REPORT OF STATE INSPECTOR OF MINES.

OFFICE OF INSPECTOR OF MINES,
INDIANAPOLIS, IND., February 10, 1902.

Prof. W. S. Blatchley, State Geologist:

Dear Sir—I have the honor to submit to you herewith my third annual report as Inspector of Mines, covering the calendar year of 1901, and being the twenty-second annual report of this department and the eleventh made to the Department of Geology and Natural Resources.

I trust it will receive your approval and be found worthy of consideration by the public.

JAMES EPPERSON,
Inspector of Mines.

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REPORT.

While following the same general lines as in former reports, it has been our purpose to improve on the different subjects reported herein and the arrangement thereof, thus making the report more comprehensive, reliable and of greater interest to the general public.

The production of bituminous and block coal is given separately and each of the products is divided so as to show the entire product hand mined and machined mined, the same being subdivided into screened, slack and nut and mine run coal and the general distribution thereof.

The table of employes shows accurately the number of persons engaged in mining, being subdivided so as to show the number of persons employed at each class of work. The table of wages is also more complete, inasmuch as it shows the aggregate wages paid to each class of labor. We also give an average wage table, showing the gross earnings of miners, inside day men and outside day men, the average earnings per person employed in each capacity for the year. A comparative table is also given showing the increased gains in the number of tons and wages and per cent. of each over that of 1900.

There has been included in this report a table of lost time, showing the aggregate number of days lost at mines and the various causes thereof. Mine accidents have been handled more completely, either by table of by descriptive work.

The Legislature of 1901 gave to this office an additional assistant inspector and a clerk. This increase has enabled us to make inspections more frequently, to investigate accidents more thoroughly, etc., and has been of much value to the general work of this office. Andrew Dodds, of Oakland City, was appointed on March 11, 1901, as such additional assistant. His work in inspections and reports has been eminently satisfactory.

TABLE

Showing the Production of Coal in Tons of 2,000 Pounds in Indiana During the Year 1901 at Mines Employing More Than Ten Men, by Months and by Counties.

County.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Totals.
Clay	111,502	103,017	110,176	75,940	47,894	57,459	73,623	104,681	99,811	132,139	117,464	119,532	1,153,238
Daviess	24,620	22,000	15,870	21,539	17,362	10,191	14,133	18,856	20,512	24,119	20,006	21,012	232,287
Greene	117,118	108,081	109,890	80,262	65,973	50,586	70,796	90,733	94,925	117,994	128,109	136,003	1,170,470
Knox	7,223	6,587	6,519	2,579	2,770	3,093	1,594	4,554	6,825	5,229	4,727	8,482	60,162
Martin	680	815	763	918	396	426	.....	.....	.....	.....	.....	.....	3,998
Parke	70,056	76,611	58,527	46,195	42,354	41,093	40,396	48,528	54,824	56,577	66,205	71,639	673,005
Perry	2,763	2,148	1,748	1,783	1,437	1,287	1,192	1,228	970	1,351	732	1,040	17,679
Pike	27,427	24,461	25,942	20,455	15,599	10,766	14,904	12,297	18,478	29,258	33,519	35,802	268,908
Sullivan	105,161	93,180	85,131	79,521	82,074	54,696	57,756	59,702	75,839	96,718	84,439	96,097	970,314
Vanderburgh	20,485	21,362	18,325	12,720	6,738	7,548	9,739	14,066	15,595	19,765	18,224	18,328	182,895
Vermillion	74,185	67,034	68,551	58,626	54,555	46,115	54,566	51,618	56,107	60,122	71,220	75,824	738,523
Vigo	107,125	98,871	97,691	92,657	83,933	85,274	82,494	82,567	89,700	101,987	127,455	142,566	1,192,320
Warrick	23,151	21,225	20,796	19,463	15,083	16,747	12,781	13,273	16,447	21,376	19,300	18,283	217,925
Fountain	4,233	3,043	3,684	4,519	3,161	2,153	2,712	2,416	1,895	2,435	2,508	2,274	35,033
Gibson	7,939	7,499	8,120	2,581	5,322	6,090	8,555	8,608	9,562	12,046	12,944	13,180	102,446
Grand total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,019,203

TABLE

Showing the Wages Paid to Employes in Indiana, During the Year 1901, at Mines Employing More Than Ten Men, by Months and by Counties.

County.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Clay	$109,269 85	$109,283 51	$108,660 38	$78,456 86	$62,592 00	$62,131 70	$90,284 51	$106,922 52	$103,482 15	$126,798 12	$114,651 81	$123,972 62	$1,196,506 03
Daviess	24,981 98	23,626 04	17,426 30	19,411 18	17,422 42	14,593 57	13,949 29	2,127 01	20,111 78	27,342 34	20,520 45	25,411 65	226,924 01
Fountain	3,988 60	3,145 95	3,640 13	5,369 50	3,259 95	2,811 90	2,723 45	2,688 45	2,211 15	2,803 95	2,773 56	2,434 37	37,850 96
Gibson	5,929 61	5,549 79	6,153 98	2,517 45	2,516 22	4,613 71	6,495 40	6,673 15	7,425 77	8,959 67	9,264 90	9,268 94	75,368 59
Greene	83,441 86	74,435 78	76,063 87	61,132 60	56,416 03	41,128 59	50,149 03	61,702 37	61,185 72	82,344 35	86,361 94	89,736 16	824,108 30
Knox	7,996 61	5,323 52	5,113 48	2,409 14	2,495 32	3,164 65	1,467 27	3,834 46	5,325 75	4,117 29	3,037 78	6,811 35	51,096 62
Martin	642 00	632 10	694 07	725 61	451 19	464 60	.....	.....	.....	.....	.....	.....	3,609 47
Parke	85,150 48	91,986 77	47,807 02	37,657 46	31,742 52	36,418 90	39,967 35	47,858 42	49,937 43	57,483 17	63,040 08	67,607 08	656,556 62
Perry	2,133 09	1,871 56	1,149 91	1,310 15	1,155 26	1,040 19	925 05	971 10	754 58	1,096 93	836 44	937 57	14,181 83
Pike	22,867 33	20,482 65	19,428 97	16,268 28	13,734 36	9,417 55	12,320 56	11,406 77	14,830 72	20,636 37	26,447 03	26,393 97	214,234 56
Sullivan	67,206 26	57,990 33	63,275 72	45,859 72	39,588 22	40,670 48	43,465 68	49,316 26	58,338 53	52,790 80	49,685 26	67,345 06	635,587 20
Vanderburgh	18,207 91	23,363 77	15,991 86	12,141 68	5,158 50	6,484 14	9,490 39	11,516 79	12,585 46	6,826 21	27,429 89	18,691 73	167,888 33
Vermillion	53,631 28	48,175 84	47,758 44	44,288 13	36,389 35	37,506 94	22,925 95	24,584 75	34,042 23	82,903 40	50,254 37	55,854 80	536,316 48
Vigo	83,379 99	59,195 83	81,077 69	71,917 54	71,362 24	74,812 39	72,934 60	73,999 08	73,390 34	84,079 74	92,859 44	98,639 69	901,650 17
Warrick	12,836 70	12,907 54	15,565 08	12,359 20	9,507 22	13,973 64	8,918 42	8,246 40	11,301 60	14,749 04	13,484 38	12,105 99	138,660 69
Grand total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	$5,680,539 86

REVIEW OF COAL TRADE AND MINING CONDITIONS.

The coal business in Indiana for the year 1901, in all its various branches, has been unparalleled. The total production, which reached 7,019,203 gross tons, shows an increase of $736,140 tons, or 11.09 per cent., over 1900. This large increase may be attributed to several causes, the most important of which are, an increasing demand for Indiana coal in adjoining states, the absence of strikes of any consequence, the failure of the gas supply in many localities, necessitating the use of coal for fuel, the enlargement of mining facilities in the way of mining machines, mechanical haulage, etc., in some of our older mines, and the large increase in the number of new mines opened within the past two years (very probably the most important factor).

Yet, as large as was the increase in production, it would have been perceptibly greater had it not been for the shortage of railroad cars, which became a serious drawback, particularly during the months of October, November and December. However, in justice to the different railroad companies, it should be stated that the increased demand for cars was brought about by the unusual increase in the number of new mines opened in 1900 and 1901, there having been thirty-two in the former and sixteen in the latter year, an increase of about thirty-nine per cent. over any year prior to 1900. The greater number of the new mines referred to have become large producers, thus requiring an unusually large supply of cars at the mines, as well as between the mines and the various markets.

The market price of coal during the past year has been good, though varying considerably. In some instances, usually large contracts, the price paid at the mine was as low as eighty-three cents per ton mine run; while again it was sold as high as one dollar and twenty-five cents per ton.

The aggregate wages paid in 1901 amounted to $5,680,539.56, an increase over 1900 of $837,196.60, or eleven and nine-hundredths (11.9) per cent., while the total number of mine employes was 12,096, an increase of 3,208, or thirty-two and four-tenths (32.4) per cent. over that of 1900. Notwithstanding this large increase in employes, the average wage table given in this report shows the average earnings to be $436.29 per miner, $544.47 per inside day man. Considering the aggregate number of days lost from various causes, as shown by the table of lost time in this report, the above figures speak well for the earning capacity of persons engaged in mining and in other capacities at Indiana mines.

A careful review and examination of the tables and general descriptions in the following report will show beyond doubt that the year has been the best in the history of the Indiana coal business, and that the prospects for 1902 are equally promising.

IMPROVEMENTS AND CHANGES IN OWNERSHIP OF MINING PROPERTY.

Clay County.

The Collins Coal Company installed electric chain machines in its Gifford No. 1 Mine in October. Three machines are in use at the present time. This number will be increased as soon as there is sufficient room. Their No. 2 Mine is equipped with the same kind of machines; power will be furnished from No. 1.

The Brazil Block Coal Company has added to the equipment of its No. 8 Mine a Smith-Vail Electric Pump, it being used to pump out an old abandoned mine whose works are adjacent to No. 8. The pump has a seven-inch suction and a six-inch discharge, and is situated some 2,000 feet from the power plant at No. 8. The only attention required to keep it in operation is oiling once in twenty-four hours. This company has also installed a third-rail motor haulage in the main west entry of their No. 1 Mine.

The Jackson Coal and Mining Company has put in a revolving small coal screen at its Cornwell mine. The screen is forty inches in diameter and twelve feet in length, having one-fourth and one-inch mesh, and is driven by a twenty-four horse-power engine.

The Rob Roy Mine changed hands in May, and is now owned and operated by the Andrew Coal and Mining Company.

Daviess County.

The Daviess County Coal Company has built a new head-frame and tipple at its Montgomery No. 2 Mine.

Greene County.

The L. T. Dickason Coal Company equipped their Wild Cat Mine with electric machines in June. At the present time they have in use four Morgan-Gardner and two Sullivan machines of the chain type.

The Black Creek Coal Company has sunk and equipped with a stairway a second outlet, or manway, at its Black Creek Mine.

The Island Coal Company has put in the Mitchell dump at its No. 2 Mine, which has increased the capacity of the mine considerably, as well as assisting materially in cleaning the coal. The company has replaced the twelve-foot fan at No. 2 with one sixteen feet in diameter.

KNOX COUNTY.

The Prospect Hill Mine changed hands August 8th, and is now operated by Freeman, Buntin, Wetzel & Company.

PIKE COUNTY.

The Hartwell Mine, formerly owned by Cabel & Company, was bought by the S. H. Wulfman Coal Company, of Huntingburg, and is now being operated by the latter company. This company has made a new opening, and is also cleaning up and reclaiming some of the old workings.

The J. Woolley Coal Company has equipped its Petersburg mine with rope haulage, which will greatly increase the capacity of the mine.

The Alden Mine, located near Winslow on the Southern Railroad, formerly owned by the Alden Mercantile Coal Company, changed hands last spring, and is now owned and operated by the St. Louis Gas Company, of St. Louis, Missouri. The coal from this mine was formerly hauled by mules over a tram-road a distance of one and one-half miles to the tipple, which was located on a siding of the Southern Railroad within the corporate limits of Winslow. This mode of hauling the output of the mine was both slow and expensive, and the present company has recently constructed a railroad switch to the mine, erected a new tipple and equipped the mine with a view to securing a large output.

The Aberdeen Coal Company has provided a second outlet, or manway, in compliance with the law, at the Aberdeen mine.

PERRY COUNTY.

Bergenroth Brothers have replaced the furnace with fan ventilation at their Troy Mine. The change has greatly improved the sanitary condition of the mine.

PARKE COUNTY.

Cox No. 3 Mine, formerly owned by the Brazil Block Coal Company, is reported as having been sold to the Bruiletts Creek Coal Company, the change occurring December 1st.

The Otter Creek Coal Company has sunk the Mary Mine to the lower block seam, i. e., Coal III, and is now mining from both seams. The second outlet was completed and equipped with a stairway during the summer.

SULLIVAN COUNTY.

The Indiana-Chicago Coal Company has added to the equipment of its Dugger Mine an electric fan, which has greatly benefited the ventilation of the mine. It has also replaced the third rail motor haulage system with a 10-ton Morgan-Gardner traction motor. This is the largest haulage motor now in use in Indiana mines.

The Bunker Hill Mine, formerly owned by Sexton, Crowder & Company, changed hands last spring, and is now owned by the Washington Fuel Company. The present company has bought three hundred acres of excellent coal land adjoining this property.

The Green Hill Coal Company has sunk and equipped the second outlet at its Green Hill Mine. The work of sinking the shaft and building the stairway was completed about September 15th.

The Hymera Coal Company, at the Hymera Mine, has sunk a shaft to the old workings in the top vein, which were abandoned about two years ago. The purpose of the shaft is to hoist out the water accumulated in the old workings, which have a very heavy dip away from the shaft, the water being considered dangerous to lives of workmen in the lower seam.

The Shelburn Mine suspended operation in April by reason of miners striking for pay. It remained idle until October, when it was leased by twenty of the former employes. They cleaned up the mine and commenced shipping coal November 1st. At last report, twenty-three persons were employed.

VANDERBURGH COUNTY.

The Crescent Coal Company has sunk and equipped a second outlet at the Unity Mine (now Crescent Mine). They have also erected coal bins for the purpose of coaling railroad engines, and have made other extensive repairs on the surface plant, to the amount of something over five thousand dollars.

The machines at the Sunny Side Mine, owned by the Sunny Side Coal and Coke Company, have been taken out. The mine is now being worked solely as a hand or pick mine.

VIGO COUNTY.

The Bruiletts Creek Coal Company has made some very extensive improvements at their Klondyke Mine, located near Ehrmandale, having built a new tipple and lengthened the slope, thereby reducing the very steep grade. They have also bought a new hoisting engine.

The Seeleyville Coal and Mining Company has lately completed the manways at their Rose Bud and Royal mines.

TABLE

Showing Amount of Money Expended on Improvements of Various Kinds of Mine Property, by Counties.

Clay	$6,098 00
Daviess	3,120 00
Gibson	319 50
Greene	16,000 00
Knox	700 00
Parke	4,631 07
Pike	2,127 71
Sullivan	19,788 23
Vanderburgh	5,327 00
Vermillion	21,799 00
Warrick	300 00
Total	$60,210 51

STRIKES.

The year just ended has been productive of many local strikes, each of which, however, occurred at individual mines, and with but seven exceptions were of so short duration that no special mention of them will be made.

The exceptions referred to were strikes that occurred at the following named mines, i. e., Knox and Prospect Hill, in Knox County; Cannelton, in Perry County; Shelburn, in Sullivan County; Cayuga, in Vermillion County, and the Star No. 1 Mine, in Warrick County. Following is a brief statement of the causes and adjustment of each strike as near as could be learned, also the number of persons affected and the length of time lost:

On April 1st a strike was inaugurated at the Knox and Bicknel mines, brought on by a difference between operators and miners as to the price to be paid for lifting bottom. The former mine, employing a total working force of twenty-four persons, was idle through April, May and until about June 20th, at which time an adjustment

of the trouble was brought about by concessions on the part of each of the interested parties. The Bicknell Mine, employing forty-seven persons, remained idle until some time in September, when, after repeated efforts on the part of the officials of both the miners and operators' organizations, a settlement was effected. We have been unable to learn the exact terms under which the miners resumed work, but are informed that each of the contending parties claims a victory. This being true, the settlement, no doubt, was satisfactory to all concerned.

The Prospect Hill Mine furnishes employment to a force of twenty-four persons. A strike occurred at this mine in October, originating from the discharge of two miners, but ultimately developing into a strike as to whether or not the mine should be operated with organized labor. The operators claimed that owing to certain conditions existing in the mine, they were unable to pay the same prices for day labor, etc., as paid at mines where organized labor was employed. An attempt to operate the mine with non-union labor was made, which precipitated a riot, in which William Scott, the mine boss, and four other persons were roughly handled. As an outgrowth of this trouble, several persons were arrested, two of whom were fined, each of the others proving an alibi. After twenty-one days' idleness, the mine resumed operation with a force of twenty persons, but on what terms, we have been unable to learn.

A strike at the Shelburn Mine was declared May 11th, by reason of the company's failing to pay the preceding half month's wages. The seventy-one persons employed in and about the mine quit work, and the mine remained idle until November 1st, at which time it was leased by twenty of the former employes, who cleaned it up and commenced shipping coal the latter part of that month. It is reported that all claims were settled by the company in September.

The Cayuga strike, in which twenty-two persons went out, was precipitated on July 8th by the company's refusing to pay a miner for a set of tools lost by reason of his room's caving in during a week of idleness of the mine. The real object of the strike, however, developed later on, when the miners refused to resume work until the mine superintendent should be discharged. They were ordered back to work by both the State and National Presidents of the United Mine Workers. Upon their refusal to resume work, the charter of the Cayuga Local was revoked and a letter written to the mine management authorizing them to employ other union miners. This the company was unable to do, and matters remained thus until August 20th, when the Cayuga Mine Local was reinstated and the matter

brought to arbitration, resulting in the mine superintendent's being suspended from the management of the mine for a period of thirty days, and an amicable adjustment of all other existing grievances.

The strike at the Star No. 1 Mine, in which sixty-five persons were thrown idle for thirty days, originated over some trouble at the Star No. 2 Mine, a small mine employing less than ten men and operated by the same company. The exact cause of the strike was not learned, but from information received at this office, the settlement made was satisfactory to all concerned.

The causes of the strike at the Cannelton Mine, in which twenty-four persons were engaged, were much the same as those at the Prospect Hill Mine, the company claiming that the distance the coal had to be hauled (nearly four miles), and other existing conditions, that it was unable to pay organization prices. As a consequence, the mine has been idle since March 1st. It is reported that it has been abandoned, which is not improbable, since it is a very old mine and is nearly worked out. Little was being done at the time of the strike except drawing pillars.

Following are copies of agreements entered into by and between the Bituminous Miners of District No. 11 and the Block Coal Miners of District No. 8 and the operators of the respective districts, each district being a separate branch of the United Mine Workers of America:

TERRE HAUTE AGREEMENT.

APRIL 1, 1901, TO APRIL 1, 1902.

Pursuant to an agreement made between the Coal Operators and United Mine Workers of America, of Illinois, Indiana, Ohio and Pennsylvania, made at Columbus, Ohio, February 9, 1900, the price of mining for bituminous coal in the State of Indiana shall be 80 cents per ton of 2,000 pounds for screened lump coal, made over a standard screen, and 49 cents per ton of 2,000 pounds for run-of-mine. That further details in scale of prices for pick and machine mining in the State of Indiana for one year, beginning April 1, 1901, shall be as follows:

PICK MINING.

(Yardage.)

In entries 7 to 9 ft. wide, $1.66.

In entries 12 ft. wide the price shall be five-eighths of regular price, or $1.03½.

Entries shall not exceed 12 ft., it being understood that this applies to entry work only.

Break Throughs.

Break throughs between entries shall be paid for at entry prices. Break throughs between rooms, when sheared or blocked, shall be paid for at entry prices, but no break throughs shall be driven without the consent of the operators. Nothing herein shall interfere with the law governing break throughs.

Room Turning.

Room turning, $4.00.

Room necks to be driven 12 ft. in and widened at an angle of 45 degrees when so desired by the operator. Any distance in excess of above shall be paid for proportionately, but no room neck shall exceed 15 feet. When room necks are driven 12 ft. wide, the price shall be five-eighths of regular price, or $2.50.

Machine Mining.

In entries 7 to 9 ft. wide, $1.19.

In entries 12 ft. wide, five-eighths of price for narrow entries, or 74 cents.

Narrow work after punching machines shall be sheared when demanded by the operator. Narrow work after the chain machine must be done in a workmanlike manner.

Break Throughs.

Break throughs between entries, same as entry prices. Break throughs between rooms shall be paid for at same price when similarly driven.

Room Turning.

Room, turning, $3.00.

Room necks to be driven 12 ft. in and widened at an angle of 45 degrees when so desired by operators. Any distance in excess of above shall be paid for proportionately, but no room neck shall exceed 15 ft. When room necks are driven 12 ft. wide, price shall be five-eighths of regular price, or $1.87.

Day Work for Punching Machines.

Machine work, when paid for by the day, shall be for:

Machine runner	$2 82
Helper	2 25

Day Work, Chain or Cutter Bar Machine.

When paid for by the day shall be for:

Machine runner $2 67½
Helper 2 67½

Day work by machines shall apply only to opening new mines and defective work, such as horse backs, etc.

Price Per Ton for Machine Mining.

FOR PUNCHING MACHINE.

Screened Lump—Runner, 9c; Helper, 8c; Loading, Shooting and Timbering, 45c; Total, 62c.

Run of Mine—Runner, 5¾c; Helper, 5¼c; Loading, Shooting and Timbering, 28c; Total, 39c.

FOR CHAIN MACHINE.

Screened Lump—Runner, 5¼c; Helper 5¼c; Loading, Shooting and Timbering, 48c; Total, 58½c.

Run-of-Mine—Runner, 3¼c; Helper, 3¼c; Loading, Shooting and Timbering, 30c; Total, 36½c.

Machine shovels shall be furnished by the operators, but when replaced the old shovels must be returned, and, in case of careless breaking or destruction, the helper shall pay for the shovel so destroyed.

Blacksmithing.

Price of blacksmithing shall be 1¼c on the dollar. Sharpening shall be done in a workmanlike manner, and men shall not have to wait for their tools.

Day Labor.

Inside day labor shall not be less than $2.25 per day of eight hours, when men are employed, and track men and timber men shall receive $2.30 per day of eight hours, and all outside day laborers working at the mines, excepting weighmasters, flat trimmer and dumper, who shall be regarded strictly as company men, shall be recognized as members of the United Mine Workers of America, provided that the present scale of prices now paid for outside day labor shall prevail during the existence of this contract, together with present conditions and hours of labor; and provided, further, that, in emergencies or in the absence of any regular employe the right of the operator to employ men not members of the United Mine Workers for outside day labor shall not be questioned.

GENERAL.

1. When the coal is paid for mine run, it shall be mined in as good condition as when paid for on a screened lump basis, and, when loaded on the miner's car, it shall, as nearly as possible, be free from slate, bone coal, or other impurities, and, if it can be shown that any miner persistently violates the letter or spirit of this clause, he shall be discharged. Nor shall he load out an undue proportion of fine coal in any one car, but shall see that the fine coal is mixed with the large coal in such a way as to make a fair quality of mine run coal. This provision for cleaning coal and penalty for failure also applies to screened lump coal.

2. The semi-monthly pay shall continue until the constitutionality of the law providing for weekly pay shall have been passed upon by the Supreme Court of Indiana and of the United States.

3. The time of beginning work in the morning and the length of intermission at noon shall be considered a local question.

4. That the above scale is based upon an eight-hour work day; that it is definitely understood that this shall mean eight hours' work at the face, exclusive of the noon time; six days in the week, or 48 hours in the week, and that no local ruling shall in any way deviate from this agreement, or impose conditions affecting the same, but any class of day labor may be paid at the option of the operator for the number of hours and fraction thereof actually worked at the hour rate, based on one-eighth of the scale rate per day; provided, that when men go into the mine in the morning, they shall be entitled to two hours' pay, whether the mine works or not; providing, further, that overtime of day labor shall be paid for at the same rate per hour.

5. Inside day work may be done upon idle days, and in case of emergency, on overtime.

6. It is agreed that if any difference arises between the operators and the miners at any time, a settlement shall be arrived at without stopping the work. If the parties immediately affected can not reach an agreement themselves, the question shall be referred without delay to a Board of Arbitration, consisting of two operators, selected by the operator interested, and two miners, selected by the local union of the United Mine Workers of America involved. In the event of these four being unable to reach a decision, they shall select a fifth man, and the decision of the Board so constituted shall be final, but no miner or operator interested in the difference shall be a member of such board.

