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SEVENTH BIENNIAL REPORT

OF THE

STATE MINE INSPECTORS

TO THE

GOVERNOR OF THE STATE OF IOWA

FOR THE

TWO YEARS ENDING JUNE 30, 1895.

JAMES A. CAMPBELL, District No. 1; J. W. MILLER, District No. 2;
MORGAN G. THOMAS, District No. 3.

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1895.

BIENNIAL REPORT

OF THE

FIRST DISTRICT,

EMBRACING

Adams, Appanoose, Davis, Lucas, Monroe, Page, Taylor, Wapello, Warren and Wayne Counties.

JAMES A. CAMPBELL, INSPECTOR.

REPORT OF FIRST DISTRICT.

To the Honorable FRANK D. JACKSON, *Governor of Iowa:*

I have the honor, in compliance with the law, to present to you herewith my biennial report on Mines and Mining for the First district for the period ending June 30, 1895.

In addition to the tabulation of the usual statistics, I wish to draw the special attention of your excellency to the growing importance of mining as one of the industries of the state, and to invoke, in its behalf, your kindly sympathy for its manifold conditions, and your aid to uplift and render more productive this great field of labor; through you we ask for the hearty cooperation of all interested in the growth of industry and the prosperity of the people. Employing as it does, in and about the mines, one per cent of the entire male population of the state, to say nothing of the ever increasing business incident to the operation of these mines, it is safe to say that the mining industry in Iowa today furnishes employment, directly or indirectly, to two and one-half per cent of the wage earners in the state. The industry ranks in importance second only to that of agriculture. As an industry, it needs attention; it has needed attention for some time past, and we fully endorse and urge the following

RECOMMENDATIONS:

After a careful study of the situation in connection with my duties as inspector, in the performance of which one is from time to time brought to feel the practical absurdity of certain clauses of our present mining law, I can not but heartily endorse the recommendations so often made in these reports relative to the necessity for a thorough reconstructing of the present laws. I would, therefore, respectfully suggest that the attention of the coming legislature be drawn to this matter by your excellency if it meets with your approval, and that steps be taken toward the appointment of a commission who shall be intelligent upon all matters relating to mines and mining. Such a commission might very properly consist of two mine operators, two miners, the three inspectors, one mining engineer, and one attorney, each of the members of said commission to have had an experience of at least ten years in the mines of Iowa, except the last named commissioner (attorney), who might be left to the choice of the other commissioners at their first meeting.

Such commissioners should be paid a reasonable per diem, except the inspectors who serve without further pay than that they already receive

from the state, and their work should be limited to sixty days. All the commissioners should be allowed mileage and should be unrestricted as to place of meeting. They should be instructed to report to the next legislature. In regard to the serving of the three inspectors upon the commission, it would seem essential that the wisdom and counsel of all of these officers should be accessible that the particular needs of any one of the mining districts should not be overlooked, and especially as the services of these men can be had without further expense to the state. In reference to the limit of time in which the work of the commission can be performed, we would suggest that much practical discussion will form a large part of the work in order to arrive at results that will be beneficial and mutually respondent, imposing no undue burden upon the operators while the men are cared for and protected in their rights and privileges. It is probable that this can not be satisfactorily completed in very much less than the time named.

We would respectfully draw the attention of your excellency to the question of coal in the southwestern part of the state. For years the question of deep lying coal in this section has been a prominent one and has received a great deal of attention from geologists and business men alike. The most intelligent conclusion and the now prevailing opinion being that there are strong probabilities of a workable vein of coal of excellent quality at a depth of from twelve to fifteen hundred feet below the railroad grade in Adams county, at Corning; and further, that if found, this vein would prove more regular and yield a better quality of coal than any mine now being worked in Iowa. We hope that the intelligence of that community will lead to an early demonstration by practical and reliable drill tests of this problem, and in this connection we would respectfully recommend that the State Geological board give to this section all of the encouragement and practical assistance that they can offer. We would be glad to see some deep borings made here under the supervision of some reliable mining expert thoroughly acquainted with the Iowa coal-fields, and we do not think that the appropriations for the geological survey could be better spent.

We are pleased to report to your excellency a thoroughly healthful and safe condition of the most of the mines of our district as far as the operation of the same is concerned with reference to appliances and improvements. Little trouble has been experienced in securing compliance with the mining law. With reference, however, to the commercial aspect, which we refer to here only for your information, it being a matter not coming under our jurisdiction, we can not report so favorably. The trouble in this direction arises from differences in the several districts relative to the marketing of the coal. So serious are the complications and so far reaching and disastrous the results, that we can not but express the hope that at no distant day operators will district the state and agree upon territory of market in such manner as will lead to the consolidation of interests in this respect; then may we look for our mines to be kept open and running at least a portion of the time the year round. We but voice the common feeling when we say that the present situation is not wholly a question of the shrinkage in the consumption of coal, but is also one of territorial discriminations and strife.

Hoping that these recommendations which are most respectfully submitted may meet with your hearty approval, and knowing that they will receive careful consideration at your hands, I am

Very respectfully yours,

JAMES A. CAMPBELL,
Inspector First District.

FIRST DISTRICT.

This district includes the two southern tiers of counties as far east as the east line of Wapello and Davis counties, and Warren county. It comprises an area of 8,640 square miles, somewhat greater than one-seventh of the entire state. It contains 151 openings or mines. These are shafts and slopes, working from 425 men down to four or five men apiece. The output of coal in this district will average somewhat greater than one-third of the entire output of the state. We have endeavored to embrace in our report all of the mines in the district, large and small, whether coming within the scope of the mining law or not, in order to give to each section its proper prominence. The counties of Appanoose, Monroe and Wapello represent the most important mining interests, and are the mining centers of this district.

A very considerable reduction in the tonnage of coal in this district for the past two years will be noted, as also the fact of the greater part of this shrinkage having taken place during the year just ending. This fact needs no explanation or comment further than to say that our mines are all in shape to meet a much greater demand than ever before, and are eagerly awaiting and expecting a stronger revival of business.

At the close of this report will be found an account of the explosion at the Jack Oak mine, in Monroe county, which was the only occurrence of this nature resulting in the death of the victims. A similar though not as disastrous occurrence took place at the Chisholm mine. Much care has been used in this direction, both on the part of the management and the men to prevent these happenings.

TABLE No. 1.

Showing the number of mines, annual output, number of miners, and other employes, value of product, etc., in District No. 1, for the year ending June 30, 1894.

NAME OF COUNTY.	Number of mines.	Number of tons of coal produced.	Number of miners employed.	Number of all other employes.	Average price per ton for mining.	Total amount paid miners.	Total amount paid all other employes.	Average selling price per ton at mine.	Total value of product at mines.
Adams	12	30,660	98	28	$1.12	$ 34,329	$ 6,340	$2.44	$ 74,810
Appanoose	68	528,640	1,644	486	.94	496,982	180,120	1.34	708,378
Davis	5	2,520	14	3	.93	2,344	550	1.30	4,087
Lucas	3	7,564	43	10	1.04	7,867	854	1.94	14,676
Monroe	15	512,240	745	304	.65	330,701	211,730	1.31	671,004
Taylor	7	35,475	109	16	1.09	38,668	4,840	2.05	72,724
Wapello	12	186,748	315	212	.62	115,784	86,626	1.42	265,182
Warren	7	25,454	73	16	.92	23,418	4,613	1.93	48,126
Wayne	7	68,330	145	38	.94	64,240	12,138	1.45	99,079
Total	136	1,397,631	3,186	1,173	$ .91	$1,104,283	$507,811	$1.40	$1,958,010

TABLE No. 2.

Showing number of mines, annual output, number of miners and other employes, value of product, etc., in District No. 1, for the year ending June 30, 1895.

NAME OF COUNTY.	Number of mines.	Number of tons of coal produced.	Number of miners employed.	Number of all other employes.	Average price per ton for mining.	Total amount paid miners.	Total am't paid all other employes.	Average selling price per ton at mine.	Total value of product at mines.
Adams	16	35,000	110	35	$1.10	$ 38,500	$ 10,500	$2.28	$ 79,800
Appanoose	72	350,000	1,415	318	.88	308,000	105,000	1.20	420,000
Davis	5	2,900	20	9	.90	2,610	870	1.50	4,350
Lucas	8	12,000	90	21	1.00	12,000	3,600	1.65	19,800
Monroe	20	312,354	789	397	.66	206,814	94,006	1.25	391,092
Page	4	4,200	24	8	1.12	4,704	1,260	2.05	8,610
Taylor	6	13,000	90	16	1.08	14,040	3,900	2.00	26,000
Wapello	12	205,900	421	235	.64	131,776	61,770	1.19	245,021
Warren	13	12,000	55	17	.90	10,800	3,600	1.60	19,200
Wayne	10	45,700	131	28	.87	39,759	13,710	1.26	57,582
Total	166	994,054	3,145	1,044	$ .92	$ 768,003	$ 298,216	$1.28	$1,272,055

TABLE No. 3.

Showing average number of mines in operation, output of coal, average number of miners and other employes, compensation, value of product, etc., in District No. 1 for the biennial period ending June 30, 1895.

NAME OF COUNTY.	Average number of mines.	Number of tons of coal produced.	Average number of miners employed.	Average number of all other employes.	Average price per ton for mining.	Total amount paid miners.	Total amount paid all other employes.	Average selling price per ton at mine.	Total value of product at mines.
Adams	14	65,660	104	31	$1.11	$ 72,829	$ 16,840	$2.35	$ 154,610
Appanoose	70	878,640	1,529	402	.91	804,982	285,120	1.28	1,128,378
Davis	5	5,420	17	6	.92	4,954	1,420	1.54	8,357
Lucas	6	19,564	66	15	1.02	19,867	4,454	1.76	34,476
Monroe	18	825,594	767	300	.66	537,515	305,736	1.28	1,062,726
Page	4	4,200	24	8	1.12	4,704	1,260	2.05	8,610
Taylor	7	48,475	99	16	1.09	52,708	8,740	2.03	98,724
Wapello	12	392,648	368	223	.63	247,560	148,406	1.29	510,203
Warren	11	37,454	64	16	.91	34,218	8,213	1.79	67,326
Wayne	9	114,030	138	33	.91	103,999	25,848	1.37	156,661
Total	158	2,391,685	3,176	1,110	$ .92	$1,873,286	$ 805,027	$1.35	$3,230,071

NOTE—The above table does not contain the salaries of superintendents or mine foremen, neither do they contain the expense of the tracking, props, etc., at mines, nor the royalty that the different companies pay on coal, which is from six to fifteen cents per ton.

TABLE No. 4.

Coal output of the counties comprising District No. 1, for the past five years.

COUNTY.	1891.	1892.	1893.	1894.	1895.
Appanoose	393,255	324,400	621,875	528,640	350,000
Adams	14,872	13,960	18,925	30,660	35,000
Davis	3,279	2,008	2,520	2,520	2,900
Lucas	196,720	7,416	10,200	7,564	12,000
Monroe	353,477	541,785	641,005	512,240	312,354
Page	2,700	....	1,450	....	4,200
Taylor	13,400	14,900	35,120	35,475	13,000
Wapello	169,590	253,073	259,160	186,748	205,900
Warren	15,904	9,570	14,325	25,454	12,000
Wayne	31,578	33,000	61,835	68,330	45,700
Total	1,136,190	1,200,961	1,597,215	1,397,631	994,054

TABLE OF FATAL ACCIDENTS

In District No. 1 for the two years ending June 30, 1895.

DATE.	NAME OF DECEASED.	CAUSE OF CASUALTY.	NAME OF COMPANY OR FIRM.	WHERE LOCATED.
August 23, 1893	Henry Johnson	Fall of rock	Standard Coal Co	Centerville, Appanoose county.
October 30, 1893	George Wright	Fall of slate and rock	Appanoose Coal Co	Willard, Wapello county.
November 6, 1893	Julius Koehler	Fall of slate	Wapello Coal Co	Hiteman, Monroe county.
December 29, 1893	John Kelley	Fall of slate	Enterprise Coal Co	Albia, Monroe county.
January 24, 1894	Egnas Soap	Fall of coal	Star Coal Co	Rathbun, Appanoose county.
March 8, 1894	Robert Roberts	Fall of slate	Whitebreast Fuel Co	Chisholm, Monroe county.
May 10, 1894	Thomas McManamon	Fall of slate	Wapello Coal Co	Hiteman, Monroe county.
May 12, 1894	John Wignall	Fell down shaft	Smoky Hollow Coal Co	Avery, Monroe county.
August 18, 1894	Thomas G. Thomas	Explosion	Whitebreast Fuel Co	Keb, Wapello county.
November 20, 1894	Charles Ricker	Caught bet. bumpers of railw'y car	Smoky Hollow Coal Co	Avery, Monroe county.
November 27, 1894	John A. Jones	Blown-out shot	Iowa and Wisconsin Coal Co	Albia, Monroe county.
December 15, 1894	Isaac Lewis	Fall of rock	Lodwick Bros	Mystic, Appanoose county.
December 22, 1894	Frank Bennett	Explosion of powder	Deep Vein Coal Co	Foster, Monroe county.
January 21, 1895	Patrick J. Ford	Fell down shaft	Anchor Coal Co	Centerville, Appanoose county.
March 18, 1895	Isaac D. Jenkins	Fall of slate	Phillips Fuel Co	Ottumwa, Wapello county.

NON-FATAL ACCIDENTS.

District No. 1.

DATE.	NAME.	OCCUPATION.	CHARACTER OF INJURY.	CAUSE OF ACCIDENT.	RESIDENCE.
July 24, 1893	Evan Poxdexter	Miner	Bone broken and left knee bruised	Fall of slate	Forbush.
July 24, 1893	Wm. Barkwell	Miner	Head and shoulder bruised	Fall of slate	Hiteman.
August 25, 1893	E. T. Ades	Miner	Bruised	Fall of slate	Foster.
October 5, 1893	M. Ratsky	Miner	Leg broken	Fall of coal	Rathbun.
November 9, 1893	Ivan Kanzlarle	Miner	Leg broken	Fall of coal	Rathbun.
November 25, 1893	Mat Olevick	Miner	Leg broken	Fall of coal	Forbush.
December 23, 1893	James Wilson	Miner	Shoulder bruised	Fall of rock	Albia.
January 12, 1894	Jno. Weible	Miner	Sprained ankle	Fall of coal	Rathbun.
February 14, 1894	F. Curran	Miner	Injury to spine	Fall of slate	Rathbun.
February 16, 1894	John Gu-taSon	Miner	Broken leg	Fall of slate	Hiteman.
February 17, 1894	Frank Adolphsen	Miner	Collar bone broken	Fall of coal	Forbush.
February 17, 1894	Wm. Kawzlerach	Miner	Head and breast bruised	Fall of coal	Forbush.
February 21, 1894	Mat Krudlets	Miner	Rib broken	Fall of rock	Forbush.
February 27, 1894	Richard Harris	Miner	Back and shoulders sprained	Fall of slate	Pickwick.
May 28, 1894	K. D. Wright	Miner	Burned on face, arms, hands and neck	Blown out shot	Chisholm.
July 16, 1894	W. A. Bednar	Miner	Burned on face, arms, hands and breast	Blown out shot	Chisholm.
July 16, 1894	Ben Thomas	Miner	Right leg broken	Fall of slate	Albia.
July 18, 1894	Aug. Fleming	Miner	Severely injured	Fall of coal	Forbush.
July 25, 1894	Peter Ash	Miner	Back hurt	Fall of coal	Albia.
August 13, 1894	Chas. V. Kirk	Miner	Fractured wrist bone	Caught by slate	Ottumwa.
August 14, 1894	Wm. Dougherty	Miner	Bruises on lower part of body	Fall of bank	Forbush.
August 31, 1894	Thos. Maugnell	Miner	Rib broken	Fall of coal	Forbush.
August 31, 1894	Wm. Wilson	Miner	Lower limbs paralyzed	Fall of coal	Ottumwa.
September 29, 1894	W. Jones	Miner	Shoulder broken	Fall of slate	Mystic.
October 16, 1894	J. C. White	Miner	Burned by powder	Caused by fire from pipe	Albia.
October 16, 1894	Barney Nicholson	Miner	Back and hips sprained		Mystic.
October 16, 1894	P. H. Collard	Miner	Strain across kidneys and hips	Fall of slate	Albia.
October 31, 1894	Wm. McKinney	Driver	Leg broken	Fall of coal	Darby.
November 9, 1894	Jess Pennington	Miner	Bruised arm, leg and ankle	Fall of coal	Jerome.
November 22, 1894	Henry Stanton	Miner	Burned	Blown out shot	Albia.
November 25, 1894	James Dyson	Miner	Burned	Blown out shot	Albia.
November 27, 1894	George Taylor	Miner	Severely burned	Explosion of powder	Foster.
December 22, 1894	Victor Johnson	Miner	Right leg broken	Fall of slate	Hiteman.
January 21, 1895	O. Polander	Miner	Left leg broken	Fall of slate	Hiteman.
February 4, 1895	Swan Nelson	Miner	Leg broken	Fall of coal	Brazil.
February 4, 1895	Geo. V. Phelby	Miner	Bruised	Fall of slate	Hiteman.
February 13, 1895	John Bognall	Miner	Collar bone broken	Fall of coal	Mystic.
June 20, 1895	Frank Ruby	Miner	Arm cut	Fall of coal	Mystic.
June 25, 1895	John Barton	Miner			

NEW MINES OPENED.

Centerville Block No. 9, operated by the Centerville Block Coal Co., at Centerville.

Iowa Block, operated by the Iowa Block Coal Co., at Mystic.

Royal, operated by the Royal Coal Co., near Sedan.

Phillips No. 3, operated by the Phillips Fuel Co., near Ottumwa.

Phillips No. 4, operated by the same company, near Ottumwa.

Diamond No. 2, operated by the Lumsden Coal Co., near Ottumwa.

Harrison, now being sunk by the Harrison Coal and Mining Co., near Eldon.

SCALES TESTED.

Fifteen sets of scales have been tested, as required by law, with the result that all of these were found to weigh correctly, except six, which took from two hundred to six hundred pounds to deflect the beam. All were at once overhauled and put in adjustment.

MINES ABANDONED.

Anderson No. 2, by the Anderson Coal Co., at New Market.

Phillips No. 2, by the Phillips Fuel Co., near Ottumwa.

FIRES.

In August, 1894, at Kirkville, the top plant of the Waddell mine was destroyed by fire.

In January, 1895, at Ford, fire destroyed the entire top plant of the Ford Coal Co.'s slope.

In the same month and year, fire destroyed the curbing and stack of Burch Bros.' furnace shaft, near Ottumwa.

APPANOOSE COUNTY.

There is a marked improvement in the mines of this district in regard to their enlargement and equipment. This improvement is fast assuming permanent shape. The larger companies in this district realize as they have never before the need of better facilities for mining and loading their output, and much new machinery has been introduced from time to time. In the ventilation of the mines, first-class and substantial fans are fast replacing the furnace, and always with a very satisfactory showing of results, both with respect to the health of the mine and economy of operation. Many of the smaller mines are still dependent upon the furnace for the maintenance of the air-current, but we cannot but express the hope that as soon as possible these too will recognize the advantage of the fan and adopt them. Small fans, say from six to ten feet in diameter and two to three and one-half feet wide, can be set up at a very inconsiderable cost, and will be found to pay for themselves within the first year.

The total number of shipping mines is fifty-eight, which will be found described in the following pages. There are in addition to these a large number of local mines, which will be found listed; a part of these ship a portion of their output.

The coal is of excellent quality, and is shipped over the Chicago, Rock Island & Pacific railroad, the Chicago, Milwaukee & St Paul, the Chicago, Burlington & Kansas City, the Keokuk & Western, and the Iowa Central, which gives it wide distribution through the state and beyond.

The majority of the mines in this county are slopes, though there are a large number of shaft openings, varying from thirty to one hundred and sixty feet in depth. Tail-rope systems have been largely introduced for inside haulage. There is one endles rope plant in operation. All of these are yielding good results, and greatly improve the sanitary condition of the mines using them by reducing the number of mules required; the air is purer, and the mine more wholesome.

The conditions of trade for this county are bound to improve from year to year. The advantage of having all of its coal mined without the use of powder is no small item in its favor. Though the vein of coal here is comporatively thin, yet it lies more regular than anywhere else in the state and mines freely.

The following mines are located on the Chicago, Rock Island & Pacific railroad: Centerville Block No. 1, Standard, National, and Raven Coal company, located at Centerville; Eldon No. 2 at Bellair, and Centerville Block No. 2 at Numa.

The most important mines on the Keokuk & Western railroad are the Centerville Block No. 3, located at Centerville; Centerville Block Nos. 4, 5, 6, and 7, Lane Coal Company's mine, Tipton Nos. 1 and 2, and Phœnix, located at or near Brazil.

On the Chicago, Milwaukee & St. Paul railroad are the Star Coal company's mine and the Evans Coal company's mine, located at Rathbun; Iowa Block, Lodwick Nos. 1 and 2, Iowa & Missouri, Brown & Bowers, Mystic fuel company Nos. 1, 2, and 3: C. L. Arnot, Coöperative, Walnut Creek, Herl Coal company, Twin Mining company, Peerless Coal company Nos. 1 and 2, Orr Bros. Nos 1 and 2, Lone Star, and Clark & Sons, located at or near Mystic; Carlton Coal company's mine, Columbia Coal company's mine, and Hazelton Coal company's mine, located at Diamond postoffice; Darby Coal company's mine, and Superior Block Coal company's mines Nos. 1 and 2, located at Darby. Mines located on the Iowa Central railway are Centerville Block No. 3, Centerville Block No. 9, and Whitebreast Fuel company No. 19.

