; pea, 160.00; nut and slack, 931.80; fuel and local not included in grades, 1,854.00. Total, 24,075.96 tons.

Inspections were made both by the Chief and by the Assistant Inspector.

ISLAND MINE.

P. O. Island.

Near Island.

Transportation, the Owensboro & Russellville division of the L. & N. Railroad.

Operated by the Island Coal Co., composed of B. V. McKenney and M. Stanley.

Output of bituminous coal for 1896, in tons: Lump, 4,648.88; nut, 971.24; run of mines, 4,518.80; slack, 1,445.80; mixed lump and nut, 1,046.48; nut and slack, 811.80; fuel and local not already included, 1,120.00. Total, 14,563.00 tons.

1. Inspected by Assistant May 2d. The mine was temporarily idle. Sufficient air was entering the mine for the number of persons (27) usually employed underground, but its distribution was bad. This was largely due to the dilapidated condition of check-curtains, and the absence of two that were needed. There was a lack of break-throughs in some rooms, also, while in others there were too many open ones. Rooms were fairly well drained and propped, but entries, especially the 1st Right, were rather too wet. A dangerous piece of top, needing five or six sets of timber, was noted on the 1st Right entry.

2. Again inspected by Chief August 15th. Dependence for supplying the mine with air being upon exhaust steam from a mine pump, which proved utterly inadequate to produce a sufficient volume in hot weather, the mine was practically without ventilation. The company had given assurances that a fan would be put in, but failed to redeem them. The Commonwealth's Attorney for the district was written to in regard to the matter, but recent advice raises a question as to whether he received the letter.

3. Inspected again by Chief November 5th. The condition of the mine had been improved, but there were, nevertheless, important defects to be remedied. It is deemed well to present the notice served in full as follows:

"The day being quite chilly, the exhaust steam of the mine pump was sufficient to provide an adequate ventilating current; but as has been determined heretofore, and due notice given you, on warm days it does not do so, hence conditions found to-day do not militate against conclusions given in previous notices nor relieve you from consequences of failing to comply with directions to provide adequate ventilating power.

"1st South Entry.—About three-fourths of the check-curtain

near the first room has been torn down. A good curtain must be hung there.

"2d South Entry.—The check-curtain near the second room has been torn down. It must be replaced. There is too much standing water on this entry.

"Main Blind Entry.—In the last room there are no props for about 25 or 30 feet back from the face. Props must be set up to within about 6 or 8 feet of the face. Another break-through for this room should be made on the left, and the present one closed.

"Rooms on the Cut-off Road.—The air is allowed to scatter too much in this portion of the bank, and it does not pass close enough to the faces. The current must be gathered together and be brought up to, and be maintained, within legal distance of the working-faces. The curtain between the Blind and Main entry, on the road leading to this portion of the bank, is torn and leaks too much. A better curtain should be hung.

"Main Entry.—The curtain on the Main just beyond the 1st South is torn and leaks badly. This should be remedied. Since there is really no necessity for using the place as a pass-way, the curtain just beyond the 2d South entry ought to be replaced by a brattice, or other tight stopping. As it now is, it is not kept closed tightly and much air that should be traveling into the 2d South passes directly to the Main Blind through this curtain-frame."

CHICAGO (OR FIELD) MINE.

Near Island.

P. O. Island.

Transportation, the Owensboro & Russellville division of the L. & N. Railroad.

Operated by the Field Coal Co., C. L. Field, President; G. B. Likens, Vice President; Rowan Holbrook, Secretary and Treasurer; W. P. Drake, General Manager. (This company succeeded the Chicago Coal & Coke Co. in January, 1896.)

During the year the tip-house was remodeled; scales were put in; a black-smith shop and eight dwellings were built; additional siding was laid, also inside tracks laid with T-rail; equipment of

bank-cars was increased, a mine-pump put in and a ventilating furnace was built.

Output of bituminous coal for 1896, in tons: Lump, 3,141.98; nut, 711.62; run of mines, 997.60; slack, 783.00; mixed lump and nut, 1,664.76; nut and slack, 120.00; fuel and local, 734.00. Total, 8,152.96 tons.

1. Inspected by Assistant May 2d. The mine was temporarily idle. When running, ten men were employed underground. An air-shaft had been sunk and provisions made for properly conducting the air, but no furnace had been built. The bank being a small one, the ventilation, procured by exhaust steam, was not bad, but was necessarily uncertain as to volume. A ditch was needed on the Main entry. Sufficient props were being used, but most of them were rather small.

2. Inspected again, by Chief, August 15th. The following notice was served: "The head of the Main entry has been carried too far ahead of the air-current. When work is resumed on the 2d South and Air-course, air must be turned into the working-rooms there. There were three open break-throughs between the 1st South entry and its air-course; the two rear ones should be closed. The exhaust steam from the pump is inadequate to provide the mine with a sufficient volume of air. I note the verbal statements of Mr. Field and Mr. Kelley that brick have been purchased for a furnace, and that construction of the latter will be begun at once. Drainage of your mine is not good. It will get worse as more ground is opened, unless more efficient means for handling the water are adopted."

3. Again inspected, by Chief, November 5th. The following notice was given: "With the exceptions of two rear breakthroughs between entries, which must be closed, and the completion of a needed break-through between the 1st North and its air-course (and hanging of a check-curtain to send air into said 1st North)—concerning which Mr. Kelly is fully informed—the mine is in a fairly good condition. The furnace is doing excellent work."

THE KARNES MINE.

Near Island.

P. O. Island.

Operated by Alva Karnes.

Output of bituminous coal for 1896, in tons: Lump, 200.00; run of mines, 920.00; slack, 20.00; mixed lump and nut, 60.00; pea, 160.00. Total, 1,360.00 tons.

This small mine was visited three times—in May, in August, and in November—but was idle each time. It has, indeed, been operated in a very desultory fashion, and for most, if not all, of the time less than six miners have been employed in it. It was connected with the Owensboro & Nashville division of the L. & N. Railroad by a tramway, and occasional shipment of coal were made. Latterly, however, what coal has been loaded for shipment has been hauled to the railroad by wagon, much of the tramway having been torn up. In a report sent in for December Mr. Karnes says: "It is my intention to put out [in] a railroad switch or put down T-rails this spring. I will be stopped until I have better arrangements to get coal to the railroad." It is probable, however, that coal for local purposes (county trade) will be mined as occasion demands during the winter."

MUHLENBERG COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 47,964.38; nut, 12,113.40; run of mines, 48,385.77; slack, 38,004.60; mixed lump and nut, 96,445.04; pea, 3,301.24; run of mines and mixed, 1,971.48; steam, 3,463.88; fuel and local, not included in grades, 4,618.40. Total, 256,268.19 tons.

Inspections were made both by the Chief and by the Assistant Inspector.

CENTRAL MINE.

At Central City.

P. O. Central City.

Transportation, by the Illinois Central Railroad (the line formerly known as the C., O. & S. W.), and by the Owensboro & Nashville division of the L. & N. Railroad.

Operated by Central Coal and Iron Co., Bannen Coleman, Presi-

dent; R. R. Hathaway, Vice President; S. Coleman, Secretary; Hywel Davies, General Manager. Main office, Louisville, Ky. Office of General Manager, Central City.

During the year the company installed a 212 H.-P. electric mining plant, including: Four Jeffrey chain-cutter machines, 2 Jeffrey drills, 1 Jeffrey 10-ton mine locomotive, 2 125 H.-P. boilers. Two new shafts cages were put in; and coal chutes were built to the boilers from a platform built out from the tippie, which greatly expedites the coaling of the furnaces.

Output of bituminous coal for 1896, in tons: Lump, 9,222.80; nut, 822.96; run of mines, 16,903.40; slack, 14,306.40; mixed lump and nut, 34,927.60; pea, 530.00; steam, 3,113.44; fuel, 1,876.40. Total, 81,703.00 tons.

1. Inspected by Assistant April 9th. The mine was temporarily idle, but a few men were underground and the fan was running, sending a current of 20,827 cubic feet of air through the bank. Ventilation, timbering, and drainage were very good.

2. Inspected by Chief August 14th, and found in excellent condition.

3. Again inspected November 9th. The entries were very well timbered and the rooms well propped. Drainage was good. An abundance of air for the 122 persons employed was entering the mine, and the workings on the North entries were well ventilated. On account of an obstruction on the Sixth South entry, however, the volume of air passing to the workings on South entries was short; with that obstruction removed, the ventilation South of the Main would also have been good.

4. On December 8th an examination of safety devices that had been adopted with respect to haulage by electricity was made by Chief. Everything was found in excellent shape. A line of fenders had been put up to protect men from coming in contact with the trolley wire, when traveling the Main entry, and as a safe-guard for the motorman; and man-holes had been prepared and whitewashed at every 60 to 75 feet to protect them from injury by trains.

POWDERLY MINE.

At Powderly.

P. O. Powderly.

Transportation by the Illinois Central (C., O. & S. W.) Railroad.

Operated by the Greenville Coal Co., Lewis Reno, President; E. D. Martin, Vice President; I. J. Kahn, General Manager; C. H. Hamilton, Superintendent (Powderly). Head Office, Greenville, Ky.

Output of bituminous coal for 1896, in tons: Lump, 9,330.20; nut, 1,318.48; run of mines, 1,790.04; slack, 5,301.00 mixed lump and nut, 15,408.12; steam, 230.00; fuel and local, not included in grades, 625.00. Total, 34,002.84 tons.