7. The duties of the Mine Committee shall be confined to the adjustment of disputes between the mine boss or superintendent and any of the members of the United Mine Workers of America, working in and around the mines, except as hereinafter set forth in Article No. 16. In case they fail to agree, they shall proceed to adjust the trouble by the selection of an arbitration board, as provided in Article 6 of this agreement. The Mine Committee shall have no other authority, nor exercise any other control, nor in any way interfere with the operation of the mine, and, for violation of this agreement, the committee, or any member thereof, or mine boss or superintendent, shall be discharged.

8. That under no circumstances will the operators recognize or treat with a Mine Committee or any representative of the United Mine Workers of America during the suspension of work, contrary to this agreement.

9. The operator shall have the privilege of working a night shift for cutting coal with machines. All men so employed shall be paid 25 cents extra for each eight hours' work at night, in addition to the scale price per ton.

10. Work on driving entries and drawing pillars may be by double shift, at the option of the operator.

11. This contract shall in no case be set aside because of any rules of any local union of the United Mine Workers of America, nor shall there be any rules made controlling or interfering with the operations of the mines except by the consent of the operators and miners.

12. Coal may be dumped as slowly as the operator may find necessary to thoroughly screen it, even if the car is brought to a stop, but it shall not be dumped in such a way as to throw the coal over the car door or unnecessarily break it.

13. Any miner, knowing his place to be unsafe, shall protect same without delay and shall go into the mine for that purpose outside of regular hours and on idle days.

14. No restrictions shall be placed on the amount of coal which machines may mine, nor on the number of cars that any miner may load in any specified time.

15. The price of powder per keg shall be $1.75. The miners agree to purchase the powder from their operators, provided it is furnished of standard grade and quality, that to be determined by the operators and expert miners jointly where there is a difference.

16. It is agreed that any hoisting engineer shall not be subjected to the interference or dictates of the Mine Committee or the local unions, but all differences between the engineer and his employer shall be adjusted by the officers of the United Mine Workers of America and the employer.

17. It is further agreed that the operators shall offer no objection to the check-off for the check-weighmen and for dues for the Federation, provided that no check-off shall be made against any person until he shall have first given his consent in writing to his employer. This applies to all day work as well as miners.

INDIANA BITUMINOUS COAL OPERATORS' ASSOCIATION,
By J. SMITH TALLEY, President.
P. H. PENNA, Secretary.

W. D. VAN HORN,
President District No. 11, U. M. W. of A.
J. H. KENNEDY,
Secretary-Treasurer District No. 11, U. M. W. of A.

CONTRACT.

PICK MINING SCALE FOR 1901.

CONTRACT BETWEEN THE OPERATORS, MINERS AND DAY LABORERS OF THE BRAZIL BLOCK COAL DISTRICT FROM APRIL 1, 1901, TO APRIL 1, 1902.

1. Entered into this 16th day of April, 1901, between the Operators' Scale Committee of the Block Coal District and the Executive Board of the United Mine Workers of America, representing District No. 8.

2. Pursuant to a contract made between the Coal Operators and the United Mine Workers of America, of Illinois, Indiana, Ohio and Pennsylvania, made at Columbus, February 9, 1901.

3. The price for mining screened block coal in the Block Coal District of Indiana shall be 90 cents per ton of 2,000 lbs. It being understood also that the price for digging unscreened coal shall be an equivalent of the price paid for screened coal.

4. That further details in scale of prices for pick mining in the Block Coal District shall be as follows:

5. The payment for low coal shall be upon the following scale:

6. For all coal two feet ten inches and under three feet one inch, ninety-five (95) cents.

7. For all coal under two feet ten inches, one dollar ($1.00).

8. The price of yardage shall remain the same, according to the agreement entered into at Columbus. Work on driving entries may be double shift, at the option of the operator; and 25 cents extra per yard shall be paid for all double yardage, and 12½ cents per yard for single yardage where same is worked double shift.

9. Inside day scale:

	April 1st to October 1st.	*October 1st to April 1st.*
Track Layers	$2 28	$2 30
Track Layers' Helpers	2 10	2 25
Trappers	1 00	1 00
Bottom Cagers	2 10	2 25
Drivers	2 10	2 25
Trip Riders	2 10	2 25
Water Haulers	2 10	2 25
Timber Men, where such are employed	2 28	2 30
Pipe Men, for compressed air plants	2 22	2 25
All other inside day labor	2 10	2 25

10. The price of Blacksmithing shall be 1½ cents on the dollar.

11. Semi-monthly pay shall continue until the constitutionality of the law providing for weekly pay shall have been passed upon by the Supreme Courts of Indiana and of the United States.

12. Inside day work may be done upon idle days, and, in case of emergency, on overtime; but 48 hours shall constitute a week's work.

13. That the hour to begin work in the morning shall be seven (7) a. m., with thirty minutes' stop for dinner, and begin shooting at 3:30 o'clock

p. m., from April 1, 1901, to October 1, 1901, and from October 1, 1901, to April 1, 1902, the mines shall start at 7:30 a. m., with thirty minutes' stop for dinner, and begin shooting at 4:00 p. m., and that no shooting shall be done at the mine except by mutual consent between the bank boss and Bank Committee, and in the event that the mine is to work half a day it shall be the duty of the mine boss to notify the Bank Committee of the fact.

14. That eight hours a day means eight hours' work in the mine at the usual working places for all classes of inside workmen. This shall be exclusive of the time required in reaching said working places in the morning and departing from the same at night.

15. The miners hereby agree to do all the propping in their rooms, except setting of props required to break the bottom in shooting the same, and if any props are loosened or displaced, thereby endangering the safety of the workmen, the miners agree to reset the same.

16. It is also agreed on the part of the operators not to require the miners to put down their own road.

17. Also, to give each miner, as near as possible, an equal turn of cars, and not to allow any day hands to load coal on idle days.

18. No miner shall be discharged or discriminated against because of his refusal to do work by the day when called upon by the pit boss.

19. It is also agreed not to require the miners to load or clean falls unless they are caused by some fault of the miner not properly timbering his working place, or his having shot or otherwise caused his timbers to become insecure, and in which case it will be the duty of the miner to put his place in good order again.

20. It is further agreed that if any differences arise between the operator and miner at any pit, settlement shall be arrived at without stopping of work. If the parties immediately affected can not reach an adjustment between themselves, the question shall be referred to the Executive Board of the United Mine Workers of America, representing District No. 8, and an equal number of operators, whose action shall be final, but no miner or operator interested in the differences shall be a member of said committee.

21. Regarding Drivers: They shall take their mules to and from the stables, and the time required in so doing shall not include any part of the day's labor, their work beginning when they reach the parting at which they receive the empty cars, but in no case shall the driver's time be docked while he is waiting for said cars at the point named, but when the men go into the mine in the morning they shall be entitled to two hours' pay, whether or not the mine works the full two hours, but after the first two hours the men shall be paid for every hour thereafter by the hour, or for each hour's work, or fractional part thereof.

22. If for any reason the regular routine of the work can not be furnished inside labor for a portion of the first two hours, the operators may furnish other than the regular labor for the unexpired time.

23. The Block Coal District of Indiana may continue the use of the Diamond Bar Screen, the screen to be seventy-two (72) feet superficial area, of uniform size, one and one-quarter (1¼) inches between the bars, free from obstructions, and that such screen shall rest upon a sufficient number of bearings to hold the bars in proper position.

24. This contract is entered into in good faith by both parties, and there is to be no deviation from it by the operators, miners or day laborers.

Committee on behalf of operators for the Executive Committee, District No. 8, United Mine Block Coal District Workers of America, for Block Coal Miners:

WILLIAM WILSON, President.
JOHN E. SWAIN, Vice-President.
HARRY WRIGHT, Secretary-Treasurer.
R. S. PEEL, Board Member.
ROBERT HOUSTON, Board Member.
W. H. ZIMMERMAN.
M. H. JOHNSON.
C. A. EASTMAN.
W. W. RISHER.
J. H. McCLELLAND.

CONTRACT.

MACHINE MINING SCALE FOR 1901.

CONTRACT BETWEEN THE MACHINE OPERATORS OF THE BLOCK COAL DISTRICT AND THE EXECUTIVE BOARD DISTRICT NO. 8 UNITED MINE WORKERS OF AMERICA, GOVERNING PRICES AND CONDITIONS OF MINING IN MACHINE MINES BLOCK COAL DISTRICT.

1. Entered into this 16th day of April, 1901, between the Operators' Machine Mines of the Block Coal District and the Executive Board of the United Mine Workers of America, representing District No. 8.

2. Pursuant to a contract made between the Coal Operators and the United Mine Workers of America, of Illinois, Indiana, Ohio and Pennsylvania, made at Columbus, February 9, 1901.

3. The price for loading, shooting, timbering, taking care of all draw slate that is four (4) inches and under, in rooms and entries, shall be 46 cents per ton.

Price for entry driving, 6 to 9 ft. wide, 46 cents per yard.

Price for entry driving, 9 to 12 ft. wide, 29 cents per yard.

The loader agrees to keep the bug dust and draw slate back 14 ft. from the working face.

All entries more than 12 ft. in width shall be paid same as rooms.

Machine Runners and Helpers to be paid 22½ cents per ton, and, when working by the day, Machine Runner to be paid $2.70 per day; Helpers, $2.40 per day.

Entry driving, 6 to 9 ft. wide, Machine Runner to be paid 22½ cents per yard.

Entry driving, 9 to 12 ft. wide, Machine Runner to be paid 14 cents per yard.

It is further agreed that where there is not sufficient room to gob the bug dust and draw slate, the loader will load it in bank cars and the company will unload it.

It is understood that there shall be nothing paid for room turning or low coal, and there shall be nothing charged for blacksmithing. There shall be no discrimination against any employe.

The Block Coal District of Indiana may continue the use of the Diamond Bar Screen, the screen to be seventy-two (72) feet superficial area, of uniform size, one and one-quarter (1¼) inches between bars, free from obstructions, and that such screen shall rest upon a sufficient number of bearings to hold the bars in proper position.

This agreement to become a part of the agreement entered into on the 16th day of April, 1901, between the Operators' Scale Committee of the Block Coal District, and the Executive Board of the United Mine Workers of America, representing District No. 8.

On behalf of the Machine Operators of the Block Coal District:

W. H. ZIMMERMAN.
J. H. McCLELLAND.

On behalf of the Executive Board, District No. 8, United Mine Workers of America:

WILLIAM WILSON, President.
JOHN E. SWAIN, Vice-President.
HARRY WRIGHT, Secretary-Treasurer.
R. S. PEEL, Board Member.
ROBERT HOUSTON, Board Member.

TABLE

Showing by Counties the Name of Mine, Number of Tons Screened, Slack and Nut and Mine Run Coal, Total Tons of All Grades of Coal Produced, and the Distribution Thereof; the Production of Block and Bituminous Coal, Each Being Shown Separately, as is the Machine and Pick or Hand-Mined Coal.

BLOCK COAL MACHINE MINES.

CLAY COUNTY.

NAME OF MINE.	Machine Mined.				Pick Mined.				Distribution.		Wages Paid.			
	Tons of Screened Coal.	Tons of Slack and Nut Coal.	Tons of Mine Run Coal.	Total Tons of all Kinds of Coal Produced.	Tons of Screened Coal.	Tons of Slack and Nut Coal.	Tons of Mine Run Coal.	Total Tons of all Kinds of Coal Produced.	Indiana.	Other States.	To Miners.	To Inside Day Men.	To Outside Day Men.	Total Wages.
Brazil Block No. 1	61,924	12,035	27	73,986	.....	.....	.....	.....	12,157	61,829	$44,237 28	$28,050 51	$11,407 39	$83,695 18
Brazil Block No. 8	55,424	10,961	.....	66,385	19,386	3,760	4,034	27,180	12,461	81,104	58,432 54	28,703 98	10,462 39	97,598 91
Gart No. 10	11,659	2 320	.....	13,979	2,869	571	.....	3,440	1,950	15,469	13,103 25	6,528 84	3,436 50	23,068 59
Brazil Block No. 11	34,442	6,347	.....	40,789	11,338	2,019	.....	13,357	6,247	47,899	35,316 89	17,352 58	6,712 24	59,381 71
Diamond No. 3	16,913	3,327	23	20,263	11,616	2,022	4	13,642	541	33,364	23,139 49	10,150 65	7,825 03	41,115 17
Diamond No. 5	24,420	4,457	.....	28,877	14,569	2,433	.....	17,002	653	45,226	33,395 35	11,157 72	7,894 01	52,447 08
Briar Hill	16,013	2,480	1,524	20,017	.....	.....	.....	.....	13,817	6,200	10,720 47	5,625 74	6,115 17	22,461 38
Total	220,795	41,927	1,574	264,296	59,778	10,805	4,038	74,621	47,826	291,091	$218,345 27	$107,570 02	$53,852 73	$379,768 02

PARKE COUNTY.

Brazil Block No. 12	41,797	8,295	256	50,348	4,116	850	26	4,982	4,621	50,719	$35,245 24	$19,830 11	$8,194 17	$63,269 52
Totals in Block Coal Machine Mines	262,592	50,222	1,830	314,644	63,894	11,655	4,064	79,613	52,447	341,810	$253,590 51	$127,400 13	$62,046 90	$443,037 54

BLOCK COAL—HAND OR PICK MINES.

CLAY COUNTY.

NAME OF MINE.	Tons of Screened Coal.	Tons of Slack and Nut Coal.	Tons of Mine Run Coal.	Total Tons of all Kinds of Coal Produced.	Distribution.		Wages Paid.			
					Indiana.	Other States.	To Miners.	To Inside Day Men.	To Outside Day Men.	Total Wages Paid.
Columbia No. 4	3,912	850	.....	4,762	2,269	2,493	$3,686 13	$835 67	$623 76	$5,145 56
Columbia No. 5	29,808	7,125	2,162	39,095	30,405	8,690	29,732 87	5,851 94	4,080 93	39,665 74
Cornwell	18,758	3,831	.....	22,589	15,922	6,667	19,662 85	4,422 95	2,357 77	26,443 57
Crawford No. 2	23,364	8,195	1,345	32,904	14,699	18,205	26,401 52	5,267 99	3,770 14	35,439 65
Crawford No. 3	39,136	9,411	.....	48,547	32,063	16,484	36,632 59	6,466 01	4,713 89	47,812 49
Crawford No. 4	13,225	3,050	.....	16,275	8,610	7,665	12,214 38	2,813 93	1,812 60	16,840 91
Crawford No. 5	28,584	9,170	3,144	40,898	18,049	22,849	28,940 25	5,733 27	4,117 14	38,790 66
Crawford No. 7	1,966	340	.....	2,306	572	1,734	2,197 30	1,949 81	1,438 68	5,585 79
Dewey	12,000	2,215	.....	14,215	10,524	3,691	11,673 62	2,816 88	1,665 91	16,156 41
Eureka No. 2	23,567	3,803	106	27,476	11,042	16,434	23,174 75	6,844 65	3,626 45	33,645 85
Eureka No. 3	17,796	3,346	1,206	22,348	8,541	13,807	20,024 45	5,104 50	2,696 35	27,825 30
Eureka No. 4	17,054	4,013	585	21,652	7,978	13,674	17,800 60	3,914 95	2,226 15	23,941 70
Eureka No. 5—(New mine; no report)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gart No. 3	11,054	2,140	192	13,386	6,435	6,951	11,389 59	3,303 18	3,285 62	17,975 37
Gart No. 5	39,220	7,770	578	47,568	30,513	17,055	41,706 19	11,603 48	6,066 82	59,376 49
Gart No. 7	.....	.....	171	171	.....	171	237 97	.....	23 75	261 72
Gladstone	14,545	3,395	3,935	21,875	.....	21,875	17,102 49	6,966 02	5,845 43	29,913 94
Harrison No. 2	2,630	580	.....	3,210	1,888	1,322	2,413 05	701 40	383 20	3,497 65
Harrison No. 3	4,019	1,210	.....	5,229	2,953	2,276	3,749 30	850 45	947 30	5,547 05
Lawrence No. 6	15,851	3,650	.....	19,501	16,492	3,009	16,377 94	2,014 28	1,828 70	20,220 92
Markland	3,390	1,143	.....	4,533	4,533	.....	3,117 40	833 50	657 50	4,608 40
Monarch	.....	.....	8,338	8,338	8,338	.....	9,719 20	2,485 31	922 19	13,126 70
Pratt	24,716	2,562	855	28,133	27,860	273	23,644 00	6,625 00	4,366 00	34,635 00
Rob Roy	15,068	2,782	26	17,876	7,961	9,915	14,774 12	2,671 44	2,485 25	19,930 81
Totals for Clay County	359,663	80,581	22,643	462,887	267,647	195,240	$376,372 56	$90,076 61	$59,938 51	$526,387 68

PARKE COUNTY.

Brazil Block No. 9	155	30	.....	185	.....	185	$109 50	$50 00	$25 00	$184 50
Crawford No. 1	3,377	651	.....	4,028	1,606	2,422	3,071 56	700 53	398 51	4,170 60
Mary	32,438	6,056	.....	38,494	2,032	36,462	35,429 01	8,077 55	4,536 96	48,043 52
McIntosh No. 3	22,234	5,605	8,696	36,535	4,019	32,516	32,483 91	8,277 50	3,811 78	44,573 19
Otter Creek	3,147	621	869	4,637	2,330	2,307	3,797 24	572 92	794 62	5,164 78
Standard	22,466	4,850	256	27,572	18,739	8,833	20,585 00	4,724 00	2,799 00	28,108 00
Superior No. 1	44,827	10,890	1,418	57,135	16,607	40,528	44,661 84	7,739 45	4,292 55	56,693 84
Superior No. 2	51,880	10,695	2,217	64,792	22,845	41,947	52,156 09	13,023 59	6,929 39	72,009 07
Totals for Parke County	180,524	39,398	13,456	233,378	68,178	165,200	$192,294 15	$43,165 54	$23,487 81	$258,947 50

TOTALS IN BLOCK COAL HAND MINES.

Clay County	359,663	80,581	22,643	462,887	267,647	195,240	$376,372 56	$90,076 61	$59,938 51	$526,387 68
Parke County	180,524	39,398	13,456	233,378	68,178	165,200	192,294 15	43,165 54	23,487 81	258,947 50
Totals in Block Coal Hand Mines	540,187	119,979	36,099	696,265	335,825	360,440	$568,666 71	$133,242 15	$83,426 32	$785,335 18

BITUMINOUS MACHINE MINES.

DAVIESS COUNTY.

NAME OF MINE.	Machine Mined.				Pick Mined.				Distribution.		Wages Paid.			
	Tons of Screened Coal.	Tons of Slack and Nut Coal.	Tons of Mine Run Coal.	Total Tons of all Kinds of Coal Produced.	Tons of Screened Coal.	Tons of Slack and Nut Coal.	Tons of Mine Run Coal.	Total Tons of all Kinds of Coal Produced.	Indiana.	Other States.	To Miners.	To Inside Day Men.	To Outside Day Men.	Total Wages.
Cable No. 9	1,535	468	9,557	11,560	2,917	935	22,876	26,728	38,288	.....	$19,611 61	$14,180 46	$3,610 04	$37,402 11
Total	1,535	468	9,557	11,560	2,917	935	22,876	26,728	38,288	.....	$19,611 61	$14,180 46	$3,610 04	$37,402 11

GREENE COUNTY.

Black Creek	44,517	28,231	34,814	107,562	495	309	622	1,426	81,873	27,115	$17,905 98	$14,561 64	$5,001 18	$67,468 80
Gilmour	.....	.....	3,411	3,411	.....	.....	.....	.....	3,411	.....	3,585 58	653 35	977 41	5,216 34
Glenburn	13,391	10,337	17,267	40,995	30,427	23,318	33,042	86,787	116,908	10,874	78,054 22	13,517 83	8,303 67	99,875 72
Hoosier	.....	.....	10,360	10,360	.....	.....	6,679	6,679	17,039	.....	8,045 64	6,737 23	3,218 52	18,001 39
Island No. 1	.....	.....	90,213	90,213	.....	.....	10,321	10,321	82,005	18,529	43,094 30	15,867 50	6,898 31	65,860 11
Island No. 2	60,831	48,135	15,911	124,877	11,565	5,590	1,756	18,911	95,130	48,558	66,802 94	18,736 55	13,279 13	98,818 62
Midland	4,992	5,402	673	11,067	.....	.....	.....	.....	9,436	1,631	5,093 71	3,172 17	1,586 05	9,851 93
Summit No. 2	60,815	18,907	63,958	143,680	1,185	440	.....	1,625	30,555	114,750	55,944 89	18,443 70	9,216 82	83,605 41
Total	184,546	111,012	236,607	532,165	43,672	29,657	52,420	125,749	436,357	221,557	$308,527 26	$91,689 97	$48,481 09	$448,698 32

PARKE COUNTY.

Brazil Block No. 12	41,797	8,295	256	50,348	4,116	850	26	4,992	4,621	50,719	$35,245 24	$19,830 11	$8,194 17	$63,269 52
Cox No. 3	.....	.....	63,997	63,997	.....	.....	14,685	14,685	17,979	60,703	35,242 24	16,921 52	13,026 25	65,190 01
Parke No. 8	14,339	11,634	39,395	65,368	3,873	.....	10,191	14,064	50,918	28,514	36,994 25	14,601 62	7,084 30	58,680 17
Total	56,136	19,929	103,648	179,713	7,989	850	24,902	33,741	73,518	139,936	$107,481 73	$51,353 25	$28,304 72	$187,139 70

SULLIVAN COUNTY.

Bunker Hill	36,012	13,101	.....	49,113	1,706	640	.....	2,346	.....	51,459	$23,449 52	$13,092 30	$6,402 85	$42,944 67
Dugger	65,714	33,131	688	99,533	.....	.....	.....	.....	58,837	40,696	41,676 58	17,491 64	8,421 81	67,590 03
Green Hill	15,280	7,391	391	23,062	573	288	.....	861	6,126	17,797	12,807 47	4,483 90	3,255 54	20,546 91
Hymera	40,118	55,214	43,447	138,779	.....	.....	.....	.....	65,315	73,464	51,804 59	18,106 53	9,392 16	79,303 28
Ingleside	1,216	621	487	2,324	8,060	3,854	2,637	14,551	13,232	3,643	8,729 29	2,445 96	1,574 50	12,749 75
Jackson Hill No. 1	14,827	8,262	9,120	32,209	2,196	1,288	1,757	5,241	22,561	14,889	17,154 76	6,736 58	2,976 46	26,867 80
Jackson Hill No. 2	79,394	60,813	51,463	191,670	4,208	3,105	.....	7,313	124,643	74,940	70,475 45	21,244 85	7,848 73	99,569 03
Jackson Hill No. 3	329	347	164	840	.....	.....	.....	.....	415	425	.....	1,040 45	940 83	1,981 28
Phœnix No. 1	.....	.....	143,757	143,757	.....	.....	11,930	11,930	78,303	77,384	69,211 62	27,601 45	15,077 26	111,890 33
Phœnix No. 3	(Reported with No. 1)				.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Phœnix No. 5	(Reported with No. 1)				.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shelburn	2,492	1,719	353	4,564	3,072	1,776	509	5,357	4,085	5,836	5,983 31	3,341 74	2,903 62	12,228 67
Star City	82,456	41,220	1,423	125,099	.....	.....	.....	.....	48,233	76,866	52,072 54	27,043 94	11,976 00	91,092 48
Total	337,838	221,819	251,293	810,950	19,815	10,951	16,833	47,599	421,750	436,799	$353,365 13	$142,629 34	$70,769 76	$566,764 23

VANDERBURGH COUNTY.

Sunnyside	17,640	11,219	5,628	34,487	9,794	4,447	1,855	16,096	41,793	8,790	$21,715 65	$7,818 55	$6,878 30	$36,412 50
Total	17,640	11,219	5,628	34,487	9,794	4,447	1,855	16,096	41,793	8,790	$21,715 65	$7,818 55	$6,878 30	$36,412 50

VIGO COUNTY.

Glen Oak	9,617	4,755	44,492	58,864	.....	.....	15,339	15,339	.....	74,203	$29,072 07	$13,478 66	$11,795 84	$54,346 57
Lawton	8,207	4,320	.....	12,527	15,691	8,430	.....	24,121	10,251	26,397	22,381 00	6,473 00	3,716 00	32,570 00
Parke No. 10	29,519	25,824	65,587	120,930	.....	.....	.....	.....	100,011	20,919	51,330 87	18,867 45	8,623 51	78,821 83
Ray	6,888	5,051	5,661	17,600	24,600	16,490	8,949	50,039	43,252	24,387	29,009 43	10,493 31	5,268 42	44,771 16
Total	54,231	39,950	115,740	209,921	40,291	24,920	24,288	89,499	153,514	145,906	$131,793 37	$49,312 42	$29,403 77	$210,509 56

WARRICK COUNTY.