The following mines are located on the Chicago, Burlington & Kansas City railroad: Appanoose Coal company's mine, Streator Block, Albert, Thistle, and Merchants, at or near Cincinnati.

The local mines mentioned below work less than ten men in the summer season, while some of them employ a larger number during the winter months. Some of these mines ship a part of their output.

The Star, Monitor, Happy, North Hill, and Rock Valley Coal company's mines are located at or near Centerville; Peacock Coal company's mine located near Brazil, and the Kansas City Coal company's mine, located at Cincinnati.

APPANOOSE COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Centerville Block Coal Co., No. 1	Alex. Dargavel	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Centerville Block Coal Co., No. 2	Alex. Dargavel	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Centerville Block Coal Co., No. 3	Alex. Dargavel	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Centerville Block Coal Co., No. 4	Alex. Dargavel	Centerville	Slope	Room and pillar	Furnace	Horse	Shipping.
Centerville Block Coal Co., No. 5	Alex. Dargavel	Centerville	Slope	Room and pillar	Furnace	Horse	Shipping.
Centerville Block Coal Co., No. 6	Alex. Dargavel	Centerville	Slope	Room and pillar	Furnace	Horse	Shipping.
Centerville Block Coal Co., No. 7	Alex. Dargavel	Centerville	Shaft	Room and pillar	Furnace	Horse	Local.
Centerville Block Coal Co., No. 8	Alex. Dargavel	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Centerville Block Coal Co., No. 9	Alex. Dargavel	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Anchor Coal Co., No. 1	James Wilson	Centerville	Shaft	Room and pillar	Steam jet	Steam	Shipping.
Anchor Coal Co., No. 2	James Wilson	Centerville	Shaft	Longwall	Fan	Steam	Shipping.
Whitebreast Fuel Co., No. 19	T. J. Phillips	Ottumwa	Shaft	Longwall	Fan	Steam	Shipping.
Star Coal Co	C. Rathbun	Streator, Ill	Shaft	Longwall	Fan	Steam	Shipping.
Standard Coal Co	G. W. Merritt	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Eldon Coal Co., No 2	John Morris	Ottumwa	Shaft	Room and pillar	Furnace	Steam	Shipping.
National Coal Co	F. W. Baker	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Scandinavian Coal Co	Claus Johnson	Centerville	Shaft	Longwall	Furnace	Horse	Shipping.
Lane Coal Co	L. Lane	Centerville	Shaft	Room and pillar	Furnace	Steam	Shipping.
Raven Coal Co	A. Highbarger	Centerville	Slope	Longwall	Furnace	Steam	Shipping.
Iowa Block Coal Co	Gus Pierson	Mystic	Slope	Longwall	Furnace	Steam	Shipping.
Iowa & Missouri Coal Co	J. R. Tuscon	Mystic	Slope	Longwall	Furnace	Horse	Shipping.
Brazil Coal Co	B. F. Silknetter	Brazil	Slope	Room and pillar	Furnace	Horse	Shipping.
Tipton Coal Co., No. 1	James Campbell	Brazil	Slope	Room and pillar	Furnace	Horse	Shipping.
Tipton Coal Co., No. 2	James Campbell	Brazil	Slope	Room and pillar	Fan	Steam	Shipping.
Appanoose Coal Co	J. M. Marsh	Cincinnati	Shaft	Room and pillar	Furnace	Horse	Shipping.
Phœnix Coal Co	Joseph Turner	Brazil	Slope	Longwall	Furnace	Steam	Shipping.
Thistle Coal Co	D. Steel	Cincinnati	Shaft	Room and pillar	Furnace	Horse	Shipping.
Streator Block Coal Co	D. M. Richardson	Cincinnati	Shaft	Room and pillar	Furnace	Horse	Shipping.
Albert Coal Co	M. Dimming	Cincinnati	Shaft	Room and pillar	Furnace	Steam	Shipping.
Merchants Coal Co	J. D. Collins	Cincinnati	Shaft	Room and pillar	Fan	Steam	Shipping.
Lodwick Bros., No. 1	L. Lodwick	Mystic	Slope	Longwall	Furnace	Horse	Shipping.
Lodwick Bros., No. 2	L. Lodwick	Mystic	Slope	Longwall	Furnace	Horse	Shipping.
Brown & Bowers	A. Hood	Mystic	Slope	Longwall	Furnace	Horse	Shipping.
Mystic Fuel Co., No. 1	James Helm	Mystic	Shaft	Longwall	Furnace	Horse	Shipping.
Mystic Fuel Co., No. 2	James Helm	Mystic	Slope	Longwall	Furnace	Horse	Shipping.
Mystic Fuel Co., No. 3	James Helm	Mystic	Slope	Longwall	Furnace	Horse	Shipping.
Co-operative Coal Co	Wm. Porter	Mystic	Slope	Longwall	Furnace	Horse	Shipping.

Walnut Creek Coal Co	D. C. Bradley	Mystic	Slope	Longwall	Furnace	Steam	Shipping.
Herl Coal Co	C. B. Herl	Brazil	Shaft	Longwall	Furnace	Horse	Shipping.
Twin Mining Co	Robt. Dixon	Mystic	Shaft	Longwall	Furnace	Horse	Shipping.
Peerless Coal Co., No. 2	James Lee	Centerville	Slope	Longwall	Furnace	Horse	Shipping.
Peerless Coal Co., No. 3	James Lee	Centerville	Slope	Longwall	Furnace	Horse	Shipping.
Orr Bros	A. Orr	Mystic	Slope	Longwall	Furnace	Horse	Shipping.
Orr Bros	A. Orr	Mystic	Shaft	Longwall	Steam jet	Steam	Shipping.
Clark & Son	A. Clark	Mystic	Shaft	Longwall	Furnace	Horse	Shipping.
Carlton Coal Co	Richard Murphy	Diamond P. O.	Slope	Room and pillar	Furnace	Steam	Shipping.
Columbia Coal Co	William Baker	Diamond P. O.	Slope	Room and pillar	Furnace	Steam	Shipping.
Hazelton Coal Co	T. D. True	Mystic	Shaft	Room and pillar	Furnace	Horse	Shipping.
Lone Star Coal Co	John Seddon	Mystic	Slope	Longwall	Furnace	Horse	Shipping.
Evans Coal Co	T. F. Evans	Rathbun	Shaft	Longwall	Furnace	Horse	Shipping.
Darby Coal Co	B. B. Stuff	Darby	Shaft	Room and pillar	Fan	Steam	Shipping.
Superior Block Coal Co., No. 1	L. W. White	Darby	Slope	Longwall	Furnace	Horse	Shipping.
Superior Block Coal Co., No. 2	L. W. White	Darby	Slope	Longwall	Furnace	Horse	Shipping.
Royal Coal Co	T. J. Green	Centerville	Slope	Room and pillar	Furnace	Steam	Shipping.
C. L. Arnot	W. M. Oughton	Mystic	Slope	Room and pillar	Furnace	Horse	Shipping.
Big Four	William Oughton	Jerome	Shaft	Longwall	Fan	Steam	Shipping.
Gladstone Coal Co., No. 1	Robert Marsden	Jerome	Shaft	Longwall	Furnace	Steam	Shipping.
Gladstone Coal Co., No. 2	Robert Marsden	Jerome	Shaft	Longwall	Furnace	Horse	Shipping.
Cincinnati Coal Co	C. C. Calker	Cincinnati	Shaft	Longwall	Furnace	Horse	Shipping.
William Lenning & Co	William Lenning	Pearl City	Shaft	Longwall	Furnace	Horse	Shipping.
Star Coal Co	William Cree	Centerville					Local.
Monitor Coal Co	A. D. Crawford	Centerville					Local.
Happy Coal Co	Charles Erickson	Centerville					Local.
North Hill Coal Co	H. H. Ashton	Centerville					Local.
Rock Valley Coal Co	L. S. Hall	Centerville					Local.
Peacock Coal Co	Thos. Philby	Brazil					Local.
Kansas City Coal Co		Cincinnati					Local.
Richard Campbell	Richard Campbell	Brazil					Local.
S. G. Houser	S. G. Houser	Seymour					Local.
Fenton Bros	Fenton Bros	Milledgeville					Local.
B. Parker	B. Parker	Milledgeville					Local.
A. Stockdick & Co	A. Stockdick	Milledgeville					Local.
Wm. Smith	Wm. Smith	Centerville					Local.
Eddy Bros	Eddy Bros	Centerville					Local.
J. A. Stevens	J. A. Stevens	Centerville					Local.
Miller Bros	Miller Bros	Centerville					Local.
Wm. Martin	Wm. Martin	Centerville					Local.
Joseph Hall	Joseph Hall	Centerville					Local.

ADAMS COUNTY.

This county lies upon the Missouri slope. There are no shipping mines at present within the county. The coal as worked belongs to the upper veins entirely. Many of the shafts are shallow and the veins are generally very thin, there being but few exceptions to this rule. The workings have formerly been extended but a short distance back from the bottom of the shaft when they would be abandoned for a new opening. Recently there has been a marked advance in the method of working these mines, and some of them are now equipped with separate air-shafts and man-ways supplied with ladders or hoisting apparatus. The coal gives good satisfaction. The mines are all located at Carbon, Eureka and Briscoe.

ADAMS COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED	Kind of power used.	Shipping or local.
Cullen & Rees	Cullen & Rees	Carbon	Shaft	Longwall	Furnace	Horse	Local.
Gibson & Co	G. W. Gibson	Carbon	Shaft	Longwall	Furnace	Horse	Local.
Effee McKee	Effee McKee	Carbon	Shaft	Longwall	Furnace	Horse	Local.
Frazier & Brooks	Brad Frazier	Carbon	Shaft	Longwall	Furnace	Horse	Local.
Kimpson Bros	— Kimpson	Carbon	Shaft	Longwall	Furnace	Horse	Local.
Thomas Gibbie	Thos. Gibbie	Carbon	Shaft	Longwall	Furnace	Horse	Local.
John Wilds	John Wilds	Carbon	Shaft	Longwall	Furnace	Horse	Local.
Wm. Chaffee	Wm. Chaffee	Carbon	Shaft	Longwall	Furnace	Horse	Local.
H. V. Jones	H. V. Jones	Carbon	Shaft	Longwall	Furnace	Horse	Local.
Lon Franklin	Lon Franklin	Carbon	Shaft	Longwall	Furnace	Horse	Local.
Harshorn Bros	— Hartshorn	Eureka	Shaft	Longwall	Furnace	Horse	Local.
Wm. Sparrier	Wm. Sparrier	Eureka	Shaft	Longwall	Furnace	Horse	Local.
Henry Hudgpeth	Henry Hudgpeth	Eureka	Shaft	Longwall	Furnace	Horse	Local.
James Harson	James Harson	Eureka	Shaft	Longwall	Furnace	Horse	Local.
W. R. Miller	W. R. Miller	Briscoe	Shaft				Local.
Thomas Nichols	Thomas Nichols	Briscoe					Local.

DAVIS COUNTY.

The coal outlook for this county is equal to that of any county in the state. There is little room to doubt but that the lay of coal is more abundant and the coal itself of as good a quality as that of any mined. In many instances, however, it lies back from the railroads and is yet largely undeveloped or prospected. All the mines are operated for local trade exclusively, except one which is just being opened, and promises well for the future. Mines are located near Eldon, Laddsdale and Belknap.

DAVIS COUNTY.

NAME OF COMPANY, FIRM, OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
G. W. Dye	G. W. Dye	Eldon	Slope	Room and pillar	Furnace	Horse	Local.
J. E. Fite	J. E. Fite	Eldon	Slope	Room and pillar	Furnace	Horse	Local.
J. Tresslar	J. Tresslar	Eldon	Slope	Room and pillar	Furnace	Horse	Local.
Thomas Hall	Thomas Hall	Laddsdale	Slope	Room and pillar	Furnace	Horse	Local.
Warren Graham	Warren Graham	Belknap	Slope	Room and pillar	Furnace	Horse	Local.

LUCAS COUNTY.

This is one of the pioneer counties in the coal trade of Iowa, and in former days was the largest producer of coal in the district. There is still considerable coal in the county, though not as extensively worked as its importance deserves. The coal is one of the best seam coals in the state. At the present time the only mines in active operation are small mines, and are taking coal from the middle measures only. There are about ten mines in this county, only two of which ship any coal, and these only ship a part of their output.

The Lucas and Cleveland Coöperative Coal Co.'s mine at Cleveland, and the New Diamond Coal Co.'s mine at Lucas, are located on the Chicago, Burlington & Quincy railroad. The local mines in this county are in the vicinity of Chariton and Oakley.

LUCAS COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Lucas & Cleveland Coöperative Coal Co.	J. A. Evans	Lucas	Shaft	Longwall	Furnace	Horse	Shipping
New Diamond Coal Co.	Wm. Sanders	Lucas	Shaft	Longwall	Furnace	Horse	Shipping
James Griffin & Son	James Griffin	Chariton					Local.
C. Robinson	C. Robinson	Chariton					Local.
James Hall	James Hall	Chariton					Local.
Thomas Smith	Thomas Smith	Chariton					Local.
Geo. Six	Geo. Six	Oakley					Local.
Wm. Swanson	Wm. Swanson	Oakley					Local.

MONROE COUNTY.

This county has always been a good coal producer. Though yet largely undeveloped, there are included within its limits very large beds of coal. In some instances these are owned and held for future development; in others they are being prospected and brought forward very rapidly. Much of this prospecting has been done within the past year by the use of the drill and by sinking trial shafts. This territory, the eastern portion of Monroe, as well as the western part of Wapello county, is practically open to incursion from northern feeders, and this naturally leads to the more rapid development of these rich fields. There is a strong belief among coal men that much of the best lying coal in this region has not as yet been opened up. The equipments of most of the larger mines in Monroe county are such as to maintain for them the full and undisputed control of the markets which they reach.

There are twelve mines shipping coal over the Chicago, Burlington & Quincy, the Iowa Central, and the Chicago, Milwaukee & St. Paul railroads. A number of local mines supply the demand for local trade.

The most prominent mines located on the Chicago, Burlington & Quincy railroad are as follows: Wapello Coal Co.'s mine No. 1, located at Hiteman; this mine has the largest output of any mine in the district. The Enterprise Coal Co.'s mine, Chicago and Iowa Coal Co.'s mine, and the Iowa and Wisconsin Coal Co.'s mine, situated from two to three miles west of Albia; the Smoky Hollow Coal Co.'s mines Nos. 1 and 2, located at Hynes City, two and one-half miles southeast of Avery; Whitebreast Fuel Co.'s mine No. 10, at Chisholm.

The Diamond Coal Co.'s mine No. 1 is located at Coalfield, and No. 2, at Hickory, on the Iowa Central railroad. Deep Vein Coal Co.'s mine is located at Foster, on the Chicago, Milwaukee & St. Paul railroad.

MONROE COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Wapello Coal Co., No. 1	P. H. Waterman	Hiteman	Shaft	Room and pillar	Fan	Steam	Shipping.
Smoky Hollow Coal Co., No. 1	F. Hynes	Avery	Slope	Room and pillar	Fan	Steam	Shipping.
Smoky Hollow Coal Co., No. 2	F. Hynes	Avery	Slope	Room and pillar	Furnace	Steam	Shipping.
Deep Vein Coal Co	C. H. Fogle	Foster	Shaft	Room and pillar	Fan	Steam	Shipping.
Enterprise Coal Co	Albert Lewis	Albia	Shaft	Room and pillar	Fan	Steam	Shipping.
Chicago and Iowa Coal Co	W. G. Bridgeman	Cedar Mines	Shaft	Room and pillar	Furnace	Steam	Shipping.
Iowa and Wisconsin Coal Co	D. H. McMillan	Albia	Shaft	Room and pillar	Fan	Steam	Shipping.
Whitebreast Fuel Co., No. 10	T. J. Phillips	Ottumwa	Shaft	Room and pillar	Fan	Steam	Shipping.
Diamond Coal Co., No. 1	A. R. Little	Coalfield	Slope	Room and pillar	Fan	Steam	Shipping.
Diamond Coal Co., No. 2	A. R. Little	Coalfield	Shaft	Room and pillar	Fan	Steam	Shipping.
Frederick Coal Co	Charles Abrams	Frederick	Shaft	Longwall	Furnace	Steam	Shipping.
Wilson Coal Co	P. F. Jackson	Frederick	Shaft	Longwall	Furnace	Horse	Local.
Remsy Bros	William Remsy	Albia	Slope	Room and pillar	Furnace	Horse	Local.
W. D. Russell	W. D. Russell	Albia	Slope	Room and pillar	Furnace	Horse	Local.
Smiley Bros	Smiley Bros	Albia	Slope	Room and pillar	Furnace	Horse	Local.
Harter Bros	Harter Bros	Albia	Slope	Room and pillar	Furnace	Horse	Local.
John K. Manley	John K. Manley	Albia	Slope	Room and pillar	Furnace	Horse	Local.
George Combs	George Combs	Albia	Slope	Room and pillar	Furnace	Horse	Local.

STEIN.

PAGE COUNTY.

There are five or six small mines operated in this county during the winter months, and for local trade only. They are changing hands often, and this fact alone makes it difficult to enroll them. The coal is thin, not exceeding twenty inches at the most. They belong to the upper measure.

PAGE COUNTY.

NAME OF COMPANY, FIRM, OR OPERATOR.	NAME OF SUPERINTENDENT	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
George Howard	George Howard	Shambaugh	Slope	Longwall	Furnace	Horse	Local.
William Turner	William Turner	Shambaugh	Slope	Longwall	Furnace	Horse	Local.
Charles Pierson	Charles Pierson	Clarinda	Slope	Longwall	Furnace	Horse	Local.

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TAYLOR COUNTY.

This county lies also upon the Missouri slope; only the upper veins are worked The coal seams may be slightly thicker than those of Adams county; the depth from the surface is, however, uniformly greater; the coal approaches in quality to that of Adams county. All of the mines are located in the western part of the county. The question of there being workable coal at a greater depth than has ever been satisfactorily prospected has always received considerable attention from those interested in the business of this locality, as well as that of the neighboring counties to the north and west. The general dip of the strata underlying the state would indicate that this seam should be found at a depth of from twelve to fifteen hundred feet below the surface; the probability is that this disposition of strata changes and begins, rising toward the Missouri river. There have never been any accurate records kept of borings to this depth in any part of this locality, and although embracing much that is hypothetical, this question should receive prompt and earnest attention.

There are only two mines shipping their output—Campbell Coal Co.'s mine and Anderson Coal Co.'s mine located at New Market, on the Humeston & Shenandoah railroad.

TAYLOR COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POST-OFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED	Kind of power used.	Shipping or local.
Campbell Coal Co.	Richard Campbell	New Market	Shaft	Longwall	Furnace	Horse	Shipping
Anderson Coal Co.	Wm. Anderson	New Market	Shaft	Longwall	Furnace	Horse	Shipping
Chas. Adams	Chas. Adams	New Market	Shaft	Longwall	Furnace	Horse	Local.
Powell & Lathrop	Lathrop	New Market	Shaft	Longwall	Furnace	Horse	Local.

WAPELLO COUNTY.

This county has a practically inexhaustible amount of coal, very much of which lies in basins as yet but little developed. These coal fields are being mentioned recently in connection with very flattering prospects, and much valuable land has been held under option during the year. Much prospecting has been carried on, both by means of the drill and by trial shafts. The coal is of a good quality, giving excellent satisfaction as a stone coal; it mines well, the veins being from three and one-half to five feet thick, and covered with a good roof.

There are six mines shipping coal over the Chicago, Burlington & Quincy, the Chicago, Milwaukee & St. Paul, and the Chicago, Rock Island & Pacific railroads, and from twelve to sixteen local mines, which supply a large city trade in Ottumwa, both for steam purposes and domestic use. Some of these local mines are well equipped, and do an excellent business, employing as many as forty men.

The White Breast Fuel company's mine No. 22, at Keb, is located on the Chicago, Burlington & Quincy railroad. Phillips Fuel company's mines Nos. 3 and 4, and Lumsden Coal company's mine No. 1, are located from two to three miles northwest of Ottumwa on the Chicago, Milwaukee & St. Paul railroad. Eldon Coal company's mine No. 1, at Laddsdale, is located on the Chicago, Rock Island & Pacific railroad.

Burch Bros., Lumsden No. 2, Baker's, Adams', and the South Ottumwa Coal company are local.

WAPELLO COUNTY.

NAME OF COMPANY, FIRM, OR OPERATOR.	NAME OF SUPERINTENDENT.	POST-OFFICE ADDR'SS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Whitebreast Fuel Co., No. 22	T. J. Phillips	Ottumwa	Shaft	Room and pillar.	Fan	Steam	Shipping.
Phillips Fuel Co., No. 3	Wm. Phillips	Ottumwa	Shaft	Room and pillar.	Fan	Steam	Shipping.
Phillips Fuel Co., No. 4	Wm. Phillips	Ottumwa	Shaft	Room and pillar.	Fan	Steam	Shipping.
Lumsden Coal Co., Diamond, No. 1	John Lumsden	Ottumwa	Shaft	Room and pillar.	Furnace	Steam	Shipping.
Lumsden Coal Co., Diamond No. 2	John Lumsden	Ottumwa	Shaft	Room and pillar.	Furnace	Horse	Local.
Eldon Coal Co., No. 1	Thos. Rinks	Ottumwa	Shaft	Room and pillar.	Fan	Steam	Shipping.
Appanoose Coal and Fuel Co	E. R. Silloy	Ottumwa	Shaft	Room and pillar.	Fan	Steam	Shipping.
Burch Bros	Burch Bros	Ottumwa	Shaft	Room and pillar.	Furnace	Horse	Local.
South Ottumwa Coal and Mining Co	Benjamin Lewis	Ottumwa	Shaft	Room and pillar.	Furnace	Horse	Local.
Baker Coal Co	W. J. Baker	Ottumwa	Shaft	Room and pillar.	Fan	Steam	Local.
Daniels Mine	John Daniels	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	Wm. Wintz	Ottumwa	Shaft	Room and pillar.	Furnace	Horse	Local.
Sweney Brothers	Sweney Brothers	Ottumwa	Shaft	Room and pillar.	Furnace	Horse	Local.
Geo. Rayerson	Geo. Rayerson	Kirkville	Shaft	Room and pillar.	Furnace	Horse	Local.
W G Davis	W. G. Davis	Kirkville	Shaft	Room and pillar.	Furnace	Horse	Local.
G. Smith	G. Smith	Kirkville	Shaft	Room and pillar.	Furnace	Horse	Local.
John Thompson	John Thompson	Kirkville	Shaft	Room and pillar.	Furnace	Horse	Local.