1. Visited by Assistant April 9th. The mine was idle and had been so, it was reported, since the 4th of the month. An inspection would have been of little service, under all the circumstances, and none was made.

2. Inspected by Chief August 14th, and found in defective condition. The following notice was served: "The shaft cages are in very bad condition. The cage used for lowering and hoisting persons has only one safety-catch, and that is of no value. The volume of air supplied the workings is insufficient for the number of persons employed inside, and check-curtains are needed on some of the entries, to cause the air to properly travel the rooms. The deficiency in volume of air supplied is principally if not entirely due to the fact that the 1st North entry, which serves as the course for the main intake is choked with falls. Moreover, the pump-shaft, which is situated on that entry, is acting as an upcast on account of the exhaust steam from the pump, and is thus robbing the intake current. The approach to the pump-shaft, which also serves as the second outlet, needs timbering. Things are in a bad shape there. If the 1st North entry is to be continued as the course for the main intake, the falls (which occurred on account of failure to timber the entry), must be cleared away, and the pump-shaft must be shut off from the entry sufficiently to prevent the robbing of the current. It may be well, however, to make the 2d North the main intake. But in any event the 1st North must be put in such condition that it may be safely used by persons seeking the second outlet. *Fifth South Blind.*—A check-

curtain is needed on entry to cause the ventilating current to traverse the rooms properly. It should be hung between the 2d and 3d or 3d and 4th rooms from the head of the entry. *Fifth North*.—Another break-through should be made at the face of this entry for the passage of the current from the 4th North, and the present break-through (which opens into face of second room coming off of the 4th North) should then be closed. *Fourth North*.—Very little current is traveling through the last break-through from the Blind to this entry. In addition to increasing the volume of air, a curtain should be hung on the entry, just back of said break-through, to send the air through the rooms on this entry. *Fourth North Blind*.—The air must be carried more regularly through the rooms, and nearer to the faces. *Miller Entry (off of 2d North)*.—The air scatters entirely too much. In addition to increasing the volume of air (which is deficient), the current must be carried more regularly through the rooms and nearer to the faces. *Second North and Blind*.—Very little air is traveling here. Your bankboss should have a copy of this for his guidance."

3. Inspected again by Chief November 2d. The condition of the mine had been improved, but there were portions in which the ventilation was defective, with respect both to volume of air supplied and its distribution. The company was subject to indictment for failure to remedy defects hitherto noted with respect to the cage used for men. A new cage, with satisfactory catches, was on the ground, but had not been swung in the shaft.

HILLSIDE MINE.

At Hillside.

P. O. Mercer Station.

Transportation, the Illinois Central (C., O. & S. W.) Railroad.

Operated by Hillside Coal Co., composed of J. W. Lam (Secretary), and William Eades.

Output of bituminous coal for 1896, in tons: Lump, 8,597.52; nut, 2,385.44; run of mines, 2,000.92; slack, 7,323; mixed lump and nut, 15,384.48; fuel and local, not included in grades, 800.00. Total, 36,491.36 tons.

The only notable improvement during the year was the installation of a shaking-screen.

1. Visited by Assistant April 9th. The mine had been closed April 1st, to put in a shaking-screen, and it was not expected that mining would be resumed before May 1st.

2. Inspected by Chief August 14th. Underground conditions were fairly good. Following is the Inspection Notice served:

"*Main Blind*.—Work was temporarily suspended on this entry at the time of the inspection. When it shall be resumed, the rear break-throughs between rooms 9 and 10 should be closed so as to cause the current to travel the upper break-throughs, and a curtain should be hung on the entry at such point as will keep the air from seeking the entry too soon. *Shaft Cages*.—I noticed that the right-hand cage was being used to lower men into the mine, although there were neither safety-catches nor cover on the cage. If that cage is to be so used, it must be provided with safety-catches and cover as required by law. This requirement has been called to your attention hitherto, and I have been resting under the assurance that said cage would not be so used. I note the statement made by Mr. Lam that it had not been so used before the change of bank-bosses, and that the new boss, Mr. Russell, had doubtless not been advised upon that point by his predecessor; but he should have been instructed by the Superintendent. *Second Outlet*.—A second outlet for the ingress and egress of the men engaged underground must be made without delay. The law has not been complied with in that respect. The outlet should have been provided long ago, as required by section 9 of the mining law, a copy of which has been furnished you. Although through an oversight I am unable to understand, your failure to comply with the law referring to outlets seems not to have been noted heretofore (and I have been under the impression that the second outlet had been made), you should not have waited for your attention to be called to your remissness. I trust that you will make no delay, but get the outlet down at once, in the time now allowed by law, which see. Your bank-boss should have a copy of this for his guidance."

3. Inspected again by Chief November 2d, and the following notice served:

"You are subject to indictment for failure to comply with preceding notice to provide a second outlet (according to sec. 9 of mining law) for the mine. *South (Main) Blind*.—The air is not sent through the rooms so as to keep within 60 feet or less of the faces. Instead, it is traveling almost exclusively on the Blind. Rear break-throughs must be closed in the first working room and check-curtains hung on the Blind so as to cause the air to travel through the rooms and keep within legal distance of the faces. Mr. Walter Russell, bankboss, will understand what is to be done. *Third North Entry*.—The air is not kept close enough to the faces of the rooms—it spills out to the entry too soon after coming from the Fourth North. The air must be made to travel according to legal requirements. Room No. 6 needs propping closer to the face. No props had been set for at least 25 feet back from the face. There should be another curtain on the Main, back from the furnace, so hung that when a trip is passing through one curtain the other will be down and prevent disturbance of the ventilating current. As matters now stand, the ventilation in working portions of the bank is not satisfactory when bank wagons are moving to and fro. Mr. Russell will understand what is to be done. The cover should be kept on the cage used for hoisting and lowering persons. Please do not fail to show this notice to your bank-boss."

On November 20th the following inquiry was addressed to Mr. J. W. Lam: "By what date do you think you will have the required second outlet to your mine completed? I trust that you will let me have a prompt answer."

The following response was received, under date of November 23d: "Yours of the 20th received. I can't say just when we will have the second outlet to our mine completed, but we will push it through as fast as we can."

Thereupon, under date of December 4th, another communication was addressed to Mr. Lam, as follows: "Upon returning from a trip among the mines, I find your letter of November 23d. Please

tell me what you have done in any way toward getting the second outlet for your mine."

To that request no response has been received. The matter will be referred to the Commonwealth's Attorney.*

MEMPHIS MINE.

At Bevier.

P. O. Bevier.

Transportation by the Owensboro & Nashville division of the L. & N. Railroad.

Operated by W. H. Moore and J. W. Moores, Lessees of the Memphis Coal & Mining Co.; Capt. J. W. Moores, Superintendent.

Output of bituminous coal for 1896, in tons: Lump, 5,277.20; nut, 1,405.04; run of mines, 8,996.04; slack, 6,538.28; mixed lump and nut, 21,098.60. Total, 43,315.16 tons.

1. Inspected by Assistant April 8th. Considerable timbering on entries had been done on entries since preceding inspection, and no lack of necessary timbering was noted on them. In the rooms, however, props were not set sufficiently close to faces. The ventilation was quite satisfactory.

2. Again inspected by Assistant August 14th. The mine was not "running," but a few men were in making coal. A satisfactory inspection was not possible on account of firing of shots before the workings could be traversed. So far as could be judged, however, the general condition of the mine was about the same as at preceding inspection. Little work had been done in the mine between the two inspections.

3. Inspected again by Assistant, November 7th. The mine was temporarily idle. When running, work was confined to Fourth and Fifth East and Fifth and Sixth West entries. The workings there were dry and well ventilated.

*In reality, practically nothing had been done. Since the above was written (on March 18th), the mine has been visited by the Assistant Inspector, for the purpose of ascertaining what steps had been taken toward complying with instructions. He reports as follows: "The second outlet has not yet been provided. Mr. Lam said a shaft was under contract and would have been down, but for the continued rains. The shaft will be thirty feet off to the right from the head of the Main entry. An entry has been turned from the Main, and will be driven to where the shaft is to come down. The shaft has been staked off but no sinking done." The matter has been called to the attention of the Commonwealth's Attorney.

STERLING (SILVER CREEK) MINE.

At Sterling.

P. O. Central City.

Transportation by the Owensboro & Nashville division of the L. & N. Railroad.

Operated by the Sterling Coal Co., George E. Henry, General Manager; John Henry, Superintendent.

Output of bituminous coal for 1896, in tons: Lump, 1,202.18; nut, 336.00; run of mines, 509.85; slack, 165.00; mixed lump and nut, 444.60; fuel and local not included in grades, 204.00. Total, 2,861.63 tons.

This is a small mine. When the present company obtained control of the property it was supposed that mining would be carried on in a large way; but up to date operations have been limited to a single entry and a few rooms on each side.

1. Inspected by Assistant April 8th. The mine was idle and there was no fire in the ventilating shaft. With a fire to produce a steady current the ventilation would have been good. The mine consists of a single entry ("the Main") with rooms on each side. The entry was quite wet, but the rooms were dry enough. But little timbering had been done on the entry; it must be said, however, that no dangerous lack of it was observed.