Big Vein No. 1	.....	.....	56,656	56,656	.....	.....	614	614	57,270	.....	$22,920 30	$6,334 80	$3,637 65	$32,892 75
Big Vein No. 2	(New mine; tonnage not reported)				.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	56,656	56,656	.....	.....	614	614	57,270	.....	$22,920 30	$6,334 80	$3,637 65	$32,892 75
Totals in Bituminous Machine Mines	651,926	404,397	779,129	1,835,452	124,478	71,760	143,788	340,026	1,222,490	952,988	$965,415 05	$363,318 79	$191,085 33	$1,519,819 17

BITUMINOUS HAND MINES.

CLAY COUNTY.

NAME OF MINE.	PRODUCTION.				DISTRIBUTION.		WAGES PAID.			
	Tons of Screened Coal.	Tons of Slack and Nut Coal.	Tons of Mine Run Coal.	Total Tons of all Kinds of Coal Produced.	Indiana.	Other States.	To Miners.	To Inside Day Men.	To Outside Day Men.	Total Wages.
Cloverland	43,119	16,700	17,580	77,399	58,537	18,862	$46,754 29	$7,821 34	$6,703 37	$61,279 00
Fortner	6,326	2,264	78	9,068	8,119	949	6,740 41	1,876 05	1,571 57	10,188 03
Gifford No. 1	78,611	24,534	.....	103,145	.....	103,145	67,440 61	12,464 83	8,975 57	88,881 01
Glen	16,729	5,185	.....	21,914	540	21,374	16,769 00	2,742 00	2,041 00	21,552 00
Klondyke	22,449	15,973	3,205	41,627	35,752	5,875	21,444 48	7,202 91	4,414 16	33,061 55
Pearl	27,845	12,733	184	40,762	37,119	3,643	21,174 29	4,083 99	4,175 51	29,433 79
Silverwood No. 3	36,312	21,207	.....	57,519	35,724	21,795	31,418 20	8,883 45	5,653 30	45,954 95
Total	231,391	98,996	21,047	351,434	175,791	175,643	$211,741 28	$45,074 57	$33,534 48	$290,350 33

DAVIESS COUNTY.

Black Diamond	1,701	111	1,811	3,623	3,623	.....	$2,352 15	$342 25	$463 00	$3,157 40
Cabel No. 4	11,874	3,642	.....	15,516	15,516	.....	10,188 18	2,981 48	2,823 59	15,993 25
Hawkins	.....	.....	2,495	2,495	2,495	.....	1,222 55	480 50	747 50	2,450 55
Hoosier	785	.....	1,933	2,718	2,718	.....	1,584 95	494 00	426 15	2,505 10
Logan Grove	.....	.....	2,858	2,858	2,858	.....	1,407 62	496 75	326 25	2,230 62
Montgomery No. 2	7,792	636	44,594	53,022	41,636	11,386	39,188 75	12,235 38	5,078 15	56,502 88
Montgomery No. 3	17,512	1,869	66,011	85,392	66,984	18,408	59,368 35	15,656 10	7,375 50	82,399 95
Mutual	14,978	1,800	6,732	23,510	8,730	14,780	14,897 10	3,191 65	2,724 25	20,813 00
Union	.....	.....	4,865	4,865	4,865	.....	2,597 10	492 80	379 25	3,469 15
Total	54,642	8,058	131,299	193,999	149,425	44,574	$132,806 75	$36,370 91	$20,344 24	$189,521 90

FOUNTAIN COUNTY.

Silverwood	23,958	11,075	.....	35,033	26,915	8,118	$24,170 80	$9,577 69	$4,202 47	$37,850 96
Total	23,958	11,075	.....	35,033	26,915	8,118	$24,170 80	$9,577 69	$4,202 47	$37,850 96

GIBSON COUNTY.

Oswald	19,275	28,656	54,515	102,446	95,015	7,431	$53,198 78	$12,830 79	$9,339 02	$75,368 59
Total	19,275	28,656	54,515	102,446	95,015	7,431	$53,198 78	$12,830 79	$9,339 02	$75,368 59

GREENE COUNTY.

Fluhart	32,070	18,578	11,576	62,224	50,069	12,155	$35,541 96	$10,972 35	$5,212 43	$51,726 74
Island Valley No. 1	10,893	6,600	20,271	37,764	26,357	11,407	19,676 63	6,518 69	4,024 61	30,219 93
Island Valley No. 2	20,647	11,933	103	32,683	19,538	13,145	19,241 25	4,315 21	3,103 90	26,660 36
Island Valley No. 3	43,103	26,909	55,612	125,624	86,150	39,474	69,003 56	11,605 34	6,201 95	86,810 85
South Linton	53,685	34,898	31,602	120,185	77,478	42,707	64,581 81	14,277 39	4,781 42	83,640 62
Summit No. 1	(Reported with No. 2)									
Templeton	17,018	8,800	104,639	130,457	122,231	8,226	69,659 00	13,030 00	8,414 00	91,103 00
Victoria	1,727	595	1,297	3,619	.....	3,619	3,177 17	959 37	1,111 94	5,248 48
Total	179,143	108,313	225,100	512,556	381,823	130,733	$280,881 38	$61,678 35	$32,850 25	$375,409 98

KNOX COUNTY.

Bicknell	7,222	5,465	2,541	15,228	13,588	1,640	$7,576 22	$1,814 21	$1,582 79	$10,973 22
Edwardsport	6,398	5,451	9,527	21,376	21,376	.....	12,219 95	4,749 89	3,419 07	20,388 91
Knox	5,400	3,796	4,331	13,527	13,527	.....	5,902 96	1,697 00	1,812 00	9,411 95
Prospect Hill	4,327	1,983	3,701	10,011	10,011	.....	5,931 14	2,575 59	1,815 81	10,332 54
Total	23,347	16,695	20,100	60,142	58,502	1,640	$31,630 26	$10,836 69	$8,629 67	$51,096 62

BITUMINOUS HAND MINES—Continued.

MARTIN COUNTY.

NAME OF MINE.	PRODUCTION.				DISTRIBUTION.		WAGES PAID.			
	Tons of Screened Coal.	Tons of Slack and Nut Coal.	Tons of Mine Run Coal.	Total Tons of all Kinds of Coal Produced.	Indiana.	Other States.	To Miners.	To Inside Day Men.	To Outside Day Men.	Total Wages.
Tunnel	408	289	3,301	3,998	3,998	.....	$2,590 83	$609 24	$409 40	$3,609 47
Total	408	289	3,301	3,998	3,998	.....	$2,590 83	$609 24	$409 40	$3,609 47

PARKE COUNTY.

Lucia	20,349	10,780	51,540	82,669	54,054	28,615	$46,930 78	$12,088 57	$8,849 40	$67,868 75
Lyford No. 1	.....	.....	1,368	1,368	.....	1,368	670 32	212 29	286 09	1,168 70
Lyford No. 2	8,092	5,148	47,388	60,628	7,753	52,875	29,596 67	14,211 52	7,321 45	51,129 64
Mecca	16,088	6,776	3,314	26,178	17,550	8,628	16,000 05	6,981 95	4,050 81	27,032 81
Total	44,259	22,704	103,610	170,843	79,357	91,486	$93,197 82	$33,494 33	$20,507 75	$147,199 90

PERRY COUNTY.

Cannelton	92	.....	2,915	3,007	3,007	.....	$1,511 29	$549 00	$461 98	$2,522 27
Troy	.....	.....	14,672	14,672	14,672	.....	8,364 94	2,098 10	1,196 52	11,659 56
Total	92	.....	17,587	17,679	17,679	.....	$9,876 23	$2,647 10	$1,658 50	$14,181 83

PIKE COUNTY.

Aberdeen	6,808	4,923	7,529	19,260	7,978	11,282	$11,555 63	$2,627 70	$2,971 48	$17,154 81
Alden—(Idle; no report)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ayrshire No. 2	.....	.....	2,527	2,527	2,392	135	1,566 79	97 75	50 00	1,714 54
Ayrshire No. 3	39,608	21,370	17,008	77,986	37,747	40,239	38,372 21	15,808 44	11,694 68	65,875 33
Ayrshire No. 4	.....	.....	27,435	27,435	22,689	4,746	15,772 04	2,655 37	1,279 61	19,707 02
Ayrshire No. 5	250	219	13,068	13,537	10,689	2,848	8,980 56	1,891 54	1,279 65	12,151 75
Blackburn	1,362	1,287	6,179	8,828	7,610	1,218	4,890 93	1,687 90	314 34	6,893 17
Carbon	.....	.....	6,371	6,371	6,371	.....	3,380 56	1,221 00	891 25	5,492 81
Hartwell	53	30	3,725	3,808	1,510	2,298	2,010 93	931 99	738 55	3,681 47
Littles	22,335	26,473	21,855	70,663	66,558	4,105	36,312 65	9,315 60	5,535 31	51,163 56
Petersburg	.....	.....	18,940	18,940	18,940	.....	10,120 75	2,948 85	1,801 81	14,871 41
Rogers	.....	.....	19,553	19,553	19,553	.....	10,209 76	4,135 39	1,183 54	15,528 69
Total	70,416	54,302	144,190	268,908	202,037	66,871	$143,172 81	$43,321 53	$27,740 22	$214,234 56

SULLIVAN COUNTY.

Briar Hill	1,547	975	1,819	4,341	.....	4,341	$2,427 10	$735 26	$284 24	$3,446 60
Caledonia	28,236	31,224	30,829	90,289	16,718	73,571	33,757 47	11,122 49	6,915 45	51,795 41
White Ash	8,513	4,797	3,825	17,135	17,135	.....	10,018 98	1,993 98	1,568 00	13,580 96
Total	38,296	36,996	36,473	111,765	33,853	77,912	$46,203 55	$13,851 73	$8,767 69	$68,822 97

VANDERBURGH COUNTY.

Diamond	8,749	4,645	1,977	15,371	15,371	.....	$10,005 72	$2,060 03	$2,456 19	$14,521 94
First Avenue	6,766	7,141	28,363	42,270	36,844	5,426	31,220 18	6,868 20	4,430 45	42,518 83
Ingleside	10,813	.....	28,710	39,523	39,523	.....	27,085 11	5,873 05	5,077 10	38,035 26
Union	6,623	3,324	6,619	16,566	16,566	.....	12,979 70	1,486 70	3,245 50	17,711 90
Unity	.....	.....	18,582	18,582	17,115	1,467	14,299 65	2,374 75	2,013 50	18,687 90
Total	32,951	15,110	84,251	132,312	125,419	6,893	$95,590 36	$18,662 73	$17,222 74	$131,475 83

BITUMINOUS HAND MINES—Continued.

VERMILLION COUNTY.

NAME OF MINE.	PRODUCTION.				DISTRIBUTION.		WAGES PAID.			
	Tons of Screened Coal.	Tons of Slack and Nut Coal.	Tons of Mine Run Coal.	Total Tons of all Kinds of Coal Produced.	Indiana.	Other States.	To Miners.	To Inside Day Men.	To Outside Day Men.	Total Wages.
Crown Hill	380	140	225	745	745	.....	$372 50	$200 00	$100 00	$672 50
Bruilett's No 3	1,474	1,985	32,347	35,806	3,356	32,450	17,725 05	3,277 60	1,803 70	22,806 35
Bruilett's No. 4	11,415	5,970	145,756	163,141	19,408	143,733	81,144 80	16,104 55	5,735 40	102,984 75
Bruilett's No. 5	44,392	27,549	28,037	99,978	16,740	83,238	48,190 40	7,406 50	3,625 53	59,222 43
Buckeye	41,098	18,915	11,547	71,560	.....	71,560	41,181 54	14,779 06	8,519 51	64,480 11
Cayuga	.....	.....	7,404	7,404	7,404	.....	4,476 15	1,659 55	1,638 70	7,774 40
Oak Hill	24,107	14,346	42,581	81,034	2,333	78,701	45,057 18	7,647 55	6,355 24	59,059 97
Prince	.....	.....	170,935	170,935	.....	170,935	95,925 31	25,680 09	9,363 86	130,969 26
Torrey No. 4	.....	.....	96,725	96,725	17,428	79,297	50,713 28	17,953 30	10,335 18	79,001 76
Willow Grove	777	685	9,733	11,195	432	10,763	7,166 25	917 61	1,261 09	9,344 95
Total	123,643	69,590	545,290	738,523	67,846	670,677	$391,952 46	$95,625 81	$48,738 21	$536,316 48

VIGO COUNTY.

Brick Works	.....	.....	14,625	14,625	14,625	.....	$8,430 11	$2,684 70	$1,171 65	$12,286 46
Broadhurst	6,097	2,135	5,619	13,851	13,159	692	5,688 86	1,323 60	771 50	7,783 96
Chicago No. 6	5,096	7,331	16,587	29,014	.....	29,014	9,245 14	2,993 52	1,479 90	13,718 56
Diamond	66,067	30,451	19,587	116,105	83,408	32,697	70,692 00	20,671 00	9,379 00	100,742 00
Ehrlich	31,772	23,827	.....	55,599	17,478	38,121	26,742 57	8,194 41	2,946 85	37,883 83
Grant No. 1	441	335	1,021	1,797	1,228	569	2,136 33	764 96	1,393 67	4,294 96
Grant No. 2	5,376	32,845	118,226	156,447	94,373	62,074	88,589 98	12,849 41	8,410 08	109,849 47
Hector	24,525	19,579	3,070	47,174	45,378	1,796	23,590 28	6,675 20	5,361 54	35,627 02
Rose Bud	44,863	26,228	4,353	75,444	71,464	3,980	43,459 53	7,740 66	5,791 83	56,992 02
Klondyke	8,371	6,380	2,250	17,001	2,964	14,037	7,804 05	2,733 80	1,641 50	12,179 35
Koch	.....	.....	1,120	1,120	1,120	.....	561 90	230 00	155 00	946 90
Miami	3,572	1,708	476	5,756	.....	5,756	4,147 36	1,331 30	453 31	5,931 97
Nickelplate	17,638	5,020	42,449	65,107	.....	65,107	39,333 92	15,561 84	12,162 56	67,058 32
Peerless	39,618	23,450	16,360	79,428	18,967	60,461	45,715 00	12,916 00	5,943 00	64,574 00
Red Bird	9'3	688	6,318	7,979	7,979	.....	4,810 47	843 76	591 86	6,246 09
Royal	21,596	10,590	25,784	57,970	57,644	326	31,836 62	4,569 70	4,286 25	40,692 57
Larimer	.....	.....	3,299	3,299	3,299	.....	1,913 42	245 60	449 00	2,608 02
Union	84,089	47,070	2,616	133,775	93,360	40,415	75,203 00	18,345 00	9,714 00	103,262 00
Vigo	.....	.....	8,212	8,212	.....	8,212	3,971 03	815 35	1,122 43	5,908 81
Woodland Valley	644	258	2,295	3,197	2,897	300	1,893 75	366 75	293 80	2,554 30
Total	360,738	237,895	294,267	892,900	529,343	363,557	$495,765 32	$121,756 56	$73,518 73	$691,140 61

WARRICK COUNTY.

Air Line	3,670	2,501	4,716	10,887	10,887	.....	$5,785 56	$679 70	$861 61	$7,326 87
Big Four	2,213	883	55,881	58,977	53,051	5,926	27,830 15	4,231 51	4,235 44	36,297 10
Caledonia	1,650	1,350	33,792	36,792	29,053	7,739	19,113 44	3,699 14	3,057 08	25,869 66
Chandler	5,080	2,599	2,513	10,192	7,910	2,282	5,865 87	1,002 19	814 47	7,682 53
DeForrest	1,718	859	8,865	11,442	11,442	.....	5,632 56	1,067 83	782 99	7,483 38
Star No. 1	.....	.....	32,375	32,375	32,375	.....	14,697 38	4,060 81	2,350 21	21,108 40
Total	14,331	8,192	138,142	160,665	144,718	15,947	$78,924 96	$14,741 18	$12,101 80	$105,767 94
Totals in Bituminous Hand Mines	1,217,160	716,871	1,819,172	3,753,203	2,091,721	1,661,482	$2,091,703 59	$521,079 21	$319,565 17	$2,932,347 97

TABLE

Showing Total Production and Wages at Indiana Mines for 1901.

	Machine Mined.				Pick Mined.				Distribution.		Wages.			
	Screened.	Slack and Nut.	Mine Run.	Total.	Screened.	Slack and Nut.	Mine Run.	Total.	Indiana.	Other States.	Miners.	Inside Day and Monthly Men.	Outside Day and Monthly Men.	Total.
Total Block Machine Mines	262,592	50,222	1,830	314,644	63,894	11,655	4,064	79,613	52,447	341,810	$253,590 51	$127,400 13	$62,046 90	$443,037 54
Total Block Pick Mines	.....	.....	.....	.....	540,187	119,979	36,099	696,265	335,825	360,440	568,666 71	133,242 15	83,426 32	785,335 18
Total Block	262,592	50,222	1,830	314,644	604,081	131,634	40,163	775,878	388,272	702,250	$822,257 22	$260,642 28	$145,473 22	$1,228,372 72
Total Bituminous Machine Mines	651,926	404,397	779,129	1,835,452	124,478	71,760	143,788	340,026	1,222,490	952,988	$965,415 05	$363,318 79	$191,085 33	$1,519,819 17
Total Bituminous Pick Mines	.....	.....	.....	.....	1,217,160	716,871	1,819,172	3,753,203	2,091,721	1,661,482	2,091,703 59	521,079 21	319,565 17	2,932,347 97
Total Bituminous	651,926	404,397	779,129	1,835,452	1,341,638	788,631	1,962,960	4,093,229	3,314,211	2,614,470	$3,057,118 64	$884,398 00	$510,650 50	$4,452,167 14
Total Machine Mined	914,518	454,619	780,959	2,150,096	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total Pick Mined	1,945,719	920,265	2,003,123	4,869,107	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grand total	2,860,237	1,374,884	2,784,082	7,019,203	.....	.....	.....	.....	3,702,483	3,316,720	$3,879,375 86	$1,145,040 20	$656,123 72	$5,680,539 86

Note.—Miners,' Machine Runners' and Helpers' and Loaders' Wages are reported together under "Miners."

TABLE

Showing Per Cent. Gain in Gross Tons Produced, Gross Wages Paid and Total Number Persons Employed at Indiana Mines for Year 1901, Over that of 1900.

	1901.	1900.	Tons Gained.	Per Cent.
Total tons produced	7,019,203	6,283,063	736,140	11.7+
Total wages paid	$56,800,539 86	$4,843,343 26	$837,196 60	11.09+
Total number employes	12,096	9,888	3,208	32.4+

TABLE

Of Idle Time, Showing Number of Days Lost and the Various Causes Therefor.

Cause.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
No cars	166	67	67	114	6	56	138	329	247	368	704	593	2,765
No orders	964	667	866	538	1,344	1,030	814	859	612	497	208	155	8,554
Strikes	51	101	75	126	182	167	146	128	89	73	26	38	1,202
Suspended indefinitely	.....	48	151	184	266	505	486	270	81	85	52	26	2,154
Making repairs	28	43	79	77	41	6	30	69	40	39	9	12	473
Floods in mines	.....	.....	15	19	.....	.....	.....	.....	5	.....	.....	.....	39
Mine squeezes	.....	.....	.....	26	27	.....	.....	.....	.....	.....	.....	.....	53
Pending settlement	.....	.....	.....	499	.....	.....	.....	.....	.....	.....	.....	.....	499
Funerals	14	2	6	.....	2	.....	.....	.....	.....	7	26	2	59
Mine fires	.....	.....	.....	26	16	.....	.....	75	75	.....	.....	14	206
Improvements	.....	.....	.....	.....	19	53	39	27	.....	6	.....	.....	144
Miscellaneous	20	1	.....	4	17	6	2	.....	16	12	.....	10	88
Total	1,243	929	1,259	1,613	1,920	1,823	1,655	1,667	1,165	1,087	1,025	850	16,236

NEW MINES.

The following new mines have been opened and equipped within the past year:

Clay County.

GIFFORD NO. 2 MINE.

A most valuable addition to the Collins Coal Company's mining interests is its new No. 2 Mine, located one mile northwest of its No. 1 Mine, on an extension of the railroad switch to the last named mine. The seam mined is the same as that at No. 1, i. e., Coal III, and is opened by a shaft eight by fifteen feet in size and seventy-five feet deep. The first coal was shipped about December 1st. Mining is done by electric chain machines. The equipment of the entire plant is modern in every detail, the company having installed first motion hoisting machines, self dumping cages, shaker screens, automatic scales and all other conveniences incident to handling a large ouptut and preparing several grades of coal suitable to the various market demands, as well as curtailing the expense of production. When fully developed, the mine will rank among the largest producers in Clay County.

CRAWFORD NO. 6 MINE.

This mine is owned and operated by the Crawford Coal Company, and is located near Center Point on a coal switch from the Center Point Branch of the Vandalia Railroad. The sinking of the shaft, which is eight by twenty feet in size, 116 feet deep, was completed in July. The machinery, cars, etc., from the No. 4 Mine, which was abandoned in May, were used in equipping it. The seam sunk to is Coal III, which was here found to be two and one-half feet thick, although drillings made in the near vicinity show the seam to be much thicker. For this reason but little has been done toward developing the mine, except driving entry and prospecting for thicker coal.

CRAWFORD NO. 7 MINE.

This is also a new addition to the Crawford Coal Company's block coal properties. It is located one-half mile north of the old Crawford No. 4 on a switch off of the Center Point Branch of the Vandalia Railroad. The seam mined is Coal III, averaging three and one-half feet in thickness, opened by a shaft eight by sixteen feet in size,

eighty-four feet deep. The sinking and equipment of the shaft was completed and coal shipped about October 1st.

Coal IV, known as the top block seam, is here found in workable thickness. A tunnel which will be about fifty feet in length is now being driven up to it from the bottom seam; both seams will be mined and hoisted from the same opening.

An inspection of this mine was made in November. But little was being done at that time except driving the double partings, timbering the shaft, bottom, etc. There was a total working force of fourteen persons, working double shifts.

LAWRENCE NO. 6 MINE.

This is a block coal hand or pick mine, owned and operated by Zeller, McClellan & Company, of Brazil. It is located one mile north of Brazil on an extension of the Sheridan Brickworks railroad switch, one-half mile in length. The seam mined here is Coal III of the lower block seam and is found under exceptionally good conditions, having an average of four feet five inches in thickness, excellent roof and bottom. Unfortunately, however, the area of coal field to be mined from this opening is limited to about sixty acres.

The mine is operated by a shaft eight by twenty feet in size, forty-one feet deep, the sinking of which was commenced July 4th and completed in sixteen days. The shaft was equipped and the first shipment of coal made September 13th.

An inspection of this mine was made October 20th, by Assistant Inspector Long, who reported it in good condition and as employing ninety persons.

NEW EUREKA MINE.

This mine is located at the Logan Grove, near Washington; it is owned and operated by Wilson Brothers, supplying local trade in the city of Washington and surrounding country.

The seam mined is Coal V, averaging three and one-half feet in thickness, opened by a slope seventy-five feet long. Coal is hoisted by a gin operated by horse power.

An inspection of this mine was made October 25th, when it was found in good condition and employing thirteen miners. This force will be increased as the mine is opened out, and when finished will furnish employment to about twenty-five miners and five or six day men.

GREENE COUNTY.

MIDLAND MINE.

This mine is owned and operated by the Midland Coal Company. It is located seven miles northwest of Linton on the Southern Railway. The seam mined here is Coal III, averaging seven feet in thickness, and is opened by a shaft eight by eighteen feet in size, 245 feet in depth.

The opening of this mine, with one exception, i. e., the Jackson Hill No. 3, is probably of more importance to the coal interests of Indiana than any other development made within the past year, or in fact for a number of years. It taps a new field, or, at least, one which has heretofore been considered of no value as mining property for the reason that seams IV, V and VI have been either thrown out or thinned so that they were unprofitable to mine. These three seams were considered the only workable seams in this part of the State. Prior to the opening of the Midland Mine, with the exception of a few local mines along the eastern horizon or outcrop of the coal field extending north from the Ohio River through Perry, Dubois, Spencer, Martin and Owen counties, Coal III was mined only in Clay and Parke counties, where it is known as the lower block seam, Coal IV being the lowest known workable coal in any other part of the State.

The seam tapped by the Midland Mine is workable over an area of several thousand acres, extending north, south and east from that point. It splits, however, going southwest and west, and is divided into two benches by a slate or dirt band, ranging from two to three and one-half feet in thickness. This condition is found at the Hoosier Mine located four miles southwest of Midland, a description of which was given in the report for 1900. It is also characteristic of this coal field that while the seam is much thicker than that found in the block field (the drillings at some points show as much as eight feet of coal), but it contains many more impurities; and though a good coal for steam and domestic use, the quality is inferior to that of the block coal.