WARREN COUNTY.

This county lies the farthest north of any in the district. Its mines are all small, there being but one of the number that comes under the mining law. This was a shipping mine, and was located at Ford, on the Chicago, Burlington & Quincy railroad, in the extreme northeastern corner of the county. Two of the remaining number employ in the winter time a number of men sufficient to cause them to comply with the law. The vein of coal in this county is for the most part thin, much of it not exceeding three feet. The shipping facilities are fair.

Caldwell & Wishman's and D. K. Jones' mines are located at Summerset, on the Chicago, Rock Island & Pacific railroad. Local mines are located near Indianola, Ackworth and Milo.

WARREN COUNTY.

NAME OF COMPANY, FIRM, OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Ford Coal Company	G. Haosen	Ford	Slope	Room and pillar	Furnace	Steam	Shipping.
Caldwell & Wishman	Wishman	Summerset	Shaft	Room and pillar	Furnace	Horse	Shipping.
D. K. Jones	D. K. Jones	Summerset	Shaft	Room and pillar	Furnace	Horse	Local.
Wm. Lumsden & Son	Wm. Lumsden	Summerset	Slope	Room and pillar	Furnace	Horse	Local.
W. S. Benum	W. S. Benum	Summerset					Local.
D. S. Sayers	D. S. Sayers	Summerset					Local.
John Lanniman	John Lanniman	Summerset					Local.
Frank Murphy	Frank Murphy	Indianola					Local.
Grant Wilson	Grant Wilson	Indianola					Local.
Johnson & Son	Johnson & Son	Ackworth					Local.
Jamison Bros	Jamison Bros	Ackworth					Local.
John Brown	John Brown	Milo					Local.
Sid Bryant	Sid Bryant	Milo					Local.

WAYNE COUNTY.

The mines of this county are local mines with but two exceptions, and are all located in the eastern half of the county. The Chicago, Milwaukee & St. Paul, and the Chicago, Rock Island & Pacific railroads furnish facilities for distributing the output of the Chicago Coal and Seymour Coal companies, located at Seymour. The local mines are located in the vicinity of Confidence and Bethlehem.

WAYNE COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Chicago Coal Co.	Peter Thomas	Seymour	Shaft	Longwall	Fan	Steam	Shipping.
Seymour Coal Co.	Geo. Elmore	Seymour	Shaft	Longwall	Fan	Steam	Shipping.
Lewis Fry	Lewis Fry	Confidence	Shaft	Longwall	Furnace	Steam	Local.
Wm. Thomson	Wm. Thomson	Confidence	Slope	Longwall	Furnace	Horse	Shipping.
L. Atwell	L. Atwell	Confidence	Slope				Local.
L. Brown	L. Brown	Confidence	Slope				Local.
M. H. Roe	M. H. Roe	Confidence	Slope				Local.
Aaron Radcliff	Aaron Radcliff	Confidence	Slope				Local.
Wm. Burns	Wm. Burns	Confidence	Slope				Local.
R. F. Jared	R. F. Jared	Bethlehem					Local.

IMPROVEMENTS MADE AT THE MINES IN DISTRICT No. 1 DURING THE PAST TWO YEARS.

APPANOOSE COUNTY.

NAME OF MINE.	Air shaft.	Second opening.	Stairway.	Cover on cages.	Safety catches.	Safety gates.	Brake on drum.	Fan.	Furnace.	Trailer or dog.	Safety block.
Centerville Block, No. 9	1	....	1	1	1	1	1	1	....	....	....
Raven Coal Co	1	....	....	1	1	1	1	....	1	....	....
Iowa & Missouri Coal Co	1	1	....	....	....	....	....	....	....	....	....
Streator Block Coal Co	1	....	1	1	1	1	1	....	1	....	....
Merchant's Coal Co	1	....	....	1	1	1	1	1	....	....	....
Mystic Fuel Co	1	....	....	....	....	....	....	....	....	1	1
Peerless Coal Co	1	....	....	....	....	....	....	....	....	....	....
Evans Coal Co	1	....	1	1	....	1	1	....	1	....	....
Columbia Coal Co	....	....	1	....	....	....	....	....	....	1	1
Darby Coal Co	....	....	1	....	....	....	....	1	....	....	....
Big Four Coal Co	....	....	....	....	....	....	....	1	....	....	....
Royal Coal Co	1	....	....	....	....	....	....	....	1	1	1
Albert Coal Co	1	....	....	1	....	1	1	....	1	....	....
Total	10	1	5	6	4	6	6	4	5	3	3

WAPELLO COUNTY.

Phillips Fuel Co., No. 3	1	....	1	1	1	1	1	1	....	....	....
Phillips Fuel Co., No. 4	1	....	1	1	1	1	1	1	....	....	....
Lumsden Coal Co	....	1	1	....	....	....	....	....	....	....	....
Eldon Coal Co	....	....	....	....	....	....	....	....	....	....	....
Burch Bros	....	....	....	....	....	....	....	1	....	....	....
South Ottumwa Coal and Mining Co	1	....	....	....	....	....	1	....	....	....	....
Total	3	1	4	3	3	3	4	3	....	....	....

MONROE COUNTY.

Smoky Hollow Coal Co	1	1	....	....	....	....	1	....	....	1	1
Wapello Coal Co	....	1	....	....	....	....	....	....	....	....	....
Deep Vein Coal Co	....	1	1	....	....	....	....	....	....	....	....
Diamond Coal Co	....	....	....	....	....	....	....	....	....	1	1
Total	1	3	1	....	....	....	1	....	....	2	2

THE EXPLOSION AT THE "JACK OAK" MINE.

The following article was prepared and published in some of the leading papers of this district, and is incorporated in this as being of interest:

"The recent explosion at the 'Jack Oak' mine of the Iowa and Wisconsin Coal company, two miles west of Albia, was fortunately not as disastrous in its results as either of the explosions of two years previous at Pekay and Cedar. Still the recurrence of such a catastrophe in our Iowa mines emphasizes the need of care and judgment on the part of our miners. In the Iowa coal field as it is developed to-day, where the presence of fire-damp is unknown, there can be but two alternatives suggested as the responsible cause of such accidents—careless or reckless negligence of some of the simplest regulations relative to the mining of coal, or else dense and inexcusable ignorance of such regulations. The former is culpable; it should be criminal and punishable under the laws of the state; the latter is pitiable, while inexcusable. Ignorance on the part of officials or workmen in any of the hazardous callings can only meet with the strongest possible condemnation. Any man who does not value his own life sufficiently to guard against accidents arising from his own ignorance can have no proper regard for the lives and safety of his fellows; such a man should not be allowed where his ignorance may at some unguarded moment bring untold destruction and misery upon his fellows. Ignorance is pitiable, but it is not excusable; it cannot be where such great odds are at stake. The mining laws of Iowa are deficient in this respect and are responsible to a large degree for many of the accidents in our mines to-day. Attention has been frequently called to this fact, but Iowa legislatures have thus far given no adequate recognition to the great industry of mining in the state. Let us hope that the future will develop a change in this respect, and that the mining interest of Iowa will receive the consideration that is its due, representing as it does one of the natural industries of a great state. But we must not digress; let us ask, and endeavor to answer in the light of the developed facts, 'What were the causes, direct or indirect, which led to this explosion?' Let us endeavor to so look at the facts as to gain therefrom an intelligent idea of the prevailing conditions just previous to this explosion; and note such of these conditions as we can reasonably suppose would tend to the reproduction of the occurrence. We must form our theories from the facts, and not, as is too often done, try vainly to adopt a certain theory, however true, to our particular case, the reasonableness of which is not clear to ourselves and wholly unintelligible to others. Men must do their own thinking, wisely, carefully, and always with consideration for the thoughts of others.

"The explosion of which we are speaking took place at half-past eight o'clock on the morning of the 27th of November last. It occurred on what

was the back entry of the main south; it had been allowed to fall in sometime previous and was now being opened up again by taking a skip off the rib. The work had proceeded in this way till at the time of the occurrence it was twenty feet ahead of the last breakthrough, where the air was traveling, and 1,250 feet from the bottom of the shaft. The hole was an ordinary 2½-inch hole, first firing, and contained four and one-half common charges of powder. The hole would measure about twelve inches on the heel and was six feet deep; it gripped a little too strongly, being from six to seven feet on the point.

"The shot was fired with a squib. The four men who were working at that place had retired through the breakthrough and were sitting or lying upon the main entry, just in from the corner of that opening. Two other men were at work ninety feet outside of this breakthrough, on the main entry, and just outside of a curtain which served to turn the air toward other workings. These men were burned worse than the inside men. The shot was simply what is termed a 'windy shot,' where the powder, instead of having its expansive force converted into work and breaking down the coal, either from not being sufficiently confined, or from being too strongly confined, is projected into the air and wastes its expansive force in the entry. The flame from the shot came through the breakthrough and went outward first as far as the curtain, only a comparatively small portion extending inward from the breakthrough; at the curtain it baffled and turned, coming down upon the two men mentioned and burning them severely; it then traveled back upon its path, this time passing the breakthrough and extending thirty-five feet further in, where it finally exhausted itself.

"Now we have reviewed the facts as they occurred, let us study them in the light of our present knowledge and ascertain as nearly as possible the responsiblity for their occurrence. We note as important first, that the flame went out with the air, upon its first course. This indicates conclusively that it was driven by an expansive energy that could not be resisted and acted in the direction of least measure. Its advance, as far as it went upon its first course, was not dependent upon feeding upon fresh air: in other words, this flame as projected through the entry, was not incident to a combustion of dust, forming gas, which burned as it came in contact with a supply of fresh air. It is not probable that dust played any appreciable part in the transmission of the flame as far as to the curtain; but when its expansive energy had reached its limit, the flame then returned upon its own trail of unconsumed gas, and the return was perhaps stimulated by the combustion of a certain amount of coal dust which had been thrown into the air by the commotion, the burning becoming somewhat more general and pushing back against the air, feeding upon its supply and burning with no little avidity as it went, till stifled and wholly extinguished thirty-five feet inside of the breakthrough, where it could get no air. Upon this return it would doubtless have gone back through the breakthrough as it came had it not the circulation for the time being, being disarranged by the expansion and the current of fresh air, thereby held back long enough to choke the passage of the flame in this direction. We learn that in an explosion of coal dust, the flame advances more particularly against the current than in any other direction, whirling and circling in the upper part of the airway, as it rolls on, into and over the cooler air. The temperature of this

advance is often very high, and when a great deal of dust is carried along, it frequently happens that much finely divided carbon, or unconsumed smoke, drops from this upper burning, the fresh air below converting them into a shower of sparks. This is a typical dust explosion. The result is sure to come, and will travel lower and perhaps not as rapidly as the first. We note that the advance in the other direction has been quickly choked in its own trail before going far. When the first flash of flame of an explosion has passed out along the entry, there is created a tendency toward a vacuum; the result of this is to draw a large supply of fresh air out of the rooms and other workings before the equilibrium is restored by the return. The effect of this is to stimulate the burning and makes the returning flame hotter and stronger than it would otherwise be. The advance of the explosion along the airways, and the extent of the same, is dependent first and most largely upon the amount of gaseous material at hand, and, second, upon the strength of the vacuum left behind, or the effort to restore the equilibrium of the air. It has been suggested that a lessening of the current, either by slowing down the fan, or by partially opening the door previous to firing time, would act to destroy, to a large extent, the force of an explosion, should one occur. Let us see how this would be. We would have less air traveling upon the airways and throughout the workings and a consequent decrease of pressure in the pit, on the one hand. We have, on the other hand, the same explosive force and expansive energy at the initial point; the same amount of dust will be stirred up and thrown in suspension upon the air in the region of the shot, and practically the same amount of gaseous material will be at hand, depending upon the supply of oxygen to burn it. This is fired from the flame of the shot and rolls out upon the entry, propelled by its expansive force; meeting the current, it feeds upon the oxygen there supplied and continues thus advancing till the outward expanding energy and the inward pressure of the current, aided by the tendency toward a vacuum behind, neutralize each other, when the further progress of the flame is stayed. Now (not to say a wind), but with the customary amount of air passing, the burning and advance of the flame will be more rapid, the tendency toward a vacuum correspondingly stronger and opposing pit pressure will be higher; all of these influences will unite to stay the progress of the flames in the entries sooner than when the current of air has been reduced. We can readily see that any influence that will stifle and smother out a burning gas will likewise prove fatal to the survivors and render their escape extremely doubtful. In most of our large pits a momentary reduction of the amount of air passing and the customary ventilating pressure can be noted at once by the very large increase of damps thrown upon the entries. We would not deem it at all advisable to, in any manner, reduce the amount of air passing previous to firing. The consequences are much too serious. Experience has proved that that amount of air is necessary for that particular pit, and it is needed more than ever when volumes of gas from perhaps two or three thousand pounds of blasting powder are thrown out upon the airways, through which from three to five hundred men must make their escape. No one can seriously doubt, for a moment, of the need of a steady flow of air at this time. It is not our intention here to attach any blame to anyone for the occurrence at the Jack Oak mine, but simply to urge upon all men more care in placing shots. Do not give your powder too much work to do; beware, always, of firing a fissured hole, and see that your holes are well tamped with material that will not fire; use squibs for firing."

BIENNIAL REPORT

OF THE

SECOND DISTRICT,

EMBRACING

Jasper, Jefferson, Keokuk, Mahaska, Scott and Van Buren Counties.

J. W. MILLER, INSPECTOR.

REPORT OF SECOND DISTRICT.

To the Honorable FRANK D. JACKSON, *Governor of Iowa:*

I herewith submit my report for the biennial period ending June 30, 1895, together with such tables and statements as the inspector is required by law to compile and furnish for publication.

Respectfully submitted,

J. W. MILLER,
Mine Inspector Second District.

SECOND DISTRICT.

At the time of my appointment as mine inspector of the Second district, the majority of the mines were idle, owing to the miners being out on a strike. Therefore I did not enter actively into the actual field work connected with this office until the 19th of June 1894, since which time I have devoted all my time and energy in looking after the welfare of the miners in my district.

The past year has not been very satisfactory, either to the operators or miners. Several causes have combined to produce this result, one of which was the depression in all lines of business which swept over the country and brought ruin and disaster to thousands. Another was the extremely mild weather that prevailed during a considerable portion of the past winter. Also another was the scarcity of crops throughout the agricultural regions which are tributary to the coal fields of this state.

It gives me great pleasure to be able to say that up to this time I have not found it necessary to invoke the aid of the courts to enforce any of the requirements of the mining laws. On the contrary, I have invariably found that it was only necessary to call attention to any defects that I found to exist, to have the same remedied as soon as it was possible to do so. I have also had the hearty co-operation of the miners, which has been invaluable to me in the successful discharge of my duty; for all of which I desire to express my sincere appreciation.

It has been my experience during the short time that I have been engaged in the duties of this office, that the matter of proper and thorough ventilation is one of the most difficult problems that the inspector has to deal with. It is a fact well known to all who are directly interested, that the mines in this state generate large quantities of carbonic acid gas, which requires strong currents of air to remove. Again, the roof that overlies the coal seam in a great many mines is of such a soft, brittle nature that there will be frequent falls in the airways. These falls are often allowed to remain; especially is such liable to be the case where the mines have been worked for a number of years, and are extensive, and the track has been removed from such airways. There are very few, if any, of the mines in this district that do any business to speak of, but what are fully equipped with all the appliances necessary to thoroughly ventilate them, if the men who have charge of the underground work will only take the precaution to guard against the difficulties just spoken of. It is a matter of economy, in my opinion, to keep at least a temporary track in all the main airways, so that all such falls may be removed as soon as possible after they occur. Again, there is another source from which trouble is being experienced, and one which I believe is gradually on the increase, and that is the use of a very inferior grade of miner's oil. Formerly it was customary to use a lard oil which gave off very little smoke in combustion, but of late years there has been put upon the market a mixture of cotton seed and mineral oil, and for the reason that the mineral is the cheaper the proportion of that has gradually increased, until at the present time the oil in use at a great many of our mines is but very little better than kerosene, the smoke and gas from which, in the close confines of the mine, is not only disagreeable to whoever is forced to inhale the foul mixture, but injurious to his health. I would suggest that the next general assembly pass a law prohibiting the use of such oils, and requiring all oils in any mine in this state to be up to a certain standard of purity, the same to be determined by some person competent to do so.

TABLE No. 1.

Showing number of mines, annual output, number of miners and other employes, value of product, etc., in District No. 2, for the year ending June 30, 1894.

NAME OF COUNTY.	Number of mines.	Number of tons of coal produced.	Number of miners employed.	Number of all other employes.	Average price paid per ton for mining.	Total amount paid miners.	Total amount paid all other employes.	Average selling price per ton at mine.	Total value of product at mines.	Capital invested.
Jasper	15	240,985	325	105	$ .76	$ 183,148	$ 68,748	$1 70	$ 409,674	$ 110,000
Jefferson	6	4,840	17	6	.87	4,211	894	1.79	8,663	4,650
Keokuk	13	215,625	340	190	.82	176,812	60,247	1.55	334,218	160,000
Mahaska	28	965,676	1,600	650	.75	724,257	160,141	1.41	1,361,693	880,600
Scott	6	13,500	45	11	1.07	14,445	920	1.75	23,323	8,100
Van Buren	6	22,000	52	20	.78	17,160	4,000	1.60	35,200	14,000
Total	74	1,462,626	2,3[illegible]4	982	$ .84	$1,120,033	$ 294,310	$1.49	$2,172,883	$ 1,186,350

TABLE No. 2.

Showing number of mines, annual output, number of miners and other employes, value of product, etc., in District No. 2 for the year ending June 30, 1895:

NAME OF COUNTY.	Number of miners.	Number of tons of coal produced.	Number of miners employed.	Number of all other employes.	Average price per ton paid for mining.	Total amount paid miners.	Total amount paid all other employes.	Average selling price per ton at mine.	Total value of product at mine.	Capital invested.
Jasper	17	160,200	298	$ 82	$ .76	$ 121,828	$ 33,064	$1 54	$ 246,400	$ 110,000
Jefferson	8	4,000	20	8	.89	3,560	800	1.75	7,000	20,000
Keokuk	16	260,000	430	190	.76	197,706	52,200	1 38	358,800	240,000
Mahaska	28	902,430	1,640	594	.75	676,802	206,927	1 34	1,209,256	900,000
Scott	6	10,100	60	17	1.02	10,310	2,100	1.65	16,665	6,500
Van Buren	6	11,000	47	14	.78	8,580	2,100	1.50	16,500	15,000
Total	81	1,347,870	2,495	906	$ .82	$1,018,786	$296,191	$1 38	$1,854,671	$1,292,100

TABLE No. 3.

Showing average number of mines in operation, output of coal, average number of miners and other employes, compensation, value of product, etc., in District No. 2, for the biennial period ending June 30, 1895.

NAME OF COUNTY.	Average number of mines.	Number of tons of coal produced	Average number of miners employed.	Average number of all other employes.	Average price per ton paid for mining.	Total amount paid miners.	Total amount paid all other employes.	Average selling price per ton at mine.	Total value of product at mines.	Capital invested.
Jasper	16	401,285	311	94	$ .76	$ 304,976	$ 100,212	$1.62	$ 656,074	$ 110,000
Jefferson	7	8,840	19	7	.88	7,771	1,694	1.77	15,663	12,325
Keokuk	15	475,625	385	190	.79	374,518	112,407	1.45	693,018	250,000
Mahaska	28	1,868,106	1,622	612	.75	1,401,059	367,068	1.38	2,570,859	894,800
Scott	6	23,600	53	14	1.04	24,755	11,300	1.70	40,190	7,350
Van Buren	6	33,000	50	17	.78	25,740	6,100	1.56	51,700	14,800
Total	78	2,810,456	2,440	934	$ .83	$2,138,819	$ 5[illegible],781	$1.43	$4,027,504	$ 1,289,275

NOTE—The above tables do not contain the salaries of superintendents, or mine-foremen; neither do they contain the expense of tracking, props, etc., at mines.

TABLE No. 4.

Output of coal of the counties comprising District No. 2, for the past two years.

COUNTIES.	1891.	1892.	1893.	1894.	1895.
Mahaska	953,568	1,048,030	1,172,530	965,676	902,430
Keokuk	363,617	312,25[illegible]	272,150	215,625	260,000
Jasper	146,191	294,295	292,000	240,985	160,300
Scott	10,534	9,850	14,500	13,500	10,100
Jefferson	2,932	5,620	4,940	4,840	4,000
Van Buren	46,764	27,330	28,680	22,000	11,000
Total	1,523,526	1,695,735	1,784,800	1,462,626	1,347,830

JASPER COUNTY.