2. Again inspected August 15th. The Main entry and rooms on the right were much too wet. The ventilation of the mine was defective.

3. Inspected again by Chief November 2d. The following notice was served:

"The mine was idle and no one was present to accompany me through the bank, but an inspection was made, nevertheless. Since the 'furnace' was cold, of course no determination of the quantity of air supplied could be made. I may state, however, that I have been informed that a fire is not kept up in the 'furnace' regularly throughout the day when the bank is working. That should be done.

"You have not complied with directions given by the Assistant Inspector to hang a check-curtain on the entry so as to cause the air to pass into and through the rooms that are up 60 feet.

"You are working the mine in a dangerous fashion. You are

counting too much on the integrity of the limestone roof, and are not setting sufficient timbers. At the same time you are leaving pillars too small. Although there is a great deal of waste packed on the sides, the gob seldom extends to the roof; hence, all the weight is thrown on the pillars, and danger is incurred from two sources, namely: (a) From a tendency of the roof to sag and thus cause a fall of stone, and (b) from crushing of pillars or tendency of roof to over-ride them. More attention must be paid to timbering, and more attention must be given to the importance of preserving adequate pillars. Along the entry, especially, posts must be set or solid packs built close to the roof, to help sustain the roof where rooms are broken off. I trust that this matter will receive prompt attention."

MUD RIVER MINE.

At Mud River.

P. O. Mud River.

Transportation by the Owensboro & Nashville division of the L. & N. Railroad. Transportation may also be had by way of Mud river down to the Green, the earlier shipments from the mine having, indeed, been made that way.

Operated by the Mud River Coal, Coke & Iron Co., Jno. C. Gordon, President; A. G. Hunter, Vice President; E. S. Rundle, Secretary and Treasurer.

Output of bituminous coal for 1896, in tons: Lump, 8,285.68; nut, 2,205.00; run of mines, 3,403.84; slack, 3,263.00; mixed lump and nut, 3,814.12. Total, 20,971.64 tons.

1. Inspected by Assistant April 10th. No lack of necessary timber was noted on entries, but in some of the rooms props were not kept close enough to faces. Drainage was good except on a portion of the Williams entry. The supply of air was quite deficient. Notwithstanding that the mine is provided with a good furnace, there were only 3,510 cubic feet of air flowing to supply 51 persons. This was in part due to the fact that a break-through (near head of Hatler entry) was partially closed with slate. On the Little Blades entry the air had not been turned through ten rooms that were more than 60 feet deep. Otherwise the air was coursed well enough.

2. Again inspected by Assistant August 13th. The mine was not

running, but a few men were at work inside, and there was a small fire in the furnace. Drainage was fair. No dangerous lack of timbering, in rooms or entries, was observed. Rooms on the right of the Williams entry were up more than 60 feet, but the ventilating current had not been turned into them.

3. Inspected by Assistant November 6th. An ample volume of air (7,638 cubic feet per minute) was entering for the 65 persons employed. It was well coursed and distributed, except as to the first seven rooms on the Williams entry. Break-throughs had been made between said rooms, but the current had not been sent through them. Rooms were fairly well propped, and entries were in good condition. Drainage was fairly good.

PIERCE (No. 9) MINE.

At Drakesboro.

P. O. Drakesboro.

Transportation by the Owensboro & Nashville division of the L. & N. Railroad.

Operated by the Black Diamond Coal Co., Jas. T. Pierce, President, General Manager and Treasurer; H. W. Buttorff, Vice President; Robert C. Hopkins, Secretary.

Output of bituminous coal for 1896, in tons: Lump, 6,048.80; nut, 3,640.48; run of mines, 13,458.96; slack, 1,107.92; mixed lump and nut, 5,367.52; pea, 2,771.24; run of mines and mixed, 1,971.48; steam, 120.44; fuel and local, not included in grades, 1,113.00. Total, 35,599.34 tons.

As stated in a preceding chapter, the electric mining machines, which had been in use in this mine, were removed about the middle of February, 1896. No special improvements in equipment or otherwise were made during the year.

1. Inspected by Assistant April 3d. The portions of the mine in which men were employed were well drained. Water was standing on the Main West entry up to the twelfth room past the 1st North, but the bank-boss (Jno. Wright) stated that the part of the bank covered by water had been abandoned. Six rooms on the left of 3d East entry off of 1st North (West of Shaft), and twelve on 2d West off of 1st North, had been driven so crooked as to leave the pillars irregular in thickness—some of them much too thin, others quite

thick. There were 54 miners employed, requiring, therefore, a current of not less than 5,400 cubic feet per minute. Notwithstanding that the fan has ample power, and that there was an ample volume of air passing down the shaft, the total volume sent through the bank amounted to only 2,553 cubic feet per minute. The loss occurred through a door and two brattices between the Main West entry and the slope. A number of rooms needed to have the ventilating current turned through them. All in all, the ventilation of the mine was far from being up to its usual standard. It is due Mr. Wright to state that he had resumed charge of the bank but a comparatively short time before the inspection, and was then working to bring the ventilation up to the proper standard.

2. Again inspected August 14th. The ventilation had been vastly improved, a current of 7,130 cubic feet of air being sent through the mine to supply 49 persons. Except that the face and two last rooms of one entry and the faces of seven rooms on another entry were more than 60 feet beyond the air, the ventilation was good. As a rule the rooms were well propped, but in a few of them the line of fore-set posts was not close enough to faces. No bad top or lack of timbering was noted on entries.

3. Inspected November 7th. But little work had been done at the mine since the preceding inspection, and the general condition of the bank was about the same as then. Drainage, timbering and ventilation were, in the main, satisfactory. In some rooms props were not as close to faces as due regard for safety required, and in a few places faces were a little too far ahead of the air.

PARADISE MINE.

This little mine at Paradise, on the Green river, has heretofore been regularly reported among the commercial mines. During the past year, however, operations have amounted to comparatively little. When visited on May 3d, the bank was idle, and had been for several days, but it was learned that there were only three miners and a driver employed when the mine was running. The mine was not subject to supervision, but the lessee, through courtesy, reported his output in full for the year. The output amounted to 1,322.72 tons, all run of mines.

OHIO COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 128,490.77; nut, 28,974.66; run of mines, 21,912.71; slack, 61,126.64; mixed lump and nut, 67,460.07; pea, 3,365.00; lump, nut and egg, 1,199.95; "mixed," 26.35; steam, 24,542.08; nut and steam, 127.60; mixed egg, 5,073.00; egg, 14,572.05; nut and pea, 1,630.00; nut and slack, 285.00; pea and slack, 765.00; fuel and local not included in grades, 8,543.56. Total, 368,094.44 tons.

Inspections were made both by the Chief and by the Assistant Inspector.

ECHOLS MINE.

At Echols.

P. O. Echols.

Transportation by the Illinois Central (C. O. & S. W.) Railroad. Operated by the McHenry Coal Co., W. G. Duncan, President; H. McH. Eskridge, Secretary; C. W. Taylor, Superintendent. Head office, 456 W. Main street, Louisville, Ky. Superintendent's address, McHenry, Ky.

A new air shaft was sunk during the year.

Output of bituminous coal for 1896, in tons: Lump, 21,837.92; nut, 1,138.95; run of mines, 2,533.60; slack, 9,205.00; mixed lump and nut, 6,645.00; lump nut and egg, 1,199.95; nut and steam, 127.60; mixed egg, 3,788.00; egg, 12,910.35; pea and nut, 1,630.00; mine fuel and local not included in grades, 2,235.95. Total, 63,252.32 tons.

1. Inspected by Chief June 26th. The inspector's anemometer being out of order, it was not practicable to readily determine volumes of air traversing the bank. It seemed probable, however, that there was sufficient for the small number of persons then in bank. The current was not sent through a number of the rooms—on 2d, 3d and 4th South entries—as should have been done. On the 2d North entry the workings were so cut up that without ready means for determining air velocities the question of ventilation could not be satisfactorily determined. It seemed, however, that the air was much scattered. In other respects, the bank was in fairly good condition.

2. Inspected again by Assistant September 25th. There were 40

persons in bank, for which 4,568 cubic feet of air were supplied—somewhat more than sufficient if properly distributed. South of the Main, however, the current was much too weak, in consequence of falls that had nearly closed two breakthroughs between rooms on the 2d South. On the 2d North a check-curtain was needed to cause the air to flow through rooms 1 to 9 inclusive. Drainage and timbering were satisfactory.

3. Again inspected by Assistant December 16th. There were 74 men in bank, for whom a volume of 7,920 cubic feet of air per minute was entering (the total intake). As upon each of the two preceding inspections, the distribution of the air was defective through failure to hang check-curtains where needed. Such curtains were needed on the 3d and 4th South and on the 3d and 4th North entries, in order to bring the ventilation of rooms up to the proper standard. Rooms were fairly well propped; no dangerous, untimbered top was noted on entries; drainage was good. A new air-shaft was being sunk into room 15 on the 3d South entry.

MCHENRY MINE.

P. O. McHenry.

At McHenry.

Transportation by the Illinois Central (C. O. & S. W.) Railroad. Operated by the McHenry Coal Co., W. G. Duncan, President; H. McH. Eskridge, Secretary; C. W. Taylor, Superintendent. Head office, 456 W. Main street, Louisville, Ky. Superintendent's address, McHenry, Ky.

