

TENTH BIENNIAL REPORT

OF THE

STATE MINE INSPECTORS

TO THE

GOVERNOR OF THE STATE OF IOWA

FOR THE

TWO YEARS ENDING JUNE 30, 1901.

JAMES A. CAMPBELL, District No. 1; JOHN VERNER, District No. 2;
JAMES W. MILLER, District No. 3.

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JOHN VERNER, *Second District*, Oskaloosa.
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BIENNIAL REPORT
OF THE
FIRST DISTRICT,

EMBRACING

Appanoose, Davis, Jefferson, Monroe, Page, Taylor, Van
Buren, Wapello and Wayne Counties.

JAMES A. CAMPBELL, INSPECTOR.

LETTER OF TRANSMITTAL.

To the Hon. Leslie M. Shaw, Governor of Iowa:

SIR—I have the honor, in compliance with the mining laws of Iowa, to submit to you herewith my biennial report for the two years ending June 30, 1901.

In it will be found tabulated statements giving number of mines, and number of miners and other employees, also the amount paid the same, number of tons of coal produced, number of fatal and non-fatal accidents, number of new mines and abandoned mines, and all improvements made in the district, and other information I deemed of importance to incorporate.

Respectfully,

JAS. A. CAMPBELL.

REPORT OF FIRST DISTRICT.

In the First district there are nine coal producing counties, namely: Appanoose, Davis, Jefferson, Monroe, Page, Taylor, Van Buren, Wapello and Wayne. They are located in the southeastern, southern and south western part of the state. Van Buren and Jefferson counties on the east, and Page on the west, are the extremities of the district. The counties in this district producing the largest output of coal are Monroe, Appanoose, Wapello, and Wayne. The mines in general have been working more steadily than heretofore, giving employment to more men, owing to a greater demand for coal and the opening of new mines, which has placed the district in a prosperous condition.

In the last two years there have been eighteen fatal and thirty-four non-fatal accidents in the district.

There has been a number of drills prospecting in the different parts of the district for the last eighteen months.

During the last two years there have been twenty-seven new mines opened. Most all of them are equipped with the latest improvements for ventilating and handling the coal. The new mines are located as follows: Wapello Coal Co. No. 3, near Hiteman; Consolidated Coal Co. Nos. 10 and 11, two and one-half and three miles southwest of Buxton; Smoky Hollow Coal Co. No. 6, five miles southeast of Hynes City; Hocking Coal Co. No. 2, near Hocking; St. Paul Coal Co., near Hilton; Frederick Coal Co., near Avery; White Ash Coal Co., near Hynes City; Star Coal Co. No. 2, near Albia; Thistle Coal Co. No. 2, two miles east of Cincinnati; Artic Coal Co., near Mystic; Columbia Coal Co. No. 3, near Diamond P. O.; Browning Coal Co. No. 2, New Market; Ingram Coal Co., two and one-half miles southwest of Clarinda; Anderson Coal Co. No. 2, two and one-half miles east of New Market; Chicago Coal Co. No. 2, two miles east of Seymour; Bear Creek Coal Co., four miles east of Ottumwa; Eldon Coal and Coke Co., two miles southwest of Eldon; Lunsford Coal Co., eight miles south of Bloomfield; Finley Coal Co. and Carson Coal Co., near Douds; Perlee Coal Co., near Perlee; Drake Coal Co., three miles east of Exline; Mystic Coal Co. No. 2, Mystic.

Five mines were abandoned—Smoky Hollow Coal Co. No. 5, near Hynes City; Browning Coal Co. No. 1, near New Market; Darby Block Coal Co., near Darbyville; Finley Coal Co. and Carson Coal Co., near Douds.

Fires have occurred at five different mines, as follows: The Appanoose Coal Co.'s top plant, at Cincinnati; Consumers' Coal Co., top works, at Jerome; a part of the top works of the Merchants' Coal Co. mine at Cincinnati; the smokestack and timber in airshaft all burned at Centerville Block.

Coal Co's. mine No. 5, at Brazil; and the Machine and Blacksmith shops at the Deep Vein Coal Co's. mine at Foster.

During the last two years there have been forty-eight sets of scales inspected. Thirty-one were found weighing correctly, and seventeen were found deficient. They were adjusted and made to weigh correctly, giving satisfaction to all concerned.

TABLE No. 1.

Showing the number of mines, out-put of coal, number of miners and other employes, etc., in District No. 1, for the year ending June 30, 1900.

NAME OF COUNTY.	Number of miners.	Number of tons of coal all grades produced.	Number of miners employed.	Number others employed.	Total amount paid miners, including yardage room turning, etc.	Total amount paid others including cost of supervision.	Value props, lumber, tracking, etc.	Cost of improvements made during year, including air and escape shafts.	Average price paid for mining lump coal.	Average price paid for mining mine run coal.
Appanoose.....	75	645,403	1,833	585	\$ 568,283	\$ 182,114	\$ 46,666	\$ 10,312	.87	.75
Monroe.....	18	641,928	1,148	516	392,924	236,351	32,559	22,952	.86	.513
Wapello.....	20	206,620	483	186	197,380	76,000	14,775	6,700	.80	.52
Wayne.....	6	48,800	125	31	35,480	11,800	1,550	700	.85	.....
Taylor.....	7	22,682	81	24	27,485	8,835	920	2,169	1.20	.....
Van Buren.....	4	13,368	30	13	10,720	5,446	850	595	.80	.....
Davis.....	2	5,750	40	15	4,600	1,650	350	200	.80	.....
Jefferson.....	2	4,500	22	6	3,600	1,640	300	100	.80	.....
Total.....	130	\$ 1,679,051	3,762	1,406	\$ 1,240,481	\$ 524,515	\$ 97,960	\$ 52,658	.....	.....

TABLE No. 2.

Showing the number of mines, out put of coal, number of miners and other employes, etc., in District No. 1, for the year ending June 30, 1901.

NAME OF COUNTY.	Number of miners.	Number of tons of coal all grades produced.	Number of miners employed.	Number others employed.	Total amount paid miners including yardage room turning, etc.	Total amount paid others including cost of supervision.	Value props, lumber, tracking, etc.	Cost of improvements made during year, including air and escape shafts.	Average price paid for mining lump coal.	Average price paid for mining mine run coal.
Appanoose.....	73	650,400	1,700	530	\$ 677,300	\$ 195,500	\$ 51,700	\$ 22,500	.95	.....
Monroe.....	19	937,750	1,330	618	672,570	273,255	68,300	71,400	.85	.....
Wapello.....	18	289,300	460	160	224,400	87,540	12,000	2,500	.85	.....
Wayne.....	6	50,200	137	40	53,440	15,430	16,000	800	.95	.....
Taylor.....	7	20,400	90	24	31,740	8,500	900	400	1.20	.....
Van Buren.....	6	6,500	26	9	7,300	2,900	200	150	.90	.....
Davis.....	4	4,300	21	7	5,850	1,750	150	75	.80	.....
Jefferson.....	2	1,500	17	6	4,730	1,840	150	150	.80	.....
Page.....	2	1,700	5	2	2,100	900	50	50	1.35	.....
Total.....	138	\$ 1,964,050	3,906	1,366	\$ 1,679,130	\$ 587,675	\$ 149,450	\$ 98,025	.....	.....

TABLE No. 3.

Out-put of coal of the counties comprising District No. 1 for the past five years:

COUNTIES.	1897.	1898.	1899.	1900.	1901.
Appanoose.....	372,402	421,100	444,282	645,403	650,400
Davis.....	3,120	2,900	3,300	5,750	4,300
Jefferson.....	5,000	4,000	4,500	4,500	3,500
Monroe.....	399,750	590,300	662,500	941,928	937,750
Page.....	7,250	5,050	5,085	22,682	1,700
Taylor.....	13,200	11,800	14,100	22,682	20,400
Van Buren.....	14,300	11,200	12,500	13,368	6,500
Wapello.....	152,203	236,100	291,300	299,620	289,300
Wayne.....	32,120	41,200	48,300	48,800	50,200

APPANOOSE COUNTY.

Improvements made in the mines during the last two years.

NAME OF MINE.	Air shaft.	Second opening.	Stairway.	Cover on cage.	Safety catches.	Safety gates.	Break on drum.	Fan.	Furnace.	Tram or dog.	Safety block.
Centerville, block No. 7.....	1								1		
Centerville, block No. 5.....	1								1		
Mystic Coal company.....	1								1		
Hocking Coal company.....	1								1		
Drake Coal company.....	1	1		2	2	2	1	1	1		
Dewey Coal company.....	1	1		2	2	2	1	1	1		
Jackett Coal company.....	1								1		
Menota Coal and Mining company.....	1	1	2	2	2	2	1	1	1		

MONROE COUNTY.

Wapello Coal company, No. 1.....	1								1		
Wapello Coal company, No. 3.....	1								1		
Consolidation Coal company, No. 10.....	1	1	1	2	2	4	1	1	1		
Hocking Coal company No. 2.....	1	1	1	2	2	4	1	1	1		
St. Paul Coal company.....	1	1		2	2	4	1	1	1		
Smoky Hollow, No. 6.....	1	1	1						1	1	1
Rex Coal company.....	1								1		
Fredrick Coal company.....	1	1		2	1	2	1	1	1		
Deep Vein Coal company.....	1								1		
Star Coal company, No. 2.....	1	1	2	2	2	1	1	1	1		

PAGE COUNTY.

Ingram Coal company.....	1	1		1	1	2			1		
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WAPLLO COUNTY.

Bear Creek Coal company.....	1	1							1	1	1
Fair Coal company.....	1								1		
Risher Coal company.....	1			2	2	4	1	1	1		
Eldon C. and M. company.....	1								1		
Eldon Coal and Coke company.....	1								1	1	1

TAYLOR COUNTY.

Anderson Coal company.....	1		2	2	2	1			1		
Browning Coal company.....	1		1	1	2	1			1		

AMOUNT OF COAL MINED IN IOWA SINCE 1881.

YEARS.	District No. 1.	District No. 2.	District No. 3.	Totals.
1881.....	845,600	1,426,744	900,430	3,262,774
1882.....	840,000	1,258,140	1,010,000	3,208,140
1883.....	1,099,503	1,470,024	1,413,419	3,989,946
1884.....	1,040,895	1,413,811	1,447,585	3,902,291
1885.....	1,156,224	1,231,963	1,194,409	3,582,656
1886.....	1,264,433	1,488,200	900,741	3,853,374
1887.....	1,426,841	1,645,978	791,671	3,864,490
1888.....	1,528,967	1,663,266	931,727	4,123,960
1889.....	1,395,156	1,461,518	806,664	3,662,738
1890.....	1,314,767	1,608,950	1,066,787	3,990,504
1891.....	1,136,190	1,533,469	1,051,205	3,720,864
1892.....	1,380,860	1,695,735	970,884	4,047,479
1893.....	1,097,215	1,784,900	1,132,857	4,014,872
1894.....	1,397,631	1,462,626	16,434	3,776,691
1895.....	994,054	1,347,830	853,052	3,195,936
1896.....	989,768	1,476,700	1,059,022	3,525,490
1897.....	1,025,706	1,572,240	1,201,788	3,799,734
1898.....	1,354,350	1,672,913	1,370,459	4,447,222
1899.....	1,520,467	1,873,793	1,555,050	4,949,304
1900.....	1,679,050	1,930,214	1,508,020	5,117,284
1901.....	1,964,050	1,870,123	1,607,660	5,441,833

APPANOOSE COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	SUPERINTENDENT.	POST OFFICE ADDRESS.	Shaft or slope.	PLAN OF WORKING MINE.	HOW VENTILATED.	Power used.	Shipping or local.
Centerville Block Coal Co., No. 1	Alex. Dargavell	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Centerville Block Coal Co., No. 2	Alex. Dargavell	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Centerville Block Coal Co., No. 3	Alex. Dargavell	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Centerville Block Coal Co., No. 4	Alex. Dargavell	Centerville	Slope	Long wall	Furnace	Steam	Shipping.
Centerville Block Coal Co., No. 5	Alex. Dargavell	Centerville	Slope	Long wall	Furnace	Steam	Shipping.
Centerville Block Coal Co., No. 6	Alex. Dargavell	Centerville	Slope	Long wall	Furnace	Steam	Shipping.
Centerville Block Coal Co., No. 7	Alex. Dargavell	Centerville	Slope	Long wall	Furnace	Horse	Shipping.
Centerville Block Coal Co., No. 9	Alex. Dargavell	Centerville	Shaft	Room and pillar	Fan	Horse	Shipping.
Centerville Block Coal Co., No. 10	Alex. Dargavell	Centerville	Shaft	Room and pillar	Furnace	Steam	Shipping.
Mendota Coal and Mining Co., No. 1	B. H. Johnson	Mendota, Mo.	Shaft	Long wall	Fan	Steam	Shipping.
Mendota Coal and Mining Co., No. 2	B. H. Johnson	Mendota Mo.	Shaft	Long wall	Fan	Steam	Shipping.
Anchor Coal Co., No. 1	James Wilson	Centerville	Shaft	Long wall	Fan	Steam	Shipping.
Anchor Coal Co., No. 2	James Wilson	Centerville	Shaft	Long wall	Fan	Steam	Shipping.
Anchor Coal Co., No. 3	James Wilson	Centerville	Shaft	Long wall	Fan	Steam	Shipping.
Whitebreast Fuel Co., No. 19	T. J. Phillips	Centerville	Shaft	Long wall	Fan	Steam	Shipping.
Numa Coal Co.	Geo. Widmer	Ottumwa	Shaft	Long wall	Fan	Steam	Shipping.
Star Coal Co.	Geo. McCleary	Seymour	Shaft	Long wall	Fan	Steam	Shipping.
Scandinavian Coal Co.	Claus Johnson	Rathbun	Shaft	Long wall	Fan	Steam	Shipping.
Consumers Coal Co.	F. R. Gable	Centerville	Shaft	Long wall	Fan	Steam	Shipping.
Big Joe Coal Co., No. 1	Robt. Hunter	Cedar Rapids	Shaft	Long wall	Fan	Steam	Shipping.
Big Joe Coal Co., No. 2	Robt. Hunter	Coal City, Ill.	Shaft	Long wall	Fan	Steam	Shipping.
Tipton Co-operative Coal Co.	A. W. Buel	Coal City, Ill.	Shaft	Long wall	Furnace	Steam	Shipping.
Iowa and Missouri Coal Co.	Jas. Seddon	Mystic	Slope	Long wall	Furnace	Steam	Shipping.
Brazil Coal Co.	B. F. Silknetter	Brazil	Slope	Long wall	Furnace	Horse	Shipping.
Columbia Coal Co., No. 1	Wm. Baker	Centerville	Slope	Long wall	Furnace	Steam	Shipping.
Columbia Coal Co., No. 2	Wm. Baker	Centerville	Slope	Long wall	Furnace	Horse	Shipping.
Electric Coal Co., No. 1	Thos. E. Lee	Centerville	Slope	Long wall	Furnace	Electric	Shipping.
Electric Coal Co., No. 2	Thos. E. Lee	Centerville	Slope	Long wall	Furnace	Horse	Shipping.
Electric Coal Co., No. 3	Thos. E. Lee	Centerville	Shaft	Long wall	Furnace	Horse	Shipping.
Electric Coal Co., No. 4	Thos. E. Lee	Centerville	Shaft	Long wall	Furnace	Horse	Shipping.
Electric Coal Co., No. 5	Thos. E. Lee	Centerville	Shaft	Long wall	Furnace	Horse	Shipping.
Electric Coal Co., No. 6	Thos. E. Lee	Centerville	Slope	Long wall	Furnace	Horse	Shipping.
Phoenix Coal Co.	Jas. Turner	Centerville	Slope	Long wall	Furnace	Horse	Shipping.
Thistle Coal Co., No. 1	David Steel	Brazil	Slope	Long wall	Furnace	Horse	Shipping.
Thistle Coal Co., No. 2	David Steel	Cincinnati	Shaft	Long wall	Fan	Steam	Shipping.
Eagle Coal Co.	Smith	Cincinnati	Shaft	Long wall	Fan	Steam	Shipping.

MONROE COUNTY.

Wapello Coal Co. No. 1	P. H. Waterman	Hiteman	Shaft	Room and pillar	Fan	Steam	Shipping.
Wapello Coal Co. No. 2	P. H. Waterman	Hiteman	Shaft	Room and pillar	Fan	Steam	Shipping.
Wapello Coal Co. No. 3	P. H. Waterman	Hiteman	Shaft	Room and pillar	Fan	Steam	Shipping.
Hocking Coal Co. No.	Jno. Schuller	Hocking Valley	Shaft	Room and pillar	Fan	Steam	Shipping.

MONROE COUNTY—CONTINUED.

NAME OF COMPANY, FIRM OR OPERATOR.	SUPERINTENDENT.	POST OFFICE ADDRESS.	Shaft or slope.	PLAN OF WORKING MINE.	HOW VENTILATED.	Power used.	Shipping or local.
Hocking Coal Co. No. 2	Ino Schuller	Hocking Valley	Shaft	Room and pillar	Fan	Steam	Shipping
Smoky Hollow Coal Co. No. 4	F. Hines	Hines City	Slope	Room and pillar	Fan	Steam	Shipping
Smoky Hollow Coal Co. No. 5	F. Hines	Hines City	Slope	Room and pillar	Fan	Steam	Shipping
Smoky Hollow Coal Co. No. 6	F. Hines	Hines City	Slope	Room and pillar	Fan	Steam	Shipping
Consolidation Coal Co. No. 10	B. C. Buxton	Muchaknock	Shaft	Room and pillar	Fan	Steam	Shipping
Consolidation Coal Co. No. 11	B. C. Buxton	Muchaknock	Shaft	Room and pillar	Fan	Steam	Shipping
Central Coal Co.	T. J. Phillips	Ottumwa	Shaft	Room and pillar	Fan	Steam	Shipping
St. Paul Coal Co.	Geo Young	Hickory	Slope	Room and pillar	Furnace	Steam	Shipping
Diamond Coal Co. No. 1	A. B. Little	Coalfield	Slope	Room and pillar	Fan	Steam	Shipping
Deep Vein Coal Co. No. 1	A. Erskin	Ottumwa	Shaft	Room and pillar	Fan	Steam	Shipping
Star Coal Co.	N. A. Flanders	Albia	Shaft	Room and pillar	Fan	Steam	Shipping
Deep Vein Coal Co. No. 2	A. Erskin	Ottumwa	Shaft	Long wall	Furnace	Horse	Shipping
Fredrick Coal Co.	Joe Scavenger	Avery	Shaft	Room and pillar	Fan	Steam	Shipping
White Ash Coal Co.	as Smith	Avery	Slope	Room and pillar	Furnace	Horse	Shipping

WAPELLO COUNTY.

Whitebreast Fuel Co., No. 22	Wm. Williams	Ottumwa	Shaft	Room and pillar	Fan	Steam	Shipping
Phillips Fuel Co., No. 4	A. Erskins	Ottumwa	Shaft	Room and pillar	Fan	Steam	Shipping
Lunsden Coal Co., No. 3	D. L. Lumsden	Ottumwa	Shaft	Room and pillar	Fan	Steam	Shipping
Eldon Coal and Mining Co.	W. R. Daum	Ottumwa	Shaft	Room and pillar	Fan	Steam	Shipping
Carbon Coal Co.	L. Ludwick	Willard	Shaft	Room and pillar	Fan	Steam	Shipping
Bear Creek Coal Co.	Robt. Parker	Ottumwa	Slope	Room and pillar	Furnace	Horse	Shipping
S. Ottumwa C. and M. Co.	Robt. Peditt	Ottumwa	Slope	Room and pillar	Furnace	Horse	Local
Star Coal Co.	Robt. Peditt	Ottumwa	Slope	Room and pillar	Fan	Steam	Local
Baker Coal Co.	L. Brown	Ottumwa	Shaft	Room and pillar	Fan	Steam	Local
Adams Coal Co.	A. P. Adams	Ottumwa	Shaft	Room and pillar	Furnace	Horse	Local
Spring Valley Coal Co.	Chas. Oleson	Ottumwa	Shaft	Room and pillar	Furnace	Horse	Local
Sampson Coal Co.	Ino Chapman	Ottumwa	Slope	Room and pillar	Furnace	Horse	Local
Excelsior Coal Co.	E. Stire	Ottumwa	Slope	Room and pillar	Furnace	Horse	Local
Black Hawk Coal Co.	A. C. Caughlin	Ottumwa	Slope	Room and pillar	Furnace	Horse	Local
Risher Coal Co.	R. Risher	Ottumwa	Shaft	Room and pillar	Furnace	Horse	Local
Fair Coal Co.	E. Fair	Ottumwa	Slope	Room and pillar	Furnace	Horse	Local
Cooper Coal Co., No. 1	Wm. Cooper	Ottumwa	Slope	Room and pillar	Grate	Horse	Local

Cooper Coal Co., No. 2	Wm. Cooper	Ottumwa	Slope	Room and pillar	Grate	Horse	Local
Eldon Coal and Coke Co.	D. J. Loyd	Eldon	Shaft	Room and pillar	Grate	Steam	Shipping
McIntosh Coal Co.	Jas. McIntosh	Eldon	Shaft	Room and pillar	Furnace	Horse	Local

VAN BUREN COUNTY.

Findley Bros.	H. Findley	Douds	Shaft	Room and pillar	Furnace	Horse	Shipping
Wm. R. Carson	W. R. Carson	Douds	Shaft	Room and pillar	Furnace	Horse	Shipping
Radcliff Coal Co.	H. L. Radcliff	Douds	Shaft	Room and pillar	Furnace	Horse	Shipping
Cahill Coal Co.	C. A. Cahill	Farmington	Shaft	Room and pillar	Furnace	Horse	Local

JEFFERSON COUNTY.

Pearlee Coal Co.	J. E. Courtney	Perlee	Shaft	Room and pillar	Furnace	Horse	Shipping
Wilcox Coal Co.	Wm. Wilcox	Fairfield	Shaft	Room and pillar	Furnace	Horse	Local
Bates Coal Co.	G. W. Bates	Fairfield	Shaft	Room and pillar	Furnace	Horse	Local

WAYNE COUNTY.

Chicago Coal Co., No. 1	Peter Thomas	Seymour	Shaft	Long wall	Fan	Steam	Shipping
Chicago Coal Co., No. 2	Peter Thomas	Seymour	Shaft	Long wall	Fan	Steam	Shipping
Seymour Coal Co.	Geo. L. Moore	Confidence	Shaft	Long wall	Fan	Steam	Local
Lewis Fry	Lewis Fry	Confidence	Slope	Long wall	Furnace	Horse	Local
Will L. Rousson	W. L. Rousson	Confidence	Slope	Long wall	Furnace	Horse	Local
Aaron Radcliff	Aaron Radcliff	Confidence	Slope	Long wall	Furnace	Horse	Local

DAVIS COUNTY.

Lunsford Coal Co.	A. C. Lunsford	Lunsford	Shaft	Room and pillar	Furnace	Horse	Local
Thomas Dial	Thomas Dial	Laddsdale	Slope	Room and pillar	Furnace	Horse	Local
Ino Jordan	Ino Jordan	Eldon	Slope	Room and pillar	Furnace	Horse	Local
G. W. Dye	G. W. Dye	Eldon	Slope	Room and pillar	Furnace	Horse	Local
J. Teesdale	J. Teesdale	Eldon	Slope	Room and pillar	Furnace	Horse	Local

TAYLOR COUNTY.

Campbell Coal Co.	Rodrick Campbell	New Market	Shaft	Long wall	Furnace	Horse	Shipping
Anderson Coal Co., No. 1	Thos. Anderson	New Market	Shaft	Long wall	Furnace	Horse	Shipping
Anderson Coal Co., No. 2	Thos. Anderson	New Market	Shaft	Long wall	Furnace	Horse	Shipping

TAYLOR COUNTY—CONTINUED.