The company operating this mine has spared no expense in equipping the mine, having installed an electric machine plant, double first-motion 125 horse-power hoisting engines, self-dumping cages and all other modern appliances required to handle a large output of coal. Mr. H. W. Sexton, the superintendent, makes the assertion that the capacity of the mine will reach 1,600 tons per day during the present year.

An inspection of the mine was made October 28th, when it was found to be in excellent condition. At that time, two Morgan-Gardner chain machines were in use, with a total working force of about forty-five persons. This force will be increased as rapidly as room is made to put on men, and when fully developed, six machines will be used, giving employment to about 175 persons.

GILMOUR MINE.

The Gilmour Mine is owned and operated by the Indiana Southern Coal Company, situated about three miles southwest of Jasonville on the Sullivan Branch of the Southern Indiana Railway. The seam mined here is Coal IV, reached by a shaft eight and one-half by eighteen and one-half feet in size, 152 feet deep. The quality of the coal is the same as that of other Greene County mines where this seam is mined, descriptions of which have been given in former reports.

The mine is situated on a tract of land of 525 acres in area, owned by this company. The land was drilled and tested thoroughly before locating and commencing to sink the shaft. The shaft was sunk during the past summer, and the switch and equipment of the mine were completed ready to hoist coal about November 1st.

Mining is done by electric machines. The sinking and equipment of the mine was done under the management of John P. Gilmour, who is also superintendent of the New Pittsburg Coal and Coke Company. Mr. Gilmour has had wide experience in such matters. In this instance, he has spared no expense in the construction of mine buildings, arrangement of tracks and equipping it as a modern mine, convenience and durability being the only points considered. The engine and boiler rooms, shop and all other mine buildings, except the tipple, have been constructed of brick and stone, with concrete floors and tiled roof, which renders them fire proof (a matter that can not receive too serious consideration in the construction of mine buildings). The mine will also be developed on the latest improved mining methods, which, with the use of modern appliances for handling coal, will insure not only a large output but also reduce the cost of production to the lowest point consistent with good mining.

VICTORIA MINE.

This mine is owned and operated by the Victoria Coal and Mining Company. The company was organized in the spring of 1900, and commenced operations about four miles north of Linton on the

Southern Indiana Railway. After sinking a shaft, however, the coal seam sunk to was found in such poor condition that it was considered as unprofitable to mine, and the property was abandoned, little having been done in the way of development.

Some changes in the organization of the company were made later in the year and a tract of land two and one-half miles west of Linton on the Illinois Central Railway was leased. After drilling this tract of land, 180 acres in area, a shaft eight by fourteen feet in size, 122 feet deep, was sunk. The shaft was completed and the mine partially equipped in January, 1901. For some reason, the mine switch from the Illinois Central was not put in until September following, at which time the equipment of the mine was complete and the shipping of coal was commenced.

This is a hand or pick mine, the surface arrangement of which is very complete. First-motion hoisting engines, self-dumping cages and the latest improved shaker screens (which are said to be very effective in cleaning coal) are in use there.

An inspection was made November 15th, at which time the first cross-entries were being turned on each side of the shaft. About thirty persons were employed, working double shift. The seam mined is Coal IV, averaging five feet ten inches thick.

PARKE COUNTY.

NEW CENTURY MINE.

This mine is owned by the New Century Coal and Mining Company and is located on a switch one and one-fourth mile long connected with the Otter Creek Coal Company's switch from the Chicago & Eastern Illinois Railroad. The sinking of the shaft, which is eight and one-half by sixteen feet in size and 175 feet deep, was finished early in the spring, but the first shipment of coal reported was in November.

The seam mined is Coal III, the same as that mined at the Lucia Mine, owned by the same company, which has an average of five feet in thickness.

PIKE COUNTY.

AYRSHIRE NO. 6 MINE.

This mine is owned and operated by The David Ingle Coal Company and is located one-fourth mile north of Ayrshire No. 4 on a switch from the Southern Railway about one-half mile in length. The seam mined is the same as that at Ayrshire No. 3 and No. 4, i. e.,

Coal V, averaging five feet thick, and is opened by a drift. The quality of coal, roof, bottom and other conditions are about the same as found at the other Ayrshire mines.

An inspection was made in October, when the working force was less than ten persons. It is intended to increase this number until the mine has a capacity of three hundred tons per day.

MASSEY MINE.

This mine is owned and operated by the Massey Coal and Mining Company and is located two and one-half miles northeast of Oakland City on a coal switch from the Evansville and Indianapolis Railway. It is operated by a shaft eight by sixteen feet in size and fifty feet deep, the sinking and equipment of which was completed ready to ship coal about November 1st.

The seam mined is Coal V. Where the shaft is sunk, the coal is but four and one-half feet thick, though the entries which are being driven north, east and west show a thickness of six and one-half feet. The quality of the coal is said to be excellent for steam purposes. The principal market for the product is found in Indianapolis, Evansville and intermediate points.

SULLIVAN COUNTY.

JACKSON HILL NO. 3 MINE.

This addition to the mining interests of the Jackson Hill Coal and Mining Company is located on the Farmersburg Branch of the Evansville and Terre Haute Railroad, three-fourths of a mile west of the old abandoned No. 1 Mine.

The seam mined has an average thickness of six feet nine inches, and though containing many impurities, it is said to be an excellent steam coal. The roof immediately overlying the coal is a very dark shale from two to six feet thick, which seems inclined to cut or shell off, especially in the entries and narrow places.

There seems to be much difference of opinion as to the geological number of this seam, some claiming that it is Coal II, while a majority of persons who are acquainted with our different coal seams claim that it is Coal III, or the same as that found at the Midland Mine. Considering the different strata sunk through and the characteristics of coal and roof, the latter opinion is more probably correct. Be that as it may, this is a new find in this part of the State and one which will add greatly to the value of Indiana mining interests. Mining at this mine will be done by compressed air punch-

ing machines, the company having installed the compressed air plant formerly used at its No. 1 Mine. The balance of the equipment is modern in every detail, and when fully developed the mine will be one of the largest producers in Sullivan County.

Sinking was commenced late in the spring, completed and mine equipped and the first car of coal shipped on November 1st. An inspection was made by Assistant Inspector Dodds on January 10th; he reported it in good condition with the exception of a few minor defects in the way of equipment, which are to be expected at new mines. These the company are remedying as rapidly as possible.

Vermillion County.

CROWN HILL MINE.

This is a bituminous hand or pick mine owned and operated by the Clinton Coal Company, of Terre Haute. It is located two miles southwest of Clinton on a coal switch from the C. & E. I. R. R. The seam mined is Coal VII, averaging five feet six inches in thickness, being about eight inches thicker than that found at the Bruiletts Creek, Oak Hill and other mines in the vicinity, where the same seam is mined. It is operated by a shaft eight by fifteen feet in size, 164 feet deep, the sinking of which was commenced August 8th. Coal was reached about October 20th. Little has been done since that time, however, except the driving of the double partings, completing the equipment and shaping matters up preparatory to shipping coal the first of the present year.

Vigo County.

MIAMI MINE.

This is a bituminous hand or pick mine, owned and operated by the Miami Coal Company, of Brazil. It is located two miles south of Ehrmandale on an extension of the C. & I. C. R. R. mine switch to the Nickelplate Mine. The mine is operated by a shaft eight by eighteen feet in size, thirty-two feet deep, which was sunk in May. The railroad switch was not laid nor the equipment of the mine completed until October 5th, when the first shipment of coal was made. The equipment of the mine is very complete in all details, more especially so with reference to screening machinery, which, together with the railroad tracks, is so arranged that four different grades of coal may be separated and loaded on cars at the same time. The seam mined is Coal VI, averaging from six to seven feet thick, the quality and other conditions of which is practically the same as found at the Nickelplate, Cloverland and other mines where this seam is mined.

ROSE BUD MINE.

The Rose Bud is a bituminous hand or pick mine, owned and operated by the Seeleyville Coal and Mining Company, located west of Seeleyville on a switch from the Vandalia Railroad. It is operated by a shaft nine by eighteen feet in size, 110 feet deep, which was sunk in November, 1900. The tipple and other equipment was not completed until the latter part of January following and the first car of coal was shipped February 1, 1901.

The seam mined is Coal VI, varying from six and one-half to seven and one-half feet in thickness. The roof is very poor, requiring a great deal of timbering. The quality of coal and other conditions are about the same as found at the Hector, Ehrlich, Seeleyville and other mines in the immediate vicinity, where this seam is mined. The mine is exceedingly well equipped, having the Parker self-dump cages, and first-class machinery of all kinds.

The company has lately completed a second outlet or manway in the shape of a slope 175 feet long, which will also be used as a timber chute, for sending timber into the mine.

WARRICK COUNTY.

BIG VEIN NO. 3 MINE.

This mine, owned and operated by the J. Woolley Coal Company, is situated one mile east of Boonville on a switch three-fourths of a mile long from the Southern Railway.

The seam mined here is Coal V, varying from seven to nine feet thick, and is of excellent quality for steam and domestic uses. It is opened by a shaft thirty-seven feet deep by eleven by eighteen feet in size, which is by far the largest hoisting shaft in Indiana. The equipment is modern in every respect. It was made on special order by Prox & Brinkman, of Terre Haute. The haulage roads in the mine are made of forty-pound steel rails fish-plated together and laid on four by eight-inch cross ties; three ton mine cars are used. The hoisting engines, self-dumping cages, screening machinery, steam plant and all other parts of the equipment have been constructed in accord with this large sized mine car.

An inspection of the mine made in November showed it to be in excellent condition. At that time but four men were employed and the mining was being done by hand. Since that time, however, the company has installed two Norwalk air compressors of 125-horse-power each, and mining is now being done by compressed air punching machines. When fully developed, this mine should be the largest producer in the State.

ABANDONED MINES.

Table Showing Names of Mines, Owners, Location and Date of Abandonment.

NAME OF MINE.	OWNER.	COUNTY.	LOCATION.	DATE.
Crawford No. 1	Crawford Coal Co	Clay	2 miles N. E. of Carbon	March 1.
Crawford No. 2	Crawford Coal Co	Clay	Near Centerpoint	July 16.
Harrison No. 2	Chicago-Indiana Coal Co	Clay	2½ miles E. Clay City	March 1.
Harrison No. 3	Chicago-Indiana Coal Co	Clay	2½ miles E. Clay City	September 21.
Gart No. 3	Brazil Block Coal Co	Clay	Near Brazil	June 1.
Hawkins	Washington Coal Co	Daviess	Near Washington	July 1.
Summitt No. 1	Summitt Coal Co	Greene	2 miles W. Linton	December 1.*
Tunnel	F. M. Wampler	Martin	Tunnel Switch	July 1.†
Otter Creek	Brazil Block Coal Co	Parke	2 miles N. E. Carbon	March 1.
Ayrshire No. 2	David Ingle Coal Co	Pike	Ayrshire	September 1.
Jackson Hill No. 1	Jackson Hill C. and M. Co	Sullivan	Farmersburg Branch E. & T. H. Ry	June 1.
Grant No. 1	Grant Coal Min. Co	Vigo	Grant	November 1.
Koch	George Koch	Vigo	Coal Bluff	February 28.

*This mine was opened in 1887 and has been one of the largest producers in Greene County. In January, 1901, the working force was reduced; since that time it has been operated on a very small scale.

†This mine has been running on a small scale since July 1.

TABLE

Showing Number of Miners, Machine Runners and Helpers, Loaders, Inside Day and Monthly Men, and Persons Employed Outside; Total Number of Employes at Each Mine; Number of Days Worked and Number of Mules Used; Totals by Counties.

CLAY COUNTY.

NAME OF MINE.	Pick Miners.	Machine Runners and Helpers.	Loaders.	Inside Day and Monthly Men.	Persons Employed Outside	Total.	Days Worked.	Mules.
Brazil Block No. 1	.....	20	54	47	12	133	249	9
Brazil Block No. 8	30	18	51	50	15	164	232	14
Brazil Block No. 11	18	14	33	30	8	103	220	16
Briar Hill	7	12	24	10	8	61	187	7
Cloverland	124	.....	.....	14	10	148	148	8
Columbia No. 4	30	.....	.....	8	2	40	77	5
Columbia No. 5	54	.....	.....	10	5	69	207	8
Cornwell	57	.....	.....	8	5	70	137	3
Crawford No. 2	60	.....	.....	9	4	73	227	3
Crawford No. 3	95	.....	.....	11	7	113	205	6
Crawford No. 4	46	.....	.....	10	5	61	115	4
Crawford No. 5	85	.....	.....	12	6	103	158	8
Dewey	44	.....	.....	4	3	51	133	4
Diamond No. 3	11	10	26	19	10	76	210	7
Diamond No. 5	16	10	29	19	10	84	209	8
Eureka No. 2	60	.....	.....	16	6	82	186	10
Eureka No. 3	61	.....	.....	12	6	79	172	7
Eureka No. 4	53	.....	.....	9	6	67	134	5
Fortner	26	.....	.....	5	4	35	99	6
Gart No. 3	55	.....	.....	11	8	74	82	4
Gart No. 5	93	.....	.....	19	8	120	199	10
Gart No. 10	53	10	15	14	5	97	128	7
Gifford	106	8	32	19	12	177	250	10
Gladstone	38	.....	.....	14	5	57	162	10
Harrison No. 2	27	.....	.....	5	4	36	38	3
Harrison No. 3	22	.....	.....	4	3	29	76	3
Klondyke	85	.....	.....	19	8	112	99	10
Markland	20	.....	.....	5	4	29	80	1
Monarch	15	.....	.....	3	2	20	268	2
Pearl	61	.....	.....	7	6	74	114	6
Pratt	60	.....	.....	14	6	80	178	8
Rob Roy	30	.....	.....	5	4	39	218	4
Silverwood No. 3	61	.....	.....	11	10	82	245	5
Glen	31	.....	.....	3	4	38	178	6
Crawford No. 7	23	.....	.....	8	5	36	63	1
Lawrence No. 6	71	.....	.....	6	.....	77	88	5
Total	1,728	102	264	470	226	2,790	5,771	233

DAVIESS COUNTY.

Cabel No. 4	43	.....	.....	7	6	56	154	5
Cabel No. 9	46	6	12	39	8	111	143	10
Hawkins	7	.....	.....	3	2	12	102	2
Hoosier	7	.....	.....	2	2	11	91	.....
Montgomery No. 2	66	.....	.....	23	9	98	197	5
Montgomery No. 3	117	.....	.....	26	12	155	242	7
Mutual	40	.....	.....	8	6	54	218	5
Black Diamond	8	.....	.....	1	2	11	172	2
Union	12	.....	.....	3	1	16	160	.....
Logan Grove	14	.....	.....	2	3	19	78	1
Total	360	6	12	114	51	543	1,557	37

FOUNTAIN COUNTY.

NAME OF MINE.	Pick Miners.	Machine Runners and Helpers.	Loaders.	Inside Day and Monthly Men.	Persons Employed Outside.	Total.	Days Worked.	Mules.
Silverwood No. 4	49	.....	.....	12	6	67	279	6
Total	49	.....	.....	12	6	67	279	6

GIBSON COUNTY.

Oswald	85	.....	.....	25	16	126	205	9
Total	85	.....	.....	25	16	126	205	9

GREENE COUNTY.

Black Creek	10	8	44	14	9	85	213	7
Fluhart	89	.....	.....	25	11	125	162	12
Gilmour	.....	12	45	10	6	73	42	2
Hoosier	28	6	17	9	4	64	175	2
Island No. 1	22	20	42	30	12	126	167	10
Island No. 2	59	30	69	36	19	213	183	14
Island Valley No. 1	37	.....	.....	12	6	55	168	6
Island Valley No. 3	117	.....	.....	20	9	146	198	8
Island Valley No. 2	51	.....	.....	6	7	64	153	4
South Linton	130	.....	.....	21	11	162	158	10
Summitt No. 2	12	14	78	29	9	142	177	14
Templeton	110	.....	.....	20	11	141	252	12
Wild Cat	90	10	20	29	10	159	213	8
Midland	.....	6	25	7	8	46	45	2
Victoria	19	.....	.....	4	5	28	62	2
Total	774	106	340	272	137	1,629	2,368	113

KNOX COUNTY.

Bicknell	32	.....	.....	7	5	44	116	3
Edwardsport	47	.....	.....	11	7	65	199	6
Knox	23	.....	.....	4	4	31	138	3
Prospect Hill	13	.....	.....	5	×	21	231	3
Lynn	6	.....	.....	1	3	10	26	1
Total	121	.....	.....	28	22	171	710	16

MARTIN COUNTY.

Tunnel	23	.....	.....	3	2	28	87	2
Total	23	.....	.....	3	2	28	87	2

PARKE COUNTY.

NAME OF MINE.	Pick Miners.	Machine Runners and Helpers.	Loaders.	Inside Day and Monthly Men.	Persons Employed Outside.	Total.	Days Worked.	Mules.
Anthony	13	.....	.....	3	3	19	20	.....
Brazil Block No. 12	6	16	55	30	12	119	201	12
Cox No. 3	20	26	40	16	23	125	172	15
Crawford No. 1	36	.....	.....	6	4	46	40	2
Lucia	73	.....	.....	19	6	98	237	7
Lyford No. 1	8	.....	.....	2	2	12	34	2
Lyford No. 2	73	.....	.....	32	10	115	170	14
Mary	67	.....	.....	11	7	85	255	4
Mecca	34	.....	.....	13	6	53	191	7
McIntosh No. 3	74	.....	.....	11	5	90	174	4
Otter Creek	26	.....	.....	4	3	33	52	2
Parke No. 8	17	30	27	33	11	118	183	10
Standard	42	.....	.....	6	4	52	189	7
Superior No. 1	70	.....	.....	11	4	85	133	8
Superior No. 2	132	.....	.....	25	8	165	182	10
New Century	24	.....	.....	2	4	30	23	2
Total	715	72	122	224	112	1,245	2,046	106

PERRY COUNTY.

Cannelton	33	.....	.....	6	5	44	42	5
Troy	20	.....	.....	3	3	26	237	2
Total	53	.....	.....	9	8	70	279	7

PIKE COUNTY.

Aberdeen	37	.....	.....	6	6	49	148	3
Ayrshire No. 3	99	.....	.....	30	20	149	209	16
Ayrshire No. 4	26	.....	.....	5	4	35	216	3
Ayrshire No. 5	16	.....	.....	3	3	22	217	5
Blackburn	17	.....	.....	3	3	23	77	7
Carbon	18	.....	.....	5	4	27	240	3
Hartwell	10	.....	.....	3	2	15	62	2
Littles	87	.....	.....	20	11	118	173	12
Petersburg	26	.....	.....	7	4	37	117	5
Rogers	23	.....	.....	4	3	30	165	2
Ayrshire No. 6	.....	(Reported with No. 3.)				.....	.....	2
Total	359	.....	.....	86	60	505	1,624	60

SULLIVAN COUNTY.

Bunker Hill	4	8	48	21	9	90	195	8
Briar Hill	33	.....	.....	6	4	43	25	4
Caledonia	71	.....	.....	17	9	97	238	8
Dugger	.....	12	74	36	15	137	161	12
Green Hill	.....	4	30	9	8	51	198	6
Hymera	.....	16	92	29	16	153	202	11
Ingleside	40	.....	.....	10	8	58	128	4
Jackson Hill No. 1	17	32	55	33	17	154	63	7
Jackson Hill No. 2	.....	14	97	35	13	159	182	12
Phoenix No. 1	14	18	60	37	14	113	148	18
Phoenix No. 3	31	2	6	4	4	47	170	5
Phoenix No. 5	4	10	30	5	5	54	124	7
Star City	.....	16	93	60	20	189	181	26
Shelburn	20	8	17	10	9	64	90	6
White Ash	38	.....	.....	5	5	48	118	3
Jackson Hill No. 3	.....	.....	.....	6	5	11	48	2
Total	272	140	602	333	161	1,508	2,271	139

VANDERBURGH COUNTY.

NAME OF MINE.	Pick Miners.	Machine Runners and Helpers.	Loaders.	Inside Day and Monthly Men.	Persons Employed Outside.	Total.	Days Worked.	Mules.
Diamond	20	....	.....	4	4	28	191	4
First Avenue	43	.....	.....	10	11	64	259	6
Sunnyside	23	16	15	17	9	80	178	12
Ingleside	46	.....	.....	8	8	62	222	6
Union	21	.....	.....	5	6	32	184	4
Unity	22	.....	.....	4	4	30	237	3
Total	175	16	15	48	42	296	1,271	35

VERMILLION COUNTY.

Brulletts No. 3	23	.....	.....	14	6	43	54	8
Brulletts No. 4	102	.....	.....	25	7	134	254	11
Brulletts No. 5	96	.....	.....	16	7	119	195	6
Buckeye	62	.....	.....	14	8	84	170	11
Cayuga	12	.....	.....	3	2	17	170	2
Crown Hill	10	.....	.....	3	2	15	24	1
Oak Hill	117	.....	.....	14	8	139	166	9
Prince	140	.....	.....	34	11	185	228	16
Torrey	97	.....	.....	32	11	140	228	12
Willow Grove	14	.....	.....	2	2	18	98	4
Total	673	.....	.....	157	64	894	1,587	80

VIGO COUNTY.

Chicago No. 6	64	.....	.....	15	5	84	21	3
Brick Works	13	.....	.....	3	2	18	296	2
Broadhurst	12	.....	.....	2	2	16	96	2
Diamond	144	.....	.....	27	10	177	206	17
Ehrlich	61	.....	.....	12	6	79	213	7
Grant No. 1	7	.....	.....	3	3	13	156	3
Grant No. 2	151	.....	.....	21	10	182	211	8
Glen Oak	7	8	35	12	12	74	258	10
Hector	53	.....	.....	12	7	72	160	6
Klondyke	60	.....	.....	16	9	85	80	4
Koch	12	.....	.....	2	2	16	34	2
Miami	44	.....	.....	5	6	55	24	5
Nickelplate	74	.....	.....	15	9	98	204	6
Peerless	95	.....	.....	21	10	126	206	15
Parke No. 10	3	36	70	34	16	159	165	11
Red Bird	13	.....	.....	2	2	17	159	2
Ray	108	12	12	20	11	163	116	11
Rose Bud	79	.....	.....	14	9	102	169	7
Royal	50	.....	.....	7	6	63	261	4
Union	141	.....	.....	31	14	186	220	14
Vigo	19	.....	.....	3	3	25	108	3
Larimer	10	.....	.....	2	3	15	138	2
Lawton	25	16	23	5	5	74	167	6
Total	1,245	72	140	284	162	1,903	3,678	150

WARRICK COUNTY.

Air Line	16	.....	.....	2	2	20	155	3
Big Four	61	.....	.....	8	9	78	240	6
Big Vein	7	12	30	8	6	63	270	6
Caledonia	50	.....	.....	7	9	66	231	5
Chandler	16	.....	.....	2	2	20	155	3
DeForrest	13	.....	.....	2	2	17	150	2
Star No. 1, No. 2	41	.....	.....	9	7	57	137	6
Total	204	12	30	38	37	321	1,338	31
Grand total	6,836	526	1,525	2,103	1,106	12,096	25,071	1,024

TABLE

Showing Number of Miners, Total Wages of Miners and Average Wages Per Miner; Number of Inside Day and Monthly Men, Total Wages of Same, and Average Wages Per Man; Number of Outside Day and Monthly Men, Total Wages of Same, and Average Wages Per Man, by Counties.

COUNTY.	Number of Miners.	Total Wages of Miners.	Average Earning per Miner.	Number of Inside Day and Monthly Men.	Total Wages of Inside Day and Monthly Men.	Average Earning per Inside Day and Monthly Man.	Number of Persons Outside.	Total Wages of Persons Outside.	Average Earning per Outside Man.
Clay	2,094	$806,459 11	$432 88	470	$242,721 20	$516 42	226	$147,325 72	$651 88
Daviess	378	152,418 36	403 38	114	50,551 37	443 52	51	23,954 28	465 77
Fountain	49	24,170 80	452 46	12	9,577 69	798 14	6	4,202 47	700 41
Gibson	85	53,198 78	625 84	25	12,830 79	513 23	16	9,339 02	583 68
Greene	1,220	589,408 64	483 12	272	153,368 32	553 67	137	81,331 34	593 65
Knox	121	31,630 26	261 48	28	10,836 61	387 02	22	8,629 67	392 25
Martin	23	2,590 83	112 64	3	609 24	203 08	2	409 40	204 70
Parke	909	428,219 04	471 08	224	147,843 23	660 01	112	80,494 45	718 70
Perry	53	9,876 23	186 34	9	2,647 18	294 11	8	1,658 50	207 31
Pike	359	143,172 81	398 81	86	43,321 53	503 73	60	27,740 22	479 00
Sullivan	1,014	399 568 68	394 05	333	156,481 07	462 91	161	79,537 45	494 02
Vanderburgh	206	117,306 01	583 49	48	26,481 28	551 69	42	24,101 04	573 89
Vermillion	673	391,952 46	582 39	157	95,625 81	609 08	64	48,738 21	761 53
Vigo	1,437	627,558 69	430 78	284	171,068 98	602 39	162	102,922 50	635 26
Warrick	246	101,845 26	414 00	38	21,075 98	554 63	37	15,739 45	425 39
Total	8,887	$3,879,375 86	$436 29	2,103	$1,145,040 20	$544 47	1,106	$656,123 72	$593 24

FATALITIES AND INJURIES.