During the year the mine was equipped with an electric mining plant, including five chain-breast machines. A shaking screen was added to the screening plant.

Output of bituminous coal for 1896, in tons: Lump, 11,508.65; nut, 1,356.75; run of mines, 16,200.99; slack, 5,395.00; mixed lump and nut, 9,156.35; mixed, 26.35; mixed egg, 1,285.00; egg, 1,661.70; nut and slack, 285.00; pea and slack, 765.00; mine fuel and local not included in grades, 2,737.77. Total, 50,378.56 tons.

1. Inspected by Chief June 26th. The ventilating current needed to be kept closer to the faces of rooms; too much of it was traveling only on entries. The 9th North entry needed better drainage and the

roof needed attention—too much loose slate hanging on it. The roof of the 10th North entry also needed attention.

2. Again inspected, by Assistant, September 23d. In two places on the North entry there was too much standing water. Although there was an abundance of air (21,750 feet per minute) coming up the Main, a fall in the Main air course so obstructed the current that on the entries to the right of the Main the supply of air was insufficient.

3. Again inspected by Assistant December 17th. There were 54 men in bank, employed in rooms on the 10th and 11th North entries and air courses, for whom a volume of 6,120 cubic feet of air per minute was supplied and well conducted. An air course was being opened around a fall near the head of the Main air course.

RENDER MINES (2).

At Render.

P. O. Render.

Transportation by the Illinois Central (C. O. & S. W.) Railroad. Operated by the Central Coal & Iron Co., Bannen Coleman, President; R. R. Hathaway, Vice President; S. Coleman, Secretary; Hywel Davies, General Manager. Head office, Louisville, Ky. Address of General Manager, Central City, Ky.

During the year the electric plant was completed by adding two Jeffrey drills, a 2½-inch electric pump, one more chain breast mining machine and a 10-ton Jeffrey motor. Pick mining has been abandoned. The yards were relaid with 50-lb. rail, 20 new bank cars were built, and an automatic (self-closing) entry door was put in.

Output of bituminous coal for 1896, in tons: Lump, 26,189.60; nut, 4,378.68; run of mines, 507.24; slack, 23,627.00; mixed lump and nut, 22,973.28; steam, 23,302.08; mine fuel not included in grades, 1,968.00. Total, 102,945.88 tons.

Render No. 1 (Old Bank).—Inspected by Chief June 27th. The ventilation of the Tenth North, Eleventh North and Eleventh South entries was very defective. There was very little current and the air was not traveling through the rooms so as to keep within 60 feet or less of faces. The closing of a break-through by a fall on the 11th South was doubtless in part responsible for the defective condition of the preceding entries. The roof of the Main and of the 10th and

11th entries needed attention. The slate was broken and hanging, or puffed and ready to break down in many places. The roof of the 10th South was also bad in places, but was being trimmed and propped at the time of the inspection.

2. Again inspected, by Assistant, September 24th. On the Main entry, between mouth and first lie-way, there were several broken cross-timbers heavily loaded with loose slate. No other dangerous condition of top was noted. The supply of air was sufficient, but with little to spare. On the 10th South entry a curtain was needed, to ventilate rooms 19 to 28 inclusive. Elsewhere ventilation was quite satisfactory.

3. Visited December 18th. The bank was not running and had not been since the 11th of the month. Electric haulage was being put in. The work was expected to be completed by January 1st. The system of coursing the air was also being changed, with the shaft on the 10th North entry as the intake.

Render No. 2 (New Bank).—Inspected by Chief June 26th. The mine needed better drainage, especially on the Main entry and for the work on the 1st West. The air needed to be carried better through the rooms, especially on the 1st West and 1st South entries—not being sent through the rooms at all on the latter entries. Timbering was satisfactory.

2. Again inspected, by Assistant September 24th. Again the ventilation on the 1st West was defective, due to lack of check-curtain. A great abundance of air was passing into the air-course, needing only proper handling to give the bank very excellent ventilation. In general the ventilation was fairly good. Drainage was good. Timbering was satisfactory.

3. Again inspected December 18th. The ventilation was excellent—an abundance of air, thoroughly well distributed. Drainage and timbering were good.

WILLIAMS MINE.

Near McHenry.

P. O. McHenry.

Transportation by the Illinois Central (C. O. & S. W.) Railroad.

Operated by the Williams Coal Co., E. T. Williams, President;
J. S. Williams, Secretary and Treasurer.

Output of bituminous coal for 1896, in tons: Lump, 7,755.08; nut, 5,738.98; run of mines, 716.00; slack, 5,054.60; mixed lump and nut, 16,153.00; steam, 1,240.00; mine fuel and local not included in grades, 1,093.00. Total, 37,749.76 tons.

The most notable improvement during the year was the equipment of the tippie with a shaker screen.

1. Inspected by Chief June 27th. The mine was in a defective condition. The notice served was as follows:

"The bank is aired by two currents, one for the workings on the right and one for those on the left. Each current is sufficient for the present number of persons employed, but the air needs to be kept closer to the faces of rooms on all entries; it is now too much scattered.

"Second Left (now called First Left) Entry off of 1st East.—This part of the mine is so badly cut up—the workings are so crooked and unsystematic—that unless much care is observed there will be trouble with the roof. The ventilation here is quite unsatisfactory. The air must be kept closer to the working faces.

"It seems to me that instead of letting the current which comes down the slope (and which is intended to ventilate the East side) travel nearly to the air-shaft and then turn back, it would be better to arrange the ventilation thus: Put a door or curtain on the Main, just beyond the Second East entry, put a stopping in the air-course that leads from the shaft, so as to cut off communication with the shaft and the east side workings, and open the Second East entry, so as to let it serve for the intake for the east side. This would enable the shaft to air the west side without interference from the conflicting current that comes down the slope, and would insure better ventilation for the east side. Should such an arrangement tend to cause the furnace to draw too much of its air from the east side, it can readily be corrected by putting in a regulator on the east side."

"Third West Entry.—All rooms being open to the entry, the air scatters too much. The old rooms should be stopped off and a curtain should be hung on the entry between the last two rooms that are up 60 feet, break-throughs being made in accordance with the law's requirement. Second and First West Entries.—The same remarks apply to these entries as have been made with reference to the Third West."

2. Inspected again, by Assistant, September 22d. The mine was idle at the time of inspection and the fire in the furnace was banked. There were five rooms on the 3d Left entry without ventilation. On the 2d Left a check-curtain was needed to send the air into the air-course (a room) to the 1st Left; and on the 1st Left a curtain was needed to hold the air to the faces of the rooms between 18 and 25. Drainage was good and in general propping of rooms and timbering of entries were satisfactory.

3. Again inspected, by Assistant, December 15th. A great abundance of air (22,500 cubic feet per minute) was entering the bank to supply 65 persons, and it was kept well up to all the working faces, except where seven men were employed (in rooms) on the 2d North. Break-throughs had been made between the excepted rooms, but a curtain was needed to send the air through them. Rooms were fairly well propped, entries were in good condition, and drainage was good.

TAYLOR MINE.

Near Beaver Dam.

P. O. Taylor Mines.

Transportation by the Illinois Central (C. O. & S. W.) Railroad.

Operated by the Taylor Coal Co., of Ky., J. B. Speed, President;
I. P. Barnard, Superintendent; W. A. Jones, Secretary and Treasurer.

Output of bituminous coal for 1896, in tons: Lump, 40,704.84; nut, 11,012.84; run of mines, 813.40; slack, 12,680.04; mixed lump and nut, 11,647.44; pea, 3,365.00. Total, 80,223.56 tons.

During the year the company put in a shaker screen, two track-scales, and 75 tons of new railroad iron for the mine. It also built a 20-room boarding-house.

1. Inspected by Chief June 25th. Sufficient air was not reach-

ing the working-places on the Huffner and Second Right entries. In other respects the mine was in fairly good condition.

2. Visited by Assistant September 22d. The mine was idle, had been since the 8th of the month, and was expected to remain so until October 1st. It had been shut down while track-scales and shaker screen were being put in.

3. Inspected by Assistant December 15th. A great abundance of air was entering the bank and it was well conducted through all working-places. The mine is aired by districts (two), a distinct intake for each district. One district, consisting of the 1st, 2d, and 3d Left and the 3d Right entries, with 36 men, was receiving 11,385 cubic feet of air per minute, the mouth of the Main being the intake therefor. The other district, consisting of 1st and 2d Right entries, with 20 men, was receiving 10,350 cubic feet of air per minute, the intake therefor being a shaft on the 1st Right air-course. In addition to the men specifically charged to each district, there were 17 day hands in the mine. The mine was in very satisfactory condition in all respects.

AETNA COLLIERY.

At Deaneffield.

P. O. Aetnaville.

Transportation by the Owensboro, Falls of Rough & Green River Railroad.

Operated by D. Stewart Miller, Lessee.

Output of bituminous coal for 1896, in tons: Lump, 10,208.76; nut, 1,705.00; run of mines, 1,141.48; slack, 2,040.00; mixed lump and nut, 885.00; fuel and local, not included in grades, 508.84. Total, 16,489.08 tons.

1. Visited by Assistant April 30th. The mine had been idle since April 1st until the day preceding this visit, when the pump was started, to clear the bank of water that had accumulated. The mine makes considerable water, and so much had accumulated during the shut-down that an inspection was impossible.