NAME OF COMPANY, FIRM OR OPERATOR.	SUPERINTENDENT.	POST OFFICE ADDRESS.	Shaft or slope.	PLAN OF WORKING MINE.	HOW VENTILATED.	Power used.	Shipping or Local.
Browning Coal Co.....	Wm. Browning.....	New Market.....	Shaft.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Wilcox Coal Co.....	Wm. Wilcox.....	New Market.....	Shaft.....	Long wall.....	Furnace.....	Horse.....	Local.....
Geo. Walsh mine.....	Geo. Walsh.....	New Market.....	Shaft.....	Long wall.....	Furnace.....	Horse.....	Local.....
James Jamison mine.....	James Jamison.....	New Market.....	Shaft.....	Long wall.....	Furnace.....	Horse.....	Local.....
PAGE COUNTY.							
Ingram Coal Co.....	J. Ingram.....	Clarinda.....	Shaft.....	Long wall.....	Furnace.....	Horse.....	Local.....
George Howard.....	George Howard.....	Shamblough.....	Shaft.....	Long wall.....	Furnace.....	Horse.....	Local.....

APPANOOSE COUNTY.

This county is underlaid with a very regular vein of coal; having double the amount of mines that any other county in the state has. The principal mining centers are Centerville and Mystic, there being more mines located within a radius of six miles of these points than in any other location in the county. The coal is worked on long wall and semi-long wall method. The coal is of an excellent quality, and one among the best domestic coals produced.

There were employed in the mines on an average, during the past biennial period, 1,809 miners and 545 day men, making, all told, employed in the mines, 2,354 men and boys, who produced, during the past two years, 1,295,800 tons of coal, receiving in wages, during the above period, \$772,800, making an average for each employee working in and around the mines of \$343; this certainly is a good showing, taking into consideration the large amount of mines that do very little work during the summer months.

There has been a great deal of improving going on in and around the mines, during the two years just passed; hoisting appliances, cages, tripplars, fans, and a number of improvements which have materially aided those connected with the coal business in the above county.

The county is favored with good railway facilities, having the Iowa Central, K. and W., C., St. P. and M., C. R. and P., and K. C. Railways, to carry her product to the northern, northwestern, and western markets.

MONROE COUNTY.

Monroe county has become the largest coal-producer in the first district, and promises to be the largest in the state, having within the past biennial period added several large mining plants and increased the output of a great many of the others. The county's location for railway facilities and railway business is second to none in the state.

The new mining plants, as well as the older ones, are equipped with the latest mining improved machinery and equipments. The vein of coal is of good quality and thickness, and the vast amount of drilling that has been done clearly shows the county to contain some of the largest basins of coal yet discovered within this section. This territory is practically open to invasion from northern feeders, and this naturally leads to the more rapid development of these rich fields.

There was produced during the first year of our biennial period, 642,000 tons of coal; during the last half of our biennial there was produced 938,000 tons, nearly reaching the million point; being a net gain in favor of the last year of 295,822 tons, which is much the largest gain that was ever made in

any one county in a year during the history of mining in Iowa. Producing this coal gave employment to 1,235 miners and 590 day men, making a total of 1,825 employees working in and around the mines. There was paid during the last two years for wages 1,574,865 dollars; showing that Monroe county is nearing the top of the column of mining counties.

WAPELLO COUNTY.

This county has quite a large field of coal, although the mineral has been mined in large quantities for a number of years. The coal is of a good quality, giving excellent satisfaction as a stone coal. The veins are from three to five and one-half feet in thickness. There is a strong belief among the coal men that the largest basins of coal are, as yet, undeveloped, although there is a great deal of drilling being continued along that line, which certainly means new developments. The local mines, within a radius of three miles of Ottumwa, do an excellent local business, owing to the large demand from manufacturing plants located around the city, which are increasing in number very rapidly.

JEFFERSON COUNTY.

Jefferson county has produced coal, in small quantities, for a number of years, but the production for each has never been large. Coal averages about three and one-half to four feet in thickness and usually free from impurities. Coal brings very good prices at the local mines, which are worked principally during the winter months. Ventilation is furnished by furnace.

VAN BUREN COUNTY.

The coal-producing area of this county is small, none of the mines having railway connections. The coal is usually reached by shaft. Nearly all the mines now working are within a radius of three miles of Doud station. At most of the mines the miner delivers his coal on the cage.

Furnace ventilation prevails throughout the county. There are employed in and around the mines about fifty employes.

DAVIS COUNTY.

Davis county joins on the east one of the largest coal producing counties in the state, the same being Appanoose county. Yet, the county does not seem to increase its outpoot of coal to a very large extent. This county needs more prospecting, which if followed up will mean more mines and machinery for handling coal. The county is favored with good railroad facilities. The mines that are now being operated are within a short distance of Eldon.

WAYNE, TAYLOR, AND PAGE COUNTIES.

Wayne, Taylor, and Page counties compose the principal southern tier of coal-producing counties, also a part of the line which divides Iowa and Missouri.

The principal coal seam worked in the above counties lies at considerable depth. The seam is of uniform thickness and a number one quality. The C., M. & St. P., the C., R. I. & P., and the C., B. & Q. handle the coal from the various mines in these counties.

Quite a number of mines are operated exclusively for local business in the various parts of the counties. They are usually located where it requires the least expense to reach the coal and handle the same. Prices for mining in Taylor county average \$1.20 per ton; in Wayne county 95c is paid; in Page county \$1.00 per ton is paid. The long-wall method is used throughout the counties. Wayne county produced during the last biennial period 99,000 tons of coal, giving employment to 138 miners and 39 day men, making a total of 167 employes. There was paid out, during the biennial period for labor performed in producing the same, \$116,200. Taylor county produced, during the same period, 43,080 tons, giving employment to on an average of 110 men, in and around the mines, and paid for wages, during the biennial period, \$73,530.

The ventilation of some parts of the mines located in the above named counties, has, at times been deficient, especially during the spring and fall months, for the reason that there are those who use furnace ventilation and depend on different ones in the mine to look after the furnace; there not being sufficient output to enable them to employ one to do nothing else but look after the furnace; and for this reason the ventilation is very often neglected. Fans are being substituted in a number of places, which all tends to aid this section in better ventilation.

The companies producing the largest output of coal are the Chicago Coal Company, Nos. 1 and 2, and the Seymour Coal Company, each plant being located near Seymour.

There are in operation six mines in Wayne county, seven in Taylor county, and two in Page county, making a total of fifteen mines in the three counties.

FATAL ACCIDENTS.

Table showing Fatal Accidents in District No. 1, for the biennial period ending June 30, 1901.

DATE.	NAME OF DECEASED.	OCCUPATION.	CAUSE OF CASUALTY.	NAME OF COMPANY OR FIRM.	WHERE LOCATED.
July 14, 1899	Alfred Swinscoe	Pit Boss	Struck by balance weight	Black Hawk	Ottumwa.
October 27, 1899	J. L. Woods	Cager	Something fell from top of shaft and struck him	Chicago Coal Co.	Seymour
November 3, 1899	J. McKinzie	Cager	Fell down shaft	Whitebreast Fuel Co.	Cleveland.
January 10, 1900	H. Edwards	Miner	Fall of slate	Wapello Coal Co.	Hiteman.
March 1, 1900	Wm. Browning	Cager	Fell down shaft	Browning Coal Co.	New Market.
March 19, 1900	Carter Perkins	Miner	Fall of slate	Hocking Coal Co.	Hocking Valley.
March 22, 1900	Jno. Hein	Miner	Fall of slate	Star Coal Co.	Ottumwa.
March 27, 1900	S. Liston	Miner	Fall of slate	Diamond Coal Co.	Coalfield.
March 29, 1900	Chas. Carlson	Miner	Fall of slate	Chicago Coal Co.	Hiteman.
May 28, 1900	W. M. Wilson	Driver	Fall of slate	Chicago Coal Co.	Seymour.
June 18, 1900	Harry Allison	Miner	Fall of slate	Mine No. 2	Hiteman.
August 28, 1900	Jno. Richards	Cager	Something fell from top of shaft and struck him	Phillips Mine.	Ottumwa.
September 6, 1900	Harry Runyon	Miner	Fall of slate	Keb Mines	Keb.
September 29, 1900	Robt. Evans	Miner	Fall of slate	Keb Mines	Keb.
January 16, 1901	Frank Shirck	Miner	Fall of coal	Centerville Block No. 5	Brazil.
June 5, 1901	Chas. Thornton	Miner	Fall of slate	Deep Vein	Foster.
June 6, 1901	G. Williams	Miner	Fall of slate	Wapello Coal Co.	Hiteman.
February 28, 1901	G. C. Rains	Miner	Fall of slate	Anderson Mine.	New Market

FIRST DISTRICT, NON-FATAL ACCIDENTS.

Table showing list Non-fatal Accidents District No. 1 for the biennial period ending June 30, 1901.

DATE.	NAME.	OCCUPATION.	CHARACTER OF INJURY.	CAUSE OF ACCIDENT.	RESIDENCE.
August 11, 1899	Frank E. Jane	Machine runner	Back injured	Fall of slate	Centerville.
August 28, 1899	R. L. Evans	Timberman	Hip and back injured	Fall of slate	Hocking.
September 25, 1899	Jno. Martin	Miner	Leg broken	Fall of coal	Avery.
October 9, 1899	Mack Wallace	Machine runner	Back broken	Fall of slate	Centerville.
October 27, 1899	Wm. Veach	Miner	Fracture of skull	Shot of coal	Mystic.
November 5, 1899	H. Mathews	Miner	Legs bruised	Fall of slate	Avery.
November 27, 1899	Geo. Palmer	Miner	Leg broken	Fall of slate	Mystic.
December 12, 1899	R. Beknapp	Miner	Leg broken	Fall of slate	Hynes.
January 10, 1900	Wm. Milligan	Miner	Back and head injured	Powder caught in Cage	Rathbun.
February 8, 1900	A. Zanning	Miner	Leg broken	Powder exploded.	Smoky Hollow.
March 16, 1900	Wm. Mathews	Miner	Head and face burned	Powder exploded.	Smoky Hollow.
March 16, 1900	J. B. James	Miner	Head and body burned	Fall of slate	Laddsdale.
March 22, 1900	J. Cudworth	Loader	Back injured	Struck by chain	Laddsdale.
March 28, 1900	Jno.	Machine Runner	Lip and nose cut	Hit by blown open door	Hynes.
May 1, 1900	T. Semansky	Miner	Bruised and stunned	Fall of slate	Foster.
June 18, 1900	W. Anderson	Day man	Back hurt	Fall of slate	Hynes
June 25, 1900	Thos. Wignal	Miner	Head cut and bruised	Fall of slate	Hynes.
June 27, 1900	Peter Gorbet	Miner	Hip bone cracked	Fall of coal	Mystic.
June 28, 1900	Chas. Morman	Miner	Left hip bruised	Fall of slate	Laddsdale.
September 4, 1900	T. Keen	Miner	Back strained	Fall of coal	Hynes.
October 15, 1900	C. F. Thayer	Miner	Bruised	Fell down shaft	Forbush.
October 30, 1900	A. Crelguse	Miner	Bruised	Fell down shaft	Cincinnati.
December 6, 1900	Arthur Jones	Miner	Leg broken	Fall of slate	Hiteman.
January 4, 1901	J. Winston	Tracklayer	Leg broken	Fall of slate	Hiteman.
January 4, 1901	S. Anderson	Miner	Hip broken	Fall of coal	Foster.
March 13, 1901	C. W. Carlson	Miner	Hip bruised	Struck with pick	Foster.
March 25, 1901	David Lewis	Miner	Hand injured	Spark dropped in powder	Foster.
March 26, 1901	W. Williams	Miner	Burned	Fall of roof	Eldon.
April 6, 1901	S. J. Wrie	Miner	Injured internally	Fall of slate	Hynes.
April 23, 1901	I. Doyle	Company Man	Leg broken	Fall of slate	Hynes.
May 18, 1901	Burt Phillips	Machine Runner	Side hurt	Machine	Diamond.
May 26, 1901	Geo. Cook	Driver	Foot injured	Car run over foot	Avery.
June 26, 1901	Gust. Blee	Miner	Back and foot injured	Fall of slate	Diamond.
January 4, 1901	K. Samuel	Tracklayer	Severe scalp wound	Fall of slate	Hiteman.

EXAMINATION HELD AUGUST 28, 1901.

IOWA STATE EXAMINATION FOR MINE FOREMAN AND PIT BOSSES—1901—
FIRST SERIES.

1. Describe fully the duties of a mine foreman of an Iowa coal mine.
2. Define the following terms: Anemometer, regulator, water-gauge, indicator and tail-rope.
3. What is the ratio of the rubbing surfaces of two airways each 2,000 feet long when one is eight feet square and the other is six by ten and two-thirds feet sectional area?
4. What does the Iowa law require in the way of fans and furnaces for the ventilation of mines, and what are the duties of the mine inspector when he finds that these devices produce an insufficient amount of air, or that the mines are being worked under unsafe conditions?
5. What is the penalty for obstructing air-courses, disturbing machinery or doing anything that will impair the health or endanger the life of miners; and in case the owner of a mine fails to provide for the safety of his men after twenty days' notice, what should be done?
6. Give a rule for determining the horse-power necessary to ventilate a mine when the amount of air and the pressure required to circulate it are known.
7. Explain the principles of natural ventilation, and give reasons why the deeper shaft usually acts as an upcast in winter and downcast in summer.
8. What is the difference between longwall advancing and longwall retreating? Under what conditions would you prefer the latter process?
9. In what does an explosive develop its power? What is a blow-out shot, and what causes it?
10. What horse-power is used to ventilate a mine using 80,000 cubic feet of air per minute when the resistance of the air as shown by the water-gauge is two inches.

SECOND SERIES.

11. What are the causes of spontaneous combustion, and how would you proceed to prevent it in a mine that produces a large amount of fine coal?
12. If a fan that makes eighty revolutions per minute produces 80,000 cubic feet of air per minute, how many revolutions must the same fan make in order to produce 100,000 cubic feet?
13. Where should a mining-shaft be located in opening up a mine, and what should be the size of shaft pillars for different depths of a mine? Under what conditions should these pillars be especially large?
14. How can the approximate velocity of an air current in a mine be determined without using an anemometer?

15. Describe an accurate method of using an anemometer in determining the velocity of an air-current in a mine.
16. Determine the motive column in a mine 400 feet deep when the temperature of the downcast is forty degrees and that of the upcast 120 degrees Fahrenheit?
17. What gases are commonly found in the coal mines of Iowa? Describe each fully and state what effect it has on the human system as well as method of testing for it?
18. How is a true meridian determined, and what is meant by the declination of a magnetic needle?
19. Describe the proper method of conducting the underground survey of a mine.
20. There are two rectangular airways each 3,000 feet long. One is five feet square and the other is four by 6.25 feet sectional area. When the pressure that is required to ventilate the square airway shows a water-gauge reading of 2.5 inches, what will be the pressure required to ventilate the other airway with the same amount of air?

IOWA STATE EXAMINATION FOR HOISTING ENGINEERS—1901—FIRST
SERIES.

1. What are the duties of a hoisting engineer at the coal mines of Iowa, and what natural qualities should he possess?
2. Define the following terms: Combustion, dead center, lead, tensile strength and factor of safety.
3. Determine the horse-power of a fifty-inch cylinder boiler, thirty-two feet long, when it is set one-half exposed to the heat.
4. Give a complete definition of foaming and priming, and state as fully as possible the causes of each.
5. Describe a proper method of conducting a test to determine the safety of a boiler.
6. Determine the indicated horse-power of a single-cylinder engine having a piston ten inches in diameter with a twelve-inch stroke, when the crank makes 120 revolutions per minute, and the mean effective pressure of the steam is sixty pounds per square inch.
7. Describe the proper method of lining the crank-shaft of an engine.
8. How can hard scale be removed from the flues and sheets of a boiler, and what can you say about cleaning it at frequent intervals?
9. Describe the best method of firing a boiler that will insure economy in fuel and protection of the plates.
10. What steam pressure should be allowed in a boiler sixty inches in diameter, made of three-eighths steel plate, having a tensile strength of 65,000 pounds, when it is double riveted and operated under a factor of safety of five?

SECOND SERIES.

11. What is meant by the mechanical efficiency of an engine? Suppose the indicated horse-power of an engine is 180, and its resistance is twenty-two horse-power, what is its mechanical efficiency?
12. The diameter of a lever safety-valve is two inches. What weight must be attached to the lever twenty inches beyond the valve to allow the

steam to blow off at sixty pounds pressure, when the distance between the fulcrum and valve is four inches?

13. Explain all the principal safety appliances that are used in connection with a hoisting plant.

14. Give a full description of a block-brake and a band-brake, and state where each of these should be placed on a drum to give best results. Which of these brakes do you prefer? Why?

15. How can the safe working load of a steel cable be determined when its diameter is known? Give a rule that will apply to cables of all diameters.

16. Describe as fully as possible the method of conducting the hydraulic test of a boiler, and state when this may be better and when less satisfactory than the hammer test.

17. What can you say about erecting hoisting appliances at the beginning that will meet all the future requirements of a mine?

18. Describe the tail-rope and endless-rope systems of haulage, and explain fully the differences in the operation of each. Are both winding drums in gear at one time for tail-rope haulage? Give reasons for your answer.

19. Describe the construction and differences between a suction-pump and a force-pump, and explain fully the forces that operate each.

20. What horse-power is required to lift 300 cubic feet of water per minute through a vertical distance of 200 feet, when the friction of the machinery and the water in the pipes is one-third the power required to lift the water?

BIENNIAL REPORT
OF THE
SECOND DISTRICT,

EMBRACING

Mahaska, Keokuk, Lucas, Marion, Scott, Adams, and
Warren Counties.

JOHN VERNER, INSPECTOR.

LETTER OF TRANSMITTAL.

Hon. Leslie M. Shaw, Governor of Iowa.

SIR—I have the honor to submit to you herewith the report of the Second inspection district, covering the biennial period ending June 30, 1901.

Very respectfully,

JOHN VERNER,
Inspector Second District.

REPORT OF SECOND DISTRICT.

Since the last report it has been found advisable to rearrange the inspection districts to some extent. Of the counties which composed the old second inspection district only three remain in the new second district, Mahaska, Keokuk, and Scott. Jasper county was added to the third district, and Jefferson and Van Buren to the first. Adams, Warren, and Lucas from the first district and Marion from the third were placed in the second district. This arrangement makes the districts more compact, the work is divided better than formerly, and the expense of reaching the mines is somewhat reduced.

The district, as now constituted, includes the counties of Mahaska, Keokuk, Scott, Marion, Warren, Lucas, and Adams. These seven counties produced from July 1, 1899, to June 30, 1901, 3,800,337 tons of coal of all grades. This output came from 128 mines, large and small, and to mine and market it 2,759 miners and 1,252 other workmen were employed.

Comparing the output of coal in the above counties for the last two years with their output of the biennial period preceding, we note a net gain of 259,821 tons. This gain, however, is not a proportionate one in all the counties. Mahaska county's coal production diminished 346,312 tons, and Adams county's loss amounted to 9,349 tons. On the other hand, Lucas county gained 359,399 tons, Marion county 156,435 tons, Keokuk county 71,002 tons, Scott county 19,069 tons, and Warren county 9,577 tons.

During the two years the miners and others employed in and about the mines have gained many concessions from the operators. The price of mining two years ago, in those counties in the district where the coal is blasted from the solid, was 75 cents per ton of screened coal and 50 cents per ton of mine run. The screens in use then had diamond bars, spaced one and one-half inches apart. The price paid in eight foot entries was \$2 per yard. Room turning was \$4. Timbermen, drivers, tracklayers, cagers, and others employed in the mines received \$1.89 per day. Outside common labor was paid \$1.25 to \$1.50 a day.

The price of mining at present is 85 cents per ton of screened coal, and 60 to 65 cents per ton of mine run. Akron bar screens have been substituted for the diamond bar screen, and the space between the bars has been reduced one-eighth of an inch. The price paid in eight foot entries is now \$2.20 per yard and \$4.48 is paid for room turning. The price for deficient and dead work has also been proportionately increased. Timbermen, drivers, tracklayers, cagers, and others employed in the mines receive at least \$2.15 per day, and the minimum wage for outside common labor has been raised to \$1.60 a day.

I believe I can say that the last two years have been the most successful in the coal trade of Iowa. Successful, not only from the operators' standpoint, but from the miners' as well. Abundant crops, heavy railroad traffic, prosperity in general, and the total absence of strikes and lockouts have contributed to give to the miners steadier work with better pay and to the operators the fair profit they are entitled to. The yearly meetings of the operators and miners, to adjust the wage-scale in a way that may be mutually satisfactory, have also had their influence, and have done much to place the coal business on a more staple basis. It means much to the operator to have the reasonable assurance that he can run his mine for a year, without having to fear or take into consideration when making his contracts emergencies that may arise on account of wage disputes between himself and the miners in his employ. On the other hand the miner is equally benefited by this arrangement. He knows that, after the ratification of the yearly agreement, for twelve months he may labor at fair wages, free from dread that his earnings may be cut off and himself and family placed in want through a strike or lockout. It is to be hoped that the miners and operators will continue to adjust what differences may arise between them with the spirit of justice and fairness that has prevailed in the past.

The condition of the mines in the district with regard to safety has been fair. Considerable work has been done during the last two years to bring about improvements in this direction. Additional escape-shafts have been provided in a number of mines, the haulage and traveling roads have been kept reasonably safe, and the safety appliances in use have in the main been found satisfactory and in good order. Not a man has been injured on account of unsafeness of entries in going to or returning from his work during the last two years, and no serious accident has resulted from defective safety appliances. Especial attention has been given to secure the safety of the miners in case of fire, and in some mines danger on that score has been reduced to a mere minimum. In a few cases mine stables were found so located that a fire breaking out in them would have proved a serious danger to the men in the mine at that time, but these stables have either been abandoned or measures provided to insure greater safety should a fire occur in them. In the absence of any legislation on this matter, I suggest that in the future all stables put underground be built as nearly fireproof as possible, and that they be so located that they can be ventilated by a separate split, directly connected with the return air current. Hay and straw should not be permitted to accumulate in any part of a mine, and the storage in a mine of large quantities of explosives and oil in one place should be avoided. Some months ago the miners in most mines in the district, where powder is used, requested the operators to send the powder ordered by them to their working places. The operators have generally complied with this request, and in some mines, to facilitate the handling of the powder, storage-places for it have been provided to hold a day's or perhaps two days supply. The danger incident to such storage is so grave that there should be no delay in discontinuing the practice, wherever it may exist.

The present mode of conveying the powder under this new arrangement through the mines is certainly more dangerous than the old way of getting the powder to the working places. I know what it means to carry a keg of powder for long distances underground, and I appreciate the desire of the

miner to be relieved of this tiresome task, but comfort purchased at the expense of safety is dearly bought. In each of the larger mines in the district from twenty to forty kegs of powder are used daily. Under the old system these kegs were taken inside by the miners who purchased them, and were carefully guarded by them against mishaps. Now the kegs are placed in one or two mine-cars, and in this way from 500 to 1,000 pounds of powder, in an almost compact mass, are sent into the mine during working hours. If by careless handling or by accident this mass of powder should explode a horrible calamity would result, and the loss of life would probably be limited only by the number of men in the mine at the time. The danger may be remote, but it exists. The possibility of such explosion occurring and its consequences should be sufficient to cause the discontinuance of a practice that apparently was adopted without due consideration of the danger involved. I do not object to the operators taking care of the powder until it reaches the purchaser at the working face, but it should be transported through the mines under safer conditions than prevail now.

While there has been no retrogression with regard to the sanitary conditions of the mines of the district, and while in many instances decided improvements along this line have been made, it remains a fact that perfection in this respect is still a long ways off. The powder-smoke nuisance is particularly objectionable. Nearly all the coal in the district is mined by blasting it from the solid, and in all the mines where powder is used, except two, the practice prevails of firing twice a day, in the middle of the shift and at quitting time. The ventilation provided for the mines, while with due care and in the absence of shot firing, sufficient to air them properly, is in a number of instances inadequate in those mines, where firing is done in the middle of the shift, to remove all the powder-smoke and gases by the time the miners have to commence work again in the afternoon. Considerable relief has been offered in some mines by the sinking of additional ventilating shafts, in others the cleaning up of airways and splitting the air current has been of benefit; yet results have not been entirely satisfactory.