This county is among the early coal producing counties of the state, it being more than thirty years since the first mine was opened. There has been several large pockets or fields of coal discovered within the past two years in this county, and when properly developed, promise to be among the largest coal producers of the state.

Jasper County Coal company's mines are the largest mines in the county and among the largest in the state. They are located two and one-half miles northwest of Colfax, on the Iowa Northern railroad. One-half mile east of the Jasper County Coal company's mines is the Little Diamond mine, which produces a large tonnage for a local mine. About three miles east of Colfax, along the south bluff of South Skunk river, are located three or four local mines, viz: The Hanson, Genter's, Briggs' and Slaughter's. They employ from four to ten miners, delivering most of their product in Colfax, which gives them a good market, especially in the fall and winter months. Three miles south of Newton is the oldest mining field in the county, and mining operations are still carried on there, there being at present three good local mines, viz: Snook's, Lister's and Carson's. They employ from six to fifteen miners during the fall and winter months. This county produces annually 200,000 tons of coal, giving employment to 450 men.

Three-fifths of the mines in this county are shafts, and the balance are slopes. Besides the mines already mentioned there are several small mines employing from two to six men, located in different parts of the county, viz: William Burdess, Metz; Robert Marshall, Draper; and one mine near Lynnville.

JASPER COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Jasper Co. Coal Co.	Henry Thomas	Colfax	Shaft	Room and pillar	Fan	Steam	Shipping.
Little Diamond Coal Co.	James Evans	Colfax	Shaft	Room and pillar	Fan	Steam	Local.
Thomas Hanson	Thos. Hanson	Colfax	Shaft	Room and pillar	Furnace	Horse	Local.
John Genter	John Genter	Colfax	Shaft	Room and pillar	Furnace	Horse	Local.
Briggs & Brown	Briggs & Brown	Prairie City	Shaft	Room and pillar	Furnace	Horse	Local.
Crawford & Shultz	John Crawford	Vandalia	Shaft	Room and pillar	Furnace	Horse	Local.
Brunner Mine	John Deer	Vandalia	Shaft	Room and pillar	Furnace	Horse	Local.
Walker Mine	John Waddel	Vandalia	Shaft	Room and pillar	Furnace	Horse	Local.
Snook's Coal Co.	Wm. Snooks	Newton	Shaft	Room and pillar	Fan	Steam	Local.
Lister Coal Co.	Albert Lister	Newton	Shaft	Room and pillar	Furnace	Horse	Local.
Robert Carson	Robt. Carson	Newton	Shaft	Room and pillar	Furnace	Horse	Local.
T. F. Welsh	T. F. Welsh	Newton	Shaft	Room and pillar	Furnace	Horse	Local.
Wm. Burgess	Wm. Burgess	Metz	Slope	Room and pillar	Furnace	Horse	Local.
Robert Marshall	Robt. Marshall	Draper	Shaft	Room and pillar	Furnace	Horse	Local.
Wm.		Lynnville	Shaft	Room and pillar	Furnace	Horse	Local.

JEFFERSON COUNTY.

This county is located in the southeastern part of the state, and is a very good agricultural county. There are at present in this county six or eight local mines, producing annually six thousand tons of coal. The seam of coal in this county averages about three and one-half feet thickness, and is of a good quality. From my own observations and from reports received from this county, I am satisfied that there are good fields of coal yet undeveloped.

The mines are located near Libertyville, Fairfield, and the county line. The majority of the mines work only during the fall and winter months.

JEFFERSON COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POST-OFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
A. J. Zimmerman	A. J. Zimmerman	Libertyville		Room and pillar.	Furnace	Horse	Local.
W. W. Laughlen	W. W. Laughlen	Libertyville		Room and pillar.	Furnace	Horse	Local.
George Bates	George Bates	Fairfield		Room and pillar.	Furnace	Horse	Local.
Thomas Russell	Thomas Russell	Fairfield		Room and pillar.	Furnace	Horse	Local.
John Clark	John Clark	County Line		Room and pillar.	Furnace	Horse	Local.

KEOKUK COUNTY.

Keokuk county has at present sixteen mines in operation. Their tonnage was larger in the years 1894 and 1895 than it has been for several years, owing to there being two large mines opened out in the year of 1894, namely: the North Star and Crescent, which produce a large tonnage. Four-fifths of the mines in this county are shaft mines, the balance are slopes. The shafts are from forty to one hundred and sixty-five feet in depth. Eight of them are shipping mines, and use steam power, the balance being exclusively local mines.

The seam of coal being worked in this county is from four to seven feet in thickness, and is, as a rule, of excellent good quality. The larger mines in this county are located within a radius of five miles of What Cheer, on the Burlington, Cedar Rapids & Northern railroad and the Chicago & Northwestern railroad.

The most important mines located on the Burlington, Cedar Rapids & Northern railroad are as follows: The North Star, Pioneer, and What Cheer. They are about two and one-half to three miles north of What Cheer. The Crescent Coal company's mine is located three miles northwest of What Cheer on the Chicago & Northwestern railroad. On the southeast edge of the city limits of What Cheer is located the Thomas Bros.' mine, the same being a slope. Below the Thomas Bros.' mine one-half mile is the Rowley mine, where the coal is mined by Harrison machines. The What Cheer mine also use machines.

The largest local mines around What Cheer are the Thompson and Black Diamond mines. Thompson's mine is located one-half mile northeast; Black Diamond mine is located one mile northwest. Both of these mines deliver part of their product to What Cheer by wagons. There are several more local mines around What Cheer employing from two to ten miners. Besides the mines already mentioned there are several others located in different parts of this county at Delta, Richland, and Packwood, the same being local mines. The majority of the mines in this county are operated the entire year, and work on the room and pillar system.

There has been considerable prospecting done and some good fields of coal discovered. I am of the opinion that Keokuk county will largely increase her output of coal in the next two years, for I am satisfied there are good fields of coal undeveloped in the county.

KEOKUK COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POST OFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Crescent Coal Co	James Chen	What Cheer	Shaft	Room and pillar	Fan	Steam	Shipping.
North Star Coal Co	Thos. Armstrong	What Cheer	Shaft	Room and pillar	Fan	Steam	Shipping.
Pioneer Coal Co	M. A. Hollingsworth	What Cheer	Shaft	Room and pillar	Fan	Steam	Shipping.
What Cheer Coal Co	E. M. Truesdell	What Cheer	Slope	Room and pillar	Furnace	Steam	Shipping.
Thomas Brothers Coal Co	Thos. Thomas	What Cheer	Shaft	Room and pillar	Fan	Steam	Shipping.
What Cheer Coal Co	E. M. Truesdell	What Cheer	Shaft	Room and pillar	Fan	Steam	Shipping.
Thos. Thompson	Thos. Thompson	What Cheer	Shaft	Room and pillar	Furnace	Horse	Local.
E. Mayar	E. Mayar	What Cheer	Shaft	Room and pillar	Furnace	Horse	Local.
Wm. Blair	Wm. Blair	What Cheer	Shaft	Room and pillar	Furnace	Horse	Local.
O. W. Olive	O. W. Olive	What Cheer	.....	Room and pillar	Furnace	Horse	Local.
Martin Fisher	Martin Fisher	Delta	.....	Room and pillar	Furnace	Horse	Local.
Chas. Cordle	Chas. Cordle	Richland	.....	Room and pillar	Furnace	Horse	Local.
Thos. Turnbull	T. Turnbull	Packwood	.....	Room and pillar	Furnace	Horse	Local.

MAHASKA COUNTY.

Mahaska county is the largest coal producing county in the state, producing annually more than 1,000,000 tons of coal, requiring 63,000 fifteen-ton cars annually to remove the coal mined at the shipping mines. There are eighteen shipping mines and twelve local mines, giving employment daily, when in operation, to more than 2,000 men.

The coal in this county runs from four to seven feet in thickness, and is of good quality. The shipping facilities are equal, if not superior, to those of any other county in the state, having the Chicago & Northwestern, the Chicago, Rock Island & Pacific, the Iowa Central and the Burlington & Western railroads to haul their product from the different mines.

The most important mines on the Chicago & Northwestern, are the Consolidation Coal company's mines Nos. 6, 7 and 8; the Iowa Fuel company's mine; Columbian Coal company, and the Oskaloosa Coal company's mine No. 4. The Consolidation Coal company's mines Nos. 6 and 7 are located two and one-half miles south of Oskaloosa; mine No. 8 is located three miles northwest of Muchakinock. The Iowa Fuel company's mine is located at Colon, or East Excelsior. The Columbian Coal company's mine is located at Wapaluka, and Oskaloosa No. 4 two miles northwest of Given.

The most important mines on the Chicago, Rock Island & Pacific railroad are the American Coal company, located at Evans; Oskaloosa Coal company's mines Nos. 2 and 3, Garfield; Superior Coal company's mines are within a radius of three miles of Beacon; M. B. Foster, located at Fishville.

Mines on the Iowa Central railroad are the Whitebreast Fuel company, located at Pekay, it being their mine No. 28; Excelsior Coal company's mines, located at Carbonado; Oskaloosa Coal company No. 1, located one mile south of Oskaloosa; Daniel Hawarth, located in city limits of Oskaloosa. Mines on the Burlington & Western railroad are Long Bros., in the city limits of Oskaloosa; Lost Creek Coal company, located five miles south of Stark, and is a new mine being equipped with all modern improvements.

There are several large local mines within a radius of three miles of Oskakoosa, namely: The Economy, C. A. Hoover, and J. D. Guthrie's two mines, which employ from ten to twenty miners The smaller local mines around Oskaloosa are operated by Cook, J. O. Deaver, Comstock, and Logue. Besides the mines already mentioned there are several local mines employing from two to eight men in the fall and winter months, located at Rose Hill, Leighton, New Sharon and Beacon. The shipping mines of this county employ from twenty to three hundred miners each.

The equipments of the mines in this county are among the best and most improved in use at the present time. The American Coal company, of Evans, has in use at their mine an endless rope system similar to the street railway system in our large cities, the cable being one and three-fourths miles in length, having an electric bell in the engine room on top, the wires running parallel with the cable throughout the mine. Quite a number have in use tail-rope systems, viz: the Consolidation Coal company's mine No. 7, and Excelsior mine No. 4, which are shaft mines. The following slope mines also use the tail-rope system: Garfield, Superior and Oskaloosa Coal company's mine No. 4. Long Bros. mine their coal with electric mining and cutting machines.

MAHASKA COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Consolidation Coal Co.	J. E. Buxton	Muchakinock	Shaft	Room and pillar	Fan	Steam	Shipping.
American Coal Co.	W. T. Phillips	Oskaloosa	Slope	Room and pillar	Fan	Steam	Shipping.
Oskaloosa Coal Co.	John Ramsay	Oskaloosa	Shaft&S	Room and pillar	Fan	Steam	Shipping.
Excelsior Coal Co.	George H. Ramsay	Carbonado	Shaft	Room and pillar	Fan	Steam	Shipping.
Iowa Fuel Co	E. C. Smith	Oskaloosa	Shaft	Room and pillar	Fan	Steam	Shipping.
Whitebreast Fuel Co.	George H. Ramsay	Pekay	Shaft	Room and pillar	Fan	Steam	Shipping.
Garfield Coal Co.	B. F. Montgomery	Oskaloosa	Slope	Room and pillar	Fan	Steam	Shipping.
M. B. Foster	W. F. Durfee	Fishville	Shaft	Room and pillar	Fan	Steam	Shipping.
Columbian Coal Co.	W. F. Durfee	Rose Hill	Shaft	Room and pillar	Jet	Steam	Shipping.
Long Bros.	Henry Long	Oskaloosa	Shaft	Room and pillar	Jet	Steam	Shipping.
Lost Creek Coal Co.	Charles Wilson	Oskaloosa	Shaft	Room and pillar	Fan	Steam	Shipping.
Howarth Coal Co.	Charles Wilson	Oskaloosa	Shaft	Room and pillar	Fan	Steam	Shipping.
Superior Coal Co.	B. F. Evans	Beacon	Slope	Room and pillar	Fan	Steam	Local.
Hoover Coal Co.	H. A. Hood	Carbonado	Shaft	Room and pillar	Fan	Steam	Local.
Guthrie Coal Co.	C. A. Hoover	Carbonado	Shaft	Room and pillar	Fan	Steam	Local.
Cook Coal Co.	P. Cook Guthrie	Oskaloosa	Shaft	Room and pillar	Furnace	Horse	Local.
J. O. Deaver	J. O. Deaver	Oskaloosa	Shaft	Room and pillar	Furnace	Horse	Local.
Comstock Coal Co.	J. Comstock	Oskaloosa	Shaft	Room and pillar	Furnace	Horse	Local.
Logue Coal Co.	J. Logue Evans	New Sharon	Shaft	Room and pillar	Furnace	Horse	Local.
William Evans	William Patterson	Leighton	Shaft	Room and pillar	Furnace	Horse	Local.
Mike Carey	Mike Carey	Rose Hill	Shaft	Room and pillar	Furnace	Horse	Local.
S. Andrews	S. Andrews	Oskaloosa	Shaft	Room and pillar	Furnace	Horse	Local.
R. C. Davis	R. C. Davis	Leighton	Shaft	Room and pillar	Furnace	Horse	Local.
J. G. Davis	J. G. Davis	Leighton	Shaft	Room and pillar	Furnace	Horse	Local.
J. G. White	J. G. White	Rose Hill	Shaft	Room and pillar	Furnace	Horse	Local.

SCOTT COUNTY.

This county is located in the eastern part of the state and is a river county. There has been coal mined in Scott county for more than forty years. The principal mines are located in the southern part of the county. The seam is from two and one-half to three and one-half feet thick, and lays very regular where it is being worked. They mine most of the coal without the aid of powder. They undermine the seam of coal and then wedge it down. They have not had any mine explosions in this county, and are not likely to have while following this plan of mining.

The important mines in this county are the James & McKin mines, being located west of Jamestown one mile. They employ in mine No. 1 from ten to thirty miners, In mine No. 2 from four to ten miners. The Williams & Penn Coal company's mines are located southwest of Jamestown, and employ from eight to twenty men. The Webster & Couch mines are located north of Buffalo one and one-half miles. The majority of these mines are operated the entire year, and are all local mines.

A good portion of their product is delivered by wagons to Davenport and Buffalo, and the balance sold at the mines. The coal in this county is of good quality and brings a good price.

SCOTT COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POST-OFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
James & McKin	Samuel James	Jamestown	Shaft	Room and pillar	Furnace	Steam	Local
Williams Coal Co.	Thomas Anderson	Jamestown	Shaft	Room and pillar	Furnace	Steam	Local
Penn Coal Co.	Ed. McCullough	Jamestown	Shaft	Room and pillar	Furnace	Horse	Local
Thomas Webster	Thomas Webster	Buffalo	Shaft	Room and pillar	Furnace	Horse	Local
Thos. Couch	Thos. Couch	Buffalo	Shaft	Room and pillar	Furnace	Horse	Local
Big Four Coal Co.	William Priddy	Buffalo	Shaft	Room and pillar	Furnace	Horse	Local

VAN BUREN COUNTY.

This county is located in the southern part of the state, adjoining Missouri. Mining operations are carried on in different parts of the county; the principal seam being worked is about three and one-half feet in thickness. The yearly output is fourteen thousand five hundred tons, giving employment to about sixty men. Mines are located at Douds, Farmington, Hillsboro and Selina.

The Findley Bros., Ratcheliff, Strong and W. R. Carson mines are located near Douds, and ship a part of their products on the Chicago, Rock Island & Pacific railroad, and sell the balance at the mines to local trade. The Turner, Farmington Coal Co., and James Haster mines are located within a radius of two miles of Farmington, and are exclusively local mines, delivering a good part of their product to Farmington. At Hillsboro, there is also a local mine operated by David Cox.

VAN BUREN COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Farmington Coal Co.	James Sloe	Farmington	Shaft	Room and pillar	Furnace	Horse	Local.
James Turner	James Turner	Farmington	Shaft	Room and pillar	Furnace	Horse	Local.
Ratcliffe Coal Co.	J. W. Ratcliff	Farmington	Shaft	Room and pillar	Furnace	Horse	Local.
David Cox	David Cox	Hillsboro	Shaft	Room and pillar	Furnace	Horse	Local.
Findley Bros.	Geo. Findley	Douds	Shaft	Room and pillar	Furnace	Horse	Shipping.
W. R. Carson	W. R. Carson	Douds	Shaft	Room and pillar	Furnace	Horse	Shipping.

IMPROVEMENTS MADE AT THE MINES IN DISTRICT No. 2, IN THE PAST TWO YEARS.

JASPER COUNTY.

NAME OF MINE.	Air shaft.	Second opening.	Stairways.	Cover on cages.	Safety catches.	Safety gates.	Brakes on drum.	Fan.	Furnace.
Jasper County Coal Co	....	....	....	....	....	....	1	....	....
Snook's Coal Co	1	1	1	1	1	1	1	1	....
Hanson's Coal Co	....	....	1	1	....	....	1	....	1
Total	1	1	2	2	1	1	3	2	....

KEOKUK COUNTY.

Thomas Bros	....	....	1	....	1	....	1	....	1
North Star Coal Co	1	1	1	1	1	1	1	1	....
Crescent Coal Co	1	1	1	1	1	1	1	1	....
Rowley Coal Co	1	....	....	1	1	1	1	1	....
Pioneer Coal Co	1	1	1	1	1	1	1	1	....
E. Mayer & Son	....	....	....	....	....	....	1	....	1
Total	4	3	4	4	5	4	6	4	2

SCOTT COUNTY.

James & McKin	1	....	1	1	....	1	1	....	1
Williams & Penn	....	....	1	1	....	1	1	....	1
Total	1	....	2	2	....	2	2	....	2

MAHASKA COUNTY.

J. D. Guthrie	1	1	1	1	....	1	1	....	1
J. D Guthrie	1	....	1	1	....	1	1	1	....
Oskaloosa Coal Co	1	1	1	1	1	1	1	1	....
Oskaloosa Cool Co	1	....	....	....	1	....	1	1	....
Consolidation Coal Co	1	1	1	1	1	1	1	1	....
Hawarth Coal Co	....	....	1	1	1	1	1	....	....
J. G. Deaver	....	....	....	1	1	....	1	....	....
Comstock Coal Co	....	....	....	1	1	....	1	....	....
Total	5	3	5	7	5	5	8	4	....

ACCIDENTS.

There is one thing, at least, in connection with the work of this department which we can view with a great deal of satisfaction, and that is the decrease in the number of accidents that have occurred during this biennial period, as compared with a like period in the past. During the two years ending June 30, 1895, there were sixteen fatal and twenty non-fatal accidents reported, as against twenty-three fatal and forty-eight non-fatal accidents for the two years previous.

Taking the output of coal as a comparison, we find that there were 2,810,456 tons of lump coal mined in this district, or one life lost for every 175,000 tons of lump coal mined; one non-fatal accident for every 134,000 tons. This showing is certainly very gratifying, and demonstrates the fact that our work is not entirely in vain, but it would not be just to claim that all the credit due to this state of affairs belongs to this department alone. We must not lose sight of the fact that upon the superintendents and mine foremen largely rest the responsibilities connected with the proper arrangements and working of our mines. Under these circumstances, they are certainly entitled to honorable mention along this line. Upon their care and watchfulness depends the safety of men and property, and it is very gratifying to see that they are becoming more fully impressed with the responsibilities of their position. This, together with the exercise of firmness with the men in their charge, especially in regard to timbering, seeing that the necessary timbering is done at the proper time, which is often a matter of economy as well as greater safety, together with the exercise of foresight and good judgment on the part of the miner himself in properly timbering his work, care in the arrangements of shots, etc., is largely responsible for the decrease in the list of fatal and non-fatal accidents.

I have made it a point to test scales whenever occasion demanded, and during the past two years the following scales have been tested:

Consolidated coal company's mine No. 6 scales were tested, and found correct.

Scales at M. B. Foster's mine were tested and found correct.

What Cheer Coal company's mine at What Cheer; scales tested; found incorrect and ordered repaired, which was done.

Excelsior Coal company's scales at No. 5 mine tested and found correct.

Scales at J. D. Guthrie's mine No. 1, hopper scales, tested, and found correct.

Oskaloosa Coal company's mine No. 2, scales tested, condemned, as not weighing correct; ordered repaired. Re-tested three days later, and found correct.

TABLE No. 5.

Showing list of fatal casualties occurring in mines in District No. 2 during the biennial period ending June 30, 1895.

DATE.	NAME OF DECEASED.	CAUSE OF CASUALTY.	NAME OF COMPANY OR MINE.	WHERE LOCATED.
July 7, 1893	Edward Martin (colored)..	Heart disease	Consolidation Coal Co	Muchakinock, Mahaska county.
August 18, 1893	Adam Carr	Fall of coal	Garfield Coal Co	Beacon, Mahaska county.
January 27, 1894	Peter A. Jader	Fall of slate	Jasper County Coal Co	Colfax, Jasper county.
March 8, 1894	Edward Lewis	Fell from car	Jasper County Coal Co	Colfax, Jasper county.
May 7, 1894	Samuel J. Gibson	Fall of slate	Consolidation Coal Co	Muchakinock, Mahaska county.
May 8, 1894	John McDonald	Fall of rock	Carbonado Coal Co	Carbonado, Mahaska county.
July 12, 1894	Chas. E. Johnson	Fall of slate	Consolidation Coal Co	Muchakinock, Mahaska county.
September 25, 1894	Ole Peterson	Fall of slate	Jasper County Coal Co	Colfax, Jasper county.
October 20, 1894	John Jeffries	Fall of slate	Oskaloosa Coal Co	Beacon, Mahaska county.
November 14, 1894	Geo. Manuel	Fall of slate	Thomas Bros	What Cheer, Keokuk county.
December 26, 1894	James Ferguson	Slip in roof	Pioneer Coal Co	Thornburg, Keokuk county.
February 13, 1895	J. W. Todd	Fall of slate	Carbonado Coal Co	Carbonado, Mahaska county.
February 14, 1895	A. T. Bailey	Fall of slate	J. D. Guthrie mine	Oskaloosa, Mahaska county.
March 30, 1895	G. S. Hogsett	Thrown from car	Iowa Fuel Co	Colon, Mahaska county.
May 1, 1895	Geo. Frazier	Fall of slate	Consolidation Coal Co	Muchakinock, Mahaska county.
June 29, 1895	Allen Crowder	Fall of slate	Consolidation Coal Co	Muchakinock, Mahaska county.