2. Inspected by Assistant July 16th. Only 8 miners were employed, four on the 1st West entry and 4 on the 4th East. The work-

ing-places were dry enough and well ventilated, and entries leading to them in good condition.

3. Visited December 19th. The mine was idle on account of an accident to the hoisting engine, which occurred on the 14th.

LOUISE MINE.

At Deaneffield.

P. O. Aetnaville.

Transportation by the Owensboro, Falls of Rough & Green River Railroad.

Operated by the Thompson Coal Co., M. S. Thompson, President; Geo. C. Roberts, Secretary and General Manager.

Output of bituminous coal for 1896, in tons: Lump, 7,652.32; nut, 3,100.00; slack, 3,125.00. Total, 13,877.32 tons.

1. Inspected by Assistant April 30th. Although the mine is a wet one, the water was being so controlled that the roads and working-places were dry enough. An ample volume of air was entering the bank, and it was well distributed. Timbering and room-propping was too scant, but no immediately dangerous top was observed.

2. Again inspected by Assistant July 16th. A good deal of timbering had been done on entries since preceding inspection. Entries were well drained, no loose or immediately dangerous top was discovered. Shooting had commenced before the mine could be fully traversed, hence, all rooms could not be visited, and definite determinations as to ventilation could not be made. Ample volumes of air were passing to the workings, however, and there was reason to believe that the ventilation was good.

3. Inspected December 19th. Additional timbering had been done on the Main entry since the preceding inspection. No dangerous top was discovered on any of the entries. Sufficient props were not used in rooms, nor were posts set close enough to faces. Drainage was good. A large volume of air was entering the bank (8,280 cubic feet per minute for 33 persons). Curtains were in place to conduct it properly, but three important ones were very badly torn, and failed, therefore, to satisfactorily perform their duties.

FORDSVILLE BLOCK (JOHNSON) MINE.

Near Fordsville.

P. O. Fordsville.

Transportation by the Louisville, Hardinsburg & Western Railroad, and by the Owensboro, Falls of Rough & Green River.

Operated by the Fordsville Block Coal Co., W. S. Gaines, President; C. E. Ford, Vice President; Ike C. Adair, Secretary and Treasurer.

Output of bituminous coal for 1896, in tons: Lump, 2,633.60; nut, 544.36. Total, 3,177.96 tons.

This mine, the opening of which was mentioned in the report for 1895, made no shipments before September 1st, and was not subject to supervision until the latter part of the year. The bank was idle from February 1st to May 10th. Up to September 1st the average number of diggers employed was five. The mine, which is half a mile from the Owensboro, Falls of Rough & Green River railroad, has no track connection therewith, or did not have as late as December 18th; hence coal for shipment is hauled to the railroad by wagon. It is expected to have track connection with the railroad in 1897.

1. When visited on July 16th there were only 4 men employed inside.

2. Inspected December 18th. Nineteen persons were employed inside, in workings on three entries, namely, 1st and 2d Left and 1st Right. A fire-basket was used, which was yielding a current of 2,331 cubic feet of air per minute; but in consequence of lack of two necessary curtains (or doors) and two brattices, and the fact that the Main entry door, near 1st Right, was allowed to stand open, the ventilation was defective; the current not being carried within 60 feet of any working-face. Rooms were reasonably well propped. Little timbering was done on entries, but no dangerously bad top was noted. The Main entry, at and near the mouth, was wet; elsewhere the drainage was good.

UNION COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 36,240.88; nut, 10,106.22; run of mines, 27, 538.00; slack, 6,735.00; mixed lump and nut, 15,598.04; pea, 5,648.00; nut and slack, 201.20; nut, pea and slack, 922.00; fuel and local, not included in grades, 1,132.00. Total, 104,121.34 tons.

Production of coke in 1896, in tons, 1,804.85.

Inspections were made both by the Chief and by the Assistant Inspector.

DEKOVEN MINES (2).

Near De Koven.

P. O. De Koven.

Transportation by Ohio Valley Railroad and by the Ohio river.

Operated by the Ohio Valley Coal & Mining Co., S. S. Brown, President; S. P. Sturgis, Secretary; P. G. Kelsey, Director, etc.

Output of bituminous coal for 1896, in tons: Lump, 11,368.48; nut, 3,687.08; run of mines, 24, 656.72; slack, 995.00; mixed lump and nut, 14,963.04; pea, 5,381.00. Total, 61,051.32 tons.

DeKoven Four Foot.—Comparatively little work was done in this mine, only a few men being employed to dig coal primarily for the railroad bins.

1. Inspected July 23d. Twelve persons were employed inside—all on the bottom level. Ventilation was fair and no dangerous lack of timbering or propping was noted.

2. Inspected October 23d. Twelve persons were employed inside—all on the lower level. The ventilation was defective. This was due to lack of a check-curtain on the Right entry between the two last rooms, to failure to close two rear break-throughs between rooms 28 and 29 on the Left entry, and to leakage between the Left entry and parallel air-course. But, although defective, the ventilation was not notably so. On the Slope, there was loose top between the 1st and 2d and 2d and 3d lifts that needed to be scaled. Elsewhere the top was good.

3. Visited December 10th. There were but 8 to 12 persons inside getting coal for railroad engines, all on the lower level, as theretofore. Since there was no advance work going on, and, so far as

legal requirements go, but a small volume of air was required—the ventilation offered no difficulties and the mine was not traversed.

DeKoren No. 9 Slope.—It is estimated that at least 70 per cent. of the company's output is taken from this mine.

1. Inspected July 23d. The mine was idle and the furnace was cold, hence no determinations of air volumes could be made, but it is known that the furnace has ample power to afford plenty of air. Except on the 2d Right level, where the air had not been turned into the rooms, which were up more than 60 feet, the current was close enough to faces. Drainage was good, and, excepting one place on the 2d Right, which already was being timbered, there was no bad top. The second outlet was in good condition.

2. Again inspected October 23d. Except at and near the 1st Right, drainage was good. The roof in front of furnace needed to be timbered or pulled down. No bad top noted elsewhere. Excepting in two rooms on 1st Right and 6 or 8 rooms on other entries, ventilation was good. The trouble on the 1st Right was due to room 8 being too much behind those on either side of it.

3. Inspected again December 10th. The mine was idle and no one was present to accompany the Inspector through, but such inspection was made as was possible under the circumstances. It was learned, before entering the mine, that work was confined to the 1st, 2d and 4th Right and 4th Left levels. Since the furnace was cold, no determinations of air volumes could be made. That question aside, the bank was in fair condition, with the following exceptions: 1st Right.—Room 8 was still too far behind its neighbors, hence the latter were not adequately ventilated. Fourth Right.—A door (or curtain) needed here to force the ventilating current through rooms had not been hung. Additional break-throughs were needed between rooms, especially between the 2d and 3d. Fourth Left Level.—Faces of first three rooms were too far beyond the air. A break-through was needed between the 3d and 4th rooms.

TRADEWATER (STURGIS SHAFT) MINE.

Near Sturgis.

P. O. Sturgis.

Transportation by the Ohio Valley Railroad.

Operated by a syndicate under the name of Tradewater Coal Mines, J. M. McKnight, President; Jacob Frankel (Louisville, Ky.), Secretary and Treasurer; L. Layman, General Manager.

Output of bituminous coal for 1896, in tons: Lump, 2,528.36; nut, 825.54; slack, 633.00; mixed lump and nut, 559.00; nut and slack, 201.20; mine fuel not included in grades, 472.00. Total, 5,219.10 tons.

This property, which had been in the hands of the Ohio Valley Banking & Trust Co. (Henderson), as Receiver, since March, 1894, was sold in February, 1896, by decree of court. The Germania Safety Vault & Trust Co., Trustee (Louisville), was the purchaser, and the sale was confirmed in March. Until the latter date, Mr. S. W. Sizemore represented the Receiver at the mine. Under the new regime, Mr. L. Layman (one of the owners) was made General Manager. For a time G. H. McCartney was Superintendent, to be succeeded by C. C. Roland, who resigned about December 1st. Up to November, comparatively little had been done beyond cleaning up and timbering mine and rebuilding the hoisting plant, the tibble and the ventilating fan, which were destroyed by fire, August 24th, 1895. Shaking and revolving screens were put in, and 50 bank cars added to the rolling stock.

1. Inspected July 22d. The mine was idle and had been since the 4th of the month. When running, work had been confined, so it was stated, to rooms on the Main (1st) West entry. Although provided with break-throughs, they were not ventilated, since the current had not been turned through them.

2. Inspected October 22d. The tip-house was not completed and very little mining was being done. Work was confined to rooms 11 to 25, inclusive, on the 1st West. All of said rooms had break-throughs, but were still without ventilation, for the same reason as noted in July. No dangerous lack of propping was noted in rooms or on entry.

On November 21st the following letter was sent to the operators:

"I find upon examination of notices served on your company by the Assistant Inspector of Mines (No. 273 in July and No. 355 in October), that you are subject to indictment for failure to comply with directions to have the ventilating current sent through rooms, so as to keep within 60 feet or less of the faces (as required by law). It is, of course, now too late to bring the matter to the attention of the November court, but I trust that you will at once have the directions complied with. In your mine, making fire-damp as it does, it is very dangerous to carry the work on ahead of the air. Unless you comply with directions to keep the air within the legal distance of working faces you run great risk of an explosion, as well as making yourself liable to a fine of \$50 a day, as provided by section 3 of mining law."