It has been suggested that the best way out of the difficulty would be to stop firing at noon. That would be an effective remedy, and would work all right in mines where the coal is of fair thickness and blasts well; but unfortunately nature has failed to provide such favorable conditions in all mines. I did not feel justified, except in aggravated cases, to apply this remedy, because in a large number of mines in this district an action of that kind would mean a reduction in the earnings of the miners working in them, as well as a reduction in the profits of the operator by reason of a decreased daily tonnage. I favor continuing the practice of firing twice a day, if it can be done without injury to the miners' health. I believe it is to the advantage of the miner and may in some respects promote his safety. It appears to me that it would be of decided benefit to the operators of mines, not especially favored by nature, to remove the objection to twice-a-day firing by providing means of ventilation of such power and capacity that the mines can be practically cleared of smoke by the time the miners are ready to start to work again after dinner.

Below will be found the tables giving the amount of coal produced in each county of the district in the last two years, the number of men employed, their earnings, etc. In this connection I wish to express my appreciation of the promptness of the operators in forwarding to this office their yearly reports on which these tables are based. Every mine that produced more than 8,000 tons of coal last year has reported, and of the smaller mines nearly ninety per cent have sent in their reports.

TABLE No. 1.

Showing the number of mines, output of coal, number of miners and other employes, etc., in District No. 2 for the year ending June 30, 1900.

COUNTY.	Number of mines.	Tons of coal of all grades produced.	Number of miners employed.	Gross earnings of miners.	Number of other employes.	Earnings of said employes.
Mahaska	39	1,235,933	1,578	\$ 788,249	758	\$406,305
Keokuk	19	299,692	435	198,210	171	87,752
Lucas	28	203,568	338	148,851	171	68,899
Marion	28	133,106	191	100,529	122	46,988
Warren	2	21,805	58	20,053	16	4,450
Scott	2	19,650	72	22,597	11	2,770
Adams	18	16,370	113	18,507	20	3,553
Total	127	1,930,214	2,785	\$1,296,996	1,269	\$620,777

TABLE No. 2.

Showing the number of mines, output of coal, number of miners and other employes etc., in District No. 2 for the year ending June 30, 1901.

COUNTIES.	Number of mines.	Tons of coal of all grades produced.	Number of miners employed.	Gross earnings of miners.	Number of other employes.	Earnings of said employes.
Mahaska	39	1,072,493	1,450	\$ 777,742	728	\$ 493,264
Keokuk	17	261,798	381	173,953	158	81,395
Lucas	7	249,803	284	174,659	166	95,195
Marion	28	228,607	368	156,332	141	67,950
Warren	16	22,499	76	24,395	12	3,868
Scott	17	18,384	118	24,859	16	3,115
Adams	17	18,384	118	24,859	16	3,115
Warren	10	16,572	55	15,255	14	3,505
Total	128	1,870,123	2,734	\$ 1,347,195	1,235	\$ 658,202

TABLE No. 3.

Increase or decrease for the year ending June 30, 1901, as compared with the year ending June 30, 1900.

COUNTY.	NUMBER OF MINES.		TONS OF COAL OF ALL GRADES PRODUCED.		NUMBER OF MINERS EMPLOYED.		GROSS EARNINGS OF MINES.		NUMBER OF OTHER EMPLOYES.		EARNINGS OF SAID EMPLOYES.	
	Increase.	Decrease.	Increase.	Decrease.	Increase.	Decrease.	Increase.	Decrease.	Increase.	Decrease.	Increase.	Decrease.
Mahaska	1	.....	163,440	.....	119	.....	\$ 10,507	.....	30	.....	\$ 3,101	.....
Keokuk	1	.....	37,894	.....	54	.....	24,257	.....	13	.....	6,444	.....
Lucas	1	116,607	.....	.....	93	.....	\$ 74,130	.....	44	.....	\$ 48,207	.....
Marion	2	25,039	.....	.....	36	.....	7,481	.....	30	.....	949	.....
Scott	2	2,819	.....	.....	4	.....	1,798	.....	1	.....	1,098	.....
Adams	1	2,011	.....	.....	2	.....	6,352	.....	4	.....	438	.....
Warren	2	.....	5,233	.....	3	.....	4,798	.....	2	.....	945	.....
Total	1	.....	60,091	.....	51	.....	\$ 50,199	.....	34	.....	\$ 37,485	.....

The last table is a very interesting one, and should prove especially gratifying to the representatives of the miners, who met the operators a year ago to adjust the scale for the year ending March 31, 1901. The mines were run an average of fifteen days less during the year ending June 30, 1901, than in the year preceding. In the last year the tonnage in the counties of Mahaska, Keokuk, Lucas and Marion fell off 59,688 tons, and fifty less miners were employed. Yet, notwithstanding this, the gross earnings of the miners in these counties increased during last year \$46,847 over their earnings of the year before. The decrease in tonnage in Mahaska county was 163,440 tons and the decrease in miners' earnings only \$10,507, while Keokuk county's output decreased 37,894 tons, and the miners' earnings \$24,257. It appears at the first glance that the showing from these two counties is very disproportionate, but investigation shows that there is nothing wrong with it. Very little has been paid by the operators of Keokuk county for deficient work, because there was little of that kind of work to do; the expense for lifting bottom or brushing has been very light, and in addition about one-half the coal produced in the last year in the county has been mined without a cent of expense for narrow work or room turning on account of the exceptionally large amount of pillar work done. The case has been different in Mahaska county. Considerable low coal was worked last year at an advance per ton over the scale price; the expense of taking up bottom and taking down top to make height has been very great, and there was a great deal of deficient work to pay for. The yardage and room turning account was proportionately very much larger than the same account in Keokuk county. The figures for Lucas and Marion county also need explanation. While Marion county's increase in tonnage last year was more than one-fifth that of Lucas county, the Marion county miners' earnings reached only one-tenth the increase gained by the miners of Lucas county. The number of small mines in Marion county is considerable, and they are run on an as inexpensive scale as possible. Some of them are not worked by union labor, and the prices paid in these mines are generally

below the scale. In Lucas county, large mines have been recently opened. Their development has been rapidly pushed, and the great expense incurred for narrow work, room turning, deficiencies, and dead work offers a ready and sufficient solution why there has been such difference in the increase of the miners' earnings in the two counties. The number of other employees, not miners, in Mahaska, Marion, Lucas and Keokuk counties was twenty-nine less in the last year than it was in the year before. Still, the 1193 employes earned \$37,710 more in the last year than the 1222 employes earned in the preceding one. The principal mines in the district worked about 260 days last year. Now, if the agreement of 1900 increased the daily wage of each of these employes 12 cents for each day worked in the twelve months ending June 30, 1901, and I believe it increased it fully that much over the daily wage paid each during the year ending June 30, 1900, we have a gain of earnings on that score of \$37,221, a sum almost identical with the one given in the table.

MAHASKA COUNTY.

Mahaska county still maintains its position at the head of the list of the coal-producing counties of Iowa. For more than twenty-five years it has produced more coal each year than any other county in the state; but it begins to look as if its supremacy in this respect is about ended. The extraordinary development of mines in Monroe county in the last two years has far outranked development work in Mahaska county; and, unless something is done quickly to offset the advantage gained by its neighbor on the south, the indications are that Mahaska county will have to be satisfied with second place.

The extension of the Chicago and North-Western Railway across the Des Moines river will prove of great advantage to the mining industry of Mahaska county. The extension has made available valuable coal territory, that promises to yield more coal than has been produced in Mahaska county since the beginning of coal mining in it. At present only one mine, shipping coal over the new road, is operated in the county on the west side of the river; but a great deal of prospecting has been done in the new field, and other mines will probably be opened in the near future. West of Oskaloosa and south of the now abandoned No. 4 mine of the American Coal Company, a new mine has been recently opened by the Garfield Coal Company. The coal in this mine, so far as it has been developed, is of fair thickness, averaging more than five feet, and the mine promises to become one of the large producers of the county. Several fair-sized basins of coal have been located southeast of the Garfield property, and their development is only a question of time. I am informed that a new mine will be opened southeast of Colon, with shipping facilities over the Chicago and North-Western Railroad. Prospecting is going on in different parts of the county, but results at this time are not definite enough to base predictions on as to whether the tracts prospected contain coal enough to warrant their development.

Of the mines now in operation in the county having railroad connections, eight are located on the Chicago and North-Western Railroad, eight on the Chicago, Rock Island and Pacific, and one on the Iowa Central Railroad.

Mechanical underground haulage is largely in use. Two endless ropes, seven tail-ropes, and one electric motor convey the coal to the shaft bottoms, and three single ropes in slopes pull it to the tipples. The electric motor in use in the Pekay mine seems to do the work satisfactorily, and there is no doubt that this kind of haulage is a success, if conditions are favorable. It appears to be not economical in mines where a solid roadbed cannot be made and maintained at a moderate cost, and where many and variable grades have to be run over.

The provisions made during the last two years to insure the safety of those employed in the mines of the county have been satisfactory. Ten air and escape shafts have been sunk, and other commendable improvements have been made to render the mines as safe as possible. Of twenty-seven fatal and non-fatal accidents occurring in the county in the last two years, none was caused through the absence or faulty construction of safety appliances.

All the large mines and some of the smaller ones are ventilated by fans. Nineteen are now in use in the county; eighteen of these are run by steam and one by electricity. These fans provide more than 375,000 cubic feet of air every minute to ventilate the mines. More than the minimum air volume per minute required by law enters each of these mines. In some of them, however, the air-current is not strong enough to remove readily the great volume of powder-smoke due to the firing of many shots at the same time, and the miners working in them are therefore compelled to labor, for a time at least, in an atmosphere that is decidedly injurious to health. I have spoken of this matter before, and I again urge the operators, if the practice of twice-a-day firing is to continue in these mines, to increase by some adequate method the volume of air going through them immediately after firing time.

KEOKUK COUNTY.

For seven years Keokuk county has ranked fifth among the coal counties of Iowa, Mahaska, Polk, Monroe and Appanoose have stood ahead of it in the number of tons of coal produced annually. It is not probable that the county can maintain that position in the future. The mine that has been the best producer in the last few years, the Crescent No. 4, is about to be abandoned, and the Columbian mine, almost equal to the Crescent, cannot last much longer, unless the coal deposits that can be reached from this mine are larger than the prospect holes put down in the adjacent territory seem to indicate. So far there have been no new mines developed of sufficient capacity to make up for the falling off in the county's coal output that will be caused by the giving out of these two mines. While some take a rather gloomy view of the situation, there is no reason to fear that the coal wealth of the county is about exhausted. It is true that the workable coal area is small, and is confined almost altogether to the northwestern part of the county; it is also true that a considerable portion of this area has been worked out; yet it is very probable that good coal fields can still be found if thorough and systematic prospecting is resorted to to locate them.

Five mines have shipping facilities over the Chicago & North-Western Railroad, and two ship over the Burlington, Cedar Rapids & Northern.

New mines have recently been opened by the Lambert Bros., the Margaret Coal company, and Bakers Bros. They are located in the vicinity of What Cheer.

The mines now in operation are not very extensive, and on that account mechanical haulage is not found in any of them, the Blatt mine excepted. In that mine single rope haulage is in use.

The mines in the county, as far as safety is concerned, compare favorably with any in the district. Four air and escape shafts have been sunk during the last two years. Two fatal accidents occurred, and four non-fatal accidents were reported. Two hundred eighty thousand, seven hundred forty-five tons of coal were mined for each fatal accident.

The fair thickness of the seam, and the consequent roomy condition of the airways, ventilating machinery of ample power, together with the general limited extent of the mine workings, make the problem of ventilation comparatively easy. In the mines where stoppings were properly constructed and looked after, and ordinary care was taken to direct the air current to the working faces, little or no complaint on account of insufficient ventilation was made by the miners employed in them. Neglect on the part of the mine foremen to make good use of the air volume at his disposal brought just complaints from the men. In such cases speedy improvement of conditions was asked for, and generally obtained to a satisfactory extent.

LUCAS COUNTY.

In my report of the first district, made in 1893, the following was said about the condition of the mining business in Lucas county: "Once the second coal producing county in the state, with an output of over a half million tons per annum, it has now taken a position almost at the foot of the list. At present only two small mines are struggling along to keep the name of Lucas county from being wiped out altogether from the roster of Iowa's coal-producing counties. There is no question that coal in paying quantity can be found here, but the reason for not developing it seems to be that the expense account to reach it would show up rather heavy. Be that as it may, the time will come when the coal fields of Lucas county will again give employment to hundreds of men." The time has come, and I am pleased that my predictions have proved to be correct. From twentieth in rank among the coal producing counties of the state in 1893, Lucas county now occupies seventh place, and the indications are that during the next two years it will move still higher in the list. This change from a practically dormant state to one of great activity has been effected in the last two years, and is due to the opening of mines by the Whitebreast Fuel Company, of Illinois, and the Big Hill Coal Company, in the western part of the county near the towns of Lucas and Cleveland, not far from the old coal territory that has yielded millions of tons of coal, and where mining was carried on from 1876 to 1891. Cleveland No. 4 mine, worked by the Whitebreast Fuel Company of Illinois, has probably produced more coal during the last year than any other mine in the state. The best day's output of this mine was 1,058 tons of mine run, and it was handled in seven and one-half hours.

More than 300 men are employed in and about this mine. The Big Hill

Coal Company's mine at Lucas has been worked so far under great disadvantage, due mainly to the large amount of water that found its way into the mine through a porous sandstone that immediately overlies the coal. In the south and southwest portions of the mine, however, the inflow of water has apparently stopped, and if this condition continues the mine's development will be more rapid and a corresponding increase in its output will result. The Chicago, Burlington & Quincy railroad furnishes shipping facilities for these two mines, and also for the mine operated by the Lucas & Cleveland Coal Company. A new mine is about to be opened, three miles north of Chariton, by the Inland Coal Company.

The principal coal seam worked in the county lies at considerable depth below the surface. North of Chariton the new shaft will reach the coal in about 225 feet; the Big Hill Coal Company's shaft is 274 feet deep; and the shaft of the Cleveland No. 4 mine has a depth of 321 feet. The latter is the deepest shaft in the state at present. The coal is of good quality, and will average four and one-half feet in thickness. The Lucas and Cleveland Coal Company works a seam belonging to the middle coal measures; the coal is two feet thick and is worked long wall.

The mines were operated 260 days during the last year.

Six fatal and six non-fatal accidents occurred in the mines of Lucas county in the last two years. Only 63,833 tons of coal were produced for each fatal accident. This is an extremely bad showing, and I hope that the miners and operators will use the utmost care to prevent, as far as possible, the occurrence of fatal and serious accidents in the future. It seems that good work in this direction has been done already. Since the explosion in No 4, on January 5, 1901, up to this time (August 15th), only three accidents, causing slight injuries, have occurred.

The ventilation of some parts of the mines has at times been insufficient, but the deficiency was caused by adverse circumstances rather than through willful neglect on the part of the mine officials. Fan ventilation has recently been substituted for ventilation by steam jet by the Lucas and Cleveland Coal Company, and efforts are being made in the other mines to put them in as good sanitary condition as possible.

MARION COUNTY.

Marion county is very rich in coal deposits, and we find it stated in the geological report of the county, issued this year, that "almost the entire county is underlain by coal. Yet," the report says further, "notwithstanding these abundant deposits, mining has not been carried on nearly so extensively as in some of the adjoining counties, particularly Mahaska. The reason for this non-development of the mining industry in this region has been neither the character of the coal nor the thickness of the seams, but the lack of railway facilities for the transportation of the product." It is true that railroad facilities to reach the main coal basins of the county have not yet been provided, but there has existed so far seemingly little necessity to tap them. Furthermore, there is yet an abundance of undeveloped coal within easy reach of the railroads. In my opinion, the principal reason why developments have been somewhat slow has not been due so much to the

lack of railroad facilities, but rather to the lack of available markets. Taking everything into consideration, Marion county has not done so badly recently in developing its mineral resources. Since 1898 the coal production of the county has increased 71 per cent, and there is every indication that the healthy growth of the coal business will continue.

Three railroads, the Chicago, Burlington & Quincy, the Wabash, and the Chicago, Rock Island & Pacific furnish transportation to get the coal to market.

The two mines having the largest output at present are located on the Wabash railroad, one is the mine operated by the Wild Rose Coal & Mining Company at Morgan Valley, and the other is No. 1 mine at Hamilton, owned by the Donley Coal Company. Four mines have switches from the Chicago, Burlington & Quincy railroad, and one mine at Otley has track connection with the Des Moines line of the Rock Island.

About two years ago a shaft was sunk by the O. K. Coal Company five miles west of Bussey, and on the north side of Cedar Creek, into a vein of coal between eight and nine feet in thickness. The mine was at the time developed to some extent, but for more than a year and a half it has been idle. Owing to the considerable distance of the mine from the railroads, the coal could not be hauled by wagons, loaded on the cars, and marketed at a profit. This difficulty has, however, been overcome. A switch about six miles in length starting near the town of Tracey, and running along the north bank of Cedar Creek, now connects the mine with the Wabash railroad. The prospecting record of the field, in which the mine is located, indicates that its yield should be very large. Another mine is about to be opened on the Knoxville branch of the Chicago, Rock Island & Pacific railroad. It will be located north of Flagler, and be operated by the American Coal Company. The vein is of good thickness and easily reached and the mine promises to become one of the large mines of the district.

The amount of coal hauled by wagons from the smaller mines near the towns of Hamilton, Flagler, and Otley, and loaded on the cars, has been considerable. About 27,000 tons were handled in this way last year.

It may confidently be expected that the next year's output of coal in the county will show a material increase over the output of the year just ended.

Only four of the county's twenty-eight mines are ventilated by fans. Small furnaces are used in the others to furnish ventilation. In the winter little difficulty is experienced in airing them satisfactorily, and as there is little work done in them in the summer and the number of men employed in them very small, the decreased efficiency of such ventilation during the warmer months does comparatively little harm. There is an evident desire on the part of the operators of small mines to improve them, make them safer, and better their sanitary condition.

SCOTT COUNTY.

Scott county has produced coal for a long number of years, but, while its total output from the time mining first commenced in the county up to the present time represents a very respectable tonnage, the production for each year has never been large. In the last two years mining has been

carried on more actively and extensively, resulting in a marked increase of the output, the coal production for the two years amounting to 42,119 tons.

The coal averages about three feet in thickness. It is worked on the room and pillar plan, and the miners receive from a dollar to a dollar and twelve and a half cents a ton for mining the coal and delivering it at the shaft bottom. In the mines west of Buffalo the coal is blasted from the solid; but in the mines around Jamestown no powder is used. None of the mines are located near a railroad, consequently little coal is shipped. Jamestown is the center of the mining industry, and the principal mines of the county are located near that place.

At only one mine steam power is found to hoist the coal, horses being used for that purpose at the others. Ventilation is maintained by small furnaces in all the mines, except in the mine operated by Buchmeier & Carlin which has fan ventilation. The mines are cheaply equipped, yet the equipments are adequate under the circumstances to insure reasonable safety to the men working in them. No accident of a serious nature has occurred in the mines of Scott county during the last two years.

ADAMS COUNTY.

The mines in Adams county produced in the last two years 34,751 tons of coal, and about 175 men found employment in work in and around the mines and in hauling the coal to market. The mines are all small, none have shipping facilities, and they are depending entirely on the local markets. As there are no manufacturing or other industrial establishments to supply, and as the demand for coal for domestic use is very light in the summer, nearly all the mines are idle during that season of the year. In the winter, however, especially if the roads are in good condition, the demand generally exceeds the supply.

The coal seam, which averages about sixteen inches in thickness, is the thinnest worked in the district. It is reached by shallow shafts and is worked long wall. The miners receive from five to six cents a bushel for mining and delivering the coal at the shaft bottom. Most of the county's coal output comes from the mines in the vicinity of Carbon. Mines are also worked near Eureka, Briscoe, and Hoyt.

Mine ventilation is produced by small furnaces, and in cold weather natural ventilation is generally sufficient to air the mines satisfactorily. Owing to the thinness of the seam, the method of working it, and the good roof, accidents of a serious nature are very rare, and none has occurred during the last two years.

WARREN COUNTY.

Warren county contains considerable coal, and its yearly output could be largely increased, were it not for the fact that railroad facilities to market the coal profitably have been lacking so far. There is only one small mine in the county that can load its product on the cars without hauling it by wagons. The larger mines are located at and near Somerset. Two different

seams are worked in this vicinity. The upper seam is about three feet thick, and is worked long wall, the lower seam is somewhat thicker, and is worked on the room and pillar plan. The mines produced 38,377 tons of coal in the last two years, and about seventy-five men were employed. Small mines have been opened in different parts of the county to supply the local demand for coal. They employ from two to six men each in the winter, but are generally closed down during the summer.

Most mines depend on natural ventilation, a few are aired by small furnaces, and one mine will be ventilated by a fan run by a gasoline engine. One serious accident occurred in the mines of the county during the last two years.

MAHASKA COUNTY.

Mines in operation in District No. 2, their location, etc.

CORPORATION, FIRM OR OPERATOR.	Mine number.	LOCATION OF MINE.	Railroad connections, if any.	Kind of opening.	PLAN OF WORKING MINE.	Means of ventilation.	Kind of hoist.	KIND OF HAULAGE.
Consolidation Coal Co.	0	1 miles east of Eddyville.	C. C. & N. W.	Shaft	Room and pillar	Fans	Steam	Endless rope and mule.
Lost Creek Fuel Co.	1	Lost Creek.	C. C. & N. W.	Shaft	Room and pillar	Fan	Steam	Mule.
Lost Creek Fuel Co.	2	1/2 mile south of Lost Creek.	C. C. & N. W.	Shaft	Room and pillar	Fan	Steam	Mule.
F. D. Corvill & Son.		3/4 miles east of Eddyville.	C. & N. W.	Slope	Room and pillar	Furnace	Horse	Mule.
Regal Coal Co.		1/2 mile south of Pekay.	Iowa Central.	Shaft	Room and pillar	Fan	Steam	Tail rope, electric moter, mule.
Whitebreast Fuel Co., of Ill.	28	Pekay		Slope	Room and pillar	Fan	Steam	Rope and mule.
Kennebec Coal Co.		1 mile south of Muchakinoek	C. & N. W.	Shaft	Room and pillar	Fan	Steam	Tail rope, mule.
Klondike Coal Co.		5 miles south of Okkaloosa.	C. & N. W.	Shaft	Room and pillar	Fan	Steam	Mule.
Iowa Fuel Co.		Colon		Shaft	Room and pillar	Furnace	Horse	Mule.
J. Baxter.		Morrisville		Shaft	Room and pillar	Natural	Horse	Mule.
Smith Bros.		4 1/2 miles east of Oskaloosa.	C. & N. W.	Shaft	Room and pillar	Fan	Steam	Mule.
Atwood Coal Co.		2 miles north of Atwood.		Slope	Room and pillar	Furnace	Steam	Mule.
Barrowman & Oakley.		North of Carbonado.		Slope	Room and pillar	Furnace	Steam	Mule.
G. Clough		North of Carbonado.		Slope	Room and pillar	Fan	Steam	Mule.
F. Schultz		1 mile north of Oskaloosa.		Slope	Room and pillar	Furnace	Steam	Rope, mule.
Evans Coal Co.		4 1/2 miles NE of New Sharon.		Slope	Room and pillar	Furnace	Horse	Mule.
W. F. Williams	3	3 1/2 miles NE of New Sharon.		Shaft	Room and pillar	Furnace	Horse	Mule.
Geo. Cook		West of Oskaloosa.		Shaft	Room and pillar	Fan	Steam	Mule.
Oskaloosa Fuel Co.		1 1/2 miles west of Oskaloosa		Shaft	Room and pillar	Furnace	Horse	Mule.
M. Carey		4 miles NW of Rose Hill.	C. R. I. & P.	Shaft	Room and pillar	Furnace	Horse	Mule.
Little-Hoover Coal Co.		Sw of Oskaloosa.	C. R. I. & P.	Shaft	Room and pillar	Furnace	Horse	Mule.
Sowden Coal Co.		N of Beacon		Shaft	Room and pillar	Furnace	Horse	Mule.
Frey Bros.		1 1/2 miles SE of Leighton		Shaft	Room and pillar	Furnace	Horse	Mule.
Wm. Patterson & Son.		1 1/2 miles SE of Leighton		Shaft	Room and pillar	Fan	Steam	Tail rope, mule.
American Coal Co.	5	2 miles W of Evans.	C. R. I. & P.	Slope	Room and pillar	Fan	Steam	Rope, mule.
Richard Bros.		1/2 miles W of Evans.	C. R. I. & P.	Shaft	Room and pillar	Fan	Steam	Mule.
Garfield Coal Co.		1 1/2 miles W of Evans.	C. R. I. & P.	Slope	Room and pillar	Fan	Steam	Tail-rope, mule.
Garfield Coal Co.	1	Nw of Beacon	C. R. I. & P.	Slope	Room and pillar	Fan	Steam	Tail-rope, mule.
Oskaloosa Coal and Mining Co	2	1 mile W of Beacon	C. R. I. & P.	Shaft	Room and pillar	Fan	Steam	Tail-rope, mule.
Oskaloosa Coal and Mining Co	3	2 miles S of Beacon	C. R. I. & P.	Slope	Room and pillar	Fan	Steam	Tail-rope, mule.
Mahaska Coal and Mining Co	4	1 miles S of Beacon	C. C. & N. W.	Slope	Room and pillar	Fan	Steam	Tail-rope, mule.
Eveland Coal Co.	4	Eveland.	C. & N. W.	Shaft	Room and pillar	Fan	Steam	Mule.