TABLE No. 5.

Showing list of non-fatal casualties of the Second Mining District for the biennial year ending June 30, 1895.

DATE.	NAME.	OCCUPATION.	CHARACTER OF INJURY.	CAUSE OF ACCIDENT.	RESIDENCE.
August 2, 1893	Anthony Taylor	Mule driver	Flesh wound	Caught bet. chain and car.	Colon.
August 3, 1893	Walter Harvey	Miner	Left leg fractured	Fall of slate	Muchakinock.
September 4, 1893	Payton Jones	Miner	Leg broken	Blast of powder	Mu hakinock.
September 28, 1893	Walter Barron	Miner	Left leg broken	Hit by coal from shot	Colon.
October 27, 1893	Alof Nystrom	Miner	Dislocated back	Slip in roof	Colon.
October 27, 1893	Emil Salvendol	Miner	Dislocated thigh	Fall of slate	Colon.
January 12, 1894	Sam Pees	Miner	Collar bone broken and back injured	Fall of slate	What Cheer.
July 1, 1894	Wm. Sanders	Shaft sinker	Scalp wound	Caught under timber	What Cheer.
July 13, 1894	Charles Wallace	Miner	Left shoulder fractured	Hit by coal from shot	Pekay.
July 19, 1894	James Baxter	Miner	Back dislocated	Fall of slate	Beacon.
August 9, 1894	J. A. Wilson	Miner	Arm fractured	Fall of slate	Muchakinock.
September 7, 1894	Wm. Spruse	Miner	Head cut and foot bruised	Fall of slate	Colon.
November 19, 1894	John Harris	Miner	Leg broken	Fall of bank car	Muchakinock.
November 22, 1894	John Powell	Miner	Back broken	Fall of slate	Buffalo.
January 9, 1895	Jesse Scoles	Driver	Three ribs broken	Sprag came out of car	Colon.
February 12, 1895	Wm. Sockfield	Miner	Head cut and side bruised	Fall of slate	What Cheer.
February 13, 1895	Wm. Braxton	Miner	Back and shoulders bruised	Fall of slate	Oskaloosa.
March 28, 1895	Sherman Hogsette	Driver	Seriously hurt	Run over by cars	Oskaloosa.
April 13, 1895	C. G. Lauthatt	Miner	Burned	By powder from shot	Muchakinock.
May 4, 1895	Lewis Larson	Miner	Leg broken	Fall of slate	Muchakinock.

EXAMINATION OF CANDIDATES FOR MINE INSPECTORSHIP.

There have been quite a number of inquiries made for the questions submitted at our last examination, held April, 1894. I herewith submit the questions in this report:

RULES AND REGULATIONS GOVERNING THE WRITTEN AND ORAL EXAMINATION OF CANDIDATES FOR THE OFFICE OF STATE MINE INSPECTOR, IOWA.

9 A. M., APRIL 17, 1894.

1. *Register.* Each candidate, before entering upon the examination, will register with the secretary of the board of examiners, his name, age, residence, citizenship, experience in coal mining in Iowa, and whether or not he has been acting as agent or superintendent of any mine for at least six months prior to his appearance for examination.

2. *Written Examination.* The written examination will consist of twenty-seven questions, and will be given in four sections, the board holding two sessions daily. All the questions given for any one session must be answered during that session, and in no case will answers be received to questions given at a previous session.

3. *Oral Examination.* The candidates will be called for the oral examination in the order of the number on their cards The oral examination of each candidate will be made separately, and he will be required to answer before the board such questions as may be propounded to him.

4. *Instructions to Candidates.* Each candidate will be assigned to a separate desk and be furnished with writing material and a printed list of questions to be answered in writing; each answer must be numbered to correspond with the number of the printed question.

(*a*). Write your name upon the numbered card furnished you, enclose the same in the envelope and seal it, but write nothing on the envelope. Put the number of your card upon the top of each sheet of your examination paper.

(*b*). Each candidate must interpret the meaning of the printed questions according to his own judgment. No information of this kind will be given by the board.

(*c*). No one will be permitted to use, or to have in his possession, any notes or memoranda, or books of any kind, as aids in answering the questions during the examination, and any one desiring to leave the room must first obtain permission from the board, and before retiring surrender his examination papers to the secretary.

5. *Marking.* The correctness of each answer will be marked separately by the board, and the whole number of marks averaged to arrive at the degree of proficiency of a candidate. Questions not answered will count zero.

6. *Certificates.* All candidates whose examinations (written and oral) shall show an average of 75 per cent, and who shall have met the requirements of the law in other respects, will receive from the board of examiners a certificate of competency, enabling them to stand before the governor as candidates for the office of state mine inspector.

7. *Time.* No applicant for examination will be registered or received after the date and hour above given. This rule will likewise apply to all the sessions of the board respecting the time appointed by them for the opening of each session throughout the examination.

For the board. J. E. STOUT, *President.*

J. T. BEARD, *Secretary.*

CANDIDATES FOR MINE INSPECTORSHIP.

WRITTEN EXAMINATION (FIRST SESSION).

1. What is a fault of dislocation?
2. What is a fault of erosion?
3. How would you determine a fault of dislocation to be an upthrow or a downthrow?
4. A certain mine is ventilated by a furnace; the upcast and downcast shafts are each 500 feet deep; size of air-ways 6x8, 20,000 feet long; the air is traveling in two equal splits, each 10,000 feet long; assuming the average temperature of the downshaft to be 40 degrees Fahr. and that of the upcast 350 degrees Fahr., what unit of ventilating pressure will result; and what will be the quantity of air passing in the mine per minute?
5. The anemometer shows a current of 10,000 cubic feet of air to be passing down the intake of the mine, per minute, where the temperature is 30 degrees Fahr. Supposing no increase of the flow from the gases of the mine, what quantity of air will be passing per minute upon the return, where the temperature has risen to 70 degrees Fahr.?
6. In order to obtain double the quantity of air, in what proportion must the ventilating pressure be increased?
7. In what proportion will the power have to be increased to obtain the same result?
8. What will be the reading of the water-gauge in inches, if the pressure per square foot in an air-way is equal to 21 pounds?

WRITTEN EXAMINATION (SECOND SESSION).

1. What is the theory of the ventilating current?
2. What are the principal factors in determining the quantity of air passing in a mine?
3. The quantity of air produced by a fan is 120,000 cubic feet per minute, the water-gauge is two inches, what is the horse-power producing ventilation?

4. If a water-gauge of two inches passes 15,000 cubic feet of air per minute in a certain mine, what water-gauge will be required to pass 30,000 cubic feet per minute, through the same mine under the same conditions?

5. A mine is passing 60,000 cubic feet of air per minute, which is divided into five splits. It is desired that No. 1 split shall take 8,000 cubic feet; No. 2 split, 10,000; No. 3 split, 12,000; No. 4 split, 14,000; No. 5 split, 16,000 per minute; what area should each split have, in order that the air in each may travel at the uniform velocity of 5 feet per second?

6. Determine the theoretical horse-power that will raise 5,000 gallons of water a vertical height of 300 feet in three hours?

7. Assuming that the diameter of the steam cylinder is double that of the water cylinder, what steam cylinder pressure will be required to raise water 200 feet, in vertical height, if one-third of the cylinder pressure is lost in the friction of the lift?

8. The quantity of air passing per minute in a mine is 112,000 cubic feet; the effective power of the furnace is 40 horse-power, required the height of the water-gauge in inches?

WRITTEN EXAMINATION (THIRD SESSION).

1. What is the chief obstacle to be overcome in the ventilation of a mine?

2. When there is an error of one degree in the bearing of a road or entry, what will be the total error if it be continued for a distance of 1,500 yards; the sine of one degree being .0175?

3. Suppose the main entry at the shaft bottom runs N. 30° W., what distance will have to be measured on this entry, from rib to rib of the cross entries, in order to leave a block of coal 400 feet between them; the direction of the cross entries being due west; the cosine of 30 degrees being .866?

4. An entry is driven to its limits a distance of 1980⅔ yards, what would be the measurement represented on a map, platted to the scale required by law?

5. How many tons of coal is there in a block 5 yards 2 feet 7 inches long, 3 yards 1 foot 11 inches wide, and 3 feet 9 inches thick; the specific gravity of the coal being 1.27?

6. Two bore holes are put down at points (A) and (B); the one at (A) reaches the coal at a depth of 97 feet, the one at (B) at a depth of 189 feet and 9 inches. In a straight line joining the two points, the surface falls from (A) for a distance of 450 feet (horizontal measurement), at the rate of 1 in 15; and then rises to (B) at the rate of 1 in 28 for 896 feet; what is the inclination of the coal seam?

7. Ninety tons of coal per hour are to be drawn up an incline plane 2,400 feet long, dipping 1 in 8; what must be the horse-power of the engine that will do the work, allowing one-half for friction and surplus power?

8. At what height above a boiler would a tank have to be placed, so that the pressure would be sufficient to feed the boiler, against 40 pounds steam pressure per square inch?

WRITTEN EXAMINATION (FOURTH SESSION).

1. If you have 10,000 cubic feet of air per minute passing into a mine, how will this current divide itself between two splits, as follows:

Split A..... 4 x 12 — 6,000 feet long.
" B..... 6 x 8 — 10,000 "

2. Suppose 50,000 cubic feet of air per minute to be passing in four splits, as follows:

Split A..... 6 x 8 — 10,000 ft. long, 5,000 cu. ft.
" B..... 5 x 10 — 5,000 " 10,000 "
" C..... 6 x 12 — 10,000 " 20,000 "
" D..... 4 x 12 — 5,000 " 15,000 "

In which of the above splits would you have introduced box-regulators to accomplish such division of the air; and what is the entire horse-power required for the circulation?

3. Draw a map of an ideal mine which you consider the best adapted to coal mining in Iowa.

ORAL EXAMINATION.

1. If you were appointed mine inspector, how would you proceed to inspect a mine upon your first visit?

2. Describe the gases commonly met with in the mines of this state.

3. State the test that you would apply to detect the presence of carbonic acid gas.

4. If you found a deficiency of air in a mine, in what manner would you proceed?

5. Give some ideas relative to the proper maintenance and care of travelling ways and air courses.

6. Give in brief your ideas in relation to the location and the ventilation of mine stables.

7. Mention some points that are essential in the construction of a furnace.

8. How would you light a furnace fire in a mine, when the temperature outside is 90 degrees and the temperature inside is 60 degrees; the furnace being built at a point 100 feet higher than the intake opening? Explain fully.

9. What method would you adopt to decrease the liability to gob-fires?

10. How would you attempt to overcome a fire in the mine already in progress.

11. What measures would you adopt to stop the progress of a squeeze?

12. What is the cause of bottoms heaving and what remedy would you apply?

13. What dangers arise from lack of judgment in placing shots? Describe the work of entry driving, method of cutting, etc.

14. We have had explosions in this state; what is your idea, briefly stated, as to their cause?

15. What precautionary measures would you suggest in order to guard against such explosions?

16. How would you proceed to rescue anyone who might be in the mine after such an explosion?

17. What size steel wire hoisting rope would you use to support a working strain of three tons?

18. What safety appliances should be in common use in the operation of a slope?

19. Give the comparative advantages and disadvantages of longwall and room and pillar workings.

20. What do you understand by magnetic variation? Explain the use of the miner's compass.

BIENNIAL REPORT

OF THE

THIRD DISTRICT,

EMBRACING

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

MORGAN G. THOMAS, INSPECTOR.

REPORT OF THIRD DISTRICT.

To the Honorable FRANK D. JACKSON, *Governor of Iowa:*

SIR—In conformity with the statutes of this state defining the duties of the state inspector of mines, I have the honor of herewith submitting the report of the Third Inspection District for the biennial period ending June 30, 1895.

The usual tabulated statements briefly mentioned will show the number of mines in operation, the number of miners and laborers employed, the amount of coal produced, the average selling price per ton at the mine, average price per ton paid for mining, the aggregate value of the total product, the sanitary and general condition, the fatal and non-fatal casualties, their causes, the number of new openings and improvements, mines abandoned: also a general outline of the industry for the past two years, and what I believe to be its probable prospects for the future. In addition to this many notes and statistics have been gathered and compiled in a condensed form; also some suggestions in regard to the mining laws, which if carried out I believe would be beneficial.

There are eight coal producing counties in this district that contain mines subject to the inspection law, *i. e.:* Adair, Boone, Dallas, Guthrie, Greene, Marion, Polk, and Webster. Three-fourths of these mines and the largest ones are located in Boone, Marion, Polk and Webster counties, and nearly all commercial or shipping mines; the others are local mines that produce the bulk of their coal during the winter months.

In compiling this report I have aimed to avoid all superfluity and make it as brief as possible, and still retain all of the important features that I believed only were necessary information to the state. I have been as diligent in the exercise of my official duties as it were practicable in looking after the sanitary and safety condition of the mines, noting any evasion or non-compliance of the mining laws, using conciliatory efforts as far as possible with operators and miners in keeping the mines and their surroundings within the legal requirements without having to resort to any enforced litigation.

There has been but a limited number in this district in the last two years that I have had occasion to call their attention to the defectiveness of their works, or give legal notice in regard to their unsafe or sanitary condition. In nearly all cases where this occurred, it was more from neglect on the part of those interested than any intention to evade the law.

When attention was called to the matter, defects pointed out and requested by the inspector to make the necessary repairs or improvements, it was readily acceded to; therefore, I have no enforced legal difficulties to report.

I wish to mention here that this has been achieved in a great measure by the concerted action of both miners and operators in the extension of courtesies, their prompt and willing efforts in relieving or adjusting any deficiencies that did not coincide with the inspection laws. This has been of great assistance and has made my official work less burdensome. Being cognizant of these facts, my acknowledgment is tendered with thanks to all those who so considerately lent their aid in the furtherance of my official duties.

The industry has not been so prosperous and successful from a financial standpoint in the last two years, as in the previous two; this is not owing to any lack of coal, or facilities for producing it, but the demand has been less, prices lower, and a consequent shortage in the output of several thousand tons is the result. There are many obvious reasons demonstrative of this fact; the most conspicuous of these are:

First.—The great financial depression that prevailed throughout the whole country has shed its blighting influence upon the coal trade in various ways, impeding work in our shops and factories of all kinds, in fact, the general stagnation of business in these great coal consumers has apparently lessened the demand, as we are aware that the demand regulates the supply to a certain extent in all commerces.

Second.—The labor troubles that occurred during the biennial period are responsible to a certain extent for the shortage in the output.

A strike that was universal in the Third district, lasting about seventy days, had a very demoralizing effect upon the trade, and was a prominent factor in causing the decrease in coal production. And this does not constitute the total or aggregate loss by any means, as the effect is palpable in many other lines of business, not only during the existence of the strike, but the commercial future of the industry is more or less influenced, causing timidity of capital, loss of confidence in the coal business, fearing the disastrous results that follow should a repetition of the past occur, thereby entailing unforseen loss that would be calamitous to investments.

While on the other hand, if harmony existed between capital and labor, and would co-operate in establishing the business on a reliable basis, imparting confidence in the industry and assurance to dealers and consumers that present and future contracts can be relied upon, this, I think, would tend to make the trade more vigorous and increase the demand and price of labor, as labor is like any other staple commodity—the demand has a tendency to buoy up and strengthen the market value. I do not believe that the coal industry is the only business that would be successful by mutuality or amalgamated interest between labor and capital, but all business would be benefited if such were the existing conditions.

In fact, I believe that any friction between labor and capital is to be deprecated at all times, as it has a demoralizing effect upon both, and is one of the essential causes of all business depression.

Respectfully submitted,

MORGAN G. THOMAS,

Inspector of Mines, Third District.

TABLE No. 1.

Showing number of mines, capital invested, annual output, number of miners employed, value of products, etc., in District No. 3, for the year ending June 30, 1894.

NAME OF COUNTY.	Number of mines.	Amount of capital invested.	Number of tons of coal produced.	Average price per ton for mining.	Number of miners employed.	Number of all other employes.	Total amt. paid miners.	Total amt. paid all other employes.	Total value of product at mines.	Av. selling price per ton at mines.	Expense of tracking, props, etc., at mines.
Adair	1	$ 10,000	2,500	$ 1.00	8	4	$ 2,500	$ 1,600	$ 6,000	$ 2.40	$ 3,300
Boone	23	400,000	180,000	.99	445	135	187,110	62,595	355,320	1.88	30,000
Dallas	8	90,000	17,500	.92	70	21	16,100	6,300	28,000	1.60	2,500
Greene	5	35,000	14,700	.88	30	12	12,320	3,120	22,342	1.52	2,340
Guthrie	13	10,000	12,340	1.25	73	17	15,425	3,140	30,850	2.50	5,400
Marion	22	290,000	172,847	.73	301	97	123,178	42,059	210,873	1.22	22,340
Polk	23	400,000	355,000	.89	746	261	315,950	101,233	575,100	1.62	38,366
Webster	18	310,000	153,249	.97	252	81	148,649	25,000	271,250	1.77	18,336
Total	113	$ 1,605,000	$ 917,136	$ .95	1,925	628	$ 824,232	$ 245,047	$ 1,499,737	$ 1.63	$ 122,582

TABLE No. 2.

Showing number of mines, capital invested, annual output, number of miners employed, value of product etc., in District No. 3, for the year ending June 30, 1895.

NAME OF COUNTY.	Number of mines.	Amount of capital invested.	Number of tons of coal produced.	Average price per ton for mining.	Number of miners employed.	Number of all other employes.	Total am't paid miners.	Total am't paid all other employes.	Total value of product at mines.	Av. selling price per ton at mines.	Expense of tracking, props, etc., at mines.
Adair	1	$ 10,000	2,640	$1.00	8	3	$ 2,640	$ 1,160	$ 6,600	$ 2.50	$ 1,320
Boone	19	450,000	191,972	.97	641	220	186,213	58,140	335,951	1.75	28,100
Dallas	3	70,000	16,503	.82	48	17	13,532	7,420	27,395	1.66	2,600
Greene	4	30,000	38,296	.85	117	42	32,552	9,760	53,6 4	1.40	1,840
Guthrie	11	15,000	11,240	1.25	86	24	14,050	3,420	28,100	2.50	4,000
Marion	18	220,000	150,361	.70	303	128	105,253	48,430	178,930	1.19	20,120
Polk	23	430,000	334,881	.76	926	320	254,510	74,680	458,787	1.37	35,280
Story	1	5,000	4,620	1.10	20	8	5,082	2,340	10,395	2.25	1,100
Webster	15	315,000	103,439	.94	389	112	97,233	46,320	149,986	1.45	6,100
Total	95	$ 1,345,000	853,952	$ .93	2,538	864	$ 711,065	$ 251,670	$ 1,249,758	1.46	$ 100,470

TABLE No. 3.

Showing average number of mines in operation, capital invested, output of coal, average number of miners and other employes, compensation, value of product, etc., in District No. 3 for the biennial period ending June 30, 1895.

NAME OF COUNTY.	Average number of mines.	Total am't of capital invested.	Total number of tons of coal produced.	Average price per ton paid for mining	Average number of miners employed.	Average number of all other employes.	Total am't paid miners.	Total am't paid all other employes.	Total value of product at mines.	Av. selling price per ton at mines.	Total expense of tracking, props, etc. at mines.
Adair	1	$ 10,000	5,140	$ 1.00	8	4	$ 5,140	$ 2,760	$ 12,593	$ 2.45	$ 4,630
Boone	21	425,000	380,972	.98	543	178	373,333	120,735	689,559	1.81	58,100
Dallas	5	80,000	34,003	.87	59	19	29,632	13,730	55,408	1.62	5,100
Greene	4	32,500	51,296	.86	74	27	44,872	12,880	75,829	1.45	4,180
Guthrie	12	12,500	21,540	1.25	78	21	29,475	6,560	58,950	2.50	9,400
Marion	20	255,000	323,208	.71	202	113	231,431	90,489	397,545	1.23	42,460
Polk	23	445,000	680,881	.82	836	291	570,460	175,913	1,021,024	1.48	73,646
Story	1	5,000	4,620	1.10	20	8	5,082	2,340	10,395	2.25	1,100
Webster	17	312,500	256,696	.95	321	97	245,892	71,320	420,965	1.64	24,436
Total	104	$ 1,577,500	$ 1,770,986	$ .94	2,141	758	$ 1,535,297	$ 496,717	$ 2,742,267	$ 1.55	$ 223,052

NOTE—The above tables do not contain the salaries of superintendents, mine foremen or other officials of the mines; neither do they contain the royalty that the different companies pay on coal, which is from eight to eighteen cents per ton.

TABLE No. 4.