The monthly reports of mine bosses made to this office for the year 1901 show an aggregate of two hundred and eighteen (218) accidents to mine employes, classified as follows: Fatal, twenty-four (24); serious, seventy-seven (77); and minor, one hundred and eighteen (118), as shown by the annexed table:

TABLE.

Cause.	Fatal.	Serious.	Minor.	Total.
Falling slate	10	19	33	63
Falling coal	2	5	22	29
Mine shaft	4	2	..	6
Mine cage	1	..	2	3
Mine cars	3	19	26	47
Machines	..	1	6	7
Blown out shots	..	7	6	13
Delayed shots	1	2	1	4
Premature shots	1	2	2	5
Tamping shots	2	..	..	2
Powder explosion	..	5	1	6
Smoke explosion	..	5	..	5
Fire damp	..	2	2	4
Kicked by mule	..	5	3	8
Miscellaneous	..	3	13	16
Total	24	77	117	218

Each of the fatalities above noted has been thoroughly investigated either by myself or by one of my assistants, and except where persons have lived for some time after being injured, the investigation was made in conjunction with the coroner of the county in which the accident occurred.

The list of fatalities represents not only those who were killed outright, but also those who received injuries which ultimately resulted in death, some of whom lived for several months. Heretofore, as a rule, only persons killed outright and on whom inquests were held were reported in the list of fatalities. This fact makes it appear on the face of this report that this year has been productive of more fatal accidents, proportionately, than most former years.

A brief review of the facts as to the causes that give rise to the many accidents in coal mines may not be amiss here.

It may be said that fifty per cent. of accidents in mines can be attributed either directly or indirectly to the use of powder, causing windy shots, smoke explosions, props to be knocked down by flying coal, thus causing slate falls, etc.

It is no uncommon sight on going through the working places of a mine early in the morning to find from two to fourteen props, and

frequently a greater number, which have been knocked out by shots fired at quitting time on the evening before. In many instances of this kind, the miner will put off resetting his props until after he has loaded a car or so of coal, and straightened things out for his day's work; or, in other words, until he has nothing else to do. As a consequence, it may be days before some of the props are reset, with the result naturally to be expected, i. e., a fall of slate and the imperilment of human life.

The complaint of not being able to get props is frequently made; and while this may be true in some instances, yet considering the fact that in addition to the safety of the workmen, it is also the purpose of props to hold up the roof in their working places and make it possible to mine coal in advance of them, and that the mine owner does not care to lose a block of coal by reason of rooms falling in, is evidence of his willingness to furnish props. The mine boss who fails to furnish props not only neglects the safety of workmen, but also the interests of his employer.

I have given this matter particular attention in past years and have instructed my assistants to do the same. The fact that working places are advanced day by day, and that inspections can not be made more frequently than from three to five months apart, much must necessarily depend upon the miner himself for the care of his working face.

It will be noticed that of the twenty-four fatal accidents occurring within the year 1901, ten, or 43⅔ per cent. of them were caused by falling slate. Six of those fatalities, as is shown in the description of accidents, would have been averted had the most ordinary precautions incumbent upon a miner been taken by the decedents for their own safety. In fact, three of these unfortunates met death while working in direct violation of orders given by the mine bosses and against the advice of fellow-workmen.

The following table shows that three drivers were killed. Of this number at least one (Wint Marvel) would have been spared had he obeyed the express order of the mine boss not to ride on the front end of his trip while coming down a very steep grade. One other (McBurney) might have been spared had there been a flagman stationed at the entry parting to prevent collisions of mine cars. Two miners were killed by shots and two while tamping shots. Of the former two but few circumstances were learned other than that one had gone back on a shot which was supposed to have squibbed (a very dangerous thing to do, as will be conceded by any experienced miner). As to the latter two (Jacks and son), the accident could have

been averted by a compliance with the law requiring tamping tools which will not strike fire on coming in contact with sulphur. Of the two persons killed by falling coal while mining off loose shots, little can be said, except that such work is fraught with much danger and should receive extra precautions on the part of miners. Of the four persons killed in mine shafts, and the one by mine cage, a full description of the facts and circumstances attending each case is given in another part of this report.

The names of persons, occupation, dates and cause of each death, the name of the mine and county wherein the fatalities occurred, are given in the following table:

FATAL ACCIDENTS REPORTED AT INDIANA MINES, 1901.

NAME.	DATE.	OCCUPATION.	CAUSE OF ACCIDENT.	NAME OF MINE.	COUNTY.
Wint Marvel	January 4	Driver	Crushed between cars and cross-bar	Phœnix No. 1	Sullivan.
David Jones	January 5	Miner	Falling cage in shaft	Brazil Block No. 10	*Clay.
George Hayes	January 5	Miner	Falling cage in shaft	Brazil Block No. 10	*Clay.
Charles Low	January 7	Miner	Falling off of cage	Bruilett's No. 3	Vermillion
Fred Sampson	January 29	Miner	Went back on shot	Bruilett's No. 3	Vermillion
Rollo Watts	February 3	Timberman	Caught by cage	Torrey No. 4	Vermillion
Robert Lee	March 11	Miner	Falling coal	Island No. 2	Greene.
James Usrey	March 11	Miner	Fell down shaft	Island Valley No. 3	Greene.
George Gibson	March 17	Miner	Falling slate	First Avenue	Vanderburgh.
Robert Bradley	March 21	Miner	Falling draw-slate	Templeton	Greene.
Elija Braken	April 15	Machine Runner	Falling slate	Big Vein	Warrick.
Geo. Dianish	April 18	Miner	Falling coal and slate	Buckeye	Vermillion.
Jas. McBurney	April 19	Driver	Collision of mine cars	Parke No. 10	Vigo.
Elmore Terry	June 23	Driver	Run down by mine car	Big Vein	Warrick.
Wm. Unverferth	June 27	Miner	Falling slate	Glenburn	Greene.
George Kapalo	July 26	Miner	Mine blast	Buckeye	Vermillion.
Jas. Jacks and Son	August 6	Miners	Explosion while charging shot	Bruilett's No. 5	†Vermillion.
John Libertine	August 6	Miner	Falling slate	Brazil Block No. 12	Parke.
Frank Barberline	August 9	Miner	Falling slate	Standard	Parke.
Reese Powell	August 29	Timberman	Falling slate	Grant No. 2	Vigo.
Walter Murphy	October 10	Timberman	Falling slate	Mecca No. 1	Parke.
William Smith	October 19	Miner	Falling slate	Montgomery No. 2	Daviess.
Floryan Kolontay	November 23	Miner	Falling slate	Brazil Block No. 11	Clay.

*Jones and Hayes killed at same time.

†Jas. Jacks was instantly killed; his son died some time later at hospital in Terre Haute.

FATAL ACCIDENTS.

We submit herewith the facts and circumstances relating to each of the above accidents, as established by coroners' inquests, together with comments on same.

The first death to occur in the mines of this State during the year 1901, by reason of accident, was that of Wint Marvel, driver, who, on the morning of January 4th, was caught and crushed between the top of a loaded car and a cross-bar, in Phoenix No. 1 Mine, Sullivan County, operated by the New Pittsburg Coal and Coke Company.

The entry in which the accident occurred rises toward the face with a grade so heavy as to require two sprags in each car when coming out of it. Evidence given at the inquest shows that Marvel, on the morning above mentioned, had gone to the face of the entry after a loaded car; that while going up the entry, he was whipping his mule; that after being hooked to the car, on account of its having been so whipped, the mule became excited and fretful and started down the entry more rapidly than usual. Marvel, in direct violation of the order of the mine boss, was riding on the front end of the car, standing in a stooping position with one foot on the draw-bar of the car and the other on the tail chain. About forty-five feet from the face of the entry, an air pipe lay across the roadway near the roof, extending into a room-neck. Attached to the end of this pipe was a rubber hose used to conduct air into a mining machine, which was in operation at the time. Just as the mule and car were passing under this pipe, the hose connection, in some manner, came off, allowing the air to escape in full force. The noise of the escaping air frightened the mule, which, at the time, was going too rapidly for the safety of the driver, into a run. The supposition is, that when it started to run, Marvel was jerked backward over the edge of the car and was caught between it and a cross-bar, crushing his breast and shoulders, and so injuring him that he died on the following morning.

Marvel was very careless and reckless in attempting to ride on the front end of the car down the heavy grade above referred to, it having at least a seven or eight per cent. fall. Also, he should have known that it would be doubly hazardous to ride in such a position after whipping the mule, which, it is a reasonable presumption, becoming fretful and excited, would naturally travel faster than usual, probably attempt to run away. In either event, his chances to get off of the car without being seriously injured were very meager. A compliance with the order of the mine boss not to ride on the front end of the car would have averted this accident.

The second fatal accident in this State, and one of the most deplorable of the year, occurred January 5th, at the Brazil Block Coal Company's No. 10 Mine, in Clay County.

At a few minutes before seven o'clock on the morning of the above date, David Jones and George Hayes, miners, employed at this mine, entered the cage and signaled the engineer to lower them down the shaft. The engineer for some reason, presumably absent-mindedness, started the cage up instead of down, and did not notice his mistake until he had hoisted it into the sheave wheel, thereby breaking the rope and safety catches and precipitating the cage with the miners on it to the bottom of the shaft, a distance of one hundred and eighty feet, killing both men instantly.

The engineer in charge of the engine was an old and experienced man and bore a reputation as a careful and competent engineer. His absent-mindedness is the only plausible reason which can be ascribed as the cause of the accident. It could have been prevented, however, had there been a top signal bell connected with the engine room with some person in charge of it while the miners were being lowered into the shaft.

On January 7th, Charles Low, miner, employed at the Bruiletts Creek Coal Company's No. 3 Mine, Vermillion County, was instantly killed by falling from an ascending cage.

The evidence adduced at the investigation of this case discloses that Low had two shots in readiness to fire at firing time on the above date, one of which exploded, the other failing to do so. There were also several other shots fired in the near vicinity of Low's working place which, together with the one he had fired, made a large amount of smoke. While trying to fire his missed shot, Low worked some time in this powder smoke, which was very dense and hot.

The usual effect of powder smoke on a person who has worked in it for any length of time is to produce dizziness when he reaches fresh air. The supposition is, that this was true in Low's case, since after so working in the smoke he started up the shaft, and upon reaching the cooler air fell off the cage. It is but a reasonable presumption that he became dizzy, which, together with the motion of the cage, caused him to fall therefrom. However, this is but an opinion, since no one saw him fall. There were two other persons on the cage at the time, but they were standing with their backs to Low, and did not miss him until they reached the top of the shaft.

The cage from which Low fell was one of the Prox-Brinkman self-dump make which on the sides had no guards or supports of any kind by which persons might steady themselves while going up or down

the shaft. Although no guards or supports are required by our statute, they are nevertheless greatly needed. Had they been provided in this instance, it is very probable that Charles Low would not have come to his death as he did.

On January 9th, a second death occurred at the last above named company's No. 3 Mine. On that date, Fred Sampson, miner, was killed by a shot fired by himself. No one was present at the time, and but little could be learned as to the real cause.

From evidence given at the inquest, it was learned that Sampson had two shots ready to fire in a room-neck at firing time; that he had fired one of them and had gone back to fire the other, but for some cause failed to get out of reach of the flying coal after lighting the shot. When found, he was lying on some of the loose coal which had been thrown out by the explosion of the shot.

It is the general opinion of those acquainted with the circumstances surrounding this case, that Sampson became confused and lost his way in the smoke made by his first shot. The room-neck being but a very short distance from the entry, and there having been a strong current of air passing that point, it seems that such opinion has no good foundation.

The third death in Vermillion County was that of Rollo Watts, who was killed on February 30th, at the foot of the Torrey Coal Company's No. 4 hoisting shaft.

Watts and two other miners were employed on the night shift to timber and clean up slate-falls. On the evening of the accident, after getting ready for work, they found the regular engineer absent from his post. Wilson Vantreaves, being present, volunteered to lower them down the shaft.

At the investigation of the accident, it was learned that Vantreaves, though not a regular and licensed engineer, in the absence of the regular engineer had frequently lowered persons into and hoisted them out of the mine. It may also be stated here that the engines at this mine are of the first motion pattern and run at a high rate of speed. This being true, none but a thoroughly competent engineer should have been allowed to handle them. On this occasion, Vantreaves lost control of the engines and allowed them to travel under a full head of steam until the cage was within a few feet from the shaft bottom, when, instead of shutting off the steam and setting the brake, he reversed the engine. The speed at which the cage was traveling at the time he so reversed the engine carried it to the bottom of the shaft, where it struck with such force as to throw Watts and his companions off their feet, Watts falling partially over the

edge of the cage, probably being stunned by the fall. The engine being reversed and the steam not shut off, the cage began to ascend before the unfortunate man could regain his feet, catching his head and shoulders against the bottom of the shaft curbing and crushing him to death.

Vantreaves was arrested and charged with manslaughter. Though bearing an excellent reputation in every particular and deploring the accident as much, or even more, than any one else, an example should be made of his case which would tend to prevent mine bosses and other persons not fully qualified and competent attempting to run hoisting engines, a thing which only the most competent engineers should be allowed to perform.

The miners, in this instance, should also be censured, inasmuch as they knew Vantreaves was not a competent engineer, and that by placing themselves under his care were thereby contributing to their own danger. Had they waited but a few minutes, the regular engineer would have been at his post, and it is fair to presume the accident would not have happened.

On March 11th, Robert Lee, loader, employed by the Island Coal Company at its No. 2 Mine, Greene County, while working off a standing shot, was injured by falling coal, from the effects of which he died four days later.

On March 11th, at about eight o'clock in the evening, James Usrey, miner, was instantly killed by falling down the Island Valley Coal Company's No. 3 shaft.

Upon investigation of this accident, it was learned that Usrey had been in the habit of going back into the mine after working hours to examine his shots, and for this purpose, on the evening he met his death, he had started to go down the shaft with the night watchman, who stopped on the way for the purpose of oiling the fan, which stood but a few feet from the hoisting shaft. While waiting for him, Usrey opened the shaft gate, and without making any examination whatever to learn whether or not the cage was at the proper landing, stepped into the shaft, falling to the bottom, a distance of forty-seven feet, instant death resulting.

On March 17th, George Gibson, miner (colored), was injured by falling slate in the First Avenue Mine, Vanderburgh County, operated by the Sunny Side Coal and Coke Company, from the effects of which he died the following day.

Gross negligence on the part of the decedent was wholly responsible for this accident. On examining the room in which he was injured, I found the distance between the face of the coal and the

first props to be twenty-one feet, also a good supply of timber at hand ready for use.

It appeared in evidence at the inquest, that the mine boss on the day preceding the accident had examined and found the roof over this place to be loose, and thereupon so advised Gibson and ordered him to properly timber it up. Miners working in adjoining rooms also advised Gibson to timber the place. His answer in each instance was to the effect that he had "not mined coal for twenty-one years for nothing, and that he guessed he knew his own business." He continued working in the place without setting the props, with the result most likely to be expected.

The mine boss, in this instance, I think, was also somewhat remiss in performing his duty. After examining the place and learning of its dangerous condition, he should have compelled Gibson either to set the timbers or to quit the room.

On March 21st, at about 11:30 o'clock a. m., in the Templeton Mine, Greene County, owned and operated by the Western Indiana Coal Company, Robert Bradley received injuries from which he died about three months afterward. The piece of draw-slate which fell upon and injured him was nine feet in length, six feet wide and two inches in thickness.

Upon investigation, the following facts and circumstances were established: That Bradley was mining off a loose shot; that he knew that the draw-slate was loose, as his attention had been called to that fact by a miner working in an adjoining working place; that at that time, Bradley pulled a part of the slate down, but failed to set props or in any way to secure the remaining portion. He being an old and experienced miner knew that his safety depended upon this slate's being secured, especially so after he had worked off a part of the loose shot. He made the statement that he had worked off about three cars of coal from the shot, and that he had taken down a part of the draw-slate; but that he thought the remainder of the slate was solid. Yet, I think his examination of it could not have been very thorough, as I am satisfied that the loose shot referred to, which was four feet ten inches thick, measured at right angles from the drill hole, and seven feet in length, which had been fired on the solid, would necessarily have loosened this draw-slate from the drill hole to the outside edge of the fall; and his having mined off three cars of coal would give the slate a chance to draw or sag.

On April 15th, Elija Bracken (colored), machine runner, at the J. Woolley Coal Company's Big Vein Mine, Warrick County, was struck by a piece of falling slate, receiving injuries from which he died three days later.

This accident was investigated by Assistant Inspector Dodds and the Coroner of Warrick County, who returned a joint verdict of accidental death. A suit for damages was instituted by the widow of the decedent at the September term of court of that county. The case was postponed until the December term following, and up to the present time no disposition has been made of it.

On April 18th, George Dianish, miner, while working off a standing shot, was killed by falling coal and slate at the McClellan, Sons and Company's Buckeye Mine, Vermillion County. No one was present at the time and but little was learned at the investigation as to the exact cause of the accident.

On April 19th, James McBurney, driver, was killed in a collision of mine cars at the Parke County Coal Company's Heckland Mine, Vigo County.

The cross-entry in which McBurney was driving rises with a tolerably steep grade from the parting at the main entry, which also rises past the same point, the grade of each entry being so steep as to require several sprags to stop a trip.

On the evening of the accident, McBurney was coming out of the cross-entry with a loaded trip, riding on the front end of the car. He reached the parting at the same time as did another driver, who was coming down the main entry. When McBurney saw the cars were bound to collide, he tried to jump and was caught between the side of the car and the rib of the entry, killing him instantly.

The accident might have been prevented had there been a flagman stationed at this point who could have stopped one of the drivers in time to have avoided a collision. There should be a law enacted requiring coal companies to station flagmen at such places.

On June 3d, Elmer Terry, driver, employed at the J. Woolley Coal Company's Big Vein Mine, Warrick County, was run down by a mine car. He died on the 22d day of June. No further facts regarding this accident were reported to this office.

On June 27th, William Unverferth, loader, was instantly killed by falling slate at the L. T. Dickason Coal Company's Mine, in Greene County.

An investigation of this accident developed some features not usually found in connection with mine accidents. As my report filed with the Clerk of the Greene Circuit Court sets forth all the facts and circumstances ascertained in my investigation as to the cause of this accident, I give it here in full (omitting the formal parts), as follows:

"I, James Epperson, Inspector of Mines, having made investigation as to the cause of the death of one William Unverferth, depose and say as follows:

On June 28, 1901, at about 6 o'clock a. m., I was notified by the mine superintendent of the L. T. Dickason Coal Mine, located near Linton, Ind., that a miner by the name of William Unverferth had been killed in said mine by falling slate at about 9:30 p. m. the day prior.

On receiving the above notice, I immediately went to the mine, and in company with the mine superintendent, mine boss and others, went into it and saw the place where the accident had occurred.

I found that it occurred on a siding which was being made on the main west entry between the second and third north cross entries, at a point about 70 feet outside of the third north entry.

I saw the piece of slate which had fallen on deceased and caused his death. In dimensions, the piece of slate, which was said to have lain directly on him, measured three feet two inches in width, nine feet long and was 15 inches thick. This piece of slate, however, was only a part of the slate fall proper, which extended the full length of the siding, a distance of 70 or 75 feet, varying in width from two to four and one-half feet. After examining the place where the accident had occurred, I then notified the assistant coroner of the accident, and requested that he come as soon as convenient to assist in making investigation.

The assistant coroner reached Linton late in the evening of the 28th, and I assisted him to examine the following witnesses, to wit: Geo. S. Payton, loader; John H. Hornbrook, boss driver; Chas. E. Daniels, road-layer, and Thomas J. Thomas, mine boss. From the evidence given by the above named witnesses and my examination of the premises, we established the facts hereinafter set forth, i. e.:

That the management of the L. T. Dickason Coal Mine had commenced to construct a siding or double parting on the west side of the mine. That the siding was being made between the second and third north entries; that in order to secure width for the siding, there had to be a slab or breast of coal about four feet wide taken off of the south side of the entry.

That the company had caused this breast of coal to be mined with mining machines for a distance of about 70 or 75 feet along the side of the entry at the point above named.

That in order to secure heighth for the haulage road, the company had shot the slate or roof down to a height or thickness of about 15 inches along the main west entry between the second and third north cross-entries.

That this slate had been shot down some days prior to the date on which the slab of coal had been mined to make the siding.

That the mine boss ordered this breast of coal after being mined, to be drilled and shot down by his road-layer, which was done.

That after the coal was mined and shot down, there was left a ledge of slate 15 inches thick the full width and length of the breast of coal above described.

That on the 24th day of June, the mine boss ordered his drivers to load out this coal; also ordered that they load along the edge of the coal next to the roadway so that there could be props set under this ledge of slate.

That it was quitting time on the evening of the 24th when sufficient coal had been loaded to make room for props to be set.

That the mine hoisted coal two hours on the morning of the 25th, and lay idle from that time until the morning of the 27th, by reason of a drivers' strike, no one being allowed to work in the mine.

That during this idle time, the Mine Committee notified the mine boss not to allow any more of this coal to be loaded by his drivers or day men, claiming that the coal should be loaded by loaders.

That on the 27th, the mine boss requested the Mine Committee to select some one to load out the coal.

That the Mine Committee selected William Unverferth and George S. Payton to come back into the mine on the evening of the 27th to load out this coal.

That said two men went back into the mine and started to work at about 6 o'clock p. m., and had loaded two cars of coal, drilled and fired a small shot at one end of the siding and were loading the third car, having it bedded or level full. Payton was working near the car leveling it off, while Unverferth was working back under the ledge of slate, it being at this time about 9:30 o'clock, when the slate fell and killed Unverferth.

That there were no props set under this ledge of slate although there was plenty of room to have set them.

That there was evidence tending to show that there were no props on hand to be set, and equally as much evidence tending to show that there were props on hand.

That William Unverferth was a coal miner, and had mined coal at various times during the past twelve or fourteen years.

That this siding was not William Unverferth's regular place of work, he and Payton having two rooms in another part of the mine in which they were employed as loaders.

The facts as above stated are, I believe, the true facts in this case. But from surrounding circumstances, I am unable to determine who

was in fault, the men who were loading the coal, or the mine management."

On July 26th, George Kapalo, miner, was killed by coming in contact with a shot fired by himself in the Buckeye Mine, Vermillion County, owned by McClellan, Sons and Company. Owing to the fact that no one was present at the time of the accident, very little was learned as to its cause, upon investigation.

Kapalo, after lighting his shot and waiting for quite a while, thought it had missed fire, and started back to try it again. When within a very few feet from it, the shot exploded, several pieces of coal striking him and inflicting injuries from which he died while being taken home from the mine.

On August 6th, two lives were lost by reason of a premature blast, in the Bruiletts Creek Coal Company's Mine, Vermillion County. James Jacks was instantly killed, and his son, ———— Jacks, was so badly burned and otherwise injured that he died some weeks later at the hospital in Terre Haute.

No one excepting the father and son was present at the time of the accident. From the testimony of the latter, it was learned that they had charged a hole with several pounds of loose powder, and that the father was either settling the powder back with a tamping bar, or had begun to tamp it, when the powder exploded.

The only plausible theory to account for the explosion is, that while starting to tamp, a piece of sulphur was struck by the iron tamper, causing a spark which ignited the powder. A compliance with the statute requiring copper tamping tools would have prevented this accident.

On the night of August 6th, John Libertine, employed by the Brazil Block Coal Company for lifting bottom at their No. 2 mine, Parke County, was struck by a piece of falling slate weighing about two tons, receiving injuries from which he died two hours later. No other person being present, the facts and circumstances surrounding this accident are unknown.

On August 9th, Frank Barberline was killed in the Standard Block Coal Company's Standard Mine, Parke County, he being struck by falling rock.