KEOKUK COUNTY.

CORPORATION, FIRM OR OPERATOR	Mine No.	LOCATION OF MINE.	RAILROAD CONNECTION, IF ANY.	Kind of Open'g.	PLAN OF WORK-ING MINE.	Means of Ven-tilation.	Kind of Hoist.	KIND OF HAULAGE.
M. Fisher		S of Delta		Shaft	Room and pillar	Furnace	Horse	
R. W. Allsup		3 miles N of Delta		Shaft	Room and pillar	Furnace	Horse	
Bell & Teeters		3 miles N of Delta		Shaft	Room and pillar	Furnace	Horse	
Volunteer Coal Co.		1 1/4 miles NE What Cheer	C. R. & N.	Shaft	Room and pillar	Fan	Steam	Mule
Margaret Coal Co.		1 mile N of What Cheer	B. C. R. & N.	Shaft	Room and pillar	Fan	Steam	Mule
T. Armstrong		E of What Cheer		Shaft	Room and pillar	Furnace	Horse	
T. Mason		E of What Cheer		Shaft	Room and pillar	Furnace	Horse	
Hugh Murray		N of What Cheer		Shaft	Room and pillar	Furnace	Horse	
Wm. Platt		N W. of What Cheer		Slope	Room and pillar	Furnace		Rope, mule
Grudings Bros.		S of What Cheer		Shaft	Room and pillar	Furnace	Horse	Mule
D. Peacock		S of What Cheer		Shaft	Room and pillar	Furnace	Horse	
Crescent Coal Co	4	2 3/4 miles NW of What Cheer	C. & N. W.	Shaft	Room and pillar	Fan	Steam	Mule
Hommerin & Son		2 miles NW of What Cheer	C. & N. W.	Shaft	Room and pillar	Jet	Steam	Mule
Baker Bros		2 3/4 miles NW of What Cheer	C. & N. W.	Shaft	Room and pillar	Fan	Steam	(New mine)
Lambert Bros.		1 3/4 miles W of What Cheer	C. & N. W.	Shaft	Room and pillar	Fan	Steam	Mule
Columbian Coal Co	3	2 miles W of What Cheer	C. & N. W.	Shaft	Room and pillar	Fan	Steam	Mule

LUCAS COUNTY.

Whitebreast Fuel Co. of Ill.	4	Cleveland	C. B. & O.	Shaft	Room and pillar	Fan	Steam	Mule
Big Hill Coal Co.		Lucas	C. B. & O.	Shaft	Room and pillar	Fan	Steam	Mule
Lucas & Cleveland Coal Co.		1 mile E of Lucas	C. B. & O.	Shaft	Longwall	Fan	Horse	Mule

MARION COUNTY.

Buwalda Bros		2 miles NW of Pella		Shaft	Room and pillar	Jet	Steam	
J. R. Dieleman		1 1/2 miles NW of Pella		Shaft	Room and pillar	Jet	Steam	
Forest Fuel Co		1 1/2 miles west of Otley	C. R. I. & P.	Slope	Room and pillar	Furnace		Rope, mule
McCroskey & Co.		W of Otley		Slope	Room and pillar	Furnace		Rope, mule
Wm. Pace & Co.		W of Otley		Slope	Room and pillar	Furnace		Mule.
Roberts & Young		W of Otley		Slope	Room and pillar	Furnace		Mule.

Youkon Coal Co.		W of Otley		Slope	Room and pillar	Furnace		Mule.
Wild Rose Coal and M. Co.		Morgan Valley	Wabash	Shaft	Room and pillar	Fan	Steam	Rope, mule.
Dunreath Coal Co		Dunreath		Slope	Room and pillar	Furnace		Mule.
H. Booth		4 1/2 miles SE of Knoxville		Slope	Room and pillar	Furnace		Mule.
Hawkeye Coal Co.		4 1/2 miles SE of Knoxville		Slope	Room and pillar	Furnace		Mule.
S. R. Rollings		Flagler	C. B. & Q.	Shaft	Room and pillar	Fan	Steam	Mule.
O. K. Coal Co.	5	5 miles W of Bussey	Wabash	Sh. ft.	Room and pillar	Fan	Steam	Mule.
O. K. Coal Co	6	1 mile W of Bussey	C. B. & Q.	Slope	Room and pillar	Furnace		Rope, mule.
Hamilton Coal Co.	3	2 miles NW of Hamilton	C. B. & Q.	Shaft	Room and pillar	Furnace	Horse	Mule.
Ennis & Stillwell		W of Hamilton		Shaft	Room and pillar	Furnace	Horse	
George Davis	1	NW of Hamilton		Shaft	Room and pillar	Furnace	Horse	
Donley Coal Co.	1	Hamilton	Wabash	Shaft	Room and pillar	Fan	Steam	Tail-rope, mule.
Donley Coal Co.	2	3 miles NW of Hamilton		Slope	Room and pillar	Furnace		Rope, mule.
Donley Coal Co.	3	3 miles NW of Hamilton		Slope	Room and pillar	Furnace		Mule.

SCOTT COUNTY.

A. McDonald		2 1/2 miles NW of Buffalo		Shaft	Room and pillar	Furnace	Horse	Pushers handle the cars.
Ed. McColough		N of Buffalo		Shaft	Room and pillar	Furnace	Horse	
Metzger & Kaucher		Jamestown		Shaft	Room and pillar	Furnace	Horse	
L. Long		Jamestown		Shaft	Room and pillar	Furnace	Horse	
Chas. Sass		Jamestown		Shaft	Room and pillar	Furnace	Horse	
E. T. Langwith		Jamestown		Shaft	Room and pillar	Furnace	Horse	
Buchmeier & Carlin		Jamestown		Shaft	Room and pillar	Fan	Steam	
Theo. Krantz		Two miles west of Buffalo		Shaft	Room and pillar	Furnace	Horse	
Thos. Webster		Two miles west of Buffalo		Shaft	Room and pillar	Furnace	Horse	

ADAMS COUNTY.

J. M. Henton		Eureka		Shaft	Longwall	Furnace	Horse	The miners push and cage their own coal.
Ed. Amdor		1 1/4 miles NW of Eureka		Shaft	Longwall	Furnace	Horse	
W. R. Miller		Briscoe		Shaft	Longwall	Furnace	Horse	
C. W. Powley		Briscoe		Shaft	Longwall	Furnace	Horse	
N. S. Wheelen		Carbon		Shaft	Longwall	Furnace	Horse	
Rice & Collins		Carbon		Shaft	Longwall	Furnace	Horse	
John Ruth		Carbon		Shaft	Longwall	Furnace	Horse	
Rees & Perks		Carbon		Shaft	Longwall	Furnace	Horse	
E. McKee		Carbon		Shaft	Longwall	Furnace	Horse	
M. Jones		Carbon		Shaft	Longwall	Furnace	Horse	
T. Gebbie		Carbon		Shaft	Longwall	Furnace	Horse	
S. O. Trowbridge		Carbon		Shaft	Longwall	Furnace	Horse	
I. F. Wilds		Carbon		Shaft	Longwall	Furnace	Horse	
R. Hathaway		Hoyt		Shaft	Longwall	Furnace	Horse	
Day Bros		Hoyt		Shaft	Longwall	Furnace	Horse	
Jas. Spargur		Hoyt		Shaft	Longwall	Furnace	Horse	

WARREN COUNTY.

CORPORATION, FIRM OR OPERATOR.	Mine number.	LOCATION OF MINE.	Railroad connections, if any.	Kind of opening.	PLAN OF WORKING MINE.	Means of ventilation.	Kind of hoist.	KIND OF HAULAGE.
Wishman & Cumming	3 miles north of Somerset.	Shaft	Room and pillar	Furnace	Horse	In some of the mines pushers are employed, in others the miners push and cage the coal.
Hart & Burt	3 miles NE of Somerset.	.....	Shaft	Room and pillar	Furnace	Horse	
Stout & Bennum	Somerset.	.....	Shaft	Room and pillar	Furnace	Horse	
Welch Bros Coal Co.	4 1/2 miles east of Somerset.	.....	Shaft	Longwall	Furnace	Horse	
Somerset Coal Co.	Somerset.	C. R. I. & P.	Shaft	Room and pillar	Furnace	Horse	
King & Turnipseed	Somerset.	.....	Shaft	Room and pillar	Furnace	Horse	
N. D. Bates	Milo	.....	Shaft	Room and pillar	Furnace	Horse	
W. C. Williams	Milo	.....	Shaft	Room and pillar	Furnace	Horse	
J. C. Williams	Liberty Center.	.....	Shaft	Room and pillar	Furnace	Horse	
Ed. Rowley	Liberty Center.	.....	Shaft	Room and pillar	Furnace	Horse	

MINES OPENED AND ABANDONED IN THE LAST TWO YEARS.

MASHASKA COUNTY.

MINES OPENED.	MINES ABANDONED.
American Coal company No. 5. Regal Coal company. Smith Bros. No. 2. Little-Hoover Coal company. Atwood Coal company No. 2. Kennebec Coal company Eveland Coal company. Lost Creek Fuel company No. 2.	American Coal company No. 2. American Coal company No. 4. Cardiff Coal company. Consolidation Coal company No. 7. Consolidation Coal company No. 8. Atwood Coal company No. 1. Smith Bros. No. 1. D. Howarth.

MARION COUNTY.

O. K. Coal company No. 5. Forest Fuel company. I. R. Dieleman. McLaughlin & Payne.	O. K. Coal company No. 4. J. H. Reddish.
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KEOKUK COUNTY.

Volunteer Coal company. Lambert Bros. Margaret Coal company.	Klondike Coal company. J. M. Olive. Thomas Bros.
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SCOTT COUNTY.

Buchmeier & Carlin No. 2. Thos. Webster. L. Long. Chas. Sass. E. T. Langwith	Clintner & Hanlon. Blackwell & Fridley. Buchmeier & Carlin No. 1.
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WARREN COUNTY.

Welch Bros. No. 2. King & Turnipseed	
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FATAL ACCIDENTS.

Table showing Fatal Accidents in District No. 2, for the two years ending June 30, 1901.

DATE.	NAME OF DECEASED.	OCCUPATION.	CAUSE OF DEATH.	MINE WHERE ACCDT. OCCURRED.	COUNTY.
August 7, 1899	Art Geddes	Miner	Fall of slate	American No. 2	Mahaska.
August 15, 1899	Jas. Kalonda	Miner	Flying coal from shot	Crescent No. 4	Keokuk.
October 21, 1899	Wm. H. Smith	Miner	Fall of slate	Garfield	Mahaska.
November 3, 1899	John McKenzie	Weighman	Falling down shaft	Cleveland No. 4	Lucas.
December 22, 1899	Rob Gray	Miner	Fall of slate	Klondike	Keokuk.
January 9, 1900	I. B. Carpenter	Miner	Fall of slate	McCollough's	Lucas.
January 25, 1900	John Evans	Driver	Run over by car	Consolidation No. 8	Mahaska.
February 2, 1900	L. H. McCune	Miner	Flying coal from shot	York No. 1	Marion.
February 27, 1900	Jas. Graham	Miner	Falling down shaft	American No. 5	Mahaska.
June 14, 1900	A. Anderson	Mine foreman	Run over by tail rope trip	Mahaska C. & M. Co's.	Mahaska.
July 18, 1900	W. Dotey	Miner	Fall of slate	Kennebec	Mahaska.
August 3, 1900	P. Anisi	Miner	Fall of slate	American No. 5	Mahaska.
August 31, 1900	Wm. Whalley	Miner	Fall of boulder	Big Hill	Lucas.
September 11, 1900	N. Brandt	Weighman	Run over by water car	Forest Fuel Co's.	Marion.
September 27, 1900	N. T. Cooley	Miner	Fall of slate	H. Booth's	Marion.
October 17, 1900	L. Gulliman	Driver	Run over by car	Oskaloosa No. 2	Mahaska.
November 3, 1900	P. Sofranko	Driver	Run over by car	Whitebreast No. 28	Mahaska.
November 21, 1900	W. Turner	Miner	Windy shot	Consolidation No. 8	Mahaska.
December 14, 1900	J. D. Williams	Driver	Fall of slate	Lucas and Cleveland	Lucas.
January 5, 1901	Thos. H. Bennett	Shot firer	Explosion	Cleveland No. 4	Lucas.
January 5, 1901	W. A. Jenkins	Shot firer	Explosion	Cleveland No. 4	Lucas.
March 11, 1901	R. Gibbons	Driver	Run over by car	Lost Creek No. 2	Mahaska.
May 29, 1901	L. Williams	Miner	Fall of slate	Garfield	Mahaska.

NON-FATAL ACCIDENTS

In District No. 2, for the two years ending June 30, 1901.

DATE OF ACCIDENT	NAME OF INJURED	OCCUPATION	CHARACTER OF INJURY	CAUSE OF INJURY	MINE WHERE ACCIDENT OCCURRED	COUNTY
July 6, 1899	Jos. Sedlock	Miner	Shoulder blade broken	Fall of slate	Klondike	Mahaska.
July 17, 1899	K. W. Maffin	Miner	Head and face bruised	Fall of slate	Oskaloosa Fuel Co.	Mahaska.
January 8, 1900	John Paul	Miner	Face and hands burned	Blown-out shot	Kennebec	Mahaska.
January 8, 1900	John Bell	Miner	Face and hands burned	Blown-out shot	Kennebec	Mahaska.
February 2, 1900	F. Rosprim	Miner	Leg and arm broken	Fall of slate	Cleveland No. 4	Lucas.
February 14, 1900	John Adams	Miner	Rib broken	Fall of slate	Iowa Fuel Co.	Mahaska.
March, 1900	Jos. Hoeler	Timberman	Knee injured	Fall of slate	O. K. No. 4	Marion.
March 24, 1900	H. Wilson	Driver	Both legs broken	Run over by car	Iowa Fuel Co.	Mahaska.
April 19, 1900	S. Evans	Trapper	Bruised about hips and abdomen	Caught by car	Whitebreast No. 28	Mahaska.
May, 1900	J. O'Connell	Miner	Back injured	Fall of slate	American No. 5	Mahaska.
June 15, 1900	P. Kemmark	Miner	Two ribs broken	Fall of slate	Columbian	Keokuk.
June 16, 1900	E. Brown	Miner	Hip dislocated	Fall of coal	Iowa Fuel Co.	Mahaska.
June 20, 1900	A. Lehigh	Miner	Back and hips bruised	Fall of slate	T. J. Hayes	Marion.
August 21, 1900	J. Barber	Miner	Leg broken	Run over by car	Cleveland No. 4	Lucas.
August 23, 1900	A. Gulliman	Miner	Leg broken	Fall of coal	Osk. C. & M. Co. No. 2	Mahaska.
September 21, 1900	K. Jones	Miner	Knee dislocated	Fall of slate	Forest Fuel Co.	Marion.
September 25, 1900	T. Baldwin	Driver	Cut and Bruised	Caught between cars	Crescent	Keokuk.
November 10, 1900	V. Manilla	Miner	Foot crushed	Fall of slate	Donley	Marion.
November 12, 1900	A. Thompson	Miner	Foot crushed	Fall of slate	Donley	Marion.
November 21, 1900	J. Kramer	Miner	Hip dislocated	Fall of slate	Garfield	Mahaska.
December 1, 1900	Thos. Hyde	Miner	Face and head injured	Flying coal from shot	Columbian	Keokuk.
December 23, 1900	Bard	Miner	Leg broken	Fall of coal	Huff & Baber	Warren.
January 6, 1901	A. Anderson	Miner	Hand crushed	Fall of slate	Donley	Marion.
January 18, 1901	B. Whacker	Miner	Leg broken	Fall of slate	Garfield	Mahaska.
February 12, 1901	B. Hartshorn	Miner	Breast bruised, head cut	Fall of slate	Big Hill	Lucas.
March 7, 1901	J. Beitel	Cager	Foot injured	Fall of slate	Big Hill	Lucas.
March 10, 1901	Jacob Luke	Driver	Left ankle fractured	Run over by car	Cleveland No. 4	Lucas.
March 22, 1901	D. Esgan	Miner	Three fingers crushed	Fall of coal	Crescent	Keokuk.
March, 1901	D. Hayes	Driver	Arm broken	Caught betw'n car and timber	J. T. Hayes	Marion.
April 10, 1901	S. Parlett	Driver	Toes crushed	Run over by empty car.	Wild Rose	Marion.
April 26, 1901	D. Reigel	Superintendent	Rib broken	Thrown under car	Regal	Mahaska.
May 24, 1901	J. Rickabaugh	Miner	External injuries	Struck by flying coal	Forest Fuel Co.	Marion.
May 24, 1901	J. Moorman	Miner	External injuries	Struck by flying coal	Forest Fuel Co.	Marion.
June 5, 1901	A. Pointer	Miner	Arm fractured	Jumping from runaway trip.	Whitebreast No. 28	Mahaska.
June 5, 1901	M. Serottnock	Miner	External injuries	Jumping from runaway trip.	Whitebreast No. 28	Mahaska.
June 5, 1901	J. Stillwell	Miner	Hand crushed	Caught betw'n car and timber.	Donley No. 1	Marion.
June 11, 1901	J. D. Clark	Foreman	Two ribs broken	Fall of slate	Lucas & Cleveland	Lucas.

Fatal and non-fatal accidents from July 1, 1899 to June 30, 1901, with relation to tonnage and number of employes.

COUNTY.	NUMBER OF ACCIDENTS.		NUMBER OF TONS OF COAL PRODUCED.	TONS OF COAL PRODUCED FOR EACH ACCIDENT.		No. of employes.	NO. EMPLOYEES FOR EACH ACCIDENT.	
	Fatal.	Non-fatal.		Fatal.	Non-fatal.		Fatal.	Non-fatal.
Mahaska	12	15	2,308,426	192,360	153,500	2,261	188	151
Keokuk	2	4	561,490	280,745	140,373	572	286	143
Lucas	6	0	382,999	63,831	63,833	482	480	80
Marion	3	11	432,175	144,058	39,269	509	170	46
Scott			42,110			85		
Adams			34,751			130		
Warren		1	38,377		38,377	71		71
Total	23	37	3,800,337	165,232	102,704	4,110	179	111

The number of fatal accidents in the last two years has been exceptionally large. It is a difficult matter to account satisfactorily for this increase, especially where we must concede that fair efforts have been made by the operators in a general way to promote the safe working of their mines, that the mines themselves have not become more dangerous, and that the work performed in them has not been of more hazardous nature than it was two, three, or more years ago. In talking over this feature of accidents with some parties interested in mining, the claim was made, that to some extent the shortening of the working day in the mines from ten to eight hours was responsible for the increase of fatalities. They referred to arguments and statistics used during a recent session of the British Parliament by the opponents of a bill pending before that body to legalize the eight-hour day in all the mines of Great Britain. Their main argument, however, was that the miners, eager to make about the same wage for the shorter workday, that they had made for the longer one, would give too much attention to the getting of the coal and take risks they would not have taken had they more time at their disposal to do their work properly. Taking this argument together with the bare fact that more accidents occurred in this district during the last biennial period and under the eight-hour day than during any like period, when the mines were running ten hours, seemingly makes it appear that there might be considerable truth in their assertion; but an analysis of the accidents themselves and their causes shows that their position is not tenable, and that there is absolutely no proof that the shortening of the workday had anything to do with the increase of accidents.

It may look to the casual observer that a reduction in the hours of labor per day should also result in a reduction of accidents incidental to the performance of such labor. This seems a reasonable conclusion, but there are reasons why it may not prove correct as far as the mining business of this district is concerned. The shorter workday does not lessen the dangers incident to travel to and from the working face, and it does not in any manner decrease the danger on account of the blasting; it may necessitate the employment of a greater number of men to get out about the same amount of coal that was produced under the old system, or, if the working force is not increased, the mines may be operated a greater number of days. But, even if it is questionable that the shorter workday has brought with it an increased measure of safety, the proposition to consider it an additional source of danger cannot be regarded seriously and of weight, because it is opposed to reason and to fact.

By placing the fatal accidents of the last two years in groups, we find that six were caused directly or indirectly through the use of powder for blasting purposes, eight occurred on the haulage roads or while the deceased were handling cars, and eight were due to falls of roof near or at the working face.

Three of the deaths due to blasting were caused by carelessness on the part of the men killed, but as to the other three men, who lost their lives on the same account, no charge of carelessness or recklessness can be made. Three of the accidents occurred where the powder was ignited by squibs, and the other three, where fuse was used for that purpose. It is still a much debated question in this district as to whether the squib or fuse is the safer to use. The facts developed in two of the above cases indicate that had the

men used fuse instead of squibs, they would not have lost their lives in the manner they did. In two of the three cases where the powder was ignited by fuse, there is nothing to show that the use of fuse was in any way responsible for the men's death, and in the third case it was foolhardiness and thoughtlessness that caused the accident. The man had been in the habit of firing his shots with fuse, but instead of lighting them at the same time, would first light one, and after that had gone, would go back and light the second. He was warned that such practice was very dangerous, but he persisted. On the day of the accident the fire from the first shot ignited the fuse of the second, and when he arrived at the room face, intending to light it, the charge exploded, and he paid the penalty for his rash act. The main objection to the use of fuse seems to be that it permits the miner to tamp the holes insufficiently and improperly, making blown-out shots more frequent and more dangerous. There is considerable proof that the objection is not an idle one, but it must be admitted that the use of squibs is by no means a sure preventive of blown-out shots and explosions that may result from them, and what greater safety it may afford on this score is more than counterbalanced by the dangers it carries with it in other directions. The squib may be used with profit when only one shot is fired in a place, but if two or more shots are required, I believe the fuse is safer, especially if the same care is taken in tamping the holes that is taken when the squib is used.

Five drivers were killed and four more seriously injured in this district during the last two years. Eighty per cent of the deaths and 75 per cent of the non-fatal accidents were caused by the extremely dangerous practice of riding the tail chain. When one contemplates the daring feats of the driver, as they stand poised on the chain in front of the loaded car, heavily topped with coal, going through the narrow entries at a high rate of speed, where there is not one chance in ten to escape serious injury or death, should the car jump the track or the mule stumble, one may well wonder that the list of killed and injured is not a great deal larger. The practice of riding the tail chain should be stopped or else adequate provisions made to make the driver's work less dangerous.

A considerable number of fatal accidents occurring at the working face was apparently unforseen, and could not well be guarded against, but there were some that might have been avoided, had a little more care been used. It has been truly said that there is little hope for a substantial reduction in fatalities, until a sense of personal care can be instilled into the miner.

SCALES TESTED.

During the last two years twenty-five scale tests were made. Fourteen tests proved the scales to be in good condition and eleven tests showed that adjustment was necessary.

THE MINE FOREMAN LAW.

Since January 1, 1901, the law requiring mine foremen, in mines with an average daily output of twenty-five tons of coal, to have a State certificate

of competency, has been in force. The object of the law is to increase the safety and provide better sanitary conditions in the mines of Iowa by permitting only men to be in charge who have proved themselves qualified, as far as such qualifications may be determined by examination and investigation, to work them intelligently and safely.