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

COUNTIES.	1891.	1892.	1893.	1894.	1895.
Adair	....	....	....	2,500	2,642
Boone	189,587	202,597	185,916	189,000	191,972
Dallas	43,324	31,841	36,188	17,500	16,603
Greene	74,544	29,012	49,543	14,000	28,296
Guthrie	11,900	12,042	14,000	12,340	11,240
Marion	210,061	219,414	233,628	172,847	150,961
Polk	397,833	371,389	466,408	355,000	334,881
Webster	124,963	104,679	145,274	153,247	103,439
Story	....	....	....	....	4,620
Total	1,051,298	970,984	1,130,857	916,434	853,252

TABLE No. 5.

Showing the number and cause of all fatal casualties in District No. 3 for the biennial period ending June 30, 1895.

DATE.	NAME OF DECEASED.	CAUSE OF CASUALTY.	NAME OF COMPANY OR FIRM.	WHERE LOCATED.
October 12, 1893	Willard S. Hilton	Falling coal	Black Swan Coal Co	Swan, Marion county.
January 2, 1894	John Pfang	Caught under the cage	Des Moines Coal Mining Co	Des Moines, Polk county.
February 21, 1894	Wm. Hull	Run over by car	Black Swan Coal Co	Swan, Marion county.
March 3, 1894	John Smith	Crushed by car	Iaka coal Co	Flagler, Marion county.
May 21, 1894	Gus Peterson	Boiler explosion	Carbondale Coal Co	Des Moines, Polk county.
October 21, 1894	Emil Lewis	Boiler explosion	Garden Coal Co	Garden, Boone county.
October 29, 1894	David Abrams	Falling slate	Slocum Coal Co	Durant, Cedar county.
January 31, 1895	Joseph Stotsport	Falling slate	Bloomfield Coal Co	Des Moines, Polk county.

TABLE No. 6.

Showing non-fatal casualties of the Third Mining District.

DATE.	NAME.	OCCUPATION.	CHARACTER OF INJURY.	CAUSE OF ACCIDENT.	RESIDENCE.
September 26, 1893	Wm. Jones	Miner	Bruised and sprained back	Fall of slate	Des Moines.
October 25, 1893	John Fry	Miner	Back and hips injured	Fall of slate	Hamilton.
December 14, 1893	Thos. Taylor	Miner	Severely bruised	Struck by coal	Des Moines.
December 18, 1893	Ed. Fulton	Miner	Severely bruised	Struck by coal	Des Moines.
June 23, 1894	F. M. Jones	Miner	Badly burned	Explosion of powder	Dayton.
June 23, 1894	J. W. Mikesell	Miner	Badly burned	Explosion of powder	Dayton.
September 11, 1894	Harry Gibson	Miner	Both legs broken	Fall of rock	Boone.
September 28, 1894	John Thrasher	Miner	Dislocated back	Fall of rock	Boonsboro.
November 13, 1894	C. A. Armstrong	Miner	Right shoulder and three ribs broken	Fall of coal	Boonsboro.
February 2, 1895	Joseph Lehner	Cager	Arm broken	Piece of coal fell from shaft	Des Moines.
June 29, 1895	James Holden	Miner	Right leg broken above ankle	Fall of slate in room	Flagler.

MINE ACCIDENTS.

The accidents which occur in and around the mines are one of the principal sources of anxiety to the inspector, and to avoid as many as possible a watchful eye is constantly kept on any defect, and to have such defect—which might cause an accident—removed as quickly as possible.

Long years of exposure to the dangers, and the frequent narrow escapes appertaining to the life of a miner, have a tendency to make him indifferent, and to increase the taking of more desperate chances each day of his life. It frequently happens when he knows his place is unsafe he judges the future by the past, and works on, expecting a more favorable opportunity to present itself in which to erect the security necessary for his safety. Thus it is until the venture has been repeated once too often. Instances have frequently occurred where the reckless disregard of danger made it seem almost a case of suicide.

It may be well to here quote from a recent issue of the *Mining Bulletin*, published by the Pennsylvania state college, some of the remarks suggested by the accident rates of the Pennsylvania mines:

"Some of them (accidents) are due to causes fully and previously recognized by the miners themselves. A little effort or precaution exercised at the moment the danger was realized would have averted many accidents, and it is a singular fact that, year in and year out, fatalities occur in the same mines under precisely similar conditions. Though the men confess that they expect to 'die with their boots on,' there is no need of plunging into untimely risks, not only to themselves, but to their co-laborers. Still, however undesirable all this may be, an undue prominence is not to be given to the carelessness of employes. A grave responsibility rests upon the operators. They must compel obedience to the laws, and they can only effect it by a rigid discipline and an active, efficient supervision. The men appreciate their peril, but only an active management can keep it ever before them. A careful management begets confidence, and the two combined go a long way to avert disaster. For example, the timbers might be delivered at the working place instead of at the shunt.

"The proportion of deaths from falls of roof and coal to the total deaths from all other causes is increasing everywhere. This follows because of the diminution of casualties from other causes, by reason of improved ventilation and the increasing rapidity of inspection. * * * A systematic propping of the roof and the sufficiency of timber would contribute to increase safety. The principal causes of falls are summarized as follows from A. R. Sawyer's 'Accident at Mines':

"'At the face—slips from insufficiently supporting the roof when starting a longwall drift from pillars; not placing foreset posts as soon as there

is room; not posting the top coal; not immediately supporting roof after firing; insufficiently supporting roof while slicing pillars in faulty grounds; or with gob on three sides; reeling out of posts while slicing pillars; while drawing timbers; insecure spragging; improper setting of sprags in steep pitches; breaking of overhanging coal by riding on sprags set too far in; resetting sprags without adding others during the operation; passing in front of the coal after having removed sprags; working the coal when only half fallen.'

"It is the 'moderately good' roof in which the danger lurks. A system of employing special roof inspectors and trained timber men would promote safety. Very seldom has it been found that the timbers themselves crush and thus let down the roof. Indeed, in longwall mines, accidents are often traced to the strength of the timbers left standing in the gob, which has the effect of not allowing the roof to subside gradually."

MINES ABANDONED IN THIRD DISTRICT

During the two years ending June 30, 1895.

MARION COUNTY.

Midland Coal and Mining company.

POLK COUNTY.

Bloomfield Coal Mining company.
Great Western Coal Mining company.
Runnell's Slope.
Des Moines Coal and Mining company, No. 1.
Campfield Coal and Mining company.
Logan Coal and Mining company.
Coon Valley Coal and Mining company.

NEW MINES OPENED.

Boone Valley Coal and Railway company, No. 1.
Boone Valley Coal and Railway company, No. 2.
Zimbleman Coal and Mining company.

POLK COUNTY.

Eagle Coal Mining company.
Gibson Coal Mining company, No. 2.
Keystone Coal Mining company, No. 1.
Keystone Coal Mining company, No. 2.
Lake Forest Coal Mining company.

WEBSTER COUNTY.

Pleasant Valley Coal Mining company.

SCALES TESTED.

The laws of 1888, chapter 54, makes it obligatory for the mine inspector of each mining district to test all scales, beams and other apparatus used in weighing coal as often as occasion may demand. On the whole, the testing of scales is the most arduous, expensive, and unsatisfactory of the many official duties the mine inspector is called upon to perform.

I have made it a positive rule to give the earliest possible attention to all complaints as to the accuracy of scales in and about the mines of my district. During the last biennial period I was called upon to test eighteen pairs of scales at mines in the following counties:

MARION COUNTY.

Black Diamond—Scales tested August 29, 1893, and found in good condition.

Samuel Rollings—May 16, 1895, and found in good condition.

POLK COUNTY.

Clifton Heights—February 15, 1894, and found in good condition.

Gibson Coal Mining Co —July 21, 1894, and found correct.

Van Ginkel Coal Mining Co.—September 17, 1894, tested two pairs of scales and found in good condition.

Great Western Coal Mining Co.—January 22, 1895, and found correct.

Clifton Heights Mine—January 28, 1895, found in bad condition. Ordered repaired at once; was done. When tested again were found correct.

Manbeck Mine—February 21, 1895, were found incorrect. Ordered repaired and canvas put on the crack around the platform. When tested on the 24th were found correct.

BOONE COUNTY.

Boone Valley Coal & Ry. Co.—July 17, 1894, and found correct.

Milford Coal Mining Co.—July 18, 1894, found in good condition.

Rogers & Crow—July 17, 1894, found correct.

Boone Valley Coal & Ry. Co. No. 2—July 17, 1894, found in good condition.

Heaps Bros.—July 19, 1894, found in bad condition. Ordered to be repaired at once, which was done, and when tested again were found correct.

W. D. Johnson Coal Mining Co.—July 19, 1894, found them correct.

Heaps Bros.—September 20, 1894, and found them in good condition.

Boone Valley Coal & Ry. Co No. 2—February 18, 1895, and found in good condition.

GREENE COUNTY.

Angus Coal Mining Co.—May 18, 1895, and found correct.

RECOMMENDATIONS.

I heartily recommend that a commission be appointed by the executive council to revise the present mining laws of the state, the said commission to be comprised of two miners, two operators, one of the state mine inspectors, a mining engineer, and an attorney, and they recommend to the next general assembly such laws as they may deem necessary to meet the present demand of the mining industry of the state.

PURE OIL FOR MINERS.

I also believe that an amendment to the present mining laws prohibiting the use of impure oil for illuminating purposes in all mines is absolutely necessary. To the intelligent miner and chemist it is known that the products of combustion and impure vapors evolved from cheap miners' oils are unhealthy and dangerous to breathe. Such poisonous fumes not only destroy health and decrease the normal activity of men working in them, but they also retard the process of ventilation, and consequently require more air to be forced through the mines than would be necessary if only pure oil was used for illumination. In many of our mines only the lowest grade of oil is used, such as a mixture of refuse of lard and cotton seed oil, and the atmosphere in them is consequently made unfit for man or beast to breathe. From the small amount of oil used, the expense of the pure article is very small indeed, and I wish therefore to recommend the enactment of a law requiring all dealers in miners' oil to sell only pure lard oil or cotton seed oil. The purity of all oil offered for sale should be determined by competent and designated authority. A certificate thereof issued before sale or use. The expense of analysis should be paid by the dealer.

CERTIFICATE MINE FOREMEN.

You are aware that the managers and superintendents of our mines are generally good business men, who have developed our mineral resources until our coal mines already rank fifth in importance in the United States, and second to none west of the Mississippi river, but these men are often

unskilled in the science of mining, and consequently delegate the practical underground work to mine foremen. This is, perhaps, as it should be, for men who are skilled in successful transaction of business affairs do not care to engage in the practical underground work, and so it is that the economy in mining, the method of ventilation, the care and protection of the miners, and all of the duties of underground work are delegated to the mine foreman. The mine foreman, therefore, generally occupies a very responsible position so far as human life is concerned. He is a man above all others around the mine, who should be familiar with the geological strata and the dangers from unsound roofs and supports, the character of and dangers from dust and gas, the danger from improper blasting, the necessity of fresh air, and the best methods of ventilation, etc., etc., and in case of accident he should know how to care skillfully for the wounded and dead. A mine foreman should be a thoroughly practical man with some theoretical knowledge of mining and how to manage mines successfully and govern the men in his employ. Only a few of our present foremen do I consider thoroughly competent for their task. So I wish to recommend the enactment of a law requiring all mine foremen within our state to pass an examination before the State Board of Examiners for Mine Inspectors. The necessity for such a measure has been long felt by the practical mining men of this state, and the experience of some other states, particularly Pennsylvania during the past ten or twelve years, has proven its utility. Too often have inexperienced men been appointed as mine foremen, owing to the fact that they *stood in* with the operators of the mine, without possessing any other qualification for such position. Thus, through their lack of knowledge as to the practical workings of a mine, they often endanger the lives of those employed under them, and often increase the working expense of the mine beyond what a practical man would do in giving the same results. I believe that there should be two classes of certificates: One given for long, faithful and satisfactory services to foremen holding positions when the law is enacted; the other to those who pass their required examinations. The service certificate should be given for use only at the mine where the holder is employed when such certificate is granted. The reasons for this are that on one hand it would be unjust to legislate a man out of a position who has given satisfaction, while on the other hand, it is well known that men who could hold their positions only for long service do not often manage new mines successfully. Some of my reasons for this recommendation can be briefly summed up as follows:

First.—The mines will be kept in better condition, better ventilated, and healthier for men to work in, and in case of unavoidable accident, the men will receive more skillful attention.

Second.—The fatal and non-fatal accidents will thus be reduced nearest to a minimum.

Third.—The working expense of the mines will be greatly reduced in comparison to what it is in many of them at present.

Fourth.—Mining as a profession will consequently be raised to a higher standard.

Fifth.—It is the duty of the state to protect its mineral resources, and by thus having the underground work of our mines managed by skillful and competent men, the waste of fuel in mining will be reduced to a minimum.

An examination of British coal mining statistics, which cover a longer period than any others at hand, shows that with careful mine inspection and no certificated mine officials, the fatalities in British mines averaged one for every 312 employes. Since the enactment of the law requiring certificated mine officials, the fatalities have averaged one for every 553 employes. In other words, the occupation of the miner has become 80 per cent safer.

ADAIR COUNTY.

Three years ago a three-foot vein of coal was discovered in this county at a depth of 240 feet. The parties that made the discovery put down a shaft and opened up a good workable bed of coal, and to all appearances the prospects for a lucrative mining business seemed to be assured. It was also claimed at that time by the parties that put down the shaft that they had drilled 40 feet deeper, or at a depth of 280 feet, and went through a four-foot vein of good coal, which if time and the roof and everything else in connection with that vein had been as good and safe to work as the upper one, it would undoubtedly be a good investment of capital to have taken an interest and fully developed the opening, for the location as a paying mine is one of the best in the state. I think that the local demand would have been more than any ordinary mine could have supplied, and at a good margin, and I believe yet that when the business of the country becomes more settled that some company will take hold and fully develop the coal field of this territory with a benefit to themselves and to the county.

The location of the mine is near the west branch of the Nodaway river, and about six miles south of Adair, a station on the main line of the Chicago, Rock Island & Pacific railway.

There are from six to eight miners employed in the mine at present, and the output is about two thousand tons per year.

BOONE COUNTY.

The output of coal in this county for the biennial period ending June 30, 1895 is equal if not in excess of the number of tons in my previous biennial report, and I think the future will show a very decided increase in the county's production, as there are several new mines that are good ones with good coal, fitted up with all modern improvements, that are ready and able to give the county the benefit of their full capacity, which undoubtedly will be a great addition to the amount of the county's coal production.

For steady work at good prices, and producing coal at a fair profit I believe Boone county to be the best in the Third district.

There is one thing that I consider worthy of mention here that I believe has a tendency towards keeping the mining interest up to the standard in this county as much or more perhaps than anything else, and that is, the majority of the miners own their homes or are permanently located, and are citizens that have become interested in the welfare of the county, attending strictly to business, thereby encouraging capital to invest in opening up new mines, and increasing the capacity and improvements of o'd ones; it also lends confidence to the trade so that they feel safe in making present and future contracts for their coal as they are satisfied that they will be filled; the assurance and promptness of filling orders and contracts is a very great inducement to purchasers to seek a market for supplies that can always be relied upon; consequently everything is settled down to a prosperous business basis, which undoubtedly is stimulating to the trade; the effect is perceptible by an increasing demand for the product.

And when the demand is such that all coal produced meets a ready sale at good living prices, there is no question as to the miners being benefited as well as the operators.

I believe that mutuality between miners and operators in any mine district to coöperate in placing contracts for their coal and giving assurance that they will be filled promptly, creates a healthy feeling to the industry, confidence to the public, and tends toward making mining a success to both miner and operator.

The most extensive mines opened up since my last report are the Boone Valley Coal & Railway company's mines at Frasier, on a branch of the Minneapolis & St. Louis railway about eight miles northwest of Boone. They have two new shafts completed and fitted up with all modern appliances and are doing a good business, employing about 220 men; the depth of shafts ninety feet with good quality of coal and seemingly plenty of it.

The Yimbleman Coal Mining company's mine is another new shaft 225 feet deep, good coal three to four feet thick and doing a business that requires the employment of about one hundred men. Their machinery and improvements are all modern. The mine is located about half a mile west of Boonsboro on the Chicago & North-Western railway.

Several other new mines of more or less importance have been opened up and are doing quite a good business, both local and shipping.

There has not been any mines of any importance abandoned or worked out, hence the good showing in this county.

The majority of the mines in this county do an extensive shipping business, the product being handled principally by the Chicago & North-Western railway, except what it takes to supply the local trade.

At my frequent visits of inspection to these mines, I have found the safety and sanitary condition generally good, but when they were not strictly in compliance with the law, the operators and miners have always been ready to acquiesce in carrying out any instructions or suggestions that I made, so that there is nothing in the line of legal difficulties to be reported or charged up against the mining interests of Boone county.

BOONE COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
W. D. Johnson Coal and Mining Co.	W. D. Morgan	Boonesboro	Shaft	Longwall	Fan	Steam	Shipping.
Milford Coal and Mining Co.	John Keating	Boonesboro	Shaft	Longwall	Fan	Steam	Shipping.
Crow & Marshall Coal and Mining Co.	William Crow	Boonesboro	Shaft	Longwall	Fan	Steam	Shipping.
Clyde Coal and Mining Co.	O. M. Carpenter	Boone	Shaft	Room and pillar.	Fan	Steam	Shipping.
Zimbelmal Coal and Mining Co.	George Bevridge	Boonesboro	Shaft	Longwall	Fan	Steam	Shipping.
Boone Valley Coal and Railroad Co.	O M. Carpenter	Boone	Shaft	Longwall	Fan	Steam	Shipping.
Boone Val. Coal and Railroad Co., No. 2.	O. M. Carpenter	Boone	Shaft	Longwall	Fan	Steam	Shipping.
Garden Hill Coal Co	Andrew Heaps	Boonesboro	Shaft	Longwall	Fan	Steam	Shipping.
John E. Johnson & Co	John E. Johnson	Moingona	Shaft	Longwall	Furnace	Steam	Shipping.
White Smoke Coal Co.	William Blythe	Moingona	Shaft	Longwall	Furnace	Horse	Shipping.
W. D. Morgan Mine	W. D. Morgan	Boonesboro	Shaft	Longwall	Furnace	Horse	Shipping.
James Wilson Mine	James Wilson	Pilot Mound	Shaft	Room and pillar.	Furnace	Horse	Local.
Hutchinson, Bro. & Son	John Hutchinson	Zenorsville	Shaft	Room and pillar.	Furnace	Horse	Local.
Joseph York Mine	Hugh Given	Zenorsville	Shaft	Room and pillar.	Furnace	Steam	Local.
Riverside Coal Co.	John Rogers	Boonesboro	Slope	Longwall	Furnace	Horse	Shipping.
John Caswell Mine	John Caswell	Moingona	Shaft	Longwall	Furnace	Horse	Local.
John Benson Mine	John Benson	Ogden	Shaft	Longwall	Furnace	Steam	Local.
John Fusland Mine	John Fusland	Incline	Shaft	Longwall	Furnace	Horse	Local.
Knox Bros. Mine	Knox Bros	Madrid	Slope	Longwall	Furnace	Horse	Local.

DALLAS COUNTY.

There are only six or seven mines in this county. Two of these are railroad or shipping mines—the Van Meter and Dawson. Both of these mines are equipped to do quite an extensive business. The Van Meter is located near Van Meter, a station on the Chicago, Rock Island & Pacific railway. They employ about seventy-five men the year round, and ship all their coal over the Rock Island road, except what is sold to the local trade and what the company uses in connection with their extensive brick and tile works that are located near the mine.

The Dawson mine is near Dawson, a station on the Chicago, Milwaukee & St. Paul railway, which mine has been doing quite an extensive business, but of late has not been doing much, owing to the depression in the coal business.

The other mines are small ones, located at Redfield, Linden and Channel Ford, and are all workèd for the local trade. They take out most of their coal in fall and winter, when they can find a local demand that is ready to purchase all they can produce.

The total production of coal in the county is about eighty thousand tons biennially. They employ about one hundred and twenty men during the winter season. The coal runs from two and a half to five feet thick, and of very good quality.

I think in all probability that sometime in the near future the county will make a better showing in its coal production, as I see no good reason why there should not be more mines opened up and modern machinery placed to develop its resources, as there are undoubtedly many beds of good coal in the county undeveloped that could be worked so that it would pay a good margin on capital invested if judiciously handled, as the local trade in the county would be of inestimable value to the producer.

DALLAS COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POST-OFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Dawson Coal and Mining Co.	Joseph Ramsey	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Van Meter Coal and Mining Co	C. B. Platt	Van Meter	Shaft	Longwall	Fan	Steam	Shipping.
James Tudor Mine	James Tudor	Dawson	Slope	Longwall	Furnace	Horse	Local.

GREENE COUNTY.

There is a decrease in the output of coal in this county for the biennial period, owing to the abandonment of the Rippey mine, which has heretofore produced considerable coal, but the company have taken out all the machinery and ceased to work it, as the expense was more than the income. There were various reasons for this, but the principal ones were bad roof and too much water that made it impossible to work the mine to any advantage.

And then there has been no new mines opened up in this county to make up this deficit, and the Angus Coal company, the Dalby, Feitch, Henderson & Thrap mines have produced just about the same as the two years previous, thereby showing in this report a loss in the number of tons produced.

The Angus Coal company's mine is the largest and only shipping mine in the county. They work about seventy men the year around, and have a fair trade at different points over the Rock Island road. The other mines are small and employ from eight to fifteen men, mostly through the winter months, as they are worked almost exclusively for the local trade.