Barberline was engaged in drawing a pillar at the time he met his death. An examination of his working place showed it to be very poorly timbered, although there was plenty of timber at hand with which it could have been made safe.

Negligence in this case should be charged to both the decedent and the mine boss, the former on account of his not providing for his

own safety by timbering, and the latter for not either compelling him to timber or to quit the place.

On August 29th, Reese Powell, timberman, was killed by falling slate in the Grant Coal Company's No. 2 Mine, Vigo County. On investigation, the evidence showed that Powell had tried for some time to take down the piece of slate, but for some reason failed to do so. He then went directly beneath it for the purpose of doing some other work, and while so engaged, the slate gave way, falling upon and killing him instantly.

On October 10th, Walter Murphy was instantly killed by falling slate in the Otter Creek Coal Company's Mecca No. 1 Mine, Parke County.

Murphy was employed at this mine as timberman, and had worked in that capacity about three years. At the time of the accident, he had gone into an old air course to level down some slate falls. No one was with him at the time, so very little could be learned as to the exact cause of the accident.

On October 15th, William Smith, miner, was killed by falling slate at the face of his working place in the Daviess County Coal Company's Montgomery No. 2 Mine, Daviess County.

This accident was investigated by Assistant Inspector Dodds and the Coroner of Daviess County. The following extract from the testimony of James McKenna, mine boss at said mine, is a fair statement of the facts and circumstances surrounding the accident.

"Mr. Smith had been working for the Daviess County Coal Company for about three months, I think. He had been working at the place where he was killed all the time excepting about two weeks, as I remember. I was in his room about 12:15 o'clock on October 15, 1901, and examined it thoroughly. I told him it was in a dangerous condition, that the bottom was heaving and that the top had begun to cut on the gob rib. I also advised him to leave the room immediately or he would be killed. He answered that it was a good room and for that reason disliked to leave it; that he had a breakthrough near the face through which he could escape in case of accident. I told him no, that it might come all at once. I told the driver to leave no car there over night. I have not seen the room since the accident."

Had the mine boss performed his duty in this instance, he would have ordered Smith to leave the room. Also, he should have given orders to the driver that no more coal should be hauled out of the room.

On the evening of November 23d, Floryan Kolontay, miner, was instantly killed by falling rock in the Brazil Block Coal Company's No. 11 Mine, Clay County.

At the time of the accident, the company was driving the main east entry and air course on double turn. Kolontay worked on the night turn in the air course. On leaving his work at 3:30 p. m., which is firing time, the miner who preceded Kolontay on the day shift fired a shot which knocked down several props. Kolontay's first duty on commencing work should have been to replace these props. This he failed to do. As a consequence, he had worked but a short time when tons upon tons of rock fell upon him. The accident occurred at about 4:45 o'clock p. m., and four hours hard work by several men were required to remove the rock in order to recover the body.

TABLE

Showing Number of Tons of Coal Produced in Each Year since January 1, 1879; also the Number of Deaths of Mine Employes by Reason of Accident and the Tonnage to each Death for each Year.

Year.	Tons Produced.	No. of Employes.	Deaths.	Tons Per Death.
1879	1,196,490	3,459	..	.....
1880	1,550,375	.....	.....	.....
1881	1,771,536	4,567	10	177,153
1882	1,900,000	.....	.....	.....
1883	2,560,000	5,403	11	232,727
1884	2,260,000	5,716	9	228,888
1885	2,375,000	6,502	7	339,285
1886	3,000,000	6,406	7	428,571
1887	3,217,711	.....	.....	.....
1888	3,140,979	6,685	17	184,763
1889	.....	.....	.....	.....
1890	3,791,211	6,550	5	758,242
1891	3,819,600	6,975	5	763,900
1892	4,408,471	7,600	19	232,024
1893	4,358,897	7,431	22	193,586
1894	.....	.....	.....	.....
1895	4,202,084	7,885	23	182,699
1896	4,068,124	7,112	28	170,290
1897	4,088,100	7,984	16	262,630
1898	5,146,920	.....	22	233,950
1899	5,864,975	7,366	15	390,997
1900	6,283,063	8,858	18	349,059
1901	7,019,203	12,096	24	292,466

1. "Employes" include only those working inside mines.
2. Prior to 1897, there was no law requiring operators to report tonnage, accidents (except fatal), etc.; hence it is very probable that many mine employes received injuries which ultimately caused their deaths, but of which we have no record in this office.

SERIOUS ACCIDENTS.

The list of serious accidents as shown by Table No. 1, includes those who have received broken bones, cuts, bruises and such other injuries as we think require special mention. A majority of such accidents have been investigated by this office, and the following pages contain brief statements of, and in some instances comments on, the same.

CLAY COUNTY.

Crawford No. 5 Mine. On January 14, Edward Bruer had leg broken by flying coal from a delayed shot.

Diamond No. 5 Mine. On January 18th, John Williams had hand badly lacerated by a saw.

Diamond No. 5 Mine. On February 21st, Frank Fisher was burned about the face and hands by powder explosion.

Diamond No. 5 Mine. On April 23d, Andrew Marshall, driver, had his leg broken by falling off a mine car.

Cloverland Mine. On March 19th, Alfred Harris, Ethal Harris and Alfred Refet were seriously burned by a smoke explosion. Assistant Inspector Long investigated the accident; and after going over the matter carefully, he established beyond a doubt that the explosion was due to an excessive amount of powder used in shots which had been placed too heavy on the solid.

Cloverland Mine. On October 30th, a second smoke explosion occurred at this mine, in which Charles Steadman and George Morgan were slightly burned. This accident was investigated by myself. After carefully examining the three shots which had been fired, one of which was supposed to have caused the explosion, I found that all of them had been properly placed, and to all appearances there had not been an excessive amount of powder used in any of them. I also found an excellent current of air, 12,000 cubic feet passing the point where the explosion occurred. Taking the above facts into consideration, I can ascribe but one reason to account for the accident, that is, that the three shots had been fired simultaneously or so close together that the smoke from one had not had time to cool sufficiently when the flame from the other two, probably fired together, entered this smoke and ignited it. I am led to believe this from the fact that it was generally admitted that little regard was paid to the law governing shot-firing, and that shots were fired indiscriminately, or rather, go-as-you-please.

Brazil Block No. 1 Mine. On May 31st, Edward Burns received severe body bruises from falling slate.

Brazil Block No. 1 Mine. On November 19th, James McGoran was injured in the back and chest by falling coal from a loose shot which he was trying to work off; concussion of the brain resulted.

Diamond No. 3 Mine. On July 19th, Fred Schrefeman was badly burned about the neck, face and arms by reason of the explosion of a keg of powder, caused by its coming in contact with an electric wire.

Brazil Block No. 1 Mine. On — day of ——, William Yorke had finger cut off while coupling cars.

Brazil Block No. 1 Mine. James Stewart, on August 27th, machine runner, had foot mashed by falling slate. He was at work again within two weeks.

Silverwood No. 3 Mine. On August 22d, John Lord, driver, was injured about the legs and chest by reason of a mine car jumping the track and catching him against the rib or side of entry.

Eureka No. 4 Mine. September 30th, Thomas Philips was struck by falling draw slate, breaking a rib and causing slight injuries in his back.

Pearl Mine. On November 12th, ——————, driver, fell off of front end of loaded trip; car caught him and seriously injured his back.

Glen Mine. On December 18th, John Baird, mine boss, was seriously burned by fire-damp. Assistant Inspector Long, upon investigation, reported that Baird had gone into an old abandoned room which had fallen in, and had climbed up over a large fall for the purpose of locating a stream of water which he supposed was coming through this fall into the mine. Just before he reached the top of the fall, he ignited a small pocket of gas which had accumulated in the top of the fall. The fact was also established that Baird, as mine boss, knew that fire-damp was being given off in small quantities in some parts of the mine and that he should have taken the precaution to examine such places before entering them with a naked light.

Brazil Block No. 11 Mine. On December 26th, Antonetti Delwassis was badly injured in the breast by coal from a shot fired by himself. Investigation showed that after lighting his shot and starting to run, he dropped his lamp, and instead of continuing his way out of the room, he stopped to replace the lamp in his cap, and while so engaged the shot went off, with the above result.

DAVIESS COUNTY.

Cabel No. 9 Mine. On April 22d, Frank Burkhart, a driver, was seriously injured by a powder explosion.

GREENE COUNTY.

Island No. 2 Mine. On February 4th, Charles Wills, a miner, had his leg broken by falling slate.

Island No. 1 Mine. On February 16th, Thomas Keene, a driver, had his right leg broken by slipping off of the tail chain and being caught by the mine car.

Island Valley No. 3 Mine. On February 26th, James Angleton, a miner, had his leg broken by falling slate at the face of his room.

Island Valley No. 3 Mine. On April 13th, Adam Vondersmit and Jacob Powell were seriously burned by an explosion of powder, caused by leaving a keg of powder lying on its side with the open end directly in range and about 24 feet distant from a very heavy shot. The keg contained about eight pounds of powder. The men though painfully burned about the face and hands were not otherwise injured.

Fluhart Mine. On April 24th, Jesse Ray, a driver, had ankle mashed by mine car jumping track; at work in a short time. Following day, James Johnson, a driver, had his foot mashed by car jumping track; idle two weeks.

Island Valley No. 3 Mine. On October 1st, Eli Rice, miner, had three ribs broken by falling slate at the face of his working place.

Wild Cat Mine. On October 6th, William Peach was injured by falling slate; injuries not reported.

Fluhart Mine. On May 11th, Adam Sutton, a miner, had shoulder broken by falling coal from a standing shot which he was working off. On June 3d, at same mine, Robert Clemitt, a miner, had leg broken in two places by falling draw-slate within three feet of the face of his room.

Templeton Mine. On March 22d, Robert Ferguson had his back broken by falling slate under almost identically the same conditions as those when Bradley was injured. An investigation of both accidents was made by myself, and in each instance I found that the men were lying down mining off loose coal and were working under loose draw-slate, which they, as practical miners, knew to be unsafe.

Hoosier Mine. On May 14th, John Starkey, a top laborer, fell into the shaft onto a descending cage. He fell about thirty feet; the force of the fall was broken by the descending cage and he escaped with but a few bruises.

Summitt No. 2 Mine. On January 11th, L. D. Heggerman, a driver, was seriously injured by being caught and squeezed between a mine car and a prop.

Island Valley No. 2 Mine. On August 13th, Charles Wonders, a miner, had back severely injured by falling slate, caused by what is known as a pot hole in the roof.

Black Creek Mine. On August 19th, John Morgan, a driver, had foot mashed by falling under a moving mine car.

Island Valley No. 1 Mine. On October 3d, J. B. Small suffered a broken leg from a fall of coal while mining off a loose shot.

South Linton Mine. On December 17th, James Dunham had his foot mashed; caused by loaded mine car jumping track and knocking a prop from under a loose piece of slate, which fell on him.

Gibson County.

Oswald Mine. On January 18th, George Carico and John Stalings, miners, were burned by a windy or misplaced shot, which had been fired by Carico. An investigation of this accident developed the fact that Carico had frequently been guilty of firing shots which were not properly placed and containing more than eight pounds of powder (the maximum amount in any one shot as prescribed by law). I am informed that the boss had attempted to discharge him for this practice a few days prior to the accident, but that the Mine Committee insisted that he be allowed to remain. On the day of the accident, he had a shot so badly misplaced and overcharged, that the miners working in adjoining places advised him not to fire it. This, however, he persisted in doing, with the result that a fellow workman was badly injured and he himself made a helpless cripple for life.

Again at this mine, on December 3d, James Stevens, head dumper, had his hand badly mashed while dumping a car of coal.

Same mine, on August 23d, John McDonald was injured by a slate-fall. His injuries consisted of left hand badly lacerated and left ankle mashed.

Parke County.

Mecca Mine. On February 7th, C. Gray, a driver, suffered a broken collar bone, caused by being kicked by a mule.

Same mine, on October 9th, William Jackson and John Caruthers, employed as shooters, were seriously burned by a blown-out or windy shot.

Lyford No. 2 Mine. On March 28th, Frank Sclachnskie, a miner, suffered severe injuries in head, back, shoulders and hips by falling slate. Investigation showed that the accident happened at his room parting, and that the roof was very bad in the room and at the point where he was injured.

Lucia Mine. On May 17th, Sandy Colerie, a driver, had his leg broken by falling under a moving mine car.

Same mine, on September 5th, Thomas West, Jr., received severe body bruises caused by falling coal while working off a loose shot.

Mary Mine. On May 31st, John Tresnittie, a miner, suffered a broken leg, caused by a premature shot.

Same mine, On June 14th, Thomas Golden had leg broken and Albert Barley received injuries in back; caused by falling slate, which they were attempting to take down preparatory to timbering.

Same mine, on July 3d, Edward Cuttie, a miner, had leg broken by falling slate; has been unable to work up to present time, and the probability is that he will be badly crippled for life.

Brazil Block No. 12 Mine. On July 30th, Richard Hendren, a driver, had leg broken; caught by mine car.

Same mine, on December 28th, Andrew Sallits, a loader, had foot mashed by falling slate.

Pike County.

Ayrshire No. 3 Mine. On February 28th, W. J. Jennings had leg mashed by a fall of slate.

Rogers Mine. On December 14th, John Everly, a miner, had thumb mashed off, caused by falling slate from under which he was mining off a loose shot.

Sullivan County.

Dugger Mine. On January 18th, Elmer Hyatt, a driver, had small bone of arm broken, caused by kick by mule.

Same mine, on November 20th, James Lawson, a miner, was injured in back by falling draw-slate.

Hymera Mine. On February 2d, Ora Sparks was kicked in abdomen by mule; injured internally.

Caledonia Mine. On February 21st, Sid Dempsey had two ribs broken, caused by being squeezed between a mule and a mine car.

Ingle Mine. On April 13th, D. Bucklew, a miner, had leg broken by falling slate.

Green Hill Mine. On May 18th, J. E. Martin had leg cut by mining machine.

Jackson Hill Mine. On July 29th, Theo. Thompson was kicked by a mule; injury not stated.

Same mine, on August 29th, George Sargent was badly crushed by falling slate.

Caledonia Mine. On ———, William Still had leg mashed between trap-door and mine car.

Star City Mine. On October 29th, H. Dodd had leg broken; caused by being struck by a mine car.

VANDERBURGH COUNTY.

Ingleside Mine. On November 28th, John B. White, a driver, had leg broken and face badly cut; caused by empty car jumping track and knocking a prop from under a piece of loose slate, which fell on him.

VERMILLION COUNTY.

Torrey No. 4 Mine. On March 25th, Herman Clinton, a driver, had leg broken; caused by falling under a mine car.

Willow Grove Mine. On October 17th, three miners, Paul Padoska, Adam Konskik and John Konskik were seriously burned by a blown-out shot, caused by an excessive amount of powder used in a short hole drilled behind a very heavy shot.

Buckeye Mine. On November 19th, Charles Kirkman was injured by flying coal from a delayed shot, which he had gone back on. His injuries consisted of a broken rib and flesh wounds.

VIGO COUNTY.

Lawton Mine. On March 25th, Edward Stewart was injured in hips and bowels by falling slate at a distance of about fifty feet from the face of his entry.

Same mine, on April 3d, Charles Hoffman, a cager, had bones in hand broken; caused by coal falling down shaft.

Peerless Mine. On July 11th, Frank Groat had left leg broken by falling slate.

Grant No. 2 Mine. On July 11th, Lee Centers was caught by falling slate, receiving injuries in back and hips, together with internal injuries.

Diamond Mine. On September 24th, Richard Edwards, a driver, while riding on the front end of a mine car, fell off and was caught between the car and ties; right leg broken.

Ehrlich Mine. On October 3d, ————————, had legs injured by flying coal from a shot which had blown through a pillar.

Rose Bud Mine. On October 15th, Thomas Sanders was burned by fire damp. He had gone into an old abandoned room and was climbing over a slate fall. A small pocket of gas was ignited.

Union Mine. David Black, on December 13th, fell down hoisting shaft. The gate at top of mine blew against him while he was putting trap on for mule to descend in cage. He fell in four feet of water. Commenced work January 6, 1902.

Warrick County.

Big Vein Mine. On March 19th, Ed. Rogers, a miner, had back injured by falling slate.

Star No. 1 Mine. On April 20th, Cisco Green, a driver, had nose broken; kicked by mule.

Same mine, on December 5th, William Hadley, a driver, had leg broken; fell under a mine car.

Air Line Mine. On August 10th, William Stigall, a miner, had hip crushed by flying coal; caused by irregular shot firing.

MINOR ACCIDENTS.

The list of minor accidents as shown by the foregoing table includes those where only slight injuries were sustained and which caused but little loss of time. We think no special mention need be made of them. It is probable, however, that some serious accidents may have been classed under minor, as the mine bosses differ considerably as to what should be termed a serious injury.

ACCIDENTS TO MINE PROPERTY.

During the year 1901, there were reported to this office ten accidents to mine property which are worthy of mention here. Six of them occurred in the surface plants, and the remainder in the inside workings of the mines.

At the Island No. 2 Mine, located at Linton, in March, a fire occurred which destroyed a large frame barn, wagon sheds, granaries and two mules.

A second fire occurred at this mine in October, when the new barn, which had been built to replace the one burned in March, together

with about $800 worth of hay and a quantity of corn and other feed was destroyed. This fire occurred during the day, when all the mules and horses were being worked in the mine, and as a consequence, no animals were lost. The total loss incurred by reason of the two fires is estimated at about $2,700. The origin of the fire, in both instances, is unknown.

At about ten o'clock a. m., on April 2d, fire was discovered in the weigh-room at the Phoenix No. 1 Mine. The mine being idle at the time, and there being but few persons about the plant, the fire had gained such headway when discovered, that it was found impossible to do anything except to save the engine, boiler and dynamo rooms, which was done with much difficulty. The head-frame, tipple and a large coal washing plant, which had been built adjoining the tipple, together with the screens, screening machinery, scales, ropes, cages and other tipple equipment, and the machinery connected with the coal washing plant were totally destroyed.

One important feature connected with the saving of the boiler, dynamo and engine rooms in which the compressors are situate, is the fact that power for driving the machines at No. 3 and No. 5 mines and also the haulage at No. 5 Mine is furnished from the No. 1 Mine, thus enabling those mines to continue in operation.

After about two months' idleness, during which time the tipple was rebuilt, work was resumed at No. 1. Matters had barely been shaped up in good running order, however, when on August 7th, at about three o'clock a. m., the entire plant was destroyed by fire. The loss at this time was very great, as the plant was considered one of the most costly equipped in the State. A great deal of the machinery was a total loss, while that which was saved required extensive, as well as very expensive, repairs before being used again.

The fact that No. 3 and No. 5 were thrown idle by reason of the power plant having been destroyed caused a loss of trade, which, added to the loss of property, etc., makes the actual loss very hard to compute.

On November 8th, the fifth destructive mine fire occurred, whereby the entire surface plant at the Brazil Block No. 8 Mine, with the exception of the engine room and blacksmith shop, were destroyed. The origin of the fire is not known, although it is generally believed to have started in the boiler room. The total loss in property destroyed is estimated at $20,000. Power for driving the electric machines and motors at No. 10 and No. 11 mines was furnished from the powerhouse at No. 8, the burning of which caused those mines to be thrown idle for some time. Arrangements were made by which

power could be furnished from the No. 12 Mine until No. 8 was rebuilt. The loss in business by reason of the three mines being thrown idle will increase the total loss to several thousand dollars.

The sixth notable accident to mine property occurred in the Ingle Mine, at Evansville, about May 1st. A general squeeze, or creep, took place, on account of which the mine was thrown idle during May and the greater portion of June, and also causing a part of the workings to be abandoned. The creep began on the east side of the mine and extended to the west, about 1,000 feet. A large expenditure of money was required to reopen the mine.

The second accident of this kind happened at the Oswald Mine, in Gibson County, during the month of May. A squeeze covering about 2,000 square yards came on the first and second south entries on the east side of the mine, completely shutting off all the workings on those two entries for a period of about four months. An expense of about $600 was entailed to reopen and repair the entries and air course.

Another similar accident occurred in the Hector Mine, Vigo County. On his inspection made May 29th, Mr. Dodds reports a very heavy squeeze as having taken place on the north side of the mine. Much narrow work was required in driving around it in order to secure ventilation.

But one fire of any consequence in the interior of mines was reported. This occurred at the Caledonia Mine, Sullivan County, in the latter part of September. The coal in one of the entries in the north side of the mine in some way (presumably from a shot) caught fire. The company has been to a very large expense in trying to extinguish it, but up to the present time has been unable to do so.

At the Nickelplate Mine, near Ehrmandale, Vigo County, on October 1st, one of the cylinder boilers exploded, completely wrecking three other boilers, hoisting machinery, engine and boiler house and blacksmith shop. Very fortunately, no persons were injured, although there were several at work within 100 feet of the boiler when it gave way.

EXAMINATIONS.

Examinations of applicants to qualify as mine bosses, fire bosses and hoisting engineers were held at three different times within the past year, with results as shown by the annexed table:

TABLE.

PLACE.	DATE.	NUMBER OF APPLICANTS.			PASSED.		
		M. B.	F. B.	H. E.	M. B.	F. B.	H. E.
Terre Haute..	April 3d.....	29	0	40	23	0	21
Evansville....	August 6th....	12	0	14	9	0	11
Terre Haute...	November 29th	16	2	18	10	1	15
	Total,..... ...	57	2	72	42	1	47

We give herewith the names and addresses of those who qualified and received certificates at the above examinations:

MINE BOSSES.

Name and Address.	*Per Cent.*
G. W. Knight, Terre Haute, Ind.	95
David H. Williams, Rosedale, Ind.	78
Daniel E. Davis, Linton, Ind.	79
William Stevens, Linton, Ind.	77
Ira C. Dalrymple, Silverwood, Ind.	81
Joseph Barker, Cardonia, Ind.	78½
William Green, Harmony, Ind.	75½
James W. Mason, Sullivan, Ind.	75
John Hammack, Sullivan, Ind.	76
Daniel P. Bogle, Terre Haute, Ind.	94
John A. McCallum, Clinton, Ind.	82
H. G. Conrad, Edwardsport Ind.	85
Roger Maher, St. Marys, Ind.	80
William H. Woods, Princeton, Ind.	77
Charles McGuire, Burnett, Ind.	80
John A. Overton, Raglesville, Ind.	75
Emil Uhleman, Petersburg, Ind.	78
Owen Tevlin, Cannelton, Ind.	83
Call. Whitman, Cannelton, Ind.	80
W. S. Risher, Linton, Ind.	78
James A. Fielder, Sophia, Ind.	78
John Boyle, Princeton, Ind.	84
Frank Osha, Linton, Ind.	78
Edgar Forcam, Knightsville, Ind.	80
T. C. Hilliard, Sullivan, Ind.	80
Frederick George, Brazil, Ind.	79
John Kelley, Linton, Ind.	79
David Love, Linton, Ind.	78
Edward Newport, Clinton, Ind.	89
A. Hostemeyer, Ayrshire, Ind.	80
George C. Williams, Harmony, Ind.	76
Adolph Becker, Evansville, Ind.	78

Name and Address.	*Per Cent.*
Moses Yemn, Brazil, Ind.	80
Hugh Bennett, West Terre Haute, Ind.	78
John Davidson, Lyford, Ind.	88
Edward Davis, Rockville, Ind.	80
H. C. E. Jaensch, Burnett, Ind.	78
John Jenkins, Brazil, Ind.	90
E. B. Rouse, Burnett, Ind.	90
James Johnson, Clinton, Ind.	76
John E. Jones, Linton, Ind.	80
James Hurley, Linton, Ind.	90
Samuel C. Watts, Burnett, Ind.	76

FIRE BOSSES.

John Patton, Lyford, Ind.	80

HOISTING ENGINEERS.