In response thereto, the following letter, under date of December 5th, was received from Mr. L. Layman, Manager: "Your favor of the 21st of November, complaining about the ventilation of our mine was duly received, and would have been answered sooner but for the fact that a recent change of Superintendents caused it to be overlooked. In reply we beg to state that we took immediate steps to remedy the cause of your complaint, and with the exception of a few improvements which we are pushing to completion the difficulty complained of will be arranged properly. Our Superintendent informed us that the lack of ventilation in the new rooms in the new work could not be remedied until the rooms had progressed far enough for break-throughs, which has since been done."

3. Inspected by Chief December 9th. Under the circumstances, it is deemed well to give the notice which was served, in full. It was as follows:

"I have already verbally communicated to you the results of the inspection, and given recommendations as to what should be done and what should be avoided in order to put the mine in proper condition, but I deem it well to file this written notice in addition.

"1. The plan for ventilating the mine as laid out by Mr. Roland, late Superintendent, as could clearly be seen from the arrangement of curtains and doors and of break-throughs between rooms,

provides for the Tate Slope to act as the intake for the air. This is the proper plan, and it ought to be followed out. But at the time of the inspection, the air instead of coming in through the Slope was all coming by way of the hoisting shaft, part going to the fan and part going out through the Slope. The Slope was, therefore working *against* instead of *with* the fan. So long as the fan remains where it is and is run as an upcast, and the Slope remains open, this fight between fan and Slope will continue. The extent to which the Slope acts against the fan on any one day, or at any particular hour of the day, however, depends upon outside temperature and winds; hence, so long as such a condition is allowed to exist, the course and amount of air traveling in the workings on the west side of the Main, especially, will be uncertain and irregular. At times, (as was noted during the inspection), there will be a considerable current traveling to the Slope; at other times there will be little, and at others there will be none—the air being at a standstill, through the tendency to reverse as the fan gains on the Slope on account of outside atmospheric changes being in its favor. This defect must be remedied. You can not afford to have uncertainty with respect to ventilation.

"2. The fact is that the fan, which is acting as an upcast (exhaust), is working at a great disadvantage. The compartment brat-ticed off of the main shaft to serve as a fan-shaft is entirely too small, and it can not safely be enlarged. I have called attention to this heretofore. A 12-foot fan (as you have), properly set, ought to produce an exhaust of at least 25,000 to 30,000 cubic feet of air per minute, but I found only 10,074 cubic feet passing up the upcast; and I may remark that at no time (when the old fan was in operation, before the fire), has a volume exceeding 10,000 to 12,000 cubic feet been found at the upcast, the area of the upcast being too small to render a much larger volume possible without an expenditure of much more horse-power than you have available. In addition, as I understand it, the opening at the Slope is considerably higher than the top of the shaft, hence there is another element that works against the fan so long as it is run as an exhaust. The fact is that the fan ought to be at the Slope. If placed there, the ventilation problem becomes of easy solution, and the danger of explosions of fire-damp, through

lack of proper ventilation, may be greatly reduced; and danger from such explosions in your mine is beyond question an ever present one. The next best thing is to put up a properly constructed furnace, with 'dumb-drift,' at the Slope, and split the air at the bottom of the shaft—letting the fan furnish air for the east side of the bank, while the Slope ventilates the west side. (But any plan which makes the hoisting-shaft a down cast is objectionable in winter, because the shaft is then liable to freeze.) The next best thing is to convert the fan into a downcast (forcing); but even that, with the small area of the fan shaft, will not produce as satisfactory results as are to be desired.

"3. As matters are now the ventilation is very unsatisfactory. There is practically none in the workings (rooms) on the 1st West and 3d South ('Little') entries. Were there a curtain between rooms 25 and 26, or between 24 and 25 (for which directions had been given you in Assistant Inspector's notice 355, but which had not been complied with), conditions would be somewhat improved on the 1st West entry—indeed, would be satisfactory were the current traveling the proper direction—but with the present arrangement of break-throughs between rooms and the air traveling to the Slope instead of in from it, there will be a constant spilling of air from the rooms to the entry, even with said curtain in place, unless special provision is made to prevent it. There are two rooms on the 1st West entry (32 and 33) that are quite beyond the course of the ventilating current. This must be remedied.

"The ventilation on the east side is also defective—working-faces being more than 60 feet in advance of the current, and very little current traveling where needed.

"I must insist very positively that this bank shall be thoroughly well ventilated, in strict accordance with law and the requirements for safety. There is positive danger from fire-damp explosions in it unless it is given a high order of ventilation; no chances or experiments can be ventured here; and unless directions are fully complied with, I shall feel compelled to place the matter in the hands of the court without further discussion. In saying this, however, I do not mean to question your desire to have the bank in proper condi-

tion. My intention is to urge upon you the exceeding necessity for intelligent and vigorous action.

"4. A cross (or 'cut-off') entry has been started from the 3d South (or 'Little') entry, off 1st West, to meet one coming from the southward extension of the Straight Main. On the 3d South, in the stretch between said cross entry and the 1st West, two or three rooms are being driven. They should be stopped. The ground has already been too greatly weakened on the left side of the 1st West, in that vicinity, and no more coal should be taken from there. In fact as much coal as possible should be left between said cross (or 'cut-off') entry and the 1st West, all the way between the 3d South and the Main; otherwise there will be danger of losing a large part of the 1st West entry, if no other harm results."

In justice to Mr. Layman, it is proper to say that, in conversation with the Inspector, he expressed an earnest desire to have the mine in proper condition, but naturally was somewhat embarrassed through lack of familiarity with mining methods and from the consequent necessity of depending upon others.

CUMBERLAND (WARDLAW) MINE.

Near Sturgis.

P. O. Sturgis.

Transportation by the Ohio Valley Railroad, and by the Ohio river.

Operated by the Cumberland Coal Co., W. W. Smith, President; Isaac Reese, Treasurer and General Manager; C. H. Wilson, Superintendent.

Output of bituminous coal for 1896, in tons: Lump, 16,696.40; nut, 5,108.00; run of mines, 2,521.28; slack, 4,730.00; mixed lump and nut, 76.00; pea, 267.00; nut, pea and slack, 922.00. Total, 30,320.68 tons.

1. Inspected by Assistant July 22d. The mine was idle and there was no fire in the furnace. Two rear-break-throughs needed to be closed on the Fourth Right and Left levels. It appeared that with that done, and a fire in the furnace, the ventilation would have been good. There was some drummy top on the Slope, at the 4th Level, which required attention. Drainage was good.

2. Inspected October 22d. Except on the 4th Right Level, near junction with the Slope, drainage was good. A volume of 15,040 cubic feet of air per minute was entering the Slope, but before the 3d Level was reached it had dwindled to 7,011 cubic feet, in consequence of losses through leaky brattices, etc. This, however, was sufficient for the 50 persons in bank, had it been properly distributed. But a number of the working rooms, more than 60 feet deep, had no break-throughs; and there were others through which, though provided with break-throughs, the air was not sent. The ventilation, therefore, was quite unsatisfactory. Rooms were fairly well propped.

On November 21st, the following letter was sent to the company:

"Referring to Notice 357 recently served on you by the Assistant Inspector, I observe that you are not sending the air through all rooms that are up 60 feet or more, so as to keep within the legal distance of the faces. As I have heretofore warned you, unless strict attention is paid to keeping the air within proper distance of room faces you run the risk of an explosion, since fire-damp in explosive quantity is liable to show itself in your mine at any time. Moreover, unless directions to thus comply with the law are observed, you will subject yourself to a fine of \$50 a day, as provided in section 3 of the mining law. I hope there will be no further occasion to complain of your remissness in the respect referred to."

3. Again inspected, by Chief, December 10th. The following notice was served:

"I noted the same defect with reference to deficiency in volume of air sent to the working places as was reported by the Assistant Inspector in his notice 357 (served in October), due to losses before the men were reached, said losses being caused by defective brattices and stoppings. In the 5th Left Level, where all the current should be traveling, I found only 3,323 to 3,758 cubic feet of air (per minute). In the air-course of the 4th Left Level, near the head, hardly any current was perceptible. You are subject to indictment for failure to comply with the Assistant Inspector's notice

on this point, and I trust that you will delay no longer in remedying the evil. Fourth Right Level.—The door or curtain needed between rooms 5 and 6, directed to be hung by the Assistant Inspector in Notice 357, has not been put up. Nor had the door directed to be hung in the Slope, to turn the air-current into this level, been put in place. Mr. Gahagen promised to remedy this on the day following the inspection. I hope he did not fail to do so. You are subject to indictment on account of the failure to comply with the Assistant's instructions. Fourth Left Level.—The defect reported by the Assistant Inspector with reference to failure to turn air into the rooms that were up 60 feet or more had not been remedied. No curtain had been hung. Unless the defects that were noted in the Assistant Inspector's Notice 357, served on you in October, and noted here as not having been obviated, are remedied at once and all directions complied with without further delay, your continued violation of the law will be brought to the attention of the next grand jury. I hope you will not render such a step necessary."

While there is no reason to believe that the company had wilfully neglected to put its mine in lawful condition, it is evident that should another inspection show no better conditions the matter will have to be carried into court.

CONN'S MINE.

Near Sturgis.