There seems to be some fine beds of coal in this county that would be very valuable if it were not for the poor roof that covers the most of them so that it is impossible to work them without extra expense. It is possible that there may be coal fields yet discovered in the county that can be worked to an advantage and good margin over and above expense of operating.

GREENE COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Angus Coal and Mining Co	Samuel Sheppard	Angus	Shaft	Room and pillar	Fan	Steam	Shipping.
Dallas Coal Co	John Thwaites	Angus	Shaft	Room and pillar	Fan	Steam	Shipping.
Michael Feltch Mine	Michael Feltch	Angus	Shaft	Room and pillar	Furnace	Horse	Local.
Henderson & Thrap	Henderson & Thrap	Angus	Shaft	Room and pillar	Furnace	Steam	Local.

GUTHRIE COUNTY.

The mines of this county are all small, local mines that employ from six to fifty miners each during the fall and winter months. The majority of them commence work taking out coal in September, as that is about the time the local trade opens up, and the work continues until spring or time to commence farming, as a great many of the operators and miners of this county farm through the summer and mine coal through the winter.

The coal is of a fine quality, about two and a half to three feet thick, and especially adapted for domestic use. The most of the product is purchased at the mine and hauled away in wagons by individuals and farmers that use it in their homes. They pay 10 cents per bushel, or $2 50 per ton.

There are times in the winter months when the demand is far in excess of the output, so that there are many tons of coal shipped into the county from other coal fields. This is something that should not be, and could be avoided, as Guthrie county has coal resources enough—if properly manipulated with capital and enterprise in opening up larger mines and putting in good machinery and pushing the small mines to their full capacity—to supply each and every demand for fuel in Guthrie county, and produce surplus enough to build up a good shipping trade outside of home

The majority of the mines that are opened out at the present time are located on or near the 'Coon river that crosses the county from the northwest to the southeast. The most important ones are the Clipper, Black Diamond, Panora and Greene Brier. All of these work from fifteen to fifty miners each. They hoist all of the coal by horse power, as the mines are too small to justify the placing of machinery and steam power for that purpose.

The mines that I have visited here during the winter (as that is about the only time you have any assurance of their being at work) I have found, as a rule, in very good condition, and all operators and miners seemed anxious to have their mines kept within bounds of the mining law.

GUTHRIE COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Clipper Mine	A. Merchant	Panora	Shaft	Longwall	Furnace	Horse	Local.
A. Winters' Mine	A. Winters	Panora	Shaft	Longwall	Furnace	Horse	Local.
Black Diamond Mine	James Thomas	Panora	Shaft	Longwall	Furnace	Horse	Local.
Marsham Mine	John Marsham	Panora	Shaft	Longwall	Furnace	Horse	Local.
S. S. Briggs Mine	S. S. Briggs	Panora	Shaft	Longwall	Furnace	Horse	Local.
Hughes Bros. Mine	N. Hughes	Panora	Shaft	Longwall	Furnace	Horse	Local.
Panora Coal Mine	W. D. Stone	Panora	Shaft	Longwall	Furnace	Horse	Local.
Greene Brier Mine	W. D. Stone	Panora	Shaft	Longwall	Furnace	Horse	Local.
Chas. Miller Mine	Chas. Miller	Bayard	Drift	Room and pillar	Furnace	Horse	Local.
W. P. Williams Mine	W. P. Williams	Bayard	Drift	Longwall	Furnace	Horse	Local.
Higgins, Hoops & Morris	J. Higgins	Panora	Shaft	Longwall	Furnace	Horse	Local.

MARION COUNTY.

The miners of this county have done as well as the average miners in the Third district, although the output will be somewhat less than in the preceding biennial report. This is not owing to any lack of coal in the mines, nor labor to mine it, but for the same reason that has materially affected the whole district—a depression of business generally has been effective in lessening the demand, hence the perceptible decrease. While it is true there have been a few mines abandoned—the Morgan Valley and two or three smaller ones—this would hardly be noticeable in the amount of coal produced for the two years, as there has been new mines opened up that would more than balance any loss in the decrease that occurred from the abandonment of the above mentioned mines.

The Iuka, a new slope opened up and operated by Harry Booth, has the capacity for producing more coal than had all the abandoned mines in the county. This mine is located about one mile east of Flagler, on the Chicago, Burlington & Quincy railway, and does an almost exclusive shipping business, giving employment to about one hundred miners.

This and the Black Swan mine are the two largest mines in the county. The Black Swan is also located on the Chicago, Burlington & Quincy railway, near Swan; the shaft is 80 feet deep, and has all the modern machinery and necessary appliances that it takes to make up a first-class mine. They work about one hundred men. Their coal is all handled by the Chicago, Burlington & Quincy railway.

Besides these two there are several other good shipping mines that employ from twenty to fifty miners each, and work the year round. The most noticeable of these are the Success Coal company, located at Dunreath, on the Wabash railroad; the Oak Hill, located at Flagler, on the Chicago, Burlington & Quincy railway, and Otley mine, located near Otley, on the Chicago, Rock Island & Pacific railway. These are all shipping mines.

There are many other smaller mines located in different parts of the county that employ from six to fifteen miners each, that have both local and shipping trade; some of them are only operated during the fall and winter months.

There have been but few instances where I have had occasion to notify mine owners in regard to the lack of ventilation, sanitary or unsafe condition of their mines, but whenever this had to be done as a legal requisite the operators or their representatives have in all cases endeavored to render due compliance to the law within the required time, in fact there seems to be a natural disposition on the part of both operator and miner in this county in keeping the mines in as good shape and healthy condition as possible, consequently this is appreciated by the inspector as it undoubtedly lessens his official responsibility.

This county is destined to be one of the greatest coal fields in the state; they certainly have the coal as the major part of the area of the county is underlaid with good coal from three to six feet thick that can be mined with no more than ordinary expense. At the present time their shipping facilities are very good, and when necessity demands it they will doubtless be made adequate to handle all of the coal that enterprise and future development of the field may be able to produce.

MARION COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Black Swan Coal and Mining Co	Thomas Bates	Swan	Shaft	Room and pillar.	Fan	Steam	Shipping.
Otley Coal and Mining Co	H. C. Foster	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Success Coal and Mining Co.	Geo. Simpson	Dunreath	Slope	Room and pillar.	Furnace	Horse	Shipping.
Iuka Coal and Mining Co.	Harry Booth	Flagler	Slope	Room and pillar.	Furnace	Horse	Shipping.
Oak Hill Mining Co	Samuel Rawlings	Flagler	Slope	Room and pillar.	Furnace	Horse	Shipping.
J. A. Boudinot Mine	J. A. Boudinot	Hamilton	Slope	Room and pillar.	Furnace	Horse	Shipping.
Geo. C. Davis Mine	Geo. C. Davis	Hamilton	Shaft	Room and pillar	Furnace	Horse	Shipping.
Wm. Lewis Mine	Wm. Lewis	Knoxville	Shaft	Room and pillar.	Furnace	Steam	Local.
Wm. Gamble Mine	Wm. Gamble	Knoxville	Shaft	Room and pillar.	Furnace	Horse	Local.
Bussey Mine	J. A. J. Powers	Bussey	Slope	Room and pillar	Furnace	Horse	Shipping.
J. M. Brennen & Co	J. M. Brennen	Swan	Shaft	Room and pillar.	Fan	Horse	Shipping.
John Youser Mine	John Youser	Marysville	Slope	Room and pillar.	Furnace	Horse	Local.
David Fry Mine	David Fry	Marysville	Slope	Room and pillar.	Furnace	Horse	Local.
J. M. Markham Mine	J. M. Markham	Pella	Shaft	Room and pillar.	Furnace	Horse	Local.
Crawford & Miller Mine	Crawford & Miller	Otley	Slope	Room and pillar	Furnace	Horse	Shipping.
Wm. Franklin Mine	Wm. Franklin	Pella	Slope	Room and pillar.	Furnace	Horse	Local.
Hugh McNish Mine	Hugh McNish	Monroe	Slope	Room and pillar	Furnace	Horse	Local.
Lewis Whitlatch Mine	Lewis Whitlatch	Attica	Drift	Room and pillar.	Furnace	Horse	Local.

POLK COUNTY.

The mines in this county are up in fair shape as regards their sanitary and safety condition. The modern machinery and appliances that the majority of them are equipped with is such that it requires no great effort on the part of the operators and miners, outside of their regular work, to keep them within compliance of the mining law. At my frequent visits to these mines, in an official capacity as mine inspector, I have always met with courtesy with both operators and miners and a willing disposition in conforming to the laws, as they all realize that upon those principles depend the preservation of health and prosperity of the mining industry.

It will be seen by the tables showing the output of coal for this biennial period that there is a decrease in the number of tons produced in this county. There are at least two very apparent reasons why this is so.

First.—The great depression of business generally throughout the whole country affects the coal interest of this county very materially, as the factories and workshops in and around the city of Des Moines—the consumers of a large amount of the coal mined in this county—have been closed at least part of the time and none working up to the standard of their capacity at any time because of this financial stringency, consequently the home demand has been far less than in the preceding biennial period, so that operators have been forced to seek markets outside of the county in competition with foreign trade, necessitating the sale of the bulk of their product to the railroads at a less price.

There is probably two-thirds of the coal mined in this county at present sold to the railroad companies and shipped outside of the county; the balance is sold here to factories, shops and for domestic purposes. This undoubtedly affects the miner as well as the operator, for when there is a demand for the product at the mines at a price ranging from $1 75 to $2 per ton for home consumption, it does not require much of a mathematician to see that the operator can afford to pay a better price for mining than he can when he is selling his coal to railroad companies, and others outside of the county for $1.25 to $1.50 per ton. There is no question but what the demand and the selling price of coal has a great deal to do with regulating the price of mining.

Second.—The strike that occurred here in April, 1894, lasting about two months, lessened the output to some extent; it not only affected the business right at the time and during the strike, but it had a very demoralizing effect subsequently, as operators become timid in regard to making future contracts for fear of a possible repetition of the trouble about the time of the filling of the contract, so that they depended largely upon the local and small order trade for the disposition of their product, making it at the time

of the decrease in the output more salable than when harmony existed between the miner and operator.

This county has more mines and larger ones, better shipping facilities and a greater local trade to supply than any other county in the Third district. Although there is considerable coal shipped in from outside counties, and a great many tons of anthracite coal used here for domestic purposes, it does not prevent the Polk county mines from controlling the bulk of the local trade in and around the city of Des Moines.

There are but few of these mines that employ less than fifteen men and some as high as one hundred and thirty, and when times are prosperous they run summer and winter.

Since my last report there have been three mines in this county worked out and abandoned: the Runnells, the Campfield, known as the old Garver mine, located in the eastern part of Des Moines on the Chicago & Northwestern railway; and the Coon Valley, located southwest of Des Moines on the Des Moines & Kansas City railway. The last named company was reorganized under the name of the Clifton Heights Coal and Mining company, and have opened up a new shaft a short distance south and east of the Coon Valley; besides this opening there are nine others since my last report. Prominent among them are the Keystone No. 1 and No. 2, Lake Forest Coal Mining company, and the West Riverside Coal Mining company No. 2, and the Gibson No. 2, located about four miles east of the state capitol. These are all good mines fitted up with all modern machinery, and employ from twenty to sixty men, to the mine.

The mines located north and west of the city are the Keystone No. 1 and No. 2, West Riverside Coal Mining company No. 1 and No. 2, Oak Park mine, and the Lake Forest mine. All of these mines do an exclusive local business; the balance do more or less shipping; some of them do an exclusive shipping business.

The county has good coal, plenty of it, easily mined at a depth of from 60 to 240 feet, vein from 3 to 4 feet thick, and when business throughout the country revives so as to justify factories and shops to open up and run on full time, and capital becomes less timid, and feel that it is safe to invest in building and opening new ones, thereby adding to and increasing the demand for fuel, be it great or small, there is no doubt but that Polk county will be amply able and ready for the emergency to fill all orders and supply all demands promptly.

POLK COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
J. M. Christy Coal and Mining Co.	James E. Stout	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Carbondale Coal and Mining Co.	Thomas Knox	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Des Moines Coal and Mining Co.	Charles Morris	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Eureka Coal and Mining Co.	Charles Carlson	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Gibson Coal and Mining Co., No. 1	John B. Gibson	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Gibson Coal and Mining Co., No. 2	John B. Gibson	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Maple Grove Coal and Mining Co.	Andrew Swanson	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Van Ginkel Coal and Mining Co.	Peter Heeney	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Proctor Coal and Mining Co.	William Edge	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
North Riverside Coal and Mining Co.	Joseph Ramsey	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Keystone Coal and Mining Co., No. 1	John McKay	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Keystone Coal and Mining Co., No. 2	John McKay	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Lake Forest Coal and Mining Co.	Ed. Heartman	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Flint Brick Coal and Mining Co.	Michael Quinn	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Eagle Coal and Mining Co.	Thomas Ray	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Oak Park Coal and Mining Co.	John Jennings	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Manbeck Coal and Mining Co.	James Hayden	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Clifton Heights Coal and Mining Co.	J. D. Stockton	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
Acme Coal and Mining Co.	J. Flemming	Des Moines	Shaft	Room and pillar.	Fan	Steam	Shipping.
American Coal and Mining Co.	Charles Rilley	Des Moines	Shaft	Room and pillar.	Furnace	Horse	Local.
R. Dale Mine	R. Dale	Commerce	Shaft	Room and pillar.	Furnace	Horse	Local.
A. Merchant Mine	A. Merchant	Commerce	Shaft	Longwall	Furnace	Horse	Local.
Rees Griffith Mine	Rees Griffith	Des Moines	Shaft	Room and pillar.	Furnace	Horse	Local.

WEBSTER COUNTY.

The location of this county is to the extreme northwest of the developed coal fields of the state, which gives it a very decided advantage from an economic standpoint over many other counties in marketing its product, as it can invariably dispose of its output near home, thereby saving a large amount in the way of freights for transportation. Even the small local mines that work only during the fall and winter months are very successful and pay a fair dividend, while the many large mines that are owned and operated by strong companies and fitted up with all modern machinery and appliances, that are operated the year round and that do a very extensive business, have always found a ready market at home or by shipping a short distance to the vast territory that lies just beyond the border of the county north and west, which has no coal and is compelled to purchase its fuel for domestic and all other purposes from some market outside of the non-producing coal territory. It naturally seeks the nearest point for its supplies, which creates a good demand and ready sale for all the coal produced in Webster county. The shipping facilities are splendid, as there are four railroads that run directly through the county—the Chicago & Northwestern and Illinois Central railways running east and west, and the Chicago, Rock Island & Pacific and Minneapolis & St. Louis railways running north and south. Besides, there are the Mason City & Fort Dodge and a short line from Lehigh to Webster City. These roads all handle more or less of the coal, in fact all except that which is sold at local sales and handled by wagons.

The principal coal fields are located at Coalville, Lehigh and Kalo, all near the Des Moines river, of course. There are several small mines outside of this territory, but these three fields produce at least 80 per cent of all the coal mined in the county.

At Lehigh the Crooked Creek Coal & Railway Co. own and operate two slopes and one shaft; two of these are new mines opened up since my last report. This is one of the strongest companies in the county. They employ about one hundred and fifty men, and ship the principal part of their coal over the Crooked Creek railway, a short line that runs from Lehigh to Webster City, and owned by the company. Also the Corey Coal Co. is also another extensive mine that employs about one hundred men and does an extensive business. They ship the bulk of their product over the Mason City & Fort Dodge railway. Besides these there are six or seven other mines of more or less importance that work from six to fifteen men each.

At Coalville the Pleasant Valley Coal Co. have opened a new shaft mine 105 feet deep, which is one of the best equipped mines in the way of modern machinery in the county. They employ about one hundred men and are handling a large amount of coal; the vein is about six feet thick and of good quality, all shipped over the Mason City & Fort Dodge railway.

The Collins Bros. have two slope mines here also that are good mines; they employ from sixty to eighty men; their product, all except their local trade, is shipped over the Mason City & Fort Dodge railway; also there are other small local mines in the field which put out considerable coal during the fall and winter.

The two mines, one shaft and one slope, owned and operated by the Craig Coal and Mining Co. at Kalo are the most important ones in that locality; they do quite a shipping business the year round, and work about one hundred men. There are four or five smaller mines that work from six to fifteen men each, which helps to increase the output in this territory; a part of their coal is sold to local trade and the balance shipped over the Minneapolis & St. Louis railway

I have visited these mines in the last two years as often as was convenient to do so in my official duty as an inspector. At these visits I did not always find them exactly in line with the mining law—such a thing can hardly be expected that each and every mine will be in perfect condition at all times—but I am glad to report that I have always found operators unhesitatingly ready and willing to make the necessary repairs and improvements when required to, or suggested by the inspector as being essential in the preservation of life and health of the miners.

WEBSTER COUNTY.

NAME OF COMPANY, FIRM, OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Crooked Creek Coal and Mining Co., No. 1	Samuel McClure	Lehigh	Slope	Longwall	Furnace	Steam	Shipping.
Crooked Creek Coal and Mining Co., No. 2	Samuel McClure	Lehigh	Shaft	Longwall	Fan	Steam	Shipping.
Corey Coal Mining Co., No. 1	Rees Stephens	Lehigh	Slope	Longwall	Furnace	Steam	Shipping.
Corey Coal Mining Co., No. 2	Jerry Dawson	Kalo	Shaft	Room and pillar	Fan	Steam	Shipping.
Craig Coal and Mining Co.	Jerry Dawson	Kalo	Slope	Longwall	Fan	Steam	Shipping.
Pleasant Valley Coal and Mining Co.	Jerry Dawson	Kalo	Shaft	Room and pillar	Fan	Steam	Shipping.
Collins' Bros. Coal Co., No. 1	Thomas Collas	Coalville	Slope	Room and pillar	Furnace	Horse	Shipping.
Collins' Bros. Coal Co., No. 2	Thomas Collas	Coalville	Slope	Room and pillar	Furnace	Horse	Shipping.
Skillet Creek Coal and Mining Co.	Wm. Harrison	Linnburg	Shaft	Longwall	Fan	Steam	Shipping.
Burton Coal Co.		Lehigh	Shaft	Longwall	Fan	Steam	Shipping.
Geo. W. Corey & Son Mine	Geo. W. Corey	Lehigh	Slope	Room and pillar	Furnace	Horse	Local.
Carlson & Co. Mine	Carlson & Co.	Kalo	Slope	Room and pillar	Furnace	Horse	Shipping.
Erwin & Porter	Erwin & Porter	Kalo	Slope	Longwall	Furnace	Horse	Local.
Albert Stine	Albert Stine	Coalville	Slope	Longwall	Furnace	Horse	Local.
James Martin	James Martin	Coalville	Slope	Longwall	Furnace	Horse	Local.

IMPROVEMENTS MADE IN MINES DURING THE LAST TWO YEARS.

BOONE COUNTY.

NAME OF MINE.	Air shaft.	Second opening.	Stairways.	Cover on cages.	Safety catches.	Safety gates.	Brakes on drums	Fan.	Furnace.
Zimbleman Coal Mining Co.	...	...	...	1	1	1	1	1	...
Garden Hill Coal Mining Co.	...	...	...	1	1	1	1	1	...
Boone Valley Coal and Railroad Co. No. 1	1	1	1	1	1	1	1	1	...
Boone Valley Coal and Railroad Co. No. 2	1	1	1	1	1	1	1	1	...
Total	2	2	2	3	3	3	3	3	...

MARION COUNTY.

Iuka Coal Mining Co.	1	1	1	...	...	...	...	...	1
Success Coal Mining Co.	1	1	...	...	...	...	...	...	1
Total	2	2	1	...	...	...	...	...	2

POLK COUNTY.

North Riverside Coal Mining Co.	1	1	...	1	1	1	1	1	...
Eagle Coal Mining Co.	...	...	...	1	1	1	1	1	...
Lake Forest Coal Mining Co.	...	...	...	1	1	1	1	1	...
Great Western Coal Mining Co.	...	...	...	1	1	1	1	1	...
Iowa Coal Mining Co.	1	1	1	...	...	...	...	1	...
Carbondale Coal Mining Co.	1	1	1	...	...	...	...	1	...
Clifton Heights Coal Mining Co.	1	1	1	1	1	1	1	1	...
Gibson Coal Mining Co. No. 2	...	...	...	1	1	1	1	1	...
Keystone Coal Mining Co. No. 1	1	1	1	1	1	1	1	1	...
Keystone Coal Mining Co. No. 2	...	...	...	1	1	1	1	1	...
Total	4	4	5	5	7	7	7	8	...

WEBSTER COUNTY.

Pleasant Valley Coal Mining Co.	1	1	1	1	1	1	1	1	...
Crooked Creek Coal Mining Co.	1	1	...	...	...	...	...	1	...
Skillet Coal Mining Co.	1	1	1	...	...	...	...	1	...
Total	3	3	2	1	1	1	1	3	...

COMPARISON OF DIFFERENT MINES, AS TO COST OF OPERATION, AND THE MARKETING OF THEIR COAL.

Well informed people often ask, "Why is it that coal cannot be mined from all mines at the same price per ton?" So frequently is that question repeated that it seems not improper at this time to discuss some of the many modifying conditions which regulate and establish the price of mining in the different coal mines of the state.

This is a broader question than would at first appear, based as it is, first, upon the material extraction of the coal from the bowels of the earth, and, second, upon the transporting of the same to the market in which it is sold.