Otis B. Lyder, Clinton, Ind.	76
James Devonald, Burnett, Ind.	77
John W. Squires, Jasonville, Ind.	89
George G. Thomas, West Terre Haute, Ind.	80
John Gilmour, Cardonia, Ind.	80
Thomas N. Walker, Bicknell, Ind.	89
A. S. Gill, Linton, Ind.	81
Morton Grimes, Arthur, Ind.	85
Portman Davis, Ayrshire, Ind.	84
Preston Usrey, Linton, Ind.	85
Charles A. Davis, Winslow, Ind.	85
Charles Arthur, Jackson Hill, Ind.	75
Otto Vaughn, Linton, Ind.	76
George Lyda, Clinton, Ind.	82
Harry L. Miller, Clay City, Ind.	77
Joseph Combs, Linton, Ind.	77
C. E. Crowder, Burnett, Ind.	78
Samuel McClain, Coal Bluff, Ind.	81
Howard Bolin, Coal Bluff, Ind.	80
L. V. Ferguson, Marco, Ind.	78
Leo Brush, Campbell, Ind.	82
John McAtee, Montgomery, Ind.	80
Malcolm T. Wilson, Brazil, Ind.	87
Cassius C. Buck, Lena, Ind.	79
Arch. Cummins, Jasonville, Ind.	84
William Layman, Dugger, Ind.	89
Nathan G. Squire, Linton, Ind.	87
George Pirkle, Ayrshire, Ind.	79
Joe Davis, Sophia, Ind.	90
John Smith, Oakland City, Ind.	80
Riley West, Oakland City, Ind.	77

Name and Address.	*Per Cent.*
C. R. Wiggs, Oakland City, Ind.	77
George Sharitz, Linton, Ind.	93
Oscar B. Roark, Linton, Ind.	85
Herbert Stewart, Burnett, Ind.	89
Winfield E. Dickey, Dugger, Ind.	79
J. M. Shumaker, Farmersburg, Ind.	79
Alvah Hansel, Diamond, Ind.	83
Claude E. Williams, Seeleyville, Ind.	80
Herman Berry, Wheatland, Ind.	82
Charles W. Decker, Washington, Ind.	80
Alvan Chaney, Linton, Ind.	80
William Lucas, Lyford, Ind.	78
W. F. Cummins, West Terre Haute, Ind.	84
Elmer Herr, Clay City, Ind.	80
John Smith, Linton, Ind.	76
C. W. Dixon, Linton, Ind.	86

CERTIFICATES SECURED BY RIGHT OF SERVICE.

Twenty-six service certificates were granted during the year, classed as follows: Mine boss, 16; fire boss, 2; hoisting engineer, 8. Following are the names and addresses of persons to whom such certificates were issued:

MINE BOSSES.

Robert Bensinger, Chandler, Ind.	Enoch Atkinson, Edwards, Ind.
C. W. Edmonson, Jackson Hill, Ind.	Richard Morgan Carbon, Ind.
Mark Wilson, DeForrest, Ind.	Ed. Davis, Ehrmandale, Ind.
Edward Hancock, Sullivan, Ind.	George Ruddock, Perth, Ind.
Marion W. Miller, Brazil Ind.	Hansford Eller, W. Terre Haute, Ind.
Joseph Gibson, Evansville, Ind.	S. P. Douglass, W. Terre Haute, Ind.
Chas. Chesterfield, Brazil, Ind.	J. B. Litell, Linton, Ind.
James Morgan, Mecca, Ind.	Harvey Wonder, Linton, Ind.

HOISTING ENGINEERS.

Daniel Bunting, Vincennes, Ind.	Sylvester Winningham, Seeleyville, Ind.
Charles Mooney, Carbon, Ind.	J. N. Burns, Boonville, Ind.
Jay McKee, Clay City, Ind.	Harry Burke, W. Terre Haute, Ind.
Jesse Shannon, Clinton, Ind.	W. D. Evans, Brazil, Ind.

FIRE BOSSES.

David Harrison, Clinton, Ind.	I. H. Woolley, Shelburn, Ind.

As stated in my report for 1899, my predecessor, Robert Fisher, held an examination at Brazil in February of that year. The result of that examination, together with numerous other papers, were not

turned over to me. As a consequence, the results of such examination were not reported in 1899. Since that time, however, I have ascertained the names of some of those who qualified at that examination, and I give herewith their names and addresses:

MINE BOSSES.

James Barr, Brazil, Ind.	Robert Bennie, Clay City, Ind.
Allan N. Walker, Brazil, Ind.	Charles Long, Brazil, Ind.
William Langman, Coal Bluff, Ind.	Wm. Arkiss, Coal Bluff, Ind.
Thos. Currie, Diamond, Ind.	Wm. Rosser, Diamond, Ind.
John Krickter, Brazil, Ind.	A. McTavish, Linton, Ind.

MINE FOREMAN'S EXAMINATION.

HELD AT TERRE HAUTE, INDIANA, NOVEMBER 29, 1901.

The answers to these questions as here given appeared originally in the March issue of the Mines and Minerals, of Scranton, Pa., for which they were prepared by Prof. J. T. Beard, Principal of the Coal Mining Course, of the International Correspondence Schools, of Scranton, Pa.:

Question 1.—Name the different capacities in which you have been employed at each class of work.

Question 2.—Describe in detail the plan of workings, methods of ventilation, arrangement and construction of haulage roads at one of the most successfully operated mines in which you have been employed.

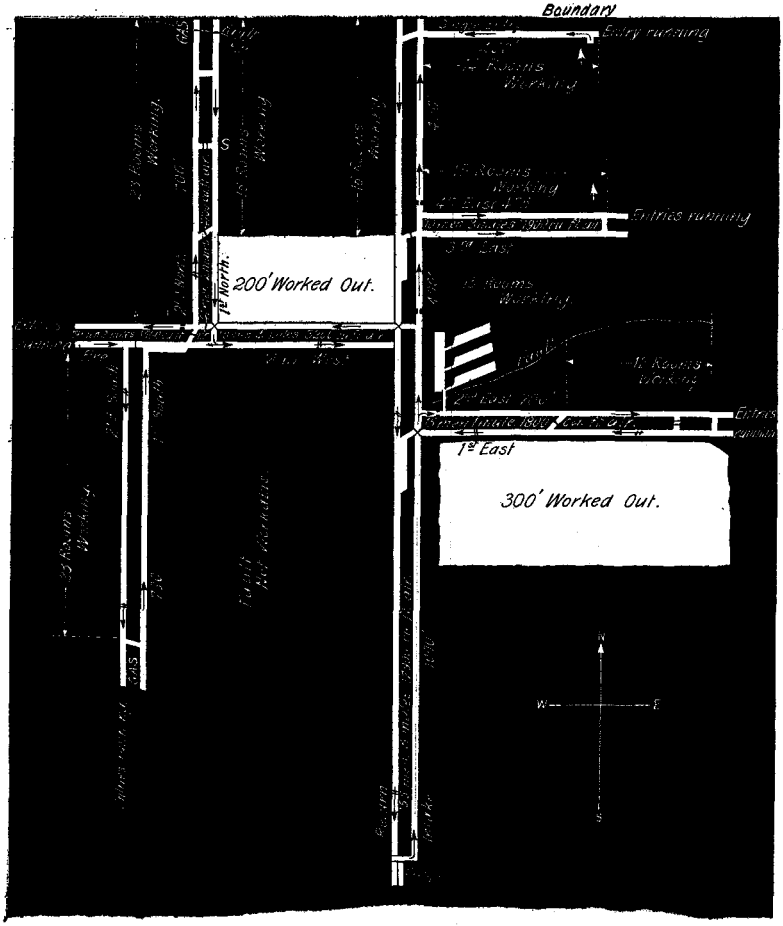
Answer 2.—A brief description of coal mining in Indiana, including a general plan of the workings of the Brazil Block Coal Company's No. 8 Mine, will be found on page 202, Mines and Minerals, for December, 1899, and page 246, January, 1900.

Question 3.—What are the laws in Indiana relative to the ventilation of coal mines?

Answer.—Section 14 of the Indiana Mining Law relating to the ventilation of mines reads as follows:

(14) That the owner, operator, agent or lessee of any coal mine, whether shaft, slope or drift, shall provide and maintain hereafter for every such mine a sufficient amount of ventilation, affording not less than one hundred (100) cubic feet per minute for each and every person employed, and three hundred (300) cubic feet per minute for each mule, horse or other animal used in said mine, measured at the foot of the downcast, and as much more as the circumstances may require, which shall be forced and circulated around the main entries, cross entries and working places throughout the mine, so that said mine shall be free from standing gas of whatsoever kind to such an extent that the entire mine shall be in a fit state at all times for men to work therein, and which will render harmless all noxious or dangerous gases generated therein. Every place where fire damp is known, or supposed to exist, shall be carefully ex-

amined with a safety lamp by a competent fire boss immediately before each shift, and in making said examination, it shall be the duty of the fire boss at each examination to leave at the face of every working place examined evidence of his presence, and it shall be unlawful for any miner to enter any mine or part of a mine generating fire damp until it has been examined by the fire boss, as aforesaid, and reported by him to be safe. The ventilation required by this act may be provided by any suitable appliance, but in case a furnace be used for ventilation purposes, it shall be built in such a manner so as to prevent the communication of fire to any part of the works by lining the upcast with incombustible material for a sufficient distance up from the said furnace.

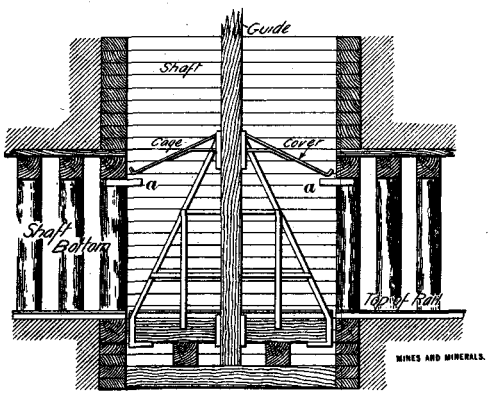


Question 4.—Copy sketch of mine as shown on blackboard. The rooms in the mine are to be driven twenty feet wide, leaving ten-foot pillars, with entry pillars twenty-one feet thick. The number and length of each entry being given, and worked out territory being shown, how many persons can be employed in the mine, using all available space and working one person in each room and entry? Use the signs given on blackboard and indicate where mine doors, brattices, overcasts and regulators should be placed, in order that the mine may be ventilated in compliance with the law. Also indicate the number of persons on each current, and the minimum quantity of air required by law.

Answer.—The rooms being thirty feet, center to center, and driven both ways off each pair of entries, assuming that no room is turned closer than twenty yards from the face of the entry, the number of persons employed in the entire mine under the conditions named will be 155, disposed of as follows: One hundred and forty-three miners and entrymen, eight drivers, two company men, one cager and one boss. Using the signs given, we have indicated in the plan of the mine the respective location of doors, brattices, overcasts and regulators to comply with the mining law. The number of men and mules employed on each current is indicated at the mouth of the split, as also the minimum quantity of air required by law to be circulated in such split. The two company men, cager and boss are added in the third and fourth E Split (they could have been added to any other split) to make the total quantity of air correspond to the total men and mules employed.

Question 5.—The above being a one-sided shaft, you will indicate in sketch the arrangement of tracks, etc., so that the greatest number of loads may be caged at the least expense.

Answer.—We would adopt the plan described in answer to Question 10 of the Illinois Examination, page ——, Mines and Minerals, February, 1902. The general arrangement of the tracks at the shaft bottom are shown in Fig. 2. The grades suitable for such a shaft bottom are given on page 33, Mines and Minerals, August, 1898.



Question 6.—What are the different causes of mine fires?

Answer.—The most prolific source of mine fires arises from the fine coal and slack thrown into the gob, waste, or abandoned workings. The

moist heat of the strata promotes the distillation of gas from the fine coal, which permeates the waste and results finally in the ignition of the gas and coal due to the rise in temperature caused by the chemical action that takes place. When sulphur is present in the form of pyrites, chemical reaction is stronger and ignition more liable to occur. Other causes of mine fires are the explosion resulting from the ignition of a body of fire damp, or the accidental explosion of powder in kegs, ignition of gas feeders by the flame of a blast or a naked lamp, ignition of hay or straw in mine stables by contact with naked lamps, or the ignition of brattices, doors, overcasts, etc., by contact with flame. At times the ignition of the coal has arisen from the mine ventilating furnace, and frequently the ignition of the timbers or curbing of the furnace shaft has taken place from the same cause.

Question 7.—Referring to sketch on blackboard, we find the coal at the face of the first North, off of the main west entry, is on fire. (a) There being no dust or gob accumulations on the entry, what has been the probable cause of the fire? You will also notice (b) that gas is being driven off at the face of the second North entry; and (c) S is the nearest point to the fire, reached by the fire boss on the morning he discovers it. (d) Explain in full how you would direct the work of extinguishing the fire with the least danger to the workmen.

Answer.—It is probable that the gas issuing from the fault at the head of these entries was ignited by a blast fired at the time of quitting work the night before the discovry of the fire. The work of extinguishing the fire should proceed as follows: Assuming that the second North is the intake, and the first North the return of the current in this split, the stopping in the cross-cut at S should first be removed, which will cut off much of the circulation at the head of these entries. A temporary stopping should then be quickly erected upon the first North, just inside of this cross-cut. When this has been done, a second temporary stopping should be erected in the second North at a corresponding point just inside of the same cross-cut. These stoppings should be tightly sealed in order to cut off the admission of all air to the fire. A long piece of gas pipe should be left in each stopping, that can be closed with a wooden plug. The purpose of these pipes is to ascertain from time to time the condition of the atmosphere within the stoppings. The pipes should be kept plugged except when ascertaining such condition of the air. The order of erecting and sealing the stoppings is important, since an explosion would almost inevitably occur if the stopping upon the intake were to be erected and sealed before that upon the return of the current. Safety lamps should be used in the performance of the work. The fire boss or mine foreman should determine before beginning this work whether or not it is necessary to withdraw the men working upon the return current. If the flow of gas is light, this would scarcely be necessary, especially as fresh air is conducted through the cross-cut at S.

Question 8.—(a) How should cage bonnets or covers be arranged and fitted upon cages to insure the greatest amount of safety to cagers or other persons, from coal falling back into the shaft? (b) Why is a safety catch worked with a spring considered more reliable than one worked by a weight or lever?

Answer.—(a) The bonnets or covers to a cage should be arranged with a slight slope toward each end of the cage, and should be large enough to practically cover the entire cage. To protect the cager at the shaft bottom, the cage bonnets should be high enough that falling coal striking the bonnets would not be thrown directly into the entry. Suitable provision should be made against this by strong hoods at the shaft bottom fitting under the cage covers. (b) Spring safety catches are more reliable than those operated by weights or levers, because the prompt action of the spring is not influenced by the downward movement of the cage, as is the case with a weight or lever.

Question 9.—Under what conditions would it be advisable to hoist water from a mine by means of a tank in preference to pumps?

Answer.—In general, at small mines, where the amount of water to be handled is small, and the steam power is not more than is required for the hoisting engine. Also, where horse-power is employed for hoisting and no steam is at hand. At larger mines, where the amount of water is small and the output is such as can be readily hoisted in the allotted time, a tank swung below the cage is often employed for hoisting the water, since the emptying of the tank will not materially delay the hoisting. Water is also often hoisted in such tanks only at night or during the noon hour. By this means the expense of installing, operating and repairing the pumping plant is obviated and the annoyance of steam in the hoisting shaft, incident to pumping, is avoided. Tanks are particularly serviceable when the water is very corrosive, and there are a number of plants where the entire use of a shaft is for the purpose of hoisting water by means of tanks. (See Mines and Minerals, September, 1898, p. 49, The Gilbertson Shaft.)

Question 10.—(a) When would you deem it advisable to replace mules with mechanical haulage? (b) Under what conditions could one system of mechanical haulage be used to better advantage than another?

Answer.—Mule haulage should be replaced by rope haulage or motor haulage as early as the development of the mine will admit, for the reason that, excepting for very small mines, rope or motor haulage is cheaper and much more efficient than mules. Neither is the mine air vitiated, as when mules are employed. The electric companies calculate that under ordinary conditions a mine requiring six or seven mules can save money by the installation of an electric haulage system. (b) In the operation of a large plant, and especially where machines are run at the working face by air, air motors may often be employed for haulage to great advantage. The use of air is also especially adapted to gaseous mines, where electricity would be objectionable owing to the danger of the gas being ignited by the sparking of the wires. In irregular seams, where the roadways are very winding, the electric system possesses an advantage on account of its flexibility and ease of installment. Rope haulage is particularly advantageous in the smaller mines that would not warrant the outlay required in the establishment of the surface plants for the generation of compressed air or electricity. Rope haulage is also well adapted to steep inclines.

Question 11.—What quantity of air is passing through an airway six and one-half feet at the top, nine and one-half feet at the bottom and six feet high, with an anemometer reading of 300 revolutions per minute?

Answer.—Area of airway:

$$\frac{6.5+9.5}{2}\times 6=48 \text{ sq. ft.}$$

Assuming the reading of the anemometer to be sufficiently accurate without the correction that is sometimes made for the instrument, we have for the quantity of air circulating in the airway:

$$48\times 300=14{,}400 \text{ cu. ft. per min.}$$

Question 12.—A shaft bottom 16 feet wide and 200 feet long is timbered with 14x14-inch cross-bars, set two feet between centers. The roof is badly broken above, causing a great deal of weight on the bars, some of which are badly decayed. We wish to replace those with new ones of the same size. Describe in detail how you would direct such work to be done at least expense, yet insuring the safety of workmen.

Answer.—It will be necessary, in order to avoid as much as possible the falling of the roof, to place each set of new timbers in position before taking out the old set. The timbers being fourteen inches wide and set two feet, center to center, the space between them is (2x12), less 14, equals 10 inches. Before a new set of timbers can be introduced, it will be necessary to remove one set of the old timbers in order to make room for the new set. Or if this can not be done without causing a fall, it would be better to wedge two of the old sets apart a sufficient distance to permit a new set of timbers being placed between them. When this has been done, one of the old sets of timbers next adjoining may then be removed carefully, so as to cause as slight a fall of the loose material above the timbers as possible. It will now be possible to place another new set of timbers in position, after which a second set of the old timbers is carefully removed, as before. In this manner the work proceeds until the retimbering is complete.

Question 13.—The main air course in the above mine is adjacent to some very extensive old workings from which large quantities of blackdamp escape into the airway. Describe in full how brattices should be constructed to prevent this.

Answer.—Beginning at the foot of the downcast shaft or at the mouth of the intake, or the nearest point thereto at which the difficulty occurs, an air-tight brattice should be constructed by setting a line of posts, say from twelve to eighteen inches from the rib separating the airway from the old workings. The brattice is closed to the airway throughout its entire length, so that no gas can find its way into the intake current. The line of brattice is carried along the rib at an equal distance from it as far as is necessary to control the escaping gas. A connection is made between the space behind this brattice and the return airway as near to the foot of the upcast shaft as possible, by constructing a box or overcast of sufficient size to carry off the gas accumulating from the old workings. By this means the gas will be conducted immediately into the return current.

Question 14.—(a) What are the principal sources of expense connected with mining the different coal seams in Indiana? (b) What are the different causes of accidents in mines?

Answer.—Some of the principal sources of expense in mining bituminous coal may be enumerated as follows: Dead work, such as entry driving, room turning, driving break-throughs and cleaning up falls of roof; the drainage, ventilation and timbering of the mine, the movement of the coal from the face to the tipple and loading, including maintenance of roads and cost of repairs of rolling stock; management, office expense, company men, mine supplies, royalties upon coal, marketing the coal, strikes and other delays, interest upon investment, etc. (b) The principal causes of mine accidents in all coal mining in the order of their importance may be classed under the following general heads: Falls of roof and coal, explosions of gas or powder, accidents in hoisting or haulage, mine fires, falling down shafts, boiler explosions, caught in machinery.

Question 15.—The owner of a certain mine intends sinking a shaft to be used as a second outlet or manway. The shaft will be 6x8 ft. in size, and 95 feet deep; the strata to be sunk through is as follows: Fifteen feet of hard pan, forty-five feet of sandstone, thirty-five feet of gray slate. Which do you think would be the cheaper method—to sink it from the top, or drift it up from the bottom? Give reasons in full for preference, showing advantages and disadvantages of each plan; also preliminary work to be done before breaking ground, and method by which you would conduct such work.

Answer.—The comparative cost of sinking or uprising will depend upon the conditions. In upraising, the material excavated must be stowed in abandoned workings, or be transported to the foot of the shaft and hoisted to the surface. The operation of upraising, considered by itself, is in general cheaper than that of sinking, for the reason that the material is handled by gravity; pumping is done away with, lighter shots are required in the work of excavation, but the disposal of the material will add very largely to the expense of upraising if this can not be done near at hand in the mine workings. The advantages in favor of sinking are that the disposal of the material excavated is effected at the surface; there is less delay in clearing the smoke when blasting than in the operation of upraising and the ventilation is easier. The preliminary work necessary to be done in sinking before breaking ground, and the method of conducting such work, is fully described in answer to Question 6, page 280, Mines and Minerals, January, 1902.

Question 16.—Again referring to sketch on blackboard, you will notice the mine surveyor has set his stations 200 feet apart, as marked on the sides of the entries. The coal seam is five feet thick, with good roof and a hard bottom, the mine is dry, and two-ton mine cars are used, the north and east entries have a fall of 1½ per cent. grade in favor of the loaded cars, while the south and west entries dip with about the same per cent. of grade against the loads. We wish to install two electric traction motors of eight tons each. Using the stations marked on the sides of the entries and the numbers of the entries, state where you would place your turnouts or your double partings to get best results of motor haulage; the number of mules used in each section of the mine; the weight of iron per yard; size and distance apart of ties used in constructing motor roads, and the number of tons of mine run coal per day this mine should produce, worked to its full capacity. How many mules will the motors displace?

What will be the amount of saving per day to the company by the use of motor haulage?

Answer.—For the present development of the mine, turnouts should be provided, as shown in Fig. 1, on the Main N, at the mouths of the 1st E and the 3d E entries; and on the Main W at the mouth of the 1st S entry. We give below Table 1, showing the number of rooms, tonnage, length of haul and ton-feet of haul for mules before motors are employed, and Table 2, showing the length of haul and ton-feet of haul for mules and motors after the latter are introduced. Before the introduction of motors, mules hauled the coal to the bottom of the shaft, but later mules hauled the coal to the nearest side parting or turnout, from which motors hauled it to the bottom of the shaft.

TABLE I.

Mule Haulage.

ENTRIES.	ROOMS.	TONNAGE.	LENGTH (ft.) OF HAUL.	TON-FEET OF HAUL.
2d E	12	48	1,500	72,000
3d and 4th E	30	120	1,700	204,000
5th E	14	56	2,100	117,600
Main N	16	64	1,700	108,800
1st N	16	92	2,100	134,400
2d N	23	92	2,000	184,000
2d S	23	92	2,100	193,200
Totals	134	536	.....	101,400

TABLE II.

Motor Haulage.

ENTRIES.	MULE HAUL.		MOTOR HAUL.	
	LENGTH (ft)	TON-FEET.	LENGTH (ft)	TON-FEET.
2d E	600	28,800	900	43,200
3d and 4th	300	36,000	1,400	168,000
5th E	700	39,200	1,400	78,400
Main N	300	19,200	1,400	89,600
1st N	600	38,400	1,500	96,000
2d N	400	36,800	1,600	147,200
2d S	400	36,800	1,700	156,400
Total	.....	235,200	.....	778,000

The work of an average mine mule upon level roads will vary from five to six ton-miles per hour. (See answer to Prize Contest Question 652, page 408, Mines and Minerals, April, 1901.) The maximum economic grade for mule haulage may also be stated as not exceeding, say 3 per

cent. (See above references, and answers to Question 24, page 184, Mines and Minerals, November, 1900.) Assuming in this case an average of four ton-miles per hour per mule, or, say, 21,000 ton-feet per hour per mule, we observe that the number of mules required to perform the above work before motors are used would be, adding 50 per cent. for the dead weight of cars, and assuming 10 hours per day $\frac{1014000 \times 1.5}{10 \times 21000} = 7.2$, say eight mules. The mules required after motors have been installed in this mine will be $\frac{235200 \times 1.5}{10 \times 21000} = 1.68$, say 2 mules. Before the introduction of motors, the work will be distributed about as follows:

2d E	5	mule-hours
3d and 4th E	14.5	mule-hours
5th E	8.5	mule-hours
Main N	7.5	mule-hours
1st N	9.5	mule-hours
2d N	13	mule-hours
2d S	14	mule-hours
Total	72	mule-hours

After the introduction of motors, the work of the entire mine will practically be divided into two sections, that upon the Main N and the East entries forming one section, and the Main W, with its North and South entries, forming the other section. One mule will be required to perform the district haulage in each of these sections.

It would be hardly practicable or economical to install two motors in this mine, since one light motor, weighing, say 5,400 pounds, with a 700-pound drawbar pull, and having a speed of six miles per hour, will readily perform the entire work of the mine. Such a motor will haul three cars of the size mentioned upon these grades. With this trip the net work of the motor, if running all the time at a speed of six miles per hour, would be 6x6=36 ton-miles per hour; but reducing this to 16-ton-miles per hour to allow for delays, changing of cars, etc., we have, for the net work of the motor 16x5,280=84,480 ton-feet per hour, or 844,800 ton-feet per day, which is considerably above the work required (778,800 ton-feet per day), as shown in Table 2. The minimum size of iron allowed for this size motor (5,400 pounds) is ten-pound iron, placing the ties, which should be five-inch oak ties, twelve inches center to center. On account of the weight of the iron cars carrying a net load of two tons each, we would prefer to use not less than sixteen-pound iron, with ties placed eight inches, center to center, as before. We have assumed an average output of four tons mine-run coal per day per miner, working one man in each room, and having one helper or loader. Since there are 134 rooms in the mine (Table 1), the total output upon this assumption would be 134x4=536 tons mine-run coal per day. The installment of motor haulage in the mine will replace 8-2=6 mules.