In a general way the law has been well received. There are some, however, who do not regard it in a favorable light. Their claim is that the law discriminates against men of practical experience, who have not had the advantage of the technical training needed to enable them to get a certificate, but who are by virtue of their practical knowledge amply able to manage a mine successfully. I think this is a mistake. Practical experience is a broad and indefinite term. It may mean much, it may mean little, and it is certain that its value cannot be justly measured by the number of years one has been employed in the mines. No man, who is possessed of the right kind of practical experience and knowledge, such as a mine foreman must necessarily have to perform his work intelligently and successfully, need fear that he will not be able to secure a certificate.

One good feature of the law has already become evident. Its enactment has proved an additional incentive to the ambitious miner to supplement his practical knowledge by study. Increased knowledge means better service. I believe it will be to the advantage of the operators to encourage the desire for self-improvement among their men. Some operators have already done this for some time, and the fact that they are still doing it seems evidence enough that they are satisfied with the results obtained.

For various reasons the cost of opening, equipping and working mines in this State is steadily increasing, and fair returns on mining investments depend more than ever on careful and judicious management. Of how much benefit the enactment of the mine foreman law will prove in this connection remains for the future to reveal. In those coal producing States, where similar laws are in force, results in that direction have been satisfactory, and there is no reason to doubt that this will be the case in Iowa.

THE EXPLOSION AT CLEVELAND NO. 4 MINE, AND SOME REMARKS ON "DUST" EXPLOSIONS.

On Saturday, January 5th, 1901, about 4 o'clock P. M. an explosion occurred in No. 4 mine at Cleveland, Ia., in which two shotfirers, T. Bennett and W. A. Jenkins lost their lives. I was immediately notified and on the morning of January 6th, accompanied by a party of miners and the representatives of the company, examined the part of the mine where the explosion had taken place. It was found that the explosion originated at the face of the third East entry on the North side. Three shots had been fired. One of these had worked all right, the second had blown off the "heel" and left about 3½ feet of the hole solid, and the third, which was located in the break-through just started, had blown the tamping on Friday, been recharged on Saturday, but had again failed to bring down the coal. The face of the entry was about 70 feet ahead of the last break-through. The entry had passed through a small depression, but for the last 25 yards had been going to the rise. The coal at the face was much

charred, indicating that the heat developed must have been exceedingly intense.

At the inquest held in the afternoon of January 6th the following facts were brought out:

Blasting was done once a day at the end of the shift. During firing time nobody was allowed in the mine except the shotfirers, six in number. Four of these fired the shots on the South side and two fired them on the North side. Fuse was used to ignite the powder. The shotfirers also examined all holes as to depth etc., before they were charged and had the right to refuse to fire any shot that, in their judgment, was unsafe.

About 4 o'clock P. M. on Saturday, January 5th, the men working around the top of the shaft were startled by a rumbling noise and the appearance of a large cloud of dust and smoke from the mouth of the shaft. The alarm that an explosion had occurred was at once given, and in a few moments a rescuing party composed of D. O. Campbell, Superintendent, John Luke, Mine Foreman, George Wright, W. J. Thomas, and W. J. Davis were ready to enter the mine. In the mean time the fan, which was always run at a low rate of speed during the time of firing, was speeded up. When the rescuing party reached the bottom of the shaft, they were met by the four shotfirers from the South side, who had felt the shock from the explosion and becoming alarmed, had immediately made their way to the shaft. The party re-inforced by the four shotfirers proceeded north through the still strong afterdamp, stopping only to make absolutely necessary repairs, urged on by the hope that they might be in time to find Bennett and Jenkins still alive. When they reached the mouths of the third and fourth East, it became evident that the explosion had occurred in one of these entries. On the West rib of the Main North and opposite these entries were large heaps of dust and fine coal. Turning east along these entries, the stoppings were found in bad shape and the afterdamp very strong. They pushed on, however, and finally found Bennett lying between rooms 9 and 10 on the fourth East entry and Jenkins between rooms 10 and 11. The hope of the rescuers to find these men alive was not to be realized, for both were dead when they reached them. While the bodies and the clothes on them were considerably burned, appearances indicated that it was not the fire, but the initial force of the explosion that had caused their death. Judging from the condition of the bodies death must have been instantaneous. The last inspection of the mine, prior to the explosion, was made October 30th, 1900. Generally speaking the mine was then found to be in fair condition. The ventilation on the north side was good. The mine is the deepest in the State, the depth of the shaft being 321 feet. It was opened in 1899 and is well equipped in every way. Ventilation is maintained by a force fan, 20 feet in diameter, producing ordinarily about 4,500 cubic feet of air per minute. The mine is free from fire damp. Just one month after this explosion, another occurred in the same locality. It originated in Room 13 on the fourth East entry. Two shots were fired in this room and they worked fairly well, although somewhat overpowdered. The two shotfirers, M. Davis and R. Edwards, were found by the rescuing party in Room 10 on the same entry in an unconscious state. They were speedily removed from the damp-laden atmosphere to fresh air and soon recovered.

Naturally the disastrous ending of the first explosion brought about a

feeling of dread and insecurity on the part of the men employed in No. 4 mine. To remove this feeling, and to devise means to work the mine with greater safety in the future, arrangements were made for a conference between the representatives of the company and a committee chosen by the miners. The parties came together early on Tuesday morning, January 8th, and remained in session all day. They investigated diligently the cause of the explosion, and considered carefully the measures that were suggested as helpful to avert a like disaster hereafter. They agreed to recommend to the miners for adoption such measures, in addition to the already existing rules, as they thought adequate to reduce the danger from shot-firing to a minimum. The miners accepted the recommendations of the conference, and pledged themselves to work in conjunction with the representatives of the company to promote the safe working of the mine in the future. This action did much to remove the feeling of dread and apprehension that was apparent everywhere before the conference was held, and the fact that fourteen volunteers offered their services as shot-firers furnished sufficient evidence to show that confidence had been restored in a remarkable degree. It is true another explosion occurred since in this mine, but that is no proof that the joint action of the representatives of the company and the miners had been barren of satisfactory results.

I believe this conference has been of much practical value. It brought to the men a better realization and understanding of the danger before them, and was the means of uniting them and the representatives of the company in the praiseworthy effort to work intelligently together for better preservation of life and property. The example set by the miners of Cleveland and their employers is certainly worthy to be followed by the miners and operators throughout the state. Co-operation in this direction is a reasonable and feasible way to lessen the number of accidents in the mines; it is the best means of arriving at a better understanding as to their causes and manner of prevention; it divides the responsibility, and will certainly result in the adoption of desirable and beneficial mine regulations and in better and more general observance of them.

Much has been said about the so-called "dust" explosions in non-gaseous mines, and many suggestions have been offered to prevent them, yet notwithstanding all this, explosions of this character are not becoming less frequent and the fearful loss of life caused by them has not been diminished to any appreciable extent. It is a difficult matter to account for this satisfactorily. I believe, however, that the main reason may be found in the fact that the causes of these explosions are not as thoroughly understood as they should be, and that in consequence measures of prevention were adopted in many instances, that proved either faulty or ineffective altogether. I think it can be truly said that all efforts to legislate these explosions out of existence have been ineffective, and that even general laws, intended to regulate shotfiring in mines, have been of doubtful value. On account of the requirement that only the shotfirers be allowed in a mine at firing time, such laws have perhaps prevented great loss of life, but aside from that they have proven so far inadequate to remove the danger itself. The reports from States, having such laws, show that the work of the men doing the shotfiring is seemingly performed under as hazardous conditions as ever and the number of shotfirers killed each year in this State proves the fact. The

trouble is, there has been too much dependence on the law-making power of a legislature to provide greater safety in the mines and too little individual effort on the part of the miner and operator to do for themselves, what they expect others to do for them.

Explosions in non-gaseous mines are said to be caused by the flames of blown-out or overcharged shots extracting and igniting the volatile matter of coal dust, stirred up and suspended in the air within reach of the flame by the concussion from the firing of such shots. Most writers on this subject enlarge especially on the danger of the presence of *dry* coal dust, and the claim is made that blown-out or overcharged shots will prove harmless, if the dust in the vicinity of the shots fired is kept in a damp condition. Some even say that the watering of the roadways alone will effectually remove all danger. Mr. Pameley says on this point: "Roadways should be systematically watered so as to damp the dust, and thus render it harmless." Mr. Hughes makes this statement: "It may now be regarded as established that small amounts of moisture are sufficient to prevent the possibility of coal dust being ignited, and at many collieries the main roads are regularly watered." I believe that the sprinkling of dusty roadways has a beneficial effect, it may afford some protection and it is certainly to be commended as a sanitary measure, but I think the above named gentlemen claim too much in this respect. If their views, that damp roadways are an absolute protection against explosions in non-gaseous mines, are correct, a number of explosions, where this condition existed in a marked degree, should not have occurred. But they occurred, nevertheless, and damp roadways apparently did not even mitigate their severity and destructiveness. I will mention only one instance. Some years ago, the owners of the Vulcan mine at New Castle, Col., realizing that the easy inflammability of the coal dust in that mine required extra precautions, concluded to install an elaborate sprinkling system, that would keep the mine at all times in a thoroughly damp condition. Along the entries pipes were laid, perforated in such manner that the water forced out under considerable pressure in fine sprays, moistened not only the bottom of the entries, but sides and roof as well. The owners did not stop with only keeping the entries damp. At the mouth of each room was a suitable arrangement to attach to the main pipe a hose, long enough to reach the room face, and before a miner was allowed to fire a shot in his room, it had to be thoroughly wetted down. Now, if dampening the dust furnishes an unfailling prevention of explosions, it should have proved its effectiveness in this case. The fact is, the explosion which occurred in this mine, was a most disastrous one. Every man in the mine was killed and the mine itself almost destroyed by its force. The mine at the time of the explosion was of comparatively small extent and well ventilated, between 54,000 and 60,000 cubic feet of air passing into it every minute.

Is it not strange, with such example before us, that of all the works of mining experts, I have looked up on the question of coal dust, there is only one (Coal and Metal Miners Pocketbook, 6th ed.,) that gives warning that "too much faith must not be placed in the use of water by sprinkling for laying the dust." When evolving theories regarding these explosions it seems well to consider carefully all the conditions and details about them as far as they can be established by close investigation. Taking the first

explosion in Cleveland No. 4 as an example, the initial force developed must have been very great, for only a short distance from the starting point of the explosion large rocks, some of them weighing several hundred pounds, had been picked up and carried quite a distance. In the Pekay explosion in 1892 chunks of fire clay were uprooted and thrown against the coal and roof in such manner as to give that part of the mine the appearance of having been whitewashed in spots. The advocates of the sprinkling system claim that their method is safe, because the dampness of the dust will prevent it from rising into the path of the flame. This would perhaps be true if the display of force accompanying or rather preceding the flames could be eliminated, but I submit that, if the force developed can dig up the clay and toss large rocks about, it can surely elevate and separate from each other the damp particles of coal dust and hold them in suspension long enough for the flames to reach them and distill and ignite the gases they contain. It may require a greater initial degree of heat than if the dust was in a dry and finely divided state, and in all probability, if the mine is naturally damp all over, the scope of the explosion may be limited to some extent, yet there seems to be no ground for assurance that an explosion even under these apparently unfavorable conditions may not be as disastrous as one occurring in a perfectly dry mine.

I do not like the term "dust explosion." The term, in my opinion, is confusing, it obscures the real cause, it leads one to attach too much importance to the dust and tends to detract attention from other features that in all probability have a great deal more to do with bringing an explosion about than the dust itself. I have no intention to belittle the influence of the dust in extending and magnifying the force of an explosion already under way, but I believe it is wrong to assign the presence of coal dust as the main cause of it.

There are no data as to the amount of dust that must be ignited to carry on an explosion started by blown-out or overcharged shots. I believe, however, the amount of dust needed is comparatively small, and considerably less than is generally supposed. The claim made by many, that the greater the amount of dust present, the greater the severity of an explosion, appears to be not in keeping with the facts. We know that excessive use of fuel in firing a boiler results in a lower degree of heat in the fire-box and a consequent lessening of the steam producing power. Now, I will not go so far as to say that an excessive supply of coal dust to the advancing flame of an explosion will weaken the explosion, but I believe I have reason and facts on my side, when I state that such excessive supply cannot in any way add to its power. Only a certain quantity of dust, varying according to conditions in each case, can be effectively ignited by the flames of an explosion, and in my judgment, the mine containing just enough dust to supply the flames of an explosion all it can readily consume is at least fully as dangerous as the mine with larger accumulations of dust, provided, of course, that other conditions are identical. It appears to be not a question as to the amount of fuel available, but as to how much of it can be used under the circumstances with the greatest possible effect.

Some years ago several governments in Europe appointed commissions to investigate and establish the cause of these explosions. These commissions did a large amount of experimental work and their experiments

proved of considerable value to all interested in mining, but as they were principally conducted with the view to establish the dangerous character of the coal dust in the presence of heat and flame from blown-out or overcharged shots, other features brought out by them did not at the time receive the attention they deserved, and in consequence of that fact the deductions made were not always as complete and exact as they might have been had these features received more careful consideration. There is ample excuse for this, however, for it must be remembered that the experiments were necessarily conducted under conditions that differed materially in many respects from those existing in an actual mine, and it could hardly be expected that absolutely correct deductions would be possible under such circumstances.

As an illustration of the manner of conducting these experiments and reaching conclusions from results obtained, the following furnishes an interesting and valuable example. The experiment and investigation was made by Messrs. Hall and Clark of England. It was carried on in a slope of thirty square feet sectional area, arched with brickwork and driven down from the surface a distance of forty-five yards. The charge of powder was fired from a strong iron tube, two feet long and two and one-half inches diameter. This is their description of the experiment and its results: "Coal dust having been scattered the whole length of the slant, the thill being very wet, fired two and one-half pounds of powder. In this case flame issued strongly at the mouth of the slant, having traveled forty-five yards. The blast was very fierce, and would certainly have proved fatal to anyone struck by it in its course. It was noticeable in this experiment that not only was the flame largely increased, but the blast was also proportionately greater, and bearing in mind that the floor of the slant was very wet (dripping), and the temperature low (50 degrees), we may fairly assume that in dry mines at a high temperature and where the roads are always covered with fine dust, this dust will play a considerable part in extending and adding to the destructiveness of an explosion."

The experiment was conducted under ideal conditions and brought out all the essential component parts of the cause of an explosion in a non-gaseous mine. The investigators, however, did not at the time take in account the importance of all these factors, in fact for years very little attention was paid to some of them and the opinion prevailed for a long time, that all that was necessary to cause an explosion, in the absence of firedamp, was plenty of coal dust and the intense heat and flame produced by blown-out or overcharged shots.

Here are the conditions as we find them to exist at Mr. Hall's experiment:

1. We have the heat and flame from the equivalent of a blown-out shot.
2. We know that the ventilation of the slope was of such a character as to insure pure air in all parts of it.
3. We note the presence of coal dust, (its state with regard to wetness or dryness not well defined).
4. We find that the slope was a place of small dimensions, affording little expansion room for the heated air and gases.
5. We find that the temperature was low (50 degrees).
6. We find that the course of the explosion was an ascending one. Mr. Hall says the result of the experiment was a very fierce blast, that would certainly have proved fatal to any one struck by it in its course.

A careful comparison of the conditions surrounding the experiment with the conditions, as investigation has proved them to exist at actual "dust" explosions, reveals a remarkable sameness, that warrants the conclusion that these conditions are essential in bringing about an explosion and further, that the four first named and generally the fifth must all be present to make such explosion assume dangerous proportions.

We may therefore state that the following are the essential factors of a dust explosion: 1. Intense heat and flame from blown-out or overcharged shots, or from shots fired in rapid succession in the same working place. 2. Good ventilation. 3. Coal dust (not necessarily very dry nor present in very large quantities. 4. Limited expansion room for the heated air and gases in the neighborhood of blown-out or overcharged shots. In addition to these factors there is another, that should be considered a prime factor, but which to be on the safe side, I shall call an auxiliary factor or a factor having a decided influence in increasing the severity and extent of an explosion, and that is a low mine temperature prevailing at the time of an explosion in the territory affected by it.

The fact that good ventilation is necessary to make a "dust" explosion possible, seems to be fully established, and it is so well known now, that there is little occasion to say anything further on this point. Good ventilation is the vitalizing agent of an explosion; without a plentiful supply of pure air near its origin, it will die in its incipency.

Investigation as to in what mines or in what parts of a mine these "dust" explosions are most likely to occur shows conclusively that they either originated in new mines of limited extent, or, if in older mines, in the newer and more congested workings. The more room there is provided for the rapid expansion and dissipation of the heated gases in the vicinity of blown-out or overcharged shots, the more remote will the possibility of a "dust" explosion become. It seems that the heat must first be confined to narrow channels to give the forming explosion the necessary impetus to project itself through the whole or a considerable portion of a mine.

The influence of a low mine temperature in assisting the formation and extension of "dust" explosion is so marked, that it should receive special attention. In the earlier investigations of these explosions, it appears, that temperature was deemed of small importance and received very little attention. Mr. Hall, in commenting on the results of his experiment, did take in account the state of temperature, but he evidently made a mistake, when he considered low temperature a check to these explosions rather than a help, for nearly all these so-called "dust" explosions have occurred during the colder months of the year and, so far as I know, there is no record of an explosion, caused by a blown-out shot, having occurred in a non-gaseous mine during the months of July and August. Admitting that most mines have a greater degree of dampness in the summer than in the winter and that in consequence the safety of the mines is thus increased somewhat, yet, as we have seen that dampness alone is not a reliable preventive of explosions, there must be other reasons why "dust" explosions are of such rare occurrence during the summer. We know that the supply of oxygen, under like conditions, is less in a mine during the summer than in the winter; we also know that natural ventilation, which plays a very important part in the winter time in supplying the workings adjacent to the main air

channels with fresh air, is almost altogether absent in the summer. Now, all these conditions, affecting more or less unfavorably the formation of a "dust" explosion, are brought about by the same cause, viz. high temperature of the air entering a mine, and therefore high temperature may rightly be regarded as a far more reliable preventive of "dust" explosion than dampening the dust by sprinkling. On the other hand, an air current of low temperature entering a mine constitutes a powerful aid in assisting the formation and enlarging the scope and force of such explosions. Good ventilation is essential to a "dust" explosion, and we know that an air current of low temperature will ventilate a mine more thoroughly than one of high temperature, other conditions being the same. Again, the lower the temperature, the less natural dampness will exist in a mine. It is also a fact, that the lower the temperature of an air current flowing through a mine at the time of an explosion, the greater will be the expansive force developed under the same conditions. The law that under the same pressure the volume of any gas or air varies as its absolute temperature has direct application in this case. Supposing that the flaming gases coming from a blown-out shot had a temperature of 2000° F., and that the temperature in a mine in the vicinity of such shot was 75°, it follows that, as long as the difference in temperature between the flaming gases and the mine and the pressure remained the same, the mine air and the other gases, after attaining a temperature of 2000°, would be expanded to 4.605 times their original volume. If the mine temperature was lowered to 40° F., other conditions remaining the same, the expansion would amount to 4.927 times the original volume. To illustrate the effect: With an original temperature of 40° in a territory traversed by an explosion, the increase in the volume of heated air contained in an entry, 40 square in area, would be for every hundred feet of its length nearly 1300 cubic feet greater than if the temperature at the time of the explosion had been 75°. It needs no argument to show the disastrous effect of such increased expansion.

The explosions which occurred in No. 4 mine, Cleveland, Iowa, on January 5th and February 5th, 1901, respectively, furnish the rare opportunity for observing the actions and effects of two explosions originating almost in the same place and extending over the same territory. The explosion on the 5th of January originated at the face of the third east entry on the north side, the explosion of the 5th of February started in room 13 on the fourth east entry, less than fifty yards distant from the seat of the first explosion. Both explosions extended through the third and fourth east entries to the main north and along this entry to the hoisting shaft and through it to the surface. Not only as to the place of origin and territory affected were these explosions decidedly similar; the manner of shotfiring was the same, the amount of air entering the mine was about the same in each case and there was no perceptible difference in the condition of the entries as to the dampness and the amount of dust present.

There was this difference, however: The amount of powder contained in the three shots fired in the third east entry was probably twice as large as the amount used for the two shots fired in room 13 on the fourth east entry. Two of the holes in the third east were tight ones, while the holes in room 13 were fair holes that did the work intended for them to do, although one of them had too much powder. With this fact before us, it was not surpris-

ing at all to find that the heat developed at the starting point of the first explosion was very intense and the display of force there very great, while the second explosion left scarcely any signs of great heat and created no unusual disturbance, either in room 13 on the fourth east or its immediate vicinity, and it would seem that, under these circumstances, the conclusion would have been justified that the first explosion would at least maintain its superior degree of violence all the way through. But this proved not to be the case, for strange as it may seem it lost considerable of its initial force in its travel to the shaft, while the second explosion gained force and became more destructive on its way out. It ejected a larger volume of smoke and dust from the hoisting shaft than the first one and demolished stoppings and doors along the main north that the first explosion had failed to damage,

How can we account for this? The physical condition of the mine in the immediate vicinity of the starting points of these explosions had probably some influence, but the fact that these starting points were less than fifty yards apart suggests that some other influential cause must have been at work to bring out the second explosion's extraordinary development of force. I submit that this cause was the very low temperature prevailing on the day of the second explosion. Mr. S. H. Mallory of Chariton (the county seat of Lucas county, where these explosions occurred) has kindly furnished me a copy of his meteorological records for the months of January and February, 1901, and according to these records the mean temperature on the day of the first explosion, January 5th, was 27.5°, and on the day of the second explosion, February 5th, 5.5°. It was therefore twenty-two degrees colder on the last named date. Of course the above readings refer to outside temperature only, but there is little doubt, in this case, at least, that any increase or decrease in the outside temperature would manifest itself in a proportionate degree in that part of the mine where the explosions occurred. I have already called attention to the influence of temperature on "dust" explosions and the comparison of the two explosions in the Cleveland mine, occurring as they did, under almost identical conditions, seems to sustain the views I have expressed on that point.

There is nothing very mysterious or unexplainable in these "dust" explosions. They are not due to agencies beyond the control of man. Much has been said as to how they may be prevented, but the greatest safeguard of any mine rests in the ability of the management and the miners employed therein to understand thoroughly the nature of the danger they may have to deal with. When that is accomplished it will prove a comparatively easy task to devise adequate means to eliminate that danger, or at least minimize it to the utmost.

TABLE No. 4.

List of corporations, firms, and individuals operating mines in the second district, their post office address and shipping facilities, if any:

MAHASKA COUNTY.

CORPORATION, FIRM OR INDIVIDUAL.	POST OFFICE ADDRESS.	SHIPPING FACILITIES.
Consolidation Coal Co.	Muchakinock	Chicago & Northwestern.
Klondyke Coal Co.	Oskaloosa	Chicago & Northwestern.
Kennebec Coal Company	Muchakinock	Chicago & Northwestern.
Lost Creek Fuel Co.	Lost Creek	Chicago & Northwestern.
Regal Coal Co.	Oskaloosa	Chicago & Northwestern.
Iowa Fuel Co.	Oskaloosa	Chicago & Northwestern.
Mahaaska Coal and Mining Co.	Oskaloosa	Chicago & Northwestern.
Atwood Coal Co.	What Cheer	Chicago & Northwestern.
Eveland Coal Co.	Eveland	Chicago & Northwestern.
American Coal Co.	Evans	Rock Island.
Oskaloosa Coal and Mining Co.	Oskaloosa	Rock Island.
Garfield Coal Co.	Beacon	Rock Island.
Little-Hoover Coal Co.	Oskaloosa	Rock Island.
Richard Bros.	Evans	Rock Island.
Wm. Patterson	Leighton	Rock Island.
Whitebreast fuel Co., of Illinois	Ottumwa	Iowa Central.
Swoden Coal Co.	Beacon	Burlington & Western.
Smith Bros.	Oskaloosa	Local.
G. Clough	Oskaloosa	Local.
Barrowman & Oakley	Oskaloosa	Local.
Fred Schultz	Oskaloosa	Local.
J. Baxter	Oskaloosa	Local.
Geo. Cook	Oskaloosa	Local.
Oskaloosa Fuel Co.	Oskaloosa	Local.
Evans Coal Co.	New Sharon	Local.
W. F. Williams	New Sharon	Local.
John Madison	Beacon	Local.
F. D. Coryell & Son	Eddyville	Local.
Jas. Staley	Harvey	Local.
Frey Bros.	Leighton	Local.
M. Carey	Rose Hill	Local.