P. O. Sturgis.

Transportation by the Ohio Valley Railroad.

This little mine was operated the larger part of the year in a desultory way, by W. D. Newcomb. When visited in July there were only 3 persons employed underground; in October it was idle, having been drowned out, according to report, in August; and in December, it was still exempt from supervision. The output for the year was about as follows, in tons: Lump, 548.08; nut, 74.28; run of mines, 360.00; slack, 85.00. Total, 1,067.36 tons.

DAVIDSON'S MINE.

Near Uniontown.

P. O. Uniontown.

The mine, although within a short distance of the Uniontown

Branch of the Ohio Valley Railroad, has no railroad connection, and is operated exclusively for local trade.

Operated by Ben. C. Davidson & Sons, a firm consisting of Ben. C. Davidson, Ben. C. Davidson, Jr., and H. T. Davidson.

During the year a new main shaft and gearing for the hoisting engine was put in.

Output of bituminous coal for 1896, in tons: Lump, 4,443.04; nut, 404.68; mine fuel not included in grades, 568.00. Total, 5,415.72 tons.

1. Inspected by Assistant July 21st. This mine, a shaft, has but one opening. Exhaust steam from a mine pump is depended upon for ventilation, and for the number of men employed underground (never more than 10 under present conditions), a sufficient volume of air is obtained thereby. The current was kept up to the working-faces very well. Drainage was good and no bad top was discovered.

2. Visited October 20th. The mine had been shut down, in order that the boiler of hoisting engine might be cleaned and some machinery repaired. Under the circumstances an inspection could not be made.

3. Again visited, by Chief, December 11th and again found idle. The drum-shaft had been strained or twisted by over-winding, and a new one had to be substituted therefor. The work of putting in the new shaft, including new gearing, was nearing completion at the time of the visit. Practically no timbering is done in this mine. But so long as the excavations are not extensive, and the present plan of mining is followed, there is little necessity for more timbering than is done. The roof of the mine is limestone (over No. 11 coal, with No. 12 several feet still above), and much rubbish is made in taking down the coal, which serves for packing. The rooms are driven 7 yards wide with pillars (which are allowed to stand) of 9 yards.

SULLIVAN MINE.

At Sullivan.

P. O. Sullivan.

Transportation by the Ohio Valley railroad.

This mine, which is operated by Lamb & Newcomb, entered the list of those subject to the law in October or November, but it was

not known of until about the middle of December—too late for an inspection to be made. Operations are conducted in a small way, only from 7 to 10 diggers being employed.

Output for 1896, in tons: Lump, 656.52; nut, 6.64; slack, 292.00; local not included in grades, 92.00. Total, 1,047.16 tons.

WEBSTER COUNTY.

Output of bituminous coal for 1896, in tons: Lump, 16,482.64; nut, 4,037.68; run of mines, 17,458.96; slack, 4,155.76; mixed lump and nut, 4,092.64; pea, 2,478.92; nut and slack, 240.00; fuel and local not included in grades, 1,592.36. Total, 50,538.96 tons.

All inspections, except at Sebree, were made by the Assistant Inspector.

PROVIDENCE SLOPE.

At Providence.

P. O. Providence.

Transportation by the Providence Branch of St. Louis & Nashville division of L. & N. Railroad.

Operated by the Providence Coal Co., W. A. Nisbet, President; W. L. Barnes, Secretary; W. A. Nisbet, E. B. Hayden, and F. D. Ramsey, Directors.

Output of bituminous coal for 1896, in tons: Lump, 11,225.12; nut, 2,952.44; run of mines, 15,769.12; slack, 3,911.20; mixed lump and nut, 3,857.64; pea, 2,282.92; fuel not included in grades, 616.00. Total, 40,614.44 tons.

The company has two mines, a Slope (No. 1) and a shaft (No. 2). No. 2 was idle most of the year. All inspections here were made by the Assistant.

1. *No. 1 Mine*.—Inspected April 24th. Except on second lie-way on the Main entry, drainage was good. Props were kept well up to the faces, though set rather far apart. Ventilation was excellent.

2. Inspected September 28th. The mine was again found in good condition.

3. Inspected November 16th. There were 64 men in bank. A volume of 13,837 cubic feet of air per minute was entering and was very well conducted. Some needed cribbing had been done on the Main entry, and another crib was needed at the inner end of the lie-way. Drainage was good.

PROVIDENCE SHAFT.

At Providence.

P. O. Providence.

Transportation by Providence Branch of the L. & N. Railroad.

On November 16th this mine, (owned by the Providence Coal Co.), was being operated by R. L. Forsythe, lessee. He had taken possession on the 10th of the month. At the time of inspection there were but 6 persons employed inside. The bank was in fairly good condition in all respects.

The output for the two months was as follows: Lump, 440.00; nut, 120.00; run of mines, 272.00; slack, 120.00; local not included in grades, 20.00. Total, 972.00 tons.

TAYLOR'S MINE.

At Providence.

P. O. Providence.

The mine is not connected with the railroad (Providence Branch), but readily could be. All inspections here were made by the Assistant.

Operated by T. L. Taylor, proprietor.

Output of bituminous coal for 1896, in tons: Lump, 2,888.04; nut, 497.48; run of mines, 941.00; mixed lump and nut, 235.00; estimated mine fuel not included in grades, 15.00. Total, 4,576.52 tons.

1. Inspected April 24th. The bank was idle and furnace cold. With fire in the furnace, ventilation would have been good. No dangerous top was discovered. Drainage was good.

2. Inspected September 28th. The shaft cage used by men had neither cover nor safety catches. Three check-curtains were needed—one in mouth of 2d Left entry, one in mouth of 3d Left, and one on the Main between said entries. Although the mine was running, there was no fire in the furnace. In other respects the bank was in tolerably good condition.

3. Inspected November 16th. Drainage was good. No dangerous top was discovered. Only nine persons were employed in bank, for whom there was sufficient air entering, which was fairly well conducted. The cage used by men was still without cover or safety-catches. A peremptory warning has been sent Mr. Taylor to put in the cover and catches, upon pain of being prosecuted.

SEBREE MINE.

Near Sebree.

P. O. Sebree.

Transportation may be had by the St. Louis & Nashville division of the L. & N. Railroad, since the mine is within a few feet of the track, but as late as December 12th no connection had been made.

Operated by the Sebree Coal Co., S. F. Powell, President; T. J. Ashby, Secretary and Manager; J. B. Ramsey, Treasurer.

The equipment of the mine was completed during the year. Shaking screens with picking pans were put in.

Output of bituminous coal for 1896, in tons: Lump, 1,929.48; nut, 467.76; run of mines, 476.84; slack, 124.56; pea, 196.00; nut and slack, 240.00; fuel and local not included in grades, 941.36. Total, 4,376.00 tons.

This mine, a shaft 170 feet deep, was opened in 1895, but was not finally equipped until the fall of 1896. The coal wrought ranges from about 52 inches to 55 inches in thickness, the usual thickness being about 52 inches. It is the equivalent of the coal worked at Henderson and Spottsville. The occurrence of this high coal here is interesting, since a low ridge of Subcarboniferous limestone, (belonging to the "Rough Creek Uplift"), occurs in the town, about two-thirds of a mile southwardly from the mine. A discussion of the matter, however, need not be given here.

1. Inspected by Assistant April 25th. At this time the Main entry had been driven about 200 feet. A Right and Left entry had been broken off, each about 70 feet long. Only one room had been turned, which was from the 1st Left entry, and it was being driven back toward the shaft, to serve as an air-way. A small temporary furnace had been built (the upcast being a compartment bratticed off of the shaft, there being but one opening to the mine). It was stated that five men were employed underground when the bank was running. No tip-house had yet been built.

2. Inspected by Assistant September 26th. The mine was idle and no fire in the furnace. There was reason to believe that with a fire in the furnace the ventilation would have been good. Drain-

age was good. No dangerous, unsupported top discovered. Tip-house had been completed.

3. Inspected November 17th. Ten persons were employed inside. Sufficient air (3,240 cubic feet per minute) was entering the mine, but it was not properly conducted. Drainage good. No unsupported dangerous top was noted.

4. Inspected by Chief December 12th. It is deemed well to present the notice served, in full, which was as follows:

"So long as there is only one opening to this mine, more than 10 persons must not be employed in it at one time. (Sec. 9 of mining law.) So long as there is only one opening, ventilation by furnace must not be undertaken. I note that you have a furnace (though not now in use), but there is too much danger from fire for a furnace to be used in any mine that has only one opening. At present, with the small amount of excavation that has been made, sufficient ventilation may be obtained from exhaust steam (as is now the case), but when the excavation has so increased that exhaust steam can no longer do the work, a fan must be put up (unless another opening is made, in which event, of course, a furnace may be used. The method of cross-timbering followed—*i. e.*, the simple laying of the collars (cross-bars) on top of the legs—is not a good one. The legs should be set against the coal, and the collars should be notched, so as to withstand lateral pressure. Where the space to be cross-timbered is extra wide, an inside leg may be set on each side, so as the better to enable the collar or cross-bar to withstand vertical pressure. A curtain should be hung on the Main air-course, between the 1st and 2d North entries. Directions to do this was given by the Assistant Inspector in his Notice 395. It must be complied with, unless all work is abandoned in both of these entries. A curtain must also be hung on the Main entry, between the 1st and 2d South entries. The 2d room on the 2d South entry needs breakthroughs to the 1st and 3d Rooms. A curtain should then be hung on the entry, between the 3d and 4th rooms, to cause the air to properly travel the rooms. Although, so far as I could learn, no fire-damp has yet been noticed in your mine, I am impressed with the belief that it is very likely to appear as further development is made.