Cost of Mule Haulage. To ascertain the saving by the use of motor haulage as compared with mule haulage, we estimate as follows: In mule

haulage employing eight mules, it will be necessary to keep at least ten mules in the stable to provide against emergency. The value of these mules may be assumed as approximately 10x$100=$1,000. It is customary to estimate a depreciation in mule stock of 25 per cent. per annum, which must be added to the cost of maintaining the mules in the pit, and the cost of drivers. These items, except the last, are continuous every day of the year, and must be reduced to a basis of, say 200 working days per year; thus,

Depreciation and Interest on Mules 25%, $\frac{1000 \times .25}{200} = \$1.25$

Feed, 10 mules at .25 = $2.50
Attendance - - - = 1.50
$4.00 per day

and $4.00 $\times \frac{360}{200} = 7.20$

Harness and repairs - - - - say $40 per year, $\frac{40}{200} = .20$

8 drivers - - - - - - - - - - - - - - - at $1.75 = 14.00

Total Cost of Mule Haulage - - - - - - - - - - = $22.65

Cost of Electric Haulage.—The estimated cost of an electric plant is, say $7,000. In estimating it is customary to figure a depreciation in the cost of the plant of about 5 per cent., which must be added to the cost of operating the same, reducing as before to a basis of 200 working days; thus:

		Per Day.
Depreciation and interest 5 %	$\frac{7000 \times .05}{200}$	= $1.75
Engineer of power house		= 1.75
Motorman		= 1.75
Helper		= 1.60
Repairs ... say $200 per year,	$\frac{200}{200}$	= 1.00
Oil and Waste		= .25
Depreciation (2 mules), 25%		= .25
Feed ... $2 \times 25 \times$	$\frac{360}{200}$	= .90
Harness and repairs		= .05
2 drivers at $1.75		= 3.50
Total cost Electric Haulage		$12.80
Saving in favor of Electric Haulage $22.65—$12.80		= $9.85

Question 17.—What changes in roof, bottom and coal seam are met with when approaching a fault? What other conditions may be expected?

Answer.—This depends upon the character of the fault in question. Proximity to a fault of displacement is frequently indicated by thin spars in the coal, occurring usually in the bedding plane of the seam, and having a trend or inclination in the direction in which the slip has occurred.

Pinchouts, horsebacks, etc., are usually indicated by the roof and floor in the seam gradually approaching each other. Faults of erosion are often indicated by the presence of stones or boulders in the coal, and a gradual thinning of the seam. None of these evidences, however, can be assumed as absolute indications of faults, since they betoken disturbances which may or may not have resulted in the faulting of the strata or erosion of the seam. The local character of each seam must be studied by itself in order to be able to predict, with any accuracy, proximity to a fault. In approaching a fault, a change in the gaseous condition of the mine may often be expected; as, for example, gas or water may often be encountered upon the opposite side of a fault where they have not been found in the present working of the seam, or *vice versa* these may disappear after crossing a fault.

Question 18.—By again referring to blackboard sketch, you will notice we have between the 2d and 3d E entries a rock roll or horseback. The roll affects the coal seam and roof for about 12 feet across, and rooms when driven up to it must be renecked or driven through narrow. The price paid for such narrow work is 80 cents per foot. Explain how you would work the above section, securing all of the seam, yet piercing the roll as few times as possible.

Answer.—The cost of holing through this fault would be 12x.80=$9.60 each time that the fault was crossed. This expense should be avoided by cutting through the fault in No. 1 Room only. This room may be driven, after crossing the fault, as a wide place (14 feet wide), or if the roof is good the room may be widened out to the usual width, after crossing the fault. The road should be carried along the straight rib and the room should be turned off of the entry so as to allow of being widened *outbye* instead of *inbye*, as is customary. Other rooms should be turned off this one, upon the inbye or straight rib, after crossing the fault. These rooms may be driven upon an angle so as to parallel the fault, or they may be driven square with the first room, in which case the fault will cut off each room in turn.

Question 19.—(a) What are the State laws of Indiana relative to the use of powder in coal mines? (b) What steps would you take to enforce these laws, or detect persons who may be violating them?

Answer.—(a) The Indiana mine law provides that blasting shall not be done in working hours only when opening a new mine employing not over 20 men, and being not over 100 yards in any direction from the bottom of the shaft. In such cases blasting is permitted *twice* only, during working hours. The law also provides that the firing of shots shall begin inbye upon the entry, and that no shot shall be fired till all the persons inbye from such shot shall have passed out. The law also provides that no hole for blasting shall be drilled more than one foot past the end of a cutting or a loose end, and no hole for blasting shall be located more than five feet from a loose end, measured at right angles to the direction of the hole. It also provides that not more than eight pounds of blasting powder shall be placed or exploded in one hole. A fine of not over $100 nor less than $5, or imprisonment in the county jail not exceeding six months nor less than thirty days, is provided for the violation of this act. (b) To detect violations of the law in reference to the use of powder is a difficult matter. An exact account of the number of holes fired and the powder

used by each man may be kept, but this would only show the average charge of powder used. The only certain method is to employ a man to inspect or load the holes.

Question 20.—What particular points should receive the attention of the mine boss when making his daily rounds of the mine?

Answer. — The duties of the mine boss as required by the Indiana mining laws are as follows: He shall (1) watch ventilating apparatus and airways; (2) See that loose coal and rock on the traveling and airways are secured against falling; (3) Measure the air at the inlet and outlet and at the face of the entries once a week; (4) Keep a record of such measurements and report monthly to the Inspector of Mines; (5) Visit and examine all working places each alternate day when men are or should be at work; (6) See that sufficient timbers are kept at working places; (7) Order and direct that unsafe places be made safe when notified of them, and give written acknowledgment when he receives such notice; (8) Give immediate notice to the Inspector of Mines when a serious or fatal accident occurs at any mine in his charge.

In addition to the above duties as prescribed by law, the mine boss having first acquainted himself with the condition of the working places of the mine as indicated by the report of the fire boss, should proceed to assign to the company men or shift hands their several duties at the different points in the mine. If the ventilating apparatus, pumps and hoisting arrangements do not require his special attention at the shaft bottom, he proceeds to the inside workings and gives his attention first to the work of the drivers to see that the coal is moving properly toward the shaft. He inspects closely the timbering of the rooms and airways as he proceeds in his rounds.

Question 21.—If a fan running 50 revolutions per minute produces 25,000 cubic feet of air, what quantity will it produce if the speed is raised to 75 revolutions per minute?

Answer.—According to the usual method of calculation, the quantity ratio equals the speed ratio; thus, $\frac{x}{25000}=\frac{75}{50}=\frac{3}{2}$; or

$$x=\frac{3}{2}\times 25000=37500 \text{ cu. ft. per min.}$$

More accurately, however, the fifth power of the quantity ratio equals the fourth power of the speed ratio; thus, $\frac{(x)^5}{25000}=\frac{(75)^4}{50}=1.5^4$; or

$$x=25000\sqrt[5]{1.5^4}=34580 \text{ cu. ft. per min.}$$

TABLE

Showing Names of Mines Which Were in Active Operation on January 1, 1902, Operators and Addresses, Mine Bosses and Addresses, by Counties.

CLAY COUNTY.

MINE.	OPERATOR.	ADDRESS.	MINE BOSS.	ADDRESS.
Brazil Block No. 1	Brazil Block Coal Co	Brazil	John Bolin	Brazil.
Brazil Block No. 8	Brazil Block Coal Co	Brazil	Henry Payne	Brazil.
Brazil Block No. 11	Brazil Block Coal Co	Brazil	James Burt	Brazil.
Gart No. 5	Brazil Block Coal Co	Brazil	Andrew Gilmour	Cardonia.
Gart No. 7	Brazil Block Coal Co	Brazil		
Gart No. 10	Brazil Block Coal Co	Brazil	William Rosser	Diamond.
Briar Hill	Clay City Coal Co	Chicago, Ill	Alex. Ferguson	Clay City.
Cloverland	Zeller, McClellan Coal Co	Brazil	George Donie	Cloverland.
Columbia No. 5	Zellar, McClellan Coal Co	Brazil	Mike Huffman	Asherville.
Cornwell	Jackson Coal Mining Co	Brazil	Moses Marks	Cardonia.
Crawford No. 2	Crawford Coal Co	Brazil	Walter Knox	Asherville.
Crawford No. 3	Crawford Coal Co	Brazil	William Penz	Asherville.
Crawford No. 5	Crawford Coal Co	Brazil	Grif. Howells	Center Point.
Dewey	Jackson Coal and Mining Co	Brazil	John Cox	Brazil.
Diamond No. 3	Diamond Block Coal Co	Brazil	W. G. Spears	Brazil.
Diamond No. 5	Diamond Block Coal Co	Brazil	J. C. Winn	Brazil.
Eureka No. 2	Eureka Block Coal Co	Terre Haute	Thos. G. Marshall	Carbon.
Eureka No. 3	Eureka Block Coal Co	Terre Haute	John T. Summers	Carbon.
Eureka No. 4	Eureka Block Coal Co	Terre Haute	John A. Boling	Carbon.
Fortner	C. Ehrlich	Turner	E. L. Tibbetts	Turner.
Gifford	Collins Coal Co	Brazil	August Norkus	Brazil.
Gladstone	Brazil Mining Co	Chicago, Ill	Oran Long	Coal Bluff.
Klondyke	C. Ehrlich Coal Co	Turner	Jacob Ehrlich, Sr	Staunton.
Monarch	American Clay Manufacturing Co	Brazil	James A. King	Brazil.
Pearl	Cloverland Coal Mining Co	Cloverland	M. D. West	Cloverland.
Pratt	Coal Bluff Mining Co	Terre Haute	H. W. Jenkins	Perth.
Glen	Coal Bluff Mining Co	Terre Haute	H. W. Jenkins	Perth.
Rob Roy	Andrew Coal and Mining Co	Brazil	James Andrews	Brazil.
Silverwood No 3	Indiana Bituminous Coal Co	Terre Haute	William Myers	Turner.
Crawford No. 7	Crawford Coal Co	Brazil	Samuel Lindsay	Hoosierville.
Lawrence No. 6	Zeller, McClellan & Co	Brazil	Fred George	Harmony.

DAVIESS COUNTY.

MINE.	OPERATOR.	ADDRESS.	MINE BOSS.	ADDRESS.
Cabel No. 4	Cabel & Co	Washington	Anthony Kocher	Washington.
Cabel No 9	Cabel & Co	Washington	Anthony Kocher	Washington.
Hoosier No 4	Raglesville Coal Co	Raglesville	Grant Stoy	Raglesville.
Montgomery No 2	Daviess County Coal Co	Montgomery	J. H. McKenna	Washington.
Montgomery No. 3	Daviess County Coal Co	Montgomery	Thos. Small	Washington.
Mutual	Mutual Mining Co	Cannelburg	Daniel Davis	Cannelburg.
Black Diamond	Black Diamond Coal Co	Washington	Henry Osha	Washington.
Union	J. M. Winkelpleck	Raglesville	A. W. Stuckey	Raglesville.
Logan Grove	Wilson Bros	Washington	Simeon Grill	Washington.

FOUNTAIN COUNTY.

Silverwood No. 4	Indiana Bituminous Coal Co	Terre Haute	William Dalrymple	Silverwood.

GIBSON COUNTY.

Oswald	Princeton Coal and Mining Co	Princeton	James Anderson	Princeton.

GREENE COUNTY.

Gilmour	Southern Indiana Coal Co	Chicago, Ill	James Stewart	Jasonville.
Black Creek	Black Creek Semi-Block Coal Co	Linton	Reuben Small	Linton.
Fluhart	Linton Coal and Mining Co	Linton	James Dunn	Linton.
Hoosier	Hoosier Coal Co	Bloomfield	Michael King	Linton.
Island No. 1	Island Coal Co	Indianapolis	S. C Risher	Linton.
Island No. 2	Island Coal Co	Indianapolis	John Eddy	Linton.
Island Valley No. 1	Island Valley Coal Co	Linton	Joseph Fennel	Linton.
Island Valley No. 2	Island Valley Coal Co	Linton	Geo. Epperson	Linton.
Island Valley No. 3	Island Valley Coal Co	Linton	Peter May	Linton.
South Linton	South Linton Coal and Mining Co	Linton	William James	Linton.
Summitt Nos. 1 and 2	Summitt Coal Co	Bloomfield	Thos. McQuade	Bloomfield.
Templeton	Western Indiana Coal Co	Terre Haute	John A. Templeton	Linton.
Wild Cat	L. T. Dickason Coal Co	Chicago, Ill	Thomas Thomas	Linton.
Midland	Midland Coal Co	Jasonville	Wm. Davidson	Jasonville.
Victoria	Victoria Coal and Mining Co	Linton	Frank Lockhart	Linton.

KNOX COUNTY.

Bicknell	Bicknell Coal Co	Bicknell	R. M. Freeman	Bicknell.
Edwardsport	Vulcan Coal Co	Indianapolis	Harvey Conrad	Edwardsport.
Knox	Knox Coal Co	Bicknell	Chas. Harting	Bicknell.
Prospect Hill	Sugar Loaf Coal and Mining Co	Vincennes	Frank Freeman	Vincennes.
Lynn	Lynn Coal Co	Bicknell	W. H. Lynn	Bicknell.

PARKE COUNTY.

Anthony	George Anthony	Fontanet	George Anthony	Fontanet.
Brazil Block No. 12	Brazil Block Coal Co	Brazil	R. F. Jenkins	Diamond.
Cox No. 3	Brazil Block Coal Co	Brazil	Oscar Busler	Coxville.
Lucia	Rock Run Coal Co	Montezuma	Victor Allais	Montezuma.
Lyford No. 2	Wabash Valley Coal Co	Lyford	John Mushett	Lyford.
Mary	Otter Creek Coal Co	Chicago, Ill	John Chesterfield, Jr	Brazil.
Mecca No. 1	Otter Creek Coal Co	Chicago, Ill	James Skene	Mecca.
McIntosh No. 3	I. W. McIntosh & Co	Brazil	Samuel Holden	Brazil.
Parke No. 8	Parke County Coal Co	Rosedale	George Mitch	Rosedale.
Standard	Standard Block Coal Co	Terre Haute	H. V. Sherburne	Brazil.
Superior No. 1	Zeller, McClellan & Co	Brazil	George Myers	Brazil.
Superior No. 2	Zeller, McClellan & Co	Brazil	John Chesterfield, Sr	Brazil.

PERRY COUNTY.

Troy	Bergenroth Bros	Troy	George Briggs	Troy.

PIKE COUNTY.

Aberdeen	Aberdeen Coal Co	Littles	James Fielder	Ayrshire.
Ayrshire No. 3	D. Ingle Coal Co	Ayrshire	Bart Stinson	Ayrshire.
Ayrshire No. 4	D. Ingle Coal Co	Ayrshire	W. L. Smith	Ayrshire.
Ayrshire No. 5	D. Ingle Coal Co	Ayrshire	D. Ingle, Jr	Ayrshire.
Blackburn	S. W. Little Coal Co	Evansville	John Willey	Peter-burg.
Hartwell	S. H. Wulfman Coal Co	Huntingburg	C. C. Roland	Cabel.
Littles	S. W. Little Coal Co	Evansville	Herman Rose	Littles.
Woolley	J. Woolley Coal Co	Petersburg	H. T. Brewis	Petersburg.
Rogers	S. W. Little Coal Co	Evansville	Jno. R. Willey	Petersburg.

SULLIVAN COUNTY.

MINE.	OPERATOR.	ADDRESS.	MINE BOSS.	ADDRESS.
Bunker Hill	Washington Fuel Co	Farnsworth	William Mason	Sullivan.
Caledonia	Rainbow Coal and Mining Co	Sullivan	Henry Butler	Farnsworth.
Dugger	Indiana-Chicago Coal Co	Dugger	Reese Griffiths	Dugger.
Green Hill	Green Hill Coal and Mining Co	Sullivan	William Mason	Sullivan.
Hymera	Hymera Coal Co	Hymera	Wm. Davidson	Hymera.
Ingleside	Indianapolis and Sullivan Coal Co	Dugger	C. C. Hall	Dugger.
Jackson Hill No. 2	Jackson Hill Coal and Mining Co	Terre Haute	Ed. Stewart	Jackson Hill.
Phoenix No. 1	New Pittsburgh Coal and Coke Co	Chicago, Ill	Jos. Peters	Alum Cave.
Phoenix No. 3	New Pittsburgh Coal and Coke Co	Chicago, Ill	Alex Faulds	Alum Cave.
Phoenix No. 5	New Pittsbuegh Coal and Coke Co	Chicago, Ill	Asa Roberts	Alum Cave.
Star City	Harder-Hafer Coal Co	Chicago, Ill	Simeon Woolley	Del Carbo.
Shelburn	Keystone Coal Co	Shelburn	Wm. Norton	Shelburn.
White Ash	White Ash Coal Co	Terre Haute	Wm. Britton	Hymera.
Jackson Hill No. 3	Jackson Hill Coal and Mining Co	Jackson Hill	William Evans	Jackson Hill.

VANDERBURG COUNTY.

Diamond	Diamond Coal Co	Evansville	Adolph Becker	Evansville.
First Avenue	H. A. Losier Coal Co	Evansville	Frank Guenther	Evansville.
Sunny Side	Sunny Side Coal and Coak Co	Evansville	Henry Baetz	Evansville.
Ingleside	John Ingle Coal Co	Evansville	John Odell	Evansville.
Union	Evansville Coal Mining Co	Evansville	P. Schultheis	Evansville.
Unity	Crescent Coal Co	Evansville	Fred Sutheimer	Evansville.

VERMILLION COUNTY.

Crown Hill	Crown Hill Coal Co	Clinton		
Bruiletts No. 3	Bruiletts Creek Coal Co	Clinton	Geo. A. Davis	Clinton.
Bruiletts No. 4	Bruiletts Creek Coal Co	Clinton	J. C. McInnes	Clinton.
Bruiletts No. 5	Bruiletts Creek Coal Co	Clinton	F. P. Christy	Clinton.
Buckeye	McClellan, Sons & Co	Clinton	Wm. Chesterfield	Clinton.
Cayuga	Cayuga Press Brick Co	Cayuga	Robert Irving	Cayuga.
Oak Hill	Oak Hill Coal Mining Co	Clinton	Wm. Hutchinson	Clinton.
Prince	Keller Coal Co	Chicago, Ill	John Mushett	Clinton.
Torry No. 4	Torrey Coal Co	Voorhees	George Davis	Clinton.
Willow Grove	Willow Grove Co	Clinton	James Boskill	Clinton.

VIGO COUNTY.

Chicago No. 6	Big Vein Coal Mining Co	Chicago, Ill	Thos. Gregory	Fontanet.
Rose Bud	Seelyville Coal and Mining Co	Seeleyville	Wm. Gray	Seeleyville.
Brick Works	Terre Haute Brick and Pipe Co	Terre Haute	J. F. Irwin	Terre Haute.
Broadhurst	H. Burke & Co	W. Terre Haute	Wm. L. Erwin	W. Terre Haute.
Diamond	Coal Bluff Mining Co	Terre Haute	...	
Ehrlich	J. Ehrlich Coal Co	Seeleyville	John P. Acree	Seeleyville.
Grant No. 2	Grant Coal Co	Burnett	James Lewis	Burnett.
Glen Oak	Glen Oak Coal and Mining Co	Burnett	Ed. Jaensch	Burnett.
Hector	Loughner Coal Co	Seeleyville	Thos. Maxwell	Seeleyville.
Nevins	Nevins Coal Co	Clinton	Thomas Clement	Burnett.
Miami	Miami Coal Co	Brazil	M. McMarrow	Brazil.
Woodland Valley	Woodland Valley Mining Co	Terre Haute	J. A. Erwin	Terre Haute.
Nickelplate	Brazil Mining Co	Brazil	C. E. Peck	Brazil.
Peerless	Coal Bluff Mining Co	Terre Haute	Chas. Nash	Burnett.
Parke No. 10	Parke County Coal Co	Rosedale	Thos. Bingham	Heckland.
Red Bird	Fauvre Coal Co	Indianapolis	R. F. Bieler	W. Terre Haute.
Ray	Vigo Coal Co	Seeleyville	George West	Seeleyville.
Royal	Seeleyville Coal and Mining Co	Seeleyville	John Scott	Seeleyville.
Union	Coal Bluff Mining Co	Coal Bluff	Jas. Johnson	Fontanet.
Vigo	Meneely Bros	Ehrmandale	Ed. Davis	Ehrmandale.
Larrimer	Peter Krachenberger	W. Terre Haute	Josiah Hodges	W. Terre Haute.
Lawton	Coal Bluff Mining Co	Terre Haute	Jas. Devonald	Burnett.

WARRICK COUNTY.

Air Line	T. B. Hall & March	Chandler	T. B. Hall	Chandler.
Big Four	Big Four Coal Co	Boonville	Jno. E. Kelley	Boonville.
Big Vein	J. Woolley Coal Co	Evansville	Louis Schultz	Boonville.
Caledonia	Caledonia Coal and Mining Co	Boonville	L. M. Gaisser	Boonville.
Chandler	J. A. Bryan	Evansville	Wm Huber	Evansville.
DeForrest	Chas. Menden	Evansville	M. Wilson	DeForrest.
Star No. 1	Jno. Archbold Coal Co	Evansville	G. F. Archbold	Newburg.

TABLE

Showing Names and Addresses of Persons Operating Small Mines in Indiana, the Number of Persons Employed Therein, the Tons of Coal Mined and Wages Paid at Each Mine Reported, During the Year 1901.

CLAY COUNTY.

Operator.	Address.	Number of Persons Employed.	Tons of Coal Mined.	Wages Paid.
Anderson & Brown	Brazil		(No Report.)	
Whitmarsh & Price	Cardonia	16	3,800	$3,940 00
Total		16	3,800	$3,940 00

DAVIESS COUNTY.

Raglesville Coal Co	Raglesville	9	1,933	$2,590 65
Burke Bros	Washington	6	5,614	2,083 28
A. M. McClintick	Washington		(No Report.)	
Mandaback Bros	Washington	6	550	
Raglesville Standard Coal Co	Raglesville	10	1,400	945 00
Total		31	9,497	$5,618 93

FOUNTAIN COUNTY.

Tilley & Son	Silverwood	1	656	$440 00
Total		1	656	$440 00

GREENE COUNTY.

Kates & Holder	Lyons	4	2,832	$2,150 00
Robertson Bros	Linton	11	4,000	1,225 00
Robertson Bros	Linton	8	5,800	3,400 00
James Dunn	Linton	7	5,200	4,400 00
Total		30	17,832	$11,175 00

GIBSON COUNTY.

Ross Herbert	Oakland City	4	100	
James Johnson	Oakland City	6	1,708	$2,000 00
Total		10	1,808	$2,000 00

OWEN COUNTY.

Schor & Thomas	Patricksburg	8	1,508	$600 00
Total		8	1,508	$600 00

KNOX COUNTY.

Operator.	Address.	Number of Persons Employed.	Tons of Coal Mined.	Wages Paid.
Bensinger & Marty	Freelandsville	4	1,015	$625 00
Caldwell & Curry	Rockville	10	2,200	1,910 00
Total		14	3,215	$2,535 00

PIKE COUNTY.

William Sargins	Winslow	3	100	$240 00
C. Myers	Winslow	4	500	
W. H. Fitenger	Winslow	3	1,200	1,050 00
Total		10	1,800	$1,290 00

SULLIVAN COUNTY.

L. S. Eaton	Sullivan	5		
Total		5		

VIGO COUNTY.

Jesse Winn		8	303	$275 00
William Harkes	Coal Bluff	1	500	
Bennett Bros	W. Terre Haute	9	4,000	
John Jones	Terre Haute	10	4,180	3,492 00
George Koch	Coal Bluff	6	2,200	1,600 00
Total		40	11,183	$5,367 00

VERMILLION COUNTY.

Wm. Hustowne		9	2,500	
Thos. Williams	Cayuga	9	3,680	$3,080 00
Total		18	6,180	$3,080 00

WARRICK COUNTY.

Sargeant Bros	Newburg	9	4,950	$4,150 00
Louis Stock	Boonville	6	2,711	1,355 50
Total		15	7,661	$5,505 50
Grand total		198	67,140	$41,551 43