MARION COUNTY.

Donley Coal Co.	Hamilton	Wabash.
Wild Rose Coal and Mining Co.	Des Moines	Wabash.
O. K. Coal Co.	Bussey	Wabash and C. B. & Q.
Hawkeye Coal Co.	Flagler	Chicago, Burlington & Quincy.
S. R. Rollings	Flagler	Chicago, Burlington & Quincy.
Hamilton Coal Co.	Hamilton	Chicago, Burlington & Quincy.
Emis & Stillwell	Hamilton	Chicago, Burlington & Quincy.
Dunreath Coal Co.	Hamilton	Chicago, Burlington & Quincy.
Forest Fuel Co.	Des Moines	Wabash.
McCroskey & Co.	Otley	Chicago, Rock Island & Pacific.
Yukon Coal Co.	Otley	Chicago, Rock Island & Pacific.
Roberts & Young	Otley	Chicago, Rock Island & Pacific.
H. Booth	Otley	Chicago, Rock Island & Pacific.
J. T. Hayes	Knoxville	Local.
Theo. Johnson	Knoxville	Local.
Wm. Pace & Co.	Local.	Local.
Union Coal Co.	Otley	Local.
J. R. Dieleman	Pella	Local.
Geo. Davis	Hamilton	Local.

KEOKUK COUNTY.

CORPORATION, FIRM OR INDIVIDUAL.	POST OFFICE ADDRESS.	SHIPPING FACILITIES.
Volunteer Coal Co.	What Cheer	Burl., Cedar Rapids & Northern
Margaret Coal Co.	What Cheer	Burl., Cedar Rapids & Northern
William Blatt	What Cheer	Burl., Cedar Rapids & Northern
Crescent Coal Co.	What Cheer	Chicago & North-Western.
Columbian Coal Co.	What Cheer	Chicago & North-Western.
Hommerin & Son	What Cheer	Chicago & North-Western.
Lambert Bros.	What Cheer	Chicago & North-Western.
Baker Bros.	What Cheer	Chicago & North-Western.
Grudgings Bros.	What Cheer	Local.
H. Murray	What Cheer	Local.
D. Peacock	What Cheer	Local.
T. Armstrong	What Cheer	Local.
T. Mason	What Cheer	Local.
M. Fisher	Delta	Chicago Rock Island & Pacific.
R. W. Allsup	Delta	Local.
Bell and Teeters	Delta	Local.

LUCAS COUNTY.

Whitebreast Fuel company of Illinois	Cleveland and Ottumwa	Chicago, Burlington & Quincy.
Big Hill Coal Co.	Lucas	Chicago, Burlington & Quincy.
Lucas and Cleveland Coal Co.	Lucas	Chicago, Burlington & Quincy.

ADAMS COUNTY.

J. M. Henton	Eureka	Local.
Ed. Andor	Eureka	Local.
W. R. Miller	Briscoe	Local.
C. W. Powley	Briscoe	Local.
Rice & Collins	Carbon	Local.
N. S. Wheeler	Carbon	Local.
John Ruth	Carbon	Local.
Rees & Perks	Carbon	Local.
E. McKee	Carbon	Local.
M. Jones	Carbon	Local.
T. Gebble	Carbon	Local.
S. O. Trowbridge	Carbon	Local.
J. F. Wilds	Carbon	Local.
R. Hathaway	Hoyt	Local.
Day Bros.	Hoyt	Local.
Jas. Spargur	Hoyt	Local.

WARREN COUNTY.

Somerset Coal Co.	Somerset	Chicago, Rock Island & Pacific.
King & Turnipseed	Somerset	Chicago, Rock Island & Pacific.
Shackey & Bennum	Somerset	Local.
Welch Bros.	Somerset	Local.
Wishman & Cumming	Somerset	Local.
Huff & Baber	Carlisle	Local.
N. D. Bales	Milo	Local.
S. C. Bryant	Milo	Local.
J. A. Williams	Milo	Local.
Ed Rowley	Liberty Center	Local.

SCOTT COUNTY.

A. McDonald	Jamestown	Local.
Metzger & Kancher	Jamestown	Local.
L. Long	Jamestown	Local.
Buchmeier & Carlin	Jamestown	Local.
Chas. Sass	Jamestown	Local.
E. T. Langwith	Jamestown	Local.
Theo. Kautz	Buffalo	Local.
Thos Webster	Buffalo	Local.
Ed McCollough	Buffalo	Local.

BIENNIAL REPORT

OF THE

THIRD DISTRICT,

EMBRACING

Adair, Boone, Dallas, Greene, Guthrie, Jasper, Polk, Story,
and Webster Counties.

JAMES W. MILLER, INSPECTOR.

LETTER OF TRANSMITTAL.

To the Hon. L. M. Shaw, Governor of Iowa:

SIR.—As inspector for the third mining district, I have the honor to present, herewith, the biennial report for the above district, which report contains the usual tabulated statements relative to the production of coal, improvements, casualties, and such other information as I deemed of importance to the mining interest.

Respectfully,

J. W. MILLER.

REPORT OF THIRD DISTRICT.

The condition of the coal business has been very satisfactory during the past biennial period, ending June 30, 1901, for the demand has been good and prices have averaged much better than in former years. Miners have been benefited by the decrease in hours, as eight hours constitute a day's work around all the mines in this district; mining price has been advanced, also top wages, and in a number of instances wages for underground day work have met an advance. It is also noticeable that a kindly feeling seems to prevail throughout the various mines between the officials and employes. The state meetings called yearly by the operators and miners to talk over and adjust the scale of prices for mining, day work, brushing and all other questions pertaining to the mining business, has met with universal satisfaction. There is an executive board elected by the operators and by the miners to act as an arbitration board to decide the various questions that come up, from time to time, between the companies and their men, which has saved a great deal of the unpleasant feeling that formerly existed during the adjusting of differences between mine officials and their men. This all tends to show that the interests of employer and employe are being appreciated by both alike, and thus they should be; for the successful operation of a mining plant means a good investment for the company and likewise a good investment to the miners for the time spent therein.

I am pleased to state that my official duties between operators and miners have been very agreeable and satisfactory to me. And I wish to thank the officials of both operators and miners for the help rendered me and the interest they have taken in bringing about and securing the present very gratifying conditions of our mines, for the same is beneficial to all concerned. During the past year the mines, as a rule were found to be in better condition, from every point of view. There are several reasons for this; one is business and prices have been better, which all tends toward successful operations. Also evidence of a willing spirit to faithfully comply with the requirements of our mining laws has been shown, which greatly aids an inspector in carrying out the intent of the law.

This, the third inspection district, comprises the following counties: Polk, Boone, Webster, Jasper, Dallas, Green, Guthrie, Story and Adair. There are about one hundred and twenty-six mines in the nine counties, and are classed as follows: Fifty-four doing an exclusive shipping business; twenty sell most of their product to local trade, but load some coal on cars; while fifty-two are operated for local trade only. There are within the district fifty-seven mines equipped with steam plants for hoisting purposes. The balance use horse or mule power, whichever is best adapted. At different small local mines they have gasoline equipments for pumping

water and running fans, which seems to give good results, and saves the expense of placing boilers and possibly the using of poor boiler water. Very few of the mines coming under the jurisdiction of the inspector use furnace ventilation, for that method is expensive, inconvenient and unreliable.

There were quite a number of good and substantial improvements made during the past biennial period. Companies have enlarged their ventilating machinery, remodeled their pit heads and top equipments, and placed better hoisting appliances to handle their increased output. Also several new shafts were put down, which were equipped with modern improved machinery and fitted up with labor-saving devices.

A WORD ON VENTILATION.

The Inspector finds the matter of ventilation one of the most important features connected with his official duties, as the health of those working underground depends largely on the condition of the air they breath. Also the conditions governing the ventilation of the mines are changing daily, and require constant attention and careful supervision from the mine foreman to keep the mine in proper condition.

The mining business, of this State, has reached the point that a mine manager or mine foreman cannot expose his incompetency in any better way than to have within his employ, and continue to have, a poorly ventilated or undisciplined mine. For, regardless of what conditions may exist, a practical and competent mine foreman will, in time, figure ahead on the laying out of his underground workings to such an extent as to take advantage of emergencies that he may come in contact with; and by so doing avoid delays, extra expense, and uncalled for grievances; which all tends to reduce the cost of his products when landed on the tippie, and is furthermore a benefit to the investors, producers, and all concerned.

The miners are greatly interested in good ventilation, and, as they spend a good portion of their time at the face underground, it is very essential that they should be. Yet, it is a common occurrence to find a room turned and driven in twenty to twenty-five yards without a break-through; and expect the same to be properly ventilated. This sometimes is the fault of the miners themselves, who in their eagerness to make money neglect to take the proper precaution to care for and ventilate the working place, but more often the neglect of the operator, who does not want to pay the expense incurred in making the necessary break-throughs, to allow the current of air to reach the working faces. Also, very often after a break-through has been made, there is fifty per cent of it filled up with draw slate, props, tool-boxes, or some kind of refuse, which all act as an obstruction to retard the air and reduce the quantity. In fact, many yards of entry, for air-ways, could be saved by having the same made a proper size and taken care of after it had been driven. Air traveling along an air-way of proper size, through break-throughs free from obstructions, means a great deal toward good ventilation. And to obtain this it is only necessary for all employes working below to work to each other's interests.

The air traveling down one shaft, and along through the air-courses,

returning to the up-cast shaft, having only partially traveled along the faces, where the men are at work, it is not proper ventilation by any means. To properly ventilate a mine, first have ventilating machinery and fan of sufficient capacity to handle 30 per cent more air than the law calls for, air-shaft, air-courses, and break-throughs made plenty large enough to admit a volume of air of sufficient quantity with the least possible resistance to the same. The use of over or under-casts are also of great benefit. By giving to each pair of entries a separate current of air, you decrease the friction increase the quantity of air, and avoid the powder-smoke and impurities from other entries; also lessen the danger should an explosion occur, for there would be less men to come in contact with it.

Regarding the splitting of air, there is, of course, a limit. The volume of air should not be reduced below a speed and quantity that will mix and remove the impurities from the working faces. The speed or velocity of the air depends on the size of the air-ways. They should, of course, always be large enough to permit a sufficient quantity of air to travel at a reasonable velocity. The best law to govern a mine foreman on this question is to have air enough to remove all obnoxious gases from the working places and replace the same with fresh air. To do this he will have large air-courses; divide his volume; place good substantial doors between entries; keep his unused break-throughs bratticed up tight, and those that are in use free from obstructions, such as tool-boxes, timber, loose slate, and rubbish; and carry his air up through the last open break-throughs where men are at work.

MINE FOREMAN'S LAW.

During the session of the legislature of 1900, there was a law passed which took effect January 1, 1901, requiring all mine foremen and hoisting engineers, being employed at mines producing more than twenty-five tons of coal per day, to pass an examination or obtain a certificate for service from the examining board. Said board consists of five members representing the different interests pertaining to mining. Said board began holding sessions, in August, 1901, at the various mining centers, at such periods as they deemed advisable, for the convenience and benefit of all concerned. There has been issued, up to June 30, 1901, 605 mine foremens' and — hoisting engineers' certificates.

In my opinion there has been no piece of legislation enacted in recent years that should be of more benefit to both miners and operators alike than this act to the operators for the reason that it has stimulated the mine foremen and hoisting engineers in their desire for knowledge pertaining to their duties, in order to enable them to pass the examination and receive a certificate, which would enable them to hold their positions if already employed in either capacity, and if not so employed to enable them to secure such a position. This knowledge, on the part of the mine foreman, is always a benefit to the operator or owner of a mine, for the reason that it should enable him to keep his mine well ventilated, and pillars of a proper thickness, and avoid extra yardage on break-throughs. In fact, it will mean a better ventilated mine, and more regard will be paid to the law in reference to health and safety to those employed underground, also a benefit to the

mine foreman himself; as a man with a thorough knowledge of his calling can always get a better salary than one who is not so well informed.

I have visited the mines, during the past biennial period, as often as time and occasion demanded. At these visits I did not always find the various mining plants in strict compliance with the mining laws. But I am glad to report that I have always found the officials in charge of the various plants ready and willing to make the necessary repairs and improvements suggested as being essential in the preservation of life and health of the miners.

A WORD REGARDING FANS.

In some of our large mines there is not enough attention paid to the movement of the fan; especially during the night. Where there are old workings in the various parts of the mine left open, they naturally fill up with damp; and unless properly bratticed up, the moment you reduce the air pressure, by opening doors or reducing the speed of the fan, the damp rush out on the entries and remain there until the pressure and current of air is again resumed; and when the current is increased the damp is carried through the working places. And very often the damp that have accumulated during the night are not entirely removed from the working places in the mine for several hours after the men start to work in the morning. This should not occur. The pressure should be the same at night as during the day. To do this the fan must be kept at the same speed, so as completely clean the mine of all impurities throughout the working places. It requires very little more fuel and attention to keep the fan running at the same speed, and there certainly is a great benefit to be derived by having the mine filled with fresh air in the morning when the men go to work.

MAPS OF ABANDONED MINES.

It requires considerable urging, at times, to secure a compliance with the mining law as regards the filing of a map of abandoned mines with the inspector. At times I think that the officials of the various mines do not realize the importance of the same. It is very essential that maps of all abandoned mines should be on file, for it affords those having adjoining territory valuable information; especially where a mine is filled with water. To know approximately the extent of such workings, so as to guard against holing through from adjoining territory, is not only a great advantage to the company, but a safeguard to the employes working below.

SCALES.

There was enacted during the Twenty-Second General Assembly a law requiring each mine inspector to procure a set of test weights for the purpose of testing the scales at the various mines used for weighing the miners'

coal. This law is still in vogue without any changes since the enactment of the same.

During the past biennial period nine-tenths of the scales used for weighing miners' coal in the third district have been tested, and some of them several times. The majority have been found deficient, and when found in such condition the company has, in nearly every case, been willing and ready to place the work of adjusting the same in a scale company's hands, to be placed in proper weighing condition as quickly as possible. Still, in some cases, scales were found deficient after being taken out, repaired and replaced. The only reason for such to occur was the incompetency of those attempting to adjust the same, which means not only an additional expense to a company, but delay and annoyance to all concerned.

The inspector finds, in a large majority of cases where he is called on to test the scales at the various mines, that the trouble lies in the dividing of each man's coal. Where a scale-beam does not break quick enough or requires too much weight to show the movement of the same, it is impossible for the weighman to give each man his just dues; and yet, on the other hand, it is possible the aggregate or full car will have been weighed within one hundred and fifty or two hundred pounds either way; showing, in this case, that the weighman has credited the men with all the coal that is due them, but might not have placed on his bulletin the proper weight of each individual car, giving too much weight to one and not enough to another.

This may be caused from a number of reasons: the weather, the contracting and expanding of the extension rods; knives or bearings becoming dull; and foundations settling and becoming uneven, or being bound so that the platform does not work freely.

Allowing locomotives to pass over a scale, or pulling loaded cars back over the same, has cost more money than any one thing in connection with a scale. This should always be avoided if possible.

BAROMETERS.

There are two kinds of barometers, the mercurial barometer and the aneroid barometer. The mercurial barometer measures the variations of the atmospheric pressure, by the raising or the falling of mercury in a glass tube. With the aneroid barometer the pressure of the air is measured without the use of a liquid. The pressure of the atmosphere causes upon the circular metal boxes, which has been nearly exhausted of air and then soldered air-tight. The sides of the box are corrugated in concentric rings, so as to increase their elasticity. Owing to the box being nearly exhausted of air, it becomes extremely sensitive to the changes and different weights of the atmosphere.

WHAT CONNECTION HAS A BAROMETER WITH A PUMP?

A barometer is used to obtain the weight of the atmosphere and the pressure that the same is exerting wherever the barometer may be placed, either

on a high or low point. By knowing the weight of the air per square inch you are enabled to know how far a pump will lift water. The weight of the air varies according to the density of the same. A pump, having the plunger in the water cylinder properly packed, when put in motion creates a vacuum in the cylinder and allows the pressure of the atmosphere, which is pressing down on the surface of the water, to force the column of water up the suction-pipe to a height equal to that of the weight of the air. The mercury used in a mercurial barometer is 13.6 heavier than water, so, if the weight of the air indicates 29½ on the face of the barometer, with a perfect vacuum the water would be forced to a level with the weight of the air, which would be about 33½ feet in height; for 13.6 multiplied by 29.5, divided by 12 inches, which equals one foot, would give 33.4 feet that the water has been lifted by the above pump and pressure.

A barometer is also used in connection with mines, more especially where the mines are giving off explosive gases in sufficient quantities to cause an explosion when mixed with air in adequate proportions. The higher the barometer the less danger of escaping gases within the workings of a mine; for the reason that the air is heavier, causing a greater pressure, and keeping the lighter gases stored up in goves, abandoned workings, crevices, etc. A low barometer indicates less weight, lighter air, and consequently less pressure in the mine; and allows the lighter gases to come out from where they have been pent up and mix with the ventilation or the volume of air.

We do not have marsh-gas, or firedamp, in the mines of Iowa—which is marsh-gas being mixed with air to an explosive point, at which point it becomes firedamp. A barometer placed at the bottom or top of a shaft at the various mines in this state would be of considerable benefit, for this reason, when there is a low barometer, indicating a lighter air, then, to avoid reducing the quantity of air in a mine, you can increase the speed of the fan, thereby overcoming the decreased atmospheric pressure.

Very often, during a time when the air is moist or foggy, you will hear the men say the air is heavy. By looking at the barometer you will find they are mistaken, for during such weather the air is lighter and requires more of it to accomplish the same results. A study of these questions will aid one in ventilating his mine or building.

POLK COUNTY.

List of companies, firms and individuals operating mines in the Third District, their location and their shipping facilities, if any.

FIRM.	LOCATION OF MINE.	SHIPPING FACILITIES.
Saylor Coal and Mining Co.	5¼ miles north of Des Moines.	Chicago & North Western.
Des Moines Coal and Mining Co.	5 miles north of Des Moines.	Chicago & North Western.
Maple Grove Coal and Mining Co.	5 miles northeast of Des Moines.	Chicago & Great Western.
Hughland Coal and Mining Co.	5 miles northeast of Des Moines.	Chicago & Great Western.
Gibson Coal and Mining Co.	5 miles east of Des Moines.	Chicago & Great Western.
Midway Coal and Mining Co.	5 miles southwest of Des Moines.	Chicago, Rock Island & Pacific.
Christy Coal and Mining Co.	5 miles east of Des Moines.	Chicago, Rock Island & Pacific.
Low-Smith Coal and Mining Co.	3 miles east of Des Moines.	Chicago, Rock Island & Pacific.
Greenwood Coal and Mining Co.	3 miles east of Des Moines.	Chicago, Rock Island & Pacific.
Coal Hill Coal and Mining Co.	3 miles south of Des Moines.	Chicago, Rock Island & Pacific.
Bloomfield Coal and Mining Co.	3 miles north of Des Moines.	Chicago, Milwaukee & St. Paul.
Keystone Coal and Mining Co.	3 miles northwest of Des Moines.	Chicago, Milwaukee & St. Paul.
Eagle Coal and Mining Co.	2½ miles northwest of Des Moines.	Chicago, Milwaukee & St. Paul.
Lehigh Coal and Mining Co.	4 miles north of Des Moines.	Chicago, Milwaukee & St. Paul.
Lehigh Coal and Mining Co.	3½ miles north of Des Moines.	Des Moines Street Railway Co.
Co-Operative Coal and Mining Co.	Runnels	Wabash
Diamond Ice Coal and Mining Co.		
BOONE COUNTY.		
Boone Coal and Mining Co.	Millford	Chicago & North Western.
W. D. Johnson Coal and Mining Co.	Incline	Chicago & North Western.
Crow Coal and Mining Co.	3 miles west of Booneboro.	Chicago & North Western.
Heaps Coal and Mining Company	2½ miles west of Booneboro.	Chicago & North Western.
Zimbleman Coal and Mining Co.	1½ miles west of Booneboro.	Chicago & North Western.
Misher Coal and Mining Co.	5 miles west of Booneboro.	Chicago & North Western.
Rodgers Coal and Mining Co.	Incline	Chicago & North Western.
Benson Bros. Coal and Mining Co.	3½ miles west of Booneboro.	Chicago & North Western.
Boone Valley Coal and Railway Co.	Fraser	Boone Valley Coal and Railway Co.

WEBSTER COUNTY.

FIRM.	LOCATION OF MINE.	SHIPPING FACILITIES.
Webster County Coal and Land Co.	3 miles southwest of Lehigh	Mason City & Ft. Dodge Railway Co
Daily Coal and Mining Co.	3 1/2 miles southwest of Lehigh	Mason City & Ft. Dodge Railway Co.
Crooked Creek Coal and Mining Co.	2 1/2 miles south of Lehigh	Crooked Creek Coal and Railway Co.
Corey Coal and Mining Co.	2 1/2 miles south of Lehigh	Crooked Creek Coal and Railway Co.
Gleason Coal and Mining Co.	Coalville	Mason City & Ft. Dodge Railway Co.
Collins Coal and Mining Co.	Coalville	Mason City & Ft. Dodge Railway Co.
Pleasantville Coal and Mining Co.	1 1/2 miles east of Coalville	Mason City & Ft. Dodge Railway Co.
Craig Coal and Mining Co.	Kalo	Minneapolis & St. Louis.
Johnson Coal and Mining Co.	Kalo	Minneapolis & St. Louis.
Irwin Bros Coal and Mining Co.	Kalo	Minneapolis & St. Louis.

JASPER COUNTY.

Jasper County Coal and Mining Co.	3 miles south of Colfax	Iowa & Northern; C. G. W.; C. R. I. & P.
Colfax Coal and Mining Co.	4 miles southeast of Colfax	Iowa & Northern; C. G. W.; C. R. I. & P.

DALLAS COUNTY.

Carpenter Coal and Mining Co.	6 miles southwest of Madrid	Chicago, Milwaukee & St. Paul.
Hutchinson Bros Coal and Mining Co.	2 miles west of Dawson	Chicago, Milwaukee & St. Paul.

POLK COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	SUPERINTENDENT.	POSTOFFICE ADDRESS.	Shaft or slope.	PLAN OF WORKING MINE.	HOW VENTILATED.	Power used.	Shipping or local.
Des Moines Coal and Mining Co.	Chas. Morris	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
J. M. Christy Coal Co.	Geo. Grylls	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Saylor Coal Co.	D. B. Flemming	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.

Smith & Lowe Coal Co., No. 2	E. C. Smith	Carbondale	Shaft	Room and pillar.	Fan	Steam	Shipping.
Smith & Lowe Coal Co., No. 3	E. C. Smith	Carbondale	Shaft	Room and pillar.	Fan	Steam	Shipping.
Norwood Coal Co.	Jos. Norwood	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Maple Grove Coal Co.	Chas. Swanson	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Gibson Coal Co.	Jno. Gibson	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Bloomfield Coal Co., No. 2	Geo. Yarn	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Diamond Joe Coal Co.	Jos. Ramsay	Runnels	Shaft	Room and pillar.	Fan	Steam	Shipping.
Keystone Coal Co.	E. M. Grey	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Eagle Coal Co.	G. M. Holmes	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Midway Coal Co.	C. H. Fullerton	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
West Riverside Coal Co.	Jos. Jackson	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Flint Brick Coal Co.	Michael Quinn	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Co-operative Coal Co.	A. Bloomquist	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Central Coal Co.	Tom Ray	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Oak Park Coal Co.	C. McClellan	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Glenwood Coal Co., No. 1	Caleb John	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Glenwood Coal Co., No. 2	Caleb John	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Proctor Coal Co.	Wm. Edge	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Elko Coal Co.	Thos. Beck	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
South Park Coal Co.	Andy Carlson	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Avon Coal Co.	Avon Evans	Levy	Shaft	Room and pillar.	Fan	Steam	Shipping.
Coal Hill Coal Co.	J. W. Hammond	Levy	Shaft	Room and pillar.	Furnace	Horse	Shipping.
Highland Coal Co.	J. Limblom	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Humes Coal Co.	Robt. Humes	Commerce	Shaft	Long wall	Furnace	Steam	Local.
Commerce Coal Co.	L. Tilton	Commerce	Shaft	Long wall	Fan	Horse	Local.
Likes Brick and Coal Co.	Jos O'Neil	Des Moines	Slope	Room and pillar.	Fan	Steam	Local.
Sortel Coal Co.	Jno. Shortell	Levy	Shaft	Room and pillar.	Furnace	Horse	Local.
Balzar Coal Co.	Jno. Balzar	Des Moines	Shaft	Room and pillar.	Furnace	Horse	Local.
McKinley Slope	A. McKinley	Runnels	Slope	Room and pillar.	Furnace	Horse	Local.
Newman Coal and Brick Co.	Chas Newman	Hastie	Slope	Room and pillar.	Furnace	Horse	Local.