Let us inquire, first, as to the former of these two conditions, viz., the material extraction of the coal, and ask ourselves the question, aside from the physical qualities of different coals, which we will assume for the present to be the same, "What is it that gives, or modifies the value of the same as a marketing product?" The answer, of course, is at once given, "The labor of extraction." Yes, all mineral deposits in place, as they are entombed in mother earth, possess a *possible* value in distinction from a *real* value. We speak of them as mineral wealth; they enhance the value of lands; they may be bought and sold; they have a possible value upon the market even while as yet they have no real value, for they must be brought out and made a commodity of trade before the true specific value of the same can be known. Labor, then, is a specific factor of the value of the marketed coal.

Having proceeded thus far, we must pause in our investigation, for there looms up before our anxious gaze an ominous cloud which portends evil and threatens a revolution in prices. Other coals have arrived from other mines in the same market. They may have cost less to mine and perhaps less to transport, coming from a near point; but the lowest priced coal, other things being equal, regulates and establishes the price in that market. Our coal must be sold, if sold at all in that market, at this competing price. We are confronted with a condition and not a theory. This is one of the hidden causes which influences the price of mining in certain districts, and often works a burden upon the operator which the miner is slow to see. But the question that becomes of interest at once is, how the mining of coal can be accomplished so much more cheaply in certain mines and districts than in others.

Were the conditions the same in all workings; were the coal seams always of uniform thickness and the coal of the same quality throughout, it would not be difficult to determine how much coal could be mined in a day by one man, and to establish therefrom a uniform price of mining. It is a fact, however, that such are the various conditions prevailing in mines in the same district, and even in different parts of the same mine, that while

the miner in some places can make excellent wages at seventy-five cents per ton, in other places in the same mine he cannot support himself at one dollar per ton for the coal he mines.

Every expedient has to be resorted to frequently by the superintendent and other officials in order to secure the thorough working out of all the workable coal and make wages for the men.

Almost every coal has a different shooting character, or, in mining parlance, "shoots" differently; remaining in large standing shots, which requires considerable undermining to bring it down: sometimes seaming out; sometimes breaking into fragments, which results in a large loss to the miner. These difficulties are often beyond the power of the miner to overcome, and always tax his skill and knowledge to the utmost. Again, the character of the roof overlying the coal is a factor which greatly concerns the miner. A treacherous roof endangers his life, and consumes much of his time in setting timbers, cleaning up falls, by which oftentimes his coal of the previous night is covered, and in other ways retards the progress of his work. A strong but yielding roof is of incalculable benefit to the miner, especially in the longwall method of mining.

Again, the thickness of the seam from which the coal is mined is an important element in the cost of extraction. The coal can be mined from a seam five or six feet in thickness at a price and under conditions that would not permit of its extraction when the thickness of the seam reduces to three feet. The reasons for this are practical, economic reasons, with which every miner is thoroughly acquainted, and relate to the amount of coal that can be reached and brought down by one shot, the ease of working, handling, loading, etc.; hence the price of mining must be increased in thin seams. Besides this increase in the price to be paid for the mining of a thin seam, there is a further expense incident to the working of such coal, viz., the brushing of the roof, or the lifting of bottoms along roadways, in order to give sufficient height for the mules to travel.

Without going further into the details of mining work, which would be tedious to the uninitiated, it is plain to all that the operators bringing coal into the same market do not stand upon equal footing, and are in no sense able to compete with each other in the matter of prices. The conditions of their business are different in almost every particular. It is the old story of the survival of the fittest; sometimes the weaker is compelled to succumb; sometimes there is a wise consolidation of interests. In all cases the situation demands the careful study and co-operation of all. It involves a question that is vital to the labor and prosperity of the surrounding district. A cessation of labor and closing down of mines, together with all the consequent baneful results to the industries and commerce of the state and country, can only work irreparable loss. Greed must give way to better judgment. Just rules should be made operative in every industry, to the end that its labor should be protected from the unwise, injudicious, and, in many cases, ruinous competitions by which the market price of a product is brought so low as to be practically non-producing.

The consumer then reaps the benefit; the operator makes no profit; neither does the laborer or producer. Let better judgment prevail in all branches of industry.

SUGGESTIONS AND RECOMMENDATIONS TO YOUNG MINERS OF THE STATE.

There are perhaps many thoughts suggestive of emulation in the life and labor of the miner in the coal fields of Iowa that are worthy of consideration, and would be beneficial to the industry if practically demonstrated; but there are some matters of importance relative to the miners' interests that are so obvious that should I refrain from mentioning them, I should at least feel that the interest of this report would be incomplete and devoid of some features which I believe to be essential.

One of the factors of importance to the miners in Iowa, and especially of consequence to the young men and boys, is in realizing the fact that there are more miners in the state than the present occasion demands, and they seem to be getting more numerous as each year sees an increase in mine labor caused by foreign emigration, and the arrival at maturity of the boys that are born and raised in the mining camps; while on the other hand, by referring to the coal statistics of the state, we find but little variation in the annual output of coal for the last six years, thereby establishing the fact that mine labor has become excessive to the demands. The consequent effect is that a part of the miners must be idle all of the time, or all be idle a part of the time, in order that there may not be an over supply, or a surplus amount of coal on a depreciative market. If the supply of miners could be limited or regulated in a manner so that in keeping the output up to the standard of the market demand, it would necessitate the steady employment of all the miners nearly the year around; evidently this would be conducive of good results.

To accomplish this we must either produce more coal, or we must lessen the number of miners. Hence my suggestions to the young men and boys of the mining camps to seek other avocations in life where as a rule they would have better chances and better facilities for intellectual developments, and where they would receive advantages by coming in contact with the business world which they can never attain by settling down and becoming one of the fixtures of a mining camp.

Past experience and personal observation in the mines of this state have convinced me that young men, a great many of them born and raised in the coal camps, while they perhaps have had more adequate advantages in the schools than did their fathers before them, we must still admit that there are many things in connection with a home in the mining camps that are not calculated to inspire or stimulate ambitions—naturally intellectual—simply because there is an endless monotony of both work and surroundings. The houses around the majority of the large mines are owned by the operators and rented to the miners, and are all as a rule of the same

architecture. Everything is suggestive of coal. The roads and dooryards are usually covered with cinders or coal dust, totally excluding flowers, grass, or vegetation, and the work, especially that of the young or unmarried man that has no one depending upon his labors but himself, becomes of an inert, or variable character; that is, he works when he pleases and plays when he pleases, as he feels he is accountable to no one and no one but himself is dependent upon his earnings, so that he eventually drifts into a sort of normal condition of indifference; his work being paid for by the bushel or ton instead of by the day, accounts for this to a certain extent.

These habits are formed by the boys and young men of the camp and become almost as fixed principles, so that after arriving at manhood it seems to be a hard matter to depart from the life they have inherited and seek other avenues of industry that tend to more thoroughly develop the mind that would otherwise remain partially dormant.

The motives of these sentiments are not to be construed as disparaging or reflecting upon the mining industry as anything but creditable, neither do I wish to be understood as underrating or ignoring the miner and his work. I regard the consideration important to the industry and applicable to all miners, and should it be practically demonstrated by encouraging new business incentives in the thirty or thirty-five per cent of miners that are young men, to abandon the life of a miner and seek other avocations of business that offer more extensive inducements towards success and better opportunities of acquiring that which every thoughtful and prudent American working man has aspirations—to possess a home of his own where his family can be comfortable, and situated where they may receive the full benefit of church and school—then the object of my endeavors would be made manifest, and by adhering to these principles it would naturally lessen the number of miners and employés, and would have a tendency to alleviate their wants by giving steady employment to those who are so situated that anything but permanency in the mining camp is inevitable.

While counseling the young men to abandon mining as a business and seek other fields of enterprise for the purpose of bettering their condition, and thereby relaxing the overflow of the labor market in the coal fields, I also regard the matter of state interest, and believe we should encourage and urge the establishing of manual training schools throughout the state where the youth and the young men of the state could be instructed in the mechanical arts and receive the full benefit of a practical education.

While not oblivious of the fact that our public school system is of a high order and its accomplishments are all that is claimed so far as educating the young men for the profession of a lawyer, doctor, minister, teacher, politician, etc., but what we are advocating is a school that produces skilled artisans by practical teaching. I believe that a part at least of the public school fund of the state should be utilized in establishing manual training or trade schools, where the youth can have the advantage of practical teaching in the art adapted to his inclination, and after having demonstrated to the faculty that he is especially adapted to or for a certain profession, he should be placed in that line and receive the full benefit of practical and theoretical instructions, so that he may become thoroughly proficient in his art. There is no doubt but that the mind is more progressive and susceptible of greater achievements if encouraged in a line harmonizing with its natural inclinations.

In these modern times, intelligence and skilled industry are an essential necessity to the life and progress of a republican form of government. In being subject to competition with foreign mechanical skill, it becomes necessary that we maintain a practical as well as a theoretical knowledge of all industries, for we must admit that it is far better for a country or state to practically educate the genius and develop the faculties of science and skilled artisanship at home rather than to be compelled to resort to importations to supply the demand.

A PLEA FOR CO-OPERATIVE LABOR.

A little more positive effort towards improvement, and less agitation, would be of advantage to the workingmen of this country. Organized effort is as likely to be triumphant here as in the old country. Such success as the co-operative principle has met in the United States has been confined chiefly to building and loan associations, or as they are more properly called in Massachusetts, co-operative banks. The principle has been employed most successfully in the conduct of retail and wholesale stores, but even in England the operation of the system has not been universal, having been confined for the most part to the northern and midland region, having met with but small success in London. In December, 1844, twenty-eight weavers of Rochdale established the Equitable Pioneer society, with a capital of $140, raised by assessments of three pence a week. One of them went to Manchester and bought at wholesale a supply of flour, sugar, butter and oatmeal, from which stock each co-operator bought what he needed at the current price. The experiment was repeated, and it soon became necessary to hire a room, which was open only in the evenings, the members taking turns as salesmen. Then came a time when it was necessary to hire a manager and assistants. The first year there was a profit of $160 to divide among the members; the second year one of $350, and the third year one of $400. This year the society celebrated its jubilee by making a gift of $5,000 to the Rochdale Infirmary.

Now, this shows what a few working people can do when they are determined to help themselves and not depend upon somebody else to do for them what they can and should do without aid. I am opposed to this eternal growl of complaint. It checks such progress as the few are now trying to make, and blocks the way of greater progress in future. Don't allow the man with a grievance to take up too much of your time; examine carefully the ills of which you so abundantly complain, and see if two-thirds of them are not purely imaginary.

The example of the Rochdale pioneers was followed elsewhere, until to-day there are 1,700 co-operative societies in England with 1,300,000 members, an aggregate capital of $90,000,000, an annual business of about $250,000,000, and an annual profit of nearly $23,500,000. In 1864 the societies established a wholesale store in Manchester, and in 1869 another in Glasgow, from which most of the retail societies procure their stocks. More than a thousand societies, with 825,000 members, have subscribed to the stock of the wholesale society, and its sales for 1893 amounted to more than $47,500,000. It owns seven ocean-going steamers, which bring home its purchases from abroad, and its agents sometimes buy the entire product of a fruit-growing district or island. It has boot and shoe factories at Leicester, soap factories at Durham, woolen cloth works at Botley, etc.

The societies are conducted practically as that at Rochdale, begun fifty years ago. To become a member one has but to subscribe $5, or in some cases $10, to the capital stock. Purchasers pay the current price for goods and at the end of the quarter receive a dividend, based on the amount of their purchase. Non-members receive dividends, but generally about 25 per cent less than members. Business is conducted on cash principles, and is managed by a committee elected annually by the members. The dividends may be allowed to remain on deposit up to the amount of $1,000, and they draw 5 per cent interest. Many of the societies maintain reading rooms and libraries for their members, support free lectures and evening schools, and pay fees for the children of members who desire to attend technical classes. The movement originated with the working classes and has been managed entirely by them. Since 1869 national congresses of co-operative societies have been held annually, and since 1871 the Co-operative News has been maintained as the organ of the co-operators.

There are localities in this state in which miners could adopt the co-operative system in buying their necessities which would be of vast advantage to them financially. By this means, they would avoid the extortionate price now so often claimed paid to merchants for goods in many of the mining camps of the state. There are miners who enjoy the confidence of the community in which they reside, and who are amply qualified to conduct an enterprise of this kind successfully. They should not regard such an undertaking as too slow of accomplishment; they should remember not to despise the day of small things; that cents make dimes, and dimes make dollars; and that the small streamlets make the mighty and majestic river.

It is the duty of each class of citizens to improve its condition by its own exertion. Do not wait for assistance, but set to work and help yourself, never doubting but that honest endeavor will be seen and approved and that help and indorsement will always be bestowed where it is merited.

THE COAL SUPPLIES OF POLK COUNTY, IOWA.

WRITTEN FOR THE ENGINEERING AND MINING JOURNAL BY FLOYD DAVIS, M. E., PH. D.

Owing to the fact that Iowa is one of the leading agricultural states, and our people are so largely engaged in tilling the soil, her mineral resources have heretofore been somewhat neglected, but mining is now gradually becoming one of the great industries, for our coal mines already rank fifth

in importance in the United States and second to none west of the Mississippi river.

More than one-third of the area of Iowa is composed of the carboniferous strata, making the coal fields of the state extend over more than twenty thousand square miles. These deposits form a trapezoid with one side extending along the whole Missouri boundary, limited on the northeast by an irregular line entending from Lee to Humboldt county. On the northwest it is bounded by an irregularly curved line extending from Humboldt to Pottawattamie county, and on the southwest by the Missouri river between Council Bluffs and the state line. At least one-half of this field, or more than ten thousand square miles, is known to be underlaid with coal seams. To the east and northeast, scattered over the sub-carboniferous, Devonian and Silurian rocks, are outlying deposits of carboniferous origin that furnish seams of coal of local importance.

The richest known deposit within this field is a belt running northwest and southeast, following the Des Moines river from Keokuk to Fort Dodge, and not extending more than ten or fifteen miles on either side of the river. Still a few other good localities for mining coal are being discovered and worked outside of this. Centrally located within this belt and the carboniferous deposits of Iowa is Polk county, which owing to the excellent railroad facilities for transportation, and the large demand for coal at home, will soon become the principal coal producing county in the state. Des Moines, the county seat, and the capital of the state, is a substantial city of steady growth, having now a population of a little more than eighty-two thousand people, and large manufacturing plants are being established in it. Seventeen lines of railway pass into the county.

The principal mines in Polk county are located within two and one-half miles of Des Moines; but other mines are operated near Runnells, to the southeast, near Commerce, to the southwest, at Polk City, to the north, and at Mitchellville, to the east. At each of these localities the coal seams are about equally important. A section of the formation at Des Moines, as shown by the outcroppings along the river, presents three seams of coal sufficiently developed to be worked, known as "first," "second" and "third" veins. These seams extend throughout the county and are well represented in all the sections of it above referred to. Many of our best mining men believe that they also extend throughout nearly the whole of the coal area of the state; and prospectors in distant parts of the field adhere to the doctrine that by boring deep enough they could meet the same seams of coal, of the same thickness and stratigraphical relations as those found at Des Moines. But we have never had sufficiently extensive investigations made by deep borings to determine whether or not this theory is correct. It is supported, however, by the geological relations in a number of mines outside of Polk county. To a person unfamiliar with the changeable character of the strata so often found in our mines, a belief might exist that the coal seams are only lenticular masses, extending not more than three or four miles in any direction. But such views are not supported by borings, a study of the mines, tracing the coal seams from place to place, or by lithological characteristics, and they have no weight whatever among our mining operators in selecting sites for new mines.

In the early days of old Fort Des Moines, the first seam, which is the highest one in the geological series, was worked to some extent in the outcroppings in the bluffs along the Des Moines river. This is really a triple seam, separated by two thin sheets of shale, and having a total thickness of about two feet. This seam is of little importance; the coal is inferior to that found below, and it is now seldom worked except for private use.

The other two seams now worked in Polk county range from sixty to one hundred and sixty feet below the one just mentioned, but at no place has the third seam been yet worked at a greater depth than about two hundred and forty feet below the bed of the Des Moines river. In some portions of the county these seams attain a thickness of seven feet, but they generally thin out after being tracted a short distance and then reappear farther on. Indeed, the seams are so variable in thickness that some mines where the coal is as thick as that given above, will have other portions not more than two feet in thickness, or it may entirely disappear, but by drifting far enough in the same geological horizon, or by sinking a new shaft some distance away, the coal will generally be found again. The third seam, so far as yet worked, is some two or three hundred feet above the bottom of the coal measures, and it is therefore evident that our coal now comes from the upper portion of the series. Owing to this fact, and that the lower portion of other coal measures generally contain the best seams of coal, it has been stated by some that we are extracting only a small portion of the coal from the area worked over. We have but little evidence to disprove this theory, and so far as I know, nothing to support it. Only two deep borings have been made in Polk county—one at the court house, in Des Moines, sunk to a depth of 700 feet, and the other near Saylor, twelve miles north, to a depth of 800 feet; but neither of these borings showed any coal seams worth notice below the ones already given. It may be hoped that our state geological survey will prospect the coal fields by deep borings and determine whether there are any deep seams of value, and also work out more accurately the limit of the fields. Such economic problems certainly deserve the most thoughtful consideration of the survey.

From our best calculations the three workable seams of coal in Polk county, although not continuous, but bearing the same stratigraphical relations, extend over more than 123,000 acres. The seams that are worked range from two and one-half to seven feet in thickness, averaging about four and one-half feet. Only a small amount of this vast field has thus far been developed. According to Mr. W. Fraley, the English coal expert, bituminous coal averages about 1,200 long tons per acre for each foot in thickness, or about 1,345 short tons. If we assume that on an average four feet of these seams is extracted, then the total merchantable coal existing in the 123,000 acres is more than 661,000,000 tons.

There are in Polk county twenty-three mines now in operation, employing upward of ten men each, and about half a dozen coal pits where a smaller number is engaged; but the total number of men and boys employed at present in and around all of these mines is 843. In eighteen of the mines the coal is reached by shaft, while in the others it is reached by slope or adit. All the mines, except the one at Polk City, are worked by the room and pillar method, and eighteen of them use steam as motive power. Twenty ship a portion of their coal, and more than half of them are operated the year around. Of the 355,000 tons of coal mined last year, 200,000

tons remained in this county, nearly all of it being used in Des Moines. In addition to this there were shipped into this city about 8,000 tons from elsewhere. The other 155,000 tons were either used by the railroads or sent to the northwestern part of the state, South Dakota, Nebraska and Kansas. In Des Moines coal slack is almost universally used for steam generation, and is purchased at the mine for about 75 cents per ton. Nearly all the lump coal is used for heating public and private buildings, and is generally sold at from $2 to $3 per ton delivered.

The coals are all bituminous, and generally quite soft. Nearly all show lines of stratification, and some vary in hardness from layer to layer. The hardest layers are very thin and nearly pure bitumen, while the thicker ones are interlaced masses of charcoal fiber, which form easy places of separation. When the bitumen is in abundance, as it is in many coals, they are coking and contain much gas, but some are free or open burning. Those coals which contain the greatest proportion of bitumen distributed through their whole mass, approximating in their physical characteristics to the cannels, produce in mining only 4 or 5 per cent of slack, and are the best shipping coals, while those that are nearly devoid of bitumen produce from 14 to 16 per cent of slack. The average amount of slack from all mines is from 10 to 12 per cent of the total product mined. The hardest coals contain the least sulphur, and the bitumen layers are almost devoid of it. Picked samples of some of these harder varieties are suitable for gas production. All of the coals contain a sufficient quantity of gas, but the sulphur in nearly all of them is too high, and their tarry constituents clog the retorts. By hand picking a fair quality of gas coal can be secured from one or two mines, but this is not yet done on a commercial scale.

The coals of this county contain considerable iron pyrites and crystalized gypsum, principally along the planes of stratification, where the impurities are sometimes half an inch in thickness. As the coal is broken and sized some of this is removed to the slack or dump. Associated with the coal and found anywhere within the seams, are bands and flattened masses of clay ironstone, commonly known as "nigger heads." No machine method of removing these impurities has yet been adopted, and with the exception of a small amount sometimes removed by hand, much of the pyrites, gypsum and ironstone go into the merchantable product. It is owing to this fact that an average sample of the coals is so much inferior to that which can be easily selected.

LEGAL DECISIONS ON MINING QUESTIONS

BY THE COURTS OF THE DIFFERENT STATES, WHICH WILL BE OF INTEREST TO MINERS AND OPERATORS.

(Taken from "The Colliery Engineer and Metal Miner.")

Liability for Failure to Prop Roof.—In an action against a coal mining company to recover for death caused by the negligence of one of its employes, the result of his incompetency, it appeared by evidence that he

was killed by the falling upon him of a portion of the roof of the room in which he was engaged in operating a machine in the mining of coal, which falling was due to insufficient support, and that by reason of a custom prevailing at the time the work of posting and propping the roof was imposed on an employe called a "filler," whose principal business was that of filling coal, and who had no control over the miner, no relation of subordination or subjection existing between them, but both were under the order of a common superior, called a "mine boss," it was held: (*a*) Such a state of facts does not make a case where the appliance or place is furnished by the master for the work in which the employes are to be engaged, but a case where the furnishing and preparation is itself a part of the work which they are employed to perform in order to effect a common object, viz: the digging of coal; and the relation of the filler to the miner is that of a fellow servant. (*b*) In such case the liability of the master is governed by the law applicable to the relation of fellow servant. Hence in order to attach liability to the company for the negligence of the filler in not properly posting and propping the roof, it must be shown that the company had knowledge before the accident of the incompetency of the filler to perform the duty of posting and propping, or, by the exercise of due care, might have known it, and that he was himself ignorant of such incompetency, and could not, by the exercise of ordinary diligence, have learned it. (*c*) And where, by the evidence, it is shown that the deceased knew of the