I therefore earnestly urge that you take every precaution against it—and that means thorough ventilation; there should be an abundance of air, thoroughly well distributed, well up to the faces of all workings. I believe it would be well to stop the second room on the 1st South entry, and not break off any more rooms on the 1st North as yet (the one already broken off having been stopped), in order to make sure of leaving a block of coal at the shaft amply large enough to protect it."

IX.

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: § 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.

§ 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.

3. Said Inspector shall have power to visit and inspect any mine to which this act applies. He shall examine into the condition of such mine with respect to ventilation, drainage, timbering and general security; and if, upon inspection, he finds that such ventilation, drainage, or timbering as the health or safety of the persons employed in the mine would require has not been provided, or should he find the mine insecure in any part, or should he find that sufficient means of ingress and egress have not been provided, said Inspector shall at once notify the agent, superintendent or owner of the mine as to the unsafe or unwholesome condition of such mine, and require him to put the mine in a safe and wholesome condition, and such mine shall forthwith be rendered safe and healthful. For a failure to comply with the directions of the Inspector to render such mine safe, and to provide such ventilation as is sought to be secured by this law, and to provide safe and suitable means of ingress and egress, within *twenty* days from the date of the inspection, the agent or superintendent and owner shall be liable to a fine of fifty dollars per day for every day that such mine shall be suffered to remain in such unsafe or unhealthful condition after the expiration of the *twenty* days above provided in which the required improvements should be made, which fine may be collected by indictment by the grand jury of the county in which such mine is situate; but in cases in which the Inspector is satisfied, from personal investigation, that, even if due diligence is observed, the required improvements can not be completed within the thirty [20] days above provided, he shall have authority to extend the time for not more than *twenty* days longer; but when the time is thus extended, the agent, superintendent or owner who is delinquent after the expiration of the additional time, shall be subject to indictment and fine as above provided; and as a cumulative remedy in case of failure of any owner, agent or superintendent to conform to the provisions of this law, after notice from the Inspector, within the time provided by this section, any circuit court, or the judge in vacation,

may, on application of the Inspector, by civil action, in the name of the State, enjoin or restrain, by writ of injunction, the said owner, agent or superintendent from working or operating such mine with more than five persons until it is made to conform with the provisions of this law. But before such writ of injunction shall issue, the owner, agent or superintendent shall have at least three days' notice of such contemplated action, and shall have the right to appear before such court, or the judge in vacation to whom the application is made, who shall hear the same on affidavits and such other testimony as may be offered in support, as well as in opposition thereto. It shall be the duty of the Commonwealth's attorney of the district, and of the county attorney of the county, in which the mine lies, to prepare and prosecute proceedings upon said application. [This section is in accordance with amendment approved March 3, 1894.]

§ 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.

§ 5. Such Inspector, while in office, shall not act as agent, or as a manager or mining engineer for, or be interested in operating any mine, and he shall annually, on or before the tenth day of February, make report to the Governor of his proceedings for and during the calendar year ending on the thirty-first day of December, and of the condition and operation of the coal mines in this State, enumerating all accidents which shall have occurred in or about the same, and giving such other information as he may deem useful, and making such suggestions as he may deem important as to further legislation on the subject of mining. The Inspector shall also report the number of persons employed in and about the mines,

and the amount 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 and about the mines, the number of persons employed, and the amount of coal mined, during the preceding month; and the owner, lessee or superintendent, refusing or failing to furnish the Inspector such information for sixty days after application therefor has been received, shall be liable to a fine of fifty dollars, to be recovered in the county in which the mine concerning which such information is refused is situated. The Inspector is authorized to extend his observations, so as to be prepared to report upon the mining possibilities and mineral resources of the counties to which he is called in the prosecution of his duties as Inspector. One thousand copies of the Inspector's annual report shall be printed for general distribution.

§ 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.

§ 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.

§ 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.

§ 9. It shall not be lawful for the owner, agent, or superintendent of any coal mine, worked by a shaft, slope or drift, wherein fifteen thousand square yards have been excavated, to employ more

than ten persons to work therein, or to permit more than ten persons to work in such mine, unless there are to every seam of coal worked in each mine at least two separate outlets, separated by natural strata of not less than one hundred feet in breadth, by which shafts or outlets distinct means of ingress and egress are always available to the persons employed in such mines; but it shall not be necessary for the two outlets to belong to the same mine; and every shaft opened after the passage of this act shall have two such separate outlets, after fifteen thousand square yards shall have been excavated; and to all other mines, whether slopes or drifts, two such openings or outlets shall be provided within twelve months after the passage of this law, provided fifteen thousand square yards have been excavated at or before the passage of this law, or if not, then within twelve months after that extent has been excavated. In case any coal mine has but one shaft, slope or drift for the ingress or egress of the men working therein, and the owner thereof does not own suitable ground for another opening, such owner may select appropriate associate adjacent surface ground for that purpose, and have the same condemned, and appropriate the same by proceedings in the county court of the county where the mine is situated, similar to proceedings now allowed by law for securing a private passway.

§ 10. The owner, agent or lessee of every coal mine, whether slope, shaft or drift, to which this act applies, shall provide and maintain for every such mine an amount of ventilation of not less than one hundred cubic feet of air per minute per person employed in such mine, which shall be circulated and distributed throughout the mine in such a manner as to dilute, render harmless, and expel the poisonous and noxious gases from each and every working-place in the mine, and no working-place shall be driven more than sixty feet in advance of a break-through or air way; and all break-throughs or air-ways, except those last made near the working-face of the mine, shall be closed up and made air-tight by brattice, trap-doors or otherwise, so that the currents of air in circulation in the mine may sweep to the interior of the excavations where the persons employed in the mines are at work; and all mines governed by

this statute shall be provided with artificial means of producing ventilation, such as suction or forcing fans, exhaust steam, furnaces, or other contrivances, of such capacity and power as to produce and maintain an abundant supply of air. All mines generating fire-damp shall be kept free from standing gas, and every working-place shall be carefully examined every morning with a safety-lamp, by a competent person or persons, before any of the workmen are allowed to enter the mine. And at every mine operated by a shaft there shall be provided an approved safety-catch, and a sufficient cover overhead, on all cages used for lowering and hoisting persons, and at the top of every shaft a safety-gate shall be provided, and an adequate break shall be attached to every drum or machine used in lowering or raising persons in all shafts and slopes.

§ 11. Any person employed in any mine governed by this statute 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, 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.

§ 12. Coal mines in which not more than five persons are employed at one time shall be exempt from the provisions of this law.

§ 13. On account of the emergency hereby declared to exist, in that it is necessary for the employes in mines to receive the protection of the provisions of this law in timely season, this law shall be in force from its approval by the 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 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 ad-

vice and consent of the Senate, an Assistant Inspector of Mines, who shall hold his office for four years; but shall be liable to be removed by the Governor for willful neglect of duty or malfeasance in office. Said Assistant Inspector shall have a practical knowledge of the different systems of working and ventilating coal mines, and of the nature and properties of the noxious and poisonous gases of mines, especially of fire-damp, and he shall also have a practical knowledge of mining. Said Assistant Inspector shall, before entering upon the discharge of his official duties, be sworn to discharge them faithfully and impartially, which oath shall be subscribed on his commission, and certified by the officer administering it, and his commission, so indorsed, shall be filed with the Secretary of State in his office, and said Assistant Inspector shall give bond in the penal sum of two thousand dollars, with surety, to be approved by the Governor, for the faithful discharge of his official duties.

3. Said Assistant Inspector shall give his entire time and attention to the duties of his office, which shall consist of aiding, under the direction of the Inspector of Mines, in carrying out the provisions of this and all other acts relating to the inspection of coal mines.

4. Such Assistant Inspector, while in office, shall not act as agent or as a manager or mining engineer for, or be interested in operating, any coal mine in this State. He shall receive an annual salary of \$1,200 (twelve hundred dollars), payable monthly, and shall likewise be allowed and paid his necessary traveling expenses when absent from his office on business connected with his department. He shall have his office with the Inspector of Mines in the State House at Frankfort, and shall keep a record of all inspections made by him, and make a monthly report of the same to the Inspector of Mines for said Inspector's use when preparing his annual report.

5. (As amended, and approved June 9, 1893.) For the reason that the number of mines in this State, subject to the law requiring inspection is now so great that it is impossible for one person charged with the duties of Inspector of Mines to give all of them the

immediate, detailed and frequent attention they require, and, in addition, discharge the other duties of his office, an emergency is hereby declared to exist, and this act shall be in force from its approval by the Governor; but the term of said Assistant Inspector of Mines provided for herein, and his salary, shall begin only with the date of his appointment.

(Act went into effect June 9, 1893.)

TO PROVIDE FOR A CHECK-WEIGHMAN.

CHAPTER 1251 of Acts of General Assembly of 1885-'86.

Be it enacted by the General Assembly of the Commonwealth of Kentucky: § 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.

§ 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.

§ 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.

§ 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.

§ 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 em-

ployed 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 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 Avert 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 employes 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.)