BOONE COUNTY.

Boone Valley Coal and R'y Co., No. 2	Thos. Carpenter	Boone	Shaft	Long wall	Fan	Steam	Shipping.
Boone Valley Coal and R'y Co., No. 3	Thos. Carpenter	Boone	Shaft	Long wall	Fan	Steam	Shipping.
Boone Coal and Mining Co.	Samuel McClure	Fraser	Shaft	Long wall	Fan	Steam	Shipping.
Boone Coal and Mining Co., No. 2	Samuel McClure	Fraser	Shaft	Long wall	Fan	Steam	Shipping.
Boone Coal and Mining Co., No. 3	Samuel McClure	Fraser	Shaft	Long wall	Fan	Steam	Shipping.
Boone Coal and Mining Co., No. 4	Samuel McClure	Fraser	Shaft	Long wall	Fan	Steam	Shipping.
W. D. Johnson Coal Co.	W. D. Morgan	Boonsboro	Shaft	Long wall	Fan	Steam	Shipping.
Heaps Bros. Coal Co.	Geo. Heaps	Boonsboro	Shaft	Long wall	Fan	Steam	Shipping.
Zimbleman Coal Co.	Geo. Zimbleman	Boonsboro	Shaft	Long wall	Fan	Steam	Shipping.
Crow Coal Co.	Wm. Crow	Boonsboro	Shaft	Long wall	Fan	Steam	Shipping.
Morgan & Canfield	W. D. Morgan	Boonsboro	Shaft	Long wall	Fan	Steam	Shipping.
Benson Coal Co.	Wm. Benson	Boonsboro	Shaft	Long wall	Fan	Steam	Shipping.
Risher Coal Company	T. W. Hughes	Boonsboro	Shaft	Long wall	Fan	Steam	Shipping.
Rodgers Coal Co., No. 1	Geo. Rodgers	Boonsboro	Shaft	Long wall	Furnace	Horse	Shipping.
Rodgers Coal Co., No. 2	Geo. Rodgers	Boonsboro	Shaft	Long wall	Furnace	Horse	Shipping.
Rodgers Coal Co., No. 3	Geo. Rodgers	Boonsboro	Shaft	Long wall	Furnace	Horse	Shipping.

BOONE COUNTY—CONTINUED.

NAME OF COMPANY FIRM OR OPERATOR.	SUPERINTENDENT.	POST OFFICE ADDRESS.	Shaft or Slope.	PLAN OF WORKING MINE.	HOW VENTILATED.	Power used.	Shipping or local.
Ogden Coal Co.	Jan. Benson	Ogden	Shaft	Long wall	Fan	Steam	Local.
Wilson mine	Jas. Wilson	Pilot Mound	Shaft	Room and pillar	Furnace	Horse	Local.
McCormick Coal Co	.....	Luther	Slope	.....	Furnace	.....	Local.
Wiscup Coal Co	.....	Luther	Slope	.....	Furnace	.....	Local.

WEBSTER COUNTY.

Crooked Creek Coal Co., No. 4	F. E. Wilson	Webster City	Shaft	Long wall	Fan	Steam	Shipping.
Crooked Creek Coal Co., No. 5	F. E. Wilson	Webster City	Slope	Long wall	Fan	Steam	Shipping.
Webster Coal and Land Co., No. 1	John Davenport	Lehigh	Shaft	Long wall	Fan	Steam	Shipping.
Pleasant Valley Coal Co.	Jerry Dawson	Kalo	Shaft	Room and pillar	Fan	Steam	Shipping.
Gleason Coal Co	Jas. Gleason	Coalville	Shaft	Room and pillar	Fan	Steam	Shipping.
Corey Coal Co., No. 2	Rees Stephens	Lehigh	Shaft	Long wall	Fan	Steam	Shipping.
Collins Bros. Mine	Frank Collins	Coalville	Shaft	Room and pillar	Furnace	Steam	Shipping.
Johnson Coal Co	Wm. Johnson	Kalo	Shaft	Long wall	Furnace	Steam	Shipping.
Irwin Bros. Coal Co	Thos. Irwin	Kalo	Shaft	Long wall	Fan	Steam	Shipping.
Owen Mine	Frank Owen	Ft. Dodge	Shaft	Long wall	Furnace	Horse	Shipping.
Timmons Mine	Hugh Timmons	Ft. Dodge	Shaft	Long wall	Furnace	Horse	Local.
Martin Mine	R. Martin	Coalville	Slope	Room and pillar	Furnace	Horse	Local.
Craig Coal and Mining Co., No. 2	Jerry Dawson	Kalo	Slope	Long wall	Fan	Steam	Local.
Craig Coal and Mining Co., No. 3	Jerry Dawson	Kalo	Slope	Long wall	Furnace	Steam	Shipping.
Bennet Coal Co.	S. Bennet	Kalo	Slope	Long wall	Furnace	Horse	Shipping.
Calford Coal Co.	P. Lochray	Moorland	Slope	Long wall	Furnace	Horse	Local.
Allen Coal Co.	T. J. Allen	Ft. Dodge	Shaft	Room and pillar	Furnace	Steam	Local.
Martin Coal Co.	Chas. Martin	Moorland	Shaft	Room and pillar	Furnace	Horse	Local.

JASPER COUNTY.

Jasper County Coal Co. No. 4	Henry Thomas	Colfax	Shaft	Room and pillar	Fan	Steam	Shipping.
Jasper County Coal Co. No. 5	Henry Thomas	Colfax	Shaft	Room and pillar	Fan	Steam	Shipping.
Colfax Coal and Mining Co.	Geo. Wilson	Colfax	Shaft	Room and pillar	Fan	Steam	Shipping.
Barret Coal Co.	J. W. Barret	Colfax	Shaft	Room and pillar	Furnace	Horse	Local.

Little Star Coal Co.	Chas. Anderson	Colfax	Shaft	Room and pillar	Furnace	Horse	Local.
French Coal Co	E. P. French	Newton	Shaft	Room and pillar	Fan	Steam	Local.
Robt. Carson	R. Carson	Newton	Shaft	Room and pillar	Furnace	Horse	Local.
Snooks Coal Co.	Wm. Snooks	Newton	Shaft	Room and pillar	Furnace	Horse	Local.
Thomas Hanson	Thos. Hanson	Colfax	Shaft	Room and pillar	Furnace	Steam	Local.
Ino. Gunter	Ino. Gunter	Colfax	Shaft	Room and pillar	Furnace	Horse	Local.
Walker Mine	Ino. Waddell	Vandalia	Shaft	Room and pillar	Furnace	Horse	Local.
Wm. White	Wm. White	Vandalia	Shaft	Room and pillar	Furnace	Horse	Local.
Lister Coal Co	Alfred Lister	Newton	Shaft	Room and pillar	Furnace	Horse	Local.
Wardel Mine	.....	Vandalia	Shaft	Room and pillar	Furnace	Horse	Local.

GUTHRIE COUNTY.

Renslow Coal Co.	Fred Renslow	Fansler	Shaft	Long wall	Furnace	Horse	Local.
Caleb Thompson Coal Co	Caleb Thompson	Fansler	Shaft	Long wall	Furnace	Horse	Local.
Scott Bros. Coal Co	M. Scott	Fansler	Shaft	Long wall	Furnace	Horse	Local.
Thomas Coal Co	Harry Thomas	Fansler	Shaft	Long wall	Furnace	Horse	Local.
Merchant Coal Co.	Wm. Merchant	Fansler	Shaft	Long wall	Furnace	Horse	Local.
Ine Butler Coal Co.	Ine Butler	Fansler	Shaft	Long wall	Furnace	Horse	Local.
Phil. Raynor Coal Co.	Phil. Raynor	Fansler	Shaft	Long wall	Furnace	Horse	Local.
Rittner Coal Co.	Wm. Rittner	Fansler	Shaft	Long wall	Furnace	Horse	Local.
Hughs Coal Co.	S. T. Hughs	Fansler	Shaft	Long wall	Furnace	Horse	Local.
Reese Coal Co.	D. B. Reese	Panora	Shaft	Long wall	Furnace	Horse	Local.
Buckeye Coal Co.	W. Embrey	Panora	Shaft	Long wall	Furnace	Horse	Local.
White Ash Coal Co.	M. Canary	Panora	Shaft	Long wall	Furnace	Horse	Local.

DALLAS COUNTY.

Carpenter Coal Co.	O. M. Carpenter	Madrid	Shaft	Long wall	Fan	Steam	Shipping.
Platt Brick and Coal Co	J. L. Platt	Van Meter	Shaft	Long wall	Fan	Steam	Shipping.
Dawson Coal Co	W. C. Hutchins	Dawson	Shaft	Long wall	Fan	Steam	Local.
Mills Coal Co	Ino. Mills	Madrid	Shaft	Long wall	Furnace	Horse	Local.
Reese Coal Co.	W. J. Reese	Madrid	Shaft	Long wall	Furnace	Horse	Local.
Reese Bros. Coal Co., No. 2	W. J. Reese	Madrid	Shaft	Long wall	Furnace	Horse	Local.
Morris Coal Co.	Jos. Topping	Linden	Slope	Long wall	Furnace	Horse	Local.

GREENE COUNTY.

Willow Grove Coal Co	H. A. McElhane	Angus	Shaft	Room and pillar	Fan	Horse	Local.
Godwin Coal Co	Thomas Goodwin	Grand Junction	Shaft	Long wall	Furnace	Steam	Shipping.
Ditchburn Coal Co	Robt. Ditchburn	Angus	Slope	Room and pillar	Furnace	Horse	Local.
Thomas Coal Co.	H. L. Thomas	Perry	Shaft	Room and pillar	Fan	Steam	Local.
Buckeye Coal Co.	Mike Fife	Angus	Shaft	Room and pillar	Furnace	Horse	Local.
Snake Creek Coal Co	Jno. Groom	Angus	Shaft	Room and pillar	Furnace	Horse	Local.

STORY COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	SUPERINTENDENT.	POST OFFICE ADDRESS.	Slope or Shaft.	PLAN OF WORKING MINE.	HOW VENTILATED.	Power used.	Shipping or Local.
Story County Coal Co. Zemoville Coal Co	Wm Benson J. York	Summit Gilbert	Shaft Shaft	Room and pillar Room and pillar	Fan Furnace	Steam Horse	Shipping Local

ADAIR COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	SUPERINTENDENT.	POST OFFICE ADDRESS.	Slope or Shaft.	PLAN OF WORKING MINE.	HOW VENTILATED.	Power used.	Shipping or Local.
Bennet Coal Co	A. J. Bennet.	Adair	Shaft	Long wall	Fan	Horse	Local

ACCIDENTS.

Accidents fall into several classes: fatal, non-fatal, serious, and not serious. We draw a line between the different classes of accidents; yet just where this line should be is often a question. Any rule adopted must be flexible. Accidents occur from various causes in and around the mines. It seems to be human nature for a large majority of the men following a hazardous occupation gradually, in many ways, to become careless. We also find from statistics that more than sixty-five per cent of the accidents occurring below are caused through the negligence of fellow workmen, who have had, as a rule, years of practical experience in the mines. However we are glad to report thirty-three per cent less fatal accidents during the last biennial period than the previous biennial ending June 30, 1899; which all tends to show that those having supervision of the mines and the employes are gradually becoming more careful. Nevertheless, there are accidents that occur in and around the mines that, with a reasonable amount of precaution and care used, could still be reduced in number, which would be an advantage to all concerned; more especially to the unfortunate mothers, widows, and orphans that are left behind to battle for themselves.

It is probable accidents, that are not contained in this report, have occurred at the various mines that have not been reported to this office; either from neglect on the part of the company, or thinking them not of sufficient injury to report the same.

There was reported to this office from the various mines in the third district, during the past biennial period, thirty-eight noteworthy accidents: fourteen fatal and twenty-four non-fatal. The coroner's inquest for each fatal accident is on file in the general office.

The following is a summary of the accidents according to causes:—

S. O. Smith, who had been in the employ of the Carbondale Fuel company only five days, met with a very painful accident about 3:30 P. M. on August 15, 1899, from the effects of which he died during the night. The accident was caused in the following way: Mr. Smith was working in room number four, turned from the seventh north, in mine No. 2. He had drilled his holes for the evening's blasts and went out to the room mouth to get the powder; leaving Robert Snook, who was working a room parallel, at the room face. While he was in the act of handling the powder at the tool-box, the coroner's jury find that in some unknown way the powder was ignited: from which explosion he received burns inwardly, to such an extent that he died.

At Boone Coal and Mining company's mine No. 1; located at Incline, Boone county, Mr. Robert Scollick, 49 years of age, while in the act of placing some props that had been knocked down by a fall of coal, was fatally injured by roof falling on him before he had placed the necessary timbers under the same.

Charles Moll; employed in the Carbondale Coal company's mine, located at Carbondale; met death instantly by a piece of falling roof. The same, falling a distance of five feet, crushed Mr. Moll to the floor, where he was afterward found by Chas. Figg and Hugh Simpson; who called help to remove the slate from him; but life was extinct.

John Marshall was killed on the 29th day of November, 1899, in the Crow and Marshall shaft, located $5\frac{1}{2}$ miles west of Boone; in the following manner: He was superintendent of the sinking of this shaft. He went to the bottom of the shaft, and when ready to return got on a loaded bucket to ride to the surface. Material was being hoisted by an engine. The engineer hoisted the bucket, which Mr. Marshall was standing on, higher than usual. Mr. Marshall, thinking that he was being taken to the pulleys, let loose, turned head downward, going through the opening at the top, and falling to the bottom of the shaft; from which injuries he died.

While the Carbondale Coal company was putting up its tower over its No. 3 shaft all material was hoisted to the ground landing and there taken off and dumped. Mr. John Salvage, an employee of the company, was a top man. On the evening of December 8th he had taken a car of dirt off of the west cage and emptied the same. Returning to the shaft, the cage from which said car was taken had been removed to the bottom of the shaft, a distance of 125 feet. Mr. Salvage, not knowing of the change in cages, ran the empty car into the open shaft and followed it down on top of the cage, injuring him internally, from which he died at 12:15 A. M. the following day.

Joseph Kubic, who was mining coal for the Christy Coal company, on December 15, at 4:30 P. M., was found dead in his room under a shot of coal. Having lit one shot and thinking it had gone off, he returned to light a second shot; when the first one, not having gone off, exploded; crushing him inwardly.

On the morning of March 5, 1900, Jas. Powell came to his death by a fall of slate near the face of his room, while mining coal in the Avon mine near Levy, Polk county.

Wm. Channels, a top employee of the Des Moines Coal company, whose duty it was to handle the loaded cars as they were run off from the scales; was taking two cars down the main switch, and when in the act of twisting the brake he fell between said cars; the wheels passing over the body, crushing the arms so that amputation was necessary above the elbows. He also received a number of other bruises. The injuries afterward proved fatal. Time of the accident April 19, 1900, at 10:00 A. M.

A. Windbush, a cager at the Des Moines Coal company's mine, on the 20th of September, 1900, about 3:45 P. M., was pushing an empty car across the cage to change the same end for end, when the cage was taken away, catching Mr. Windbush between the cage and the cap, crushing him inwardly, from which injuries he died soon after being taken to the top landing.

There occurred at Carbondale mine No. 3, on December 5, 1900, about 10:45 an accident to A. L. Johnson in the following manner: While in the act of loading a car a piece of slate fell striking him on the head and shoulders and pinning him to the floor of the room. When taken out he lived only a short time.

An inquisition was held at Des Moines, Polk county, Iowa on the 6th, 9th and 11th days of February, 1901, before R. V. Ankeny, coroner of said county, upon the body of B. Logia, who while in the employ of the Christy Coal company, at Youngstown, Polk county, was killed on February 5th, about 4:45 P. M. Frank Jones was working in a room parallel to the room in which Mr. Logia worked, fired a shot on his right hand rib, which blew the shot of coal through into Mr. Logia's room, catching him while he was passing, and killing him almost instantly. Wm. Grant and Frank Jones both testified that Frank Jones stepped to the breakthrough, between the two rooms, and hallowed fire two different times. Whether Mr. Logia heard him or not is a question we will never be able to find out. The unfortunate man met death while trying to pass the shot in the pillar between the two rooms.

During the afternoon of April 13, 1901, Mr. Henry Thomas and Mr. Ryan were making a tour of their mine, No. 6, located at Colfax. They had visited nearly every working place in the mine, and when in the act of returning from the face of a room a piece of slate, weighing perhaps from six to eight hundred pounds, fell from between two slips, about half way between the face and the mouth of the room, striking Mr. Thomas on the head, crushing him to the floor; from which injury he died within one hour from the time of the accident. Mr. Thomas had charge, as superintendent, of the Jasper County Coal company's mines, for more than 30 years, and at no time prior to this accident did Mr. Thomas receive an injury in or around the mines of any consequence. Mr. Thomas was a man who was very careful; in fact, during this trip around the mine he had cautioned quite a number of his men to be careful and timber their places and keep their working places always safe. But this seemed to be one of the unforeseen accidents.

On the 20th of April, 1901, Vinton Swesia, an employee of the Webster County Coal and Land company, at Lehigh, was in the act of loading a car of coal at the road head, when a piece of undermined coal along the wall fell on him, catching him on the left side; also a piece of roof, from above the coal, fell striking him on the head; causing internal injuries from which he died. His partner, Wm. Phillips, being duly sworn, testified that he spoke to him about the safety of the coal and roof, when the deceased expressed himself as thinking it was perfectly safe.

Walter Miller, who was working mining coal for the Carbondale Coal company's mine No. 2, was asked on the morning of April 29, 1901, to drive a mule, which he consented to do, and in the act of bringing his first trip down the 10th north he fell off the tail chain under the car and was dragged quite a distance. He was removed to the pit-top, and into the engine room, at which time they did not suppose he was badly injured. From there he was taken home and a doctor called. Upon examination it was found that he had received internal injuries, from which he died at 9:00 P. M. on the above date.

On the morning of June 14, 1901, at 11:30 A. M., John Jones was killed in a room turned off the 4th west entry on the north side of the Norwood Coal company's mine in the following manner: He had two shots to fire. One was tamped with fuse. Lighting them both at the same time and going out upon the entry, remaining there until he thought both shots had gone off,

as he said to a man on the entry. Upon entering the room to see what the shots had done, when he reached the vicinity of the shot tamped with fuse, it went off, and Mr. Jones was completely covered by the shot of coal; breaking several bones and injuring him internally, from which he died within two hours after being taken to the surface.

George Fox, who was acting in the capacity as pit-boss for a short time, for the Gibson Coal company's mine No. 2, met with an accident at noon on May 6, 1900, in the following manner: He and some other employees were coming out for dinner, and a piece of rock on the entry fell catching Mr. Fox between the shoulders injuring his back, from which injury he suffered untold agony for several months, but finally dying from the effects of the same.

FATAL ACCIDENTS.

Table showing fatal accidents in District No. 3, for the biennial period ending June 30, 1901.

DATE.	NAME OF DECEASED.	OCCUPATION.	CAUSE OF CASUALTY.	NAME OF COMPANY OR FIRM.	WHERE LOCATED.
August 16, 1899	Samuel Smith	Miner	Explosion of powder	Carbondale Coal Co	Carbondale
September 12, 1899	Robt. Scollick	Miner	Fall of coal	Boone C. and M. Co	Incline, Boone Co.
September 26, 1899	Chas. Moll	Miner	Fall of slate	Carbondale Coal Co	Carbondale
November 29, 1899	Geo. Marshall	Superintendent	Fell down shaft	Crow Coal Co	Boonsboro
December 9, 1899	Geo. Salvage	Miner	Fell down shaft	Carbondale Coal Co	Carbondale
December 15, 1899	Geo. Subic	Miner	Discharge of shot	Christy Coal Co	1 mile W.P., Polk Co.
December 15, 1899	Geo. P. Chinnels	Miner	Thrown under car	Des Moines C. and M. Co	Marquisville
April 19, 1900	Wm. Chinnels	Laborer	Caught betw'n cage and timbers	Des Moines C. and M. Co	Marquisville
September 20, 1900	A. Windbush	Cager	Caught betw'n cage and timbers	Des Moines C. and M. Co	Marquisville
December 5, 1900	A. L. Johnson	Miner	Fall of slate	Carbondale Coal Co, No. 3	Youngstown
February 5, 1901	B. Logan	Miner	Fall of slate	Carbondale Coal Co	Carbondale
April 13, 1901	Henry Thomas	Superintendent	Fall of slate	Wasper County Coal Co	Volley
April 15, 1901	Wm. Miller	Miner	Fell under car	Carbondale Coal Co	Carbondale
April 29, 1901	Walter Miller	Miner	Fell under car	Carbondale Coal Co	Carbondale
June 14, 1901	John Jones	Miner	Fall of coal	Norwood Coal Co	Berwick

NON-FATAL ACCIDENTS.

Table showing Non-Fatal Accidents in District No. 3, for the biennial period ending June 30, 1901.

DATE.	NAME.	OCCUPATION.	CHARACTER OF INJURY.	CAUSE OF ACCIDENT.	RESIDENCE.
July 7, 1899	Samuel Sage	Miner	Leg broken	Fall of slate	Colfax.
July 10, 1899	W. Finnagin	Miner	Shoulder	Fall of slate	Carbondale.
August 2, 1899	Thos. Cooper	Driver	Ribs squeezed	Fall of slate	Des Moines.
August 11, 1899	W. Williamson	Whep boss	Ribs broken	Flying coal	Des Moines.
December 9, 1899	J. McInerney	Miner	Leg broken	Brake on engine slipped	Des Moines.
December 20, 1899	C. Wickland	Miner	Foot hurt	Flashshot	Saylor.
January 23, 1900	J. Sloan	Miner	Shook up	Brake on engine slipped	Carbondale.
April 12, 1900	Thos. Robinson	Miner	Not serious	Flashshot	Colfax.
May 6, 1900	Geo. Fox	Whep boss	Back injured	Fall of coal	Colfax.
May 15, 1900	W. Segord	Driver	Leg fractured	Fall of rock	Des Moines.
May 21, 1900	S. Lundstrum	Driver	Leg fractured	Fall of slate	Colfax.
August 20, 1900	N. G. Johnson	Miner	Not serious	Fall of slate	Fraser.
September 22, 1900	W. Birmingham	Miner	Broken leg	Fall of slate	Saylor.
November 15, 1900	A. Frevethan	Driver	Bone in foot broken	Caught between cars	Boone county.
November 26, 1900	Frank Harris	Miner	Ribs crushed	Fall of slate	Lehigh.
December 20, 1900	Frank Harris	Miner	Wrist of leg broken	Fall of slate	Lehigh.
January 4, 1901	Creed Taylor	Miner	Wrist bone broken	Fall of slate	Saylor.
January 22, 1901	David Morgan	Miner	Two ribs broken	Fall of slate	Colfax.
February 15, 1901	E. Alkinson	Brusher	Collar bone broken	Fall of slate	Des Moines Twp.
March 8, 1901	E. Bgork	Miner	Spine injured	Fall of slate	Fraser.
April 19, 1901	Wm. Lewis	Miner	Back crushed	Fall of slate	N. E. Des Moines.
			Leg broken	Shot from adjoining room	W. Des Moines.

POLK COUNTY.

The people of Iowa are largely an agricultural class, and Iowa, too, is above most states of the union as an agricultural producer. The mineral wealth, although superior to that of many other states, has not had the attention it merits. But in recent years especially her coal deposits have been attracting increased attention and capital, to such an extent that the coal industry of the state ranks it well up to the top of coal-producing states, and makes it the largest coal producer west of the Mississippi river.

The developed coal strata begins at Webster county, in the northwest part of the state, and continues southeast to the southern tier of counties, ranging in width from five to thirty miles.

Polk county, located nearly centrally in this belt, and owing to her superior railroad facilities and the great demand for local consumption which the city of Des Moines affords, probably surpasses most other localities. The theory existing in the minds of many people as to the extent and shape of the bodies of coal we will not discuss or trouble the reader with here. It is only necessary to say that the different large companies which are locating plants in this county, and the vast amount of drilling that is being done, from time to time, by large mining companies in the various parts of the county; also the large, well-equipped mining plants that are now in operation, some of them having an output of 1000 tons daily, only demonstrates that Des Moines, the county seat of Polk county and the capital of the state of Iowa, and much the largest city in the above state, is fast coming to the front as a manufacturing city; chiefly from the inexhaustible supply of steam coal so readily accessible.

On investigation of the various drillings that have been done from time to time, also the mines that are now in operation in the different parts of the county, we find that the most careful calculations show it has in the mean 50,000 acres of coal land. The coal under these broad acres varies in thickness from two and one-half to six feet; showing Polk county thus has, in round numbers, 152,000,000 tons of merchantable coal underlying its surface.

The mines are divided up in groups, and are located on the various railroads in such a way as to be able to divide their product to very good advantage. North of Des Moines, and within three miles of the city limits, we find two large modern equipped mines, located on spurs from the C. & N. W. R. R., known as the Des Moines and Saylor Coal and Mining companies. The Saylor company has one of the largest and most complete direct first motion engines now in use in the state, and has also placed a new 12x3½ foot fan within a year over its airshaft. Its main shaft is 225 feet deep; the employes in and around the mines number 264 men and boys; capacity 1000 tons. The Des Moines Coal and Mining company use mechanical

haulage, having in use an endless rope system, which transports a large portion of their coal more than three-quarters of a mile. Within a year their top landing, tipples and chute have been raised six feet higher and completely remodeled. For furnishing ventilation the company has two large improved fans, placed at each airshaft, one being located near the extreme end of the west workings; depth of main shaft 225 feet; employes working in and around the mine 285.

Northeast of Des Moines four to six miles, in conjunction with the C. G. W. R'y., is located the Maple Grove Coal company's mine No. 2, which mine has been in operation for several years. Above the Maple Grove mine the Norwood Coal and Mining company is operating the plant formerly owned by the Evans Coal company. It is completely overhauling the tower, cages, tipples, scales and fan. When completed the mine promises to be one among the large coal producers. What was known as the C. G. W. mine is being operated by a new company East of the city of Des Moines, near the edge of the city limits, the Gibson Coal company has its No. 3 mine, also on the C. G. W. R'y.

Five miles east of Des Moines there are three mines located on the C. R. I. & P. Ry., namely: The Christy Coal company's, and Lowe and Smith Coal company's mines Nos. 2 and 3. The Lowe and Smith mines were formerly operated by the Carbondale Coal company, and are located near Carbondale, employing 350 men.

The Christy mine has been in operation for a number of years, having hauled a large portion of its coal over three-fourths of a mile of track; it has in operation one among the best tail rope haulage systems in the state, which in former years was taxed to its capacity, for the mine was then quite a large coal producer. The depth of the coal from the surface in this locality varies from 130 to 200 feet. Veins of coal will average about 4½ feet in thickness. Employes in and around the mine number 125 men.

The Beck Coal and Mining company, operates a mine ¾ miles southwest of Des Moines, located on the Winterset branch of the C. R. I. & P. R. R. The Flint Brick Coal company operates a mine principally for its own use in connection with its brick plant; also ships considerable coal over the street railway, which connects with the plant. The Co-operative Coal company has a mine located on the same street railway, and has also a very large local trade. There are a number of mines that have no railway connections, that do quite a large shipping business. The Bloomfield Coal and Mining company has one among the best equipped mines for local trade, and has a very large local business, besides the large amount of coal hauled from the mine and loaded on cars. It employs during the winter 175 men.

Northwest of the city limits of the city of Des Moines are located, within a radius of one mile of each other, the Keystone Coal company's mine No. 1, Eagle Coal company's mine, and Central Coal company's mine. Each have in its employ, during the winter season, from 60 to 125 men. While there is considerable coal loaded on cars from the mines, at least seventy-five per cent of their entire output goes to the local consumers within the city limits. Coal averages in thickness from 4 to 5 feet, and is found from 90 to 125 feet below the surface.

Glenwood has within the last year, opened a mine east of the city limits,

equipped the same for a large local business, and expects in the near future to have a switch from the C. R. I. & P. R. R.

There are within the county 30 mines, which mines, during the biennial period, produced 1,793,000 tons of coal, which gave employment to 1310 miners and 461 day men, making a total of 1770 men working in and around the mines. For their labor the miners were paid, during the period, \$1,452,180, while the day men received \$555,400, making a total paid out by the mining companies, of the county, \$2,007,360; for the labor performed in and around the mines. During the last year of the biennial period there was paid out for props, tracking, etc., \$36,940, and there were improvements made during the year to the amount of \$59,870.

BOONE COUNTY.

The output of coal for the year ending June 30, 1900, was 281,180 tons; for the year ending June 30, 1901, 302,800 tons; making a total, for the biennial period, of 583,480 tons; giving employment, on an average, to 660 miners, and 260 day men; making a total of 920 men, which were employed in and around the mines. There was produced for each employe about 320 tons of coal per year. Taking into consideration the miners who mine coal only during the winter season, this certainly is an excellent average; moreover, a suspension of work at Fraser, during the early part of the first year, reduced the output to considerable extent.

There are several new shafts being put down, at this writing. They are being equipped with the latest improved machinery and, when thoroughly opened up, will increase the production of coal in Boone county considerably; especially, taking into consideration the large acreage of workable coal territory surrounding some of the large mining companies' plants.

The condition of the mines has been gradually improved, especially with regards to safety appliances, traveling ways, escape-shaft, safety-catches, and other devices for safety, which have in some instances been considerably improved.

The larger mines are controlled by the following companies: Boone Valley Coal & R. R. Co. has in operation two mines at Fraser; Nos. 1 and 3; is now equipping its No. 4 mine, and is laying the track up to the mine. This company has its own railroad connecting with the M. & St. P. at Fraser Junction, also with the C., R. I. & P. R. R. at Gowrie. The Boone Coal & Mining Co. operates Nos. 2 and 3 at Milford, four and one-half miles north-west of Boonsboro; and has shipping facilities over the C., N. W. R. R. The balance of the shipping mines lying west of Boonsboro all have C., N. W. connections. The W. D. Johnson, Crow, Zimbleman, and Heaps Coal companies, all being within a short distance of each other, one and one-half to three miles west of Boonsboro; employing from seventy-five to 150 men.

Coal in this section lies from 200 to 225 feet below the surface; averaging about three feet in thickness, and is of an excellent quality.

WEBSTER COUNTY.

Webster county lies the farthest north of all our coal producing counties. Coal was being mined in this county, in small drift mines, between 1855 and 1860, being more than forty years since the mineral was first discovered and mined in the county. Nine tenths of the coal that has been produced was from developments within a radius of six miles of Kalo, which town is located on the Des Moines river, six miles below Ft. Dodge; also within a radius of four miles of Lehigh. These are the only two points that coal has been mined, to any great extent, in the county, except at Coalville, which lies directly east of Kalo, which, at present, is quite a mining point. There was produced in this county, during the biennial period, 323,700 tons of coal, which gave employment to an average of 385 miners and 105 day men, making a total of 490 employes in and around the mines of Webster county. Within the county are twenty-four mines, twelve of which are equipped with steam hoisting appliances and equipments.

We find along the banks of the Des Moines river, which flows diagonally across the county, from northwest to southeast, coal-measures exposed at various points, showing that it is quite probable there is a large acreage of undeveloped coal within this county. While the coal is usually from two and one-half to three feet thick, it is of an excellent quality, and is mined on the longwall system. However, the Gleason Coal Co's. mine, located at Coalville, is working a six-foot vein; yet, the adjacent territory is usually thinner. The vein lies from 40 to 130 feet from the surface.

Some years ago practical investigation of the various geological formations, in this county, showed deposits of gypsum in paying quantities. Since then there have been several gypsum mines opened and mills built, and the product has gradually increased until they are now producing quite a large tonnage of the same. There are eight mines and mills, located within a radius of five and one-half miles of Ft. Dodge, producing gypsum and stucco under the following companies: Iowa Plaster Association, having in its employ 125 men; Duncombe Stucco Co., 35; Cardiff Gypsum Plaster Co., 40; Ft. Dodge Plaster Co., 30; Mineral City Plaster Co., 30; there being thus a of 290 men working in and around the gypsum mines and mills.

JASPER COUNTY.

Jasper county ranges fourth as a coal producer in the Third district. However, the amount of drilling that has been done during the last biennial period has clearly demonstrated that the best and the thickest coal is now being developed. The Jasper County Coal Co., which has quite a large acreage of coal-land, after drilling quite a number of holes located and opened its No. 5 shaft, three miles south of Colfax, being the first coal worked in this locality. Within the last fifteen months this company has done considerable drilling east of its No. 5 shaft, where a thicker and better quality of coal is found. At this place, one-half mile east of No. 5, the company has sunk its No. 6 shaft; which shaft is equipped with the latest improved machinery, and one of the J. M. Christy box car loaders. This plant employs about 270 men in and around the mine, and is connected with

the C. R. I. & P. R. R. and the C. G. W. R. R. by its own line of railroad, which line continues two miles farther east to where is located the Colfax Coal & Mining Co's. mine No. 1, which is a large well proportioned shaft sixty feet in depth and equipped with good machinery and mining facilities. This company has a large acreage of coal land adjoining its plant, where considerable drilling has been done, that will, no doubt, soon develop results. Since making this opening, the company has built quite a number of houses for its employees, and also made a number of improvements in the vicinity. With the addition to Jasper county of the Colfax Coal & Mining Co., which promises to soon be a large coal producer, there is no doubt that the county will, in a very short time, show quite an increased tonnage.

There was an average of 255 miners employed at mining coal during the past biennial period, also 70 day men; making a total of 325 men working in and around the various mines in the county. There was produced, during the past biennial period, 291,000 tons of coal.

DALLAS AND GUTHRIE COUNTIES.

The coal measures are very much alike in these counties. The coal seam now being worked, in the counties, lies in close proximity to the South and Middle Raccoon rivers and the Des Moines river, and is of about the same thickness, quality, and nature of the roof throughout the counties. The vein of coal now being worked is very often exposed along the banks of the rivers named. The coal is of a very good quality, being very hard, bright, and a free burner. There is quite a demand for coal at the various mines during the winter months. Coal sells at the mines for \$2.50 per ton, and it often occurs, during cold snaps, that the mines are unable to supply the demands, for very few of our local mines make the necessary improvements to stock coal ready for the extra demand made on them; but where they do prepare for such they profit by it. Long wall method is used throughout the various mines. The largest mining plant, in these counties, is operated by the Carpenter Coal company, and is located midway between Madrid and Woodward, and $1\frac{1}{2}$ miles south of the Milwaukee railway. This plant is equipped with an electric mining plant, and also with modern improved machinery, and has good shipping facilities, enabling the product to reach the northwestern markets for a less freight rate than those plants farther away.

GREENE COUNTY.

There are only six or eight mines in this county. They employ, during the winter months, about 80 to 100 men; during the summer season they mine some coal, which they haul to Angus and load on cars. Being near the northern market they have an advantage in freights. The largest expense in operating some of the mines near Angus is handling the water. The coal seems to be of a very bright nature and of good quality.

STORY COUNTY.

There is a decrease in the output of coal in this county, for the biennial period, owing to the abandonment of the mining plant located at Summit, which was operated by Benson Bros., of Boonsboro. This plant heretofore produced seven-tenths of the coal produced in the above county. The equipments connected with it have been moved into Boone county.

ADAIR COUNTY.

The mines of this county are small local mines that employ, during the winter season, from 4 to 8 men; usually beginning work about September 1st, or near the time local trade opens up, and continuing until spring. The coal is of an excellent quality, but only about 16 inches thick. Mining price is \$1.50 per ton.

TABLE No. 1.

Showing the number of mines, output of coal, number of miners and other employes, etc., in District No. 3, for the year ending June 30, 1900.

NAME OF COUNTY.	Number of mines.	Number of tons of coal, all grades produced.	Number miners employed.	Number other employes.	Amount paid miners, including yardage, room turnage, etc.	Amount paid other employes, including cost of supervision, etc.	Amount paid for timber, tracking, etc.	Cost of improvements, etc., including air and escape shafts.	Average price paid for lump coal, per ton.	Average price paid for mine run coal, per ton.
Polk...	36	854,500	1,235	440	\$ 684,980	\$269,000	\$35,915	\$ 66,945	80	59
Boone...	17	281,180	671	276	237,309	106,390	15,775	45,335	94	
Webster...	18	156,400	389	98	144,380	76,640	9,135	12,980	96	62
Jasper...	16	156,200	257	66	118,850	43,857	6,340	1,730	90	66
Guthrie...	14	17,700	94	43	21,940	7,350	590	720	110	
Greene...	6	11,850	54	16	16,830	2,900	280	950	85	
Dallas...	7	18,090	63	29	27,135	8,610	390	1,850	93	
Story...	2	5,300	29	9	6,350	2,100	400	2,600	100	
Adair...	3	3,800	31	13	7,100	2,940	210	250	125	
Total...	119	1,508,020	2,823	996	\$1,164,874	\$514,787	\$69,035	\$133,360		

TABLE No. 2.

Showing the number of mines, output of coal, number of miners and other employes, etc., in District No. 3, for the year ending June 30, 1901.

NAME OF COUNTY.	Number of mines.	Number tons of coal all kinds produced.	Number miners employed.	Number other employes.	Total amount paid miners, including yardage, room turning, etc.	Amount paid other employes, including cost of supervision, etc.	Amount paid for timber, tracking, etc.	Cost of improvements, etc., including air and escape shafts.	Average price paid for mining, per ton, lump coal.	A. v. price paid for mine run coal, per ton.
Polk...	36	938,620	1,320	478	\$ 767,200	\$276,400	\$36,900	\$ 59,870	\$.90	.....
Boone...	17	302,800	645	200	272,520	151,430	16,540	37,650	1.03	.....
Webster...	18	167,300	372	121	153,940	88,470	9,850	9,300	1.05	.....
Jasper...	16	134,500	249	59	113,200	41,240	5,080	23,000	.91	.....
Dallas...	7	29,400	86	35	39,250	11,750	6,240	5,450	1.20	.....
Guthrie...	14	16,750	90	44	29,940	7,630	400	800	1.25	.....
Green...	6	12,400	52	21	18,340	6,650	250	350	1.00	.....
Story...	2	3,200	17	6	4,150	1,540	100	100	1.00	.....
Adair...	3	2,740	14	5	3,200	1,130	40	100	1.50	.....
Total	119	1,607,660	2,845	1,059	\$1,392,740	\$488,240	\$76,260	\$136,570	.....	.....

TABLE No. 3.

Showing the output of coal of the counties comprising District No. 3 for the past five years.

COUNTIES.	1897	1898.	1899.	1900.	1900.
Adair.....	2,500	11,000	1,700	3,800	2,740
Boone.....	329,285	314,997	371,410	281,180	302,800
Dallas.....	16,781	12,400	13,000	18,000	29,400
Greene.....	17,085	21,900	22,600	11,850	12,400
Guthrie.....	11,340	16,000	16,400	17,700	16,750
Jasper.....	153,000	157,430	188,800	159,200	134,500
Polk.....	572,895	707,360	790,410	854,500	938,600
Story.....	12,240	9,010	9,600	5,300	3,200
Webster.....	101,643	143,812	187,650	150,400	167,300

A WORD REGARDING THE INTERESTS OF ALL CONNECTED WITH THE COAL BUSINESS.

The coal trade, and the production of coal, rest upon a triangular base and equilateral triangle; namely, labor, capital and transportation. Any one is indispensable to the other two; therefore it is of the utmost importance that all should work on lines of common or mutual interests, though each one occupies a separate and distinct field. Yet the ultimate purpose of all is the same. Labor produces, or rather mines, the coal; capital, through the owner or operator of the mine, is the medium or agent between the miner, or laborer, and the consumers. Capital also furnishes the transportation, making the transaction complete. And the consumer pays for the value he receives, which, if on an equitable basis, divided equitably between labor and capital and transportation, gives each a fair return for the part each performed in the transaction.

Any differences of opinion that are trivial should not be allowed to come

in the way of success from either base. Instead a generous policy should be adopted and maintained by all, to the end that all may be constantly employed; for inactivity on the part of either is fatal to the other two; or I might say to the other two and the consumer also. Therefore any vital change in either base should not be made independently without the careful consideration of the interests of the other two. Differences of this nature cannot be, or we should more properly say, are not, promptly settled. But it may be as well, for thorough discussion does not hurt a just cause, and an unjust cause is exposed by such discussion.

A healthy, thriving business for the operator means plenty of work and its emoluments to the miner. The two are mutually dependent. The operator could not exist and be a dealer in coal unless the miner aided him in producing it; neither could the miner enter the mine and dig coal and earn wages unless there was some one to furnish the mine and the machinery to run it.

In the event that the market does not justify the price paid for mining and transportation, the only alternatives are to lessen the price of production and transportation, to close down the mine, and when the receipts become inadequate to cover expenses to change the method of the business; for it is just as unreasonable to expect the mine to run at a loss, or in a manner that would ultimately bankrupt the operator, as it is to expect the miner to take his tools and go into the mine and dig coal for less than living wages, or at a price that would likely bring his family and himself to privation. Of course, the closing down of a mine should not be considered except as a last resort, as it unsettles business, not only while the mine is inoperative, but often is the effect obvious for many months; while its consequences are shared more or less by each individual who is dependent upon the work.

To the casual observer the adjustment of these vexed and varied questions is solely in the hands of the mine owners; but it is not so, for the laborer jointly has an interest at stake equal to if not greater than the operator's. Therefore the interests of the laborer cannot be successfully ignored. It is a fact, though not recognized by some, that labor, as a factor in the world's progress, has rights that cannot successfully be passed over, independent of the mere wages the individual receives. And we think it a safe proposition to say that the failure to recognize this fact is often the cause of strikes and so-called "labor troubles" in this country, as well as in Europe. For the fact has been demonstrated by experience in the manipulation of matters appertaining to the business that a digression of opinions, when in pursuit of the same object, seldom terminates with success, at least not with any degree of permanency, and these disagreements, which occur between operator and miner, as a rule originate and are the outgrowth of wrong impressions and misunderstandings. Often there develops a feeling among the miners that the operator is exacting, his rules are too oppressive, and his dividends are greater than they should be. On the other hand, the operator attaches too little importance to the considerations of the miner, especially in relation to matters wherein the miner is directly concerned.

The operator, or capital, takes voluntarily the obligations and risk of furnishing the mine with all necessary equipments to operate it, and should have a fair return on the capital invested, and on the capital necessary to

pay for all labor performed, clerical and otherwise. But the miners and others that labor in and around the mines represent an equal interest jointly with that of the operator; and the risk to his life is more than equal to the capital, that is, the aggregate risk of the men.

Moreover, the situation of the miner, his work, and the surrounding conditions, with their attendant dangers, are of like importance; and when comparatively considered, with other kinds of labor, his hardships and endurance are more apparent, for when he takes his tools and miner's lamp and goes into the mine out of God's sunlight, to perform his arduous task, with the purpose in view of earning an honest dollar; he has no assurance whether he will walk out or be carried out, for his dangers are many and often not apparent. Even the precautionary measures of the mining laws are not always effective in averting casualties.

Although the official requirements upon the operator are principally in the miner's interests, for his preservation and protection; and notwithstanding, he may be diligent and observant in the pursuance of his duties regarding sanitation, and the safe condition of the mine; yet there are many dangers unforeseen, and frequently accidents happen from causes that are almost unaccountable; evidencing the fact, that in the coal mine danger lurks in every entry, drive-way, and room. No matter how much discretion or caution the miner may exercise for his own protection, he is always liable to accidents that come without warning, and probably from an unexpected source, with fatal results or the laming for life. And very often the unfortunate is the husband and father of a family, that are dependent, and likewise are forced to bear the burden of distress. Thus the exposure and risk of the miner in connection with his labor, undoubtedly entitles him to a consideration in the councils that govern his conditions, and regulate the price of his labor; which was formerly denied him. But, now he is receiving the share of attention, in part at least, that is his due. And we are pleased to note the fact that those operators who the most fully recognize the equitable rights of labor as entirely independent of the individual are the best pleased with their business, and have the full confidence and respect of their men, without which, no business can be successfully conducted any length of time.

The stability of the business is dependent on, and can be regulated only by propositions that have their origin in, and are actuated by a joint representative council. For unquestionably confidence is the only reliable agency of medium that can reconcile the interests of miners and operators when any differences arise, and place them on a substantial basis with harmony. At least it is evident that strikes emanating usually from the impulsive and unpromising element of organized labor, and always from lack of confidence in the operator, have never been very effective in establishing favorable results. Nevertheless, organized labor is necessary and needful to a certain extent, and very advantageous if properly managed, but when controlled by rash and indiscreet persons, that are guided more or less by outside influences, it becomes a menace to business and in the main dominative and arrogant; and tends to compel capital to combine for protection, thereby widening the breach between miner and operator; who otherwise should be united in common efforts for the purpose of contributing to the welfare of the coal industry. Full confidence in, and respect for each other, by the

operators and men, also by and between the transportation companies and all other business, come under the same rule, and would entirely overcome great evils (for it is surely nothing less), and strikes and lockouts would be unknown.

Exercise tolerance and moderation in the light that each has rights that the other should respect, keeping in view at all times the fact that the man who furnishes the muscle, strength, and intellect to mine the coal should be credited in their business relations as the equal of the man who furnishes the capital and enterprise to build and operate the mine.

Operators, miners, and transportation companies should all banish prejudice; avoid competition, as regards both wages, freight, and markets; endeavor to establish confidence in the trade commercially; and promote and protect home markets in the interest of miners and mine owners. All general business appertaining to the coal trade would be appreciative of its beneficial results. For, beyond a doubt, the inauguration of these principles and a practical demonstration of their motives would culminate in success.

FIRST DISTRICT.

	TONS
For year ending June 30, 1900.....	1,679,050
For year ending June 30, 1901.....	1,964,050
For the two years.....	3,643,100
Miners June 30, 1900.....	3,792
Other employees June 30, 1900.....	1,496
Total number employees June 30, 1900.....	5,168
Miners June 30, 1901.....	3,006
Other employees June 30, 1901.....	1,396
Total number employees June 30, 1901.....	5,302
Average number of employees for the two years.....	5,235

SECOND DISTRICT.

	TONS
For year ending June 30, 1900.....	1,930,214
For year ending June 30, 1901.....	1,870,123
For the two years.....	3,800,337
Miners June 30, 1900.....	2,785
Other employees June 30, 1900.....	1,260
Total number employees June 30, 1900.....	4,054
Miners June 30, 1901.....	2,734
Other employees June 30, 1901.....	1,235
Total number employees June 30, 1901.....	3,969
Average number of employees for the two years.....	4,012

THIRD DISTRICT.

	TONS
For year ending June 30, 1900.....	1,508,020
For year ending June 30, 1901.....	1,607,690
For the two years.....	3,115,710

Miners June 30, 1900.....	2,823
Other employees June 30, 1900.....	996
Total number employees June 30, 1900.....	3,819
Miners June 30, 1901.....	2,845
Other employees June 30, 1901.....	1,059
Total number employees June 30, 1901.....	3,904
Average number of employees for two years.....	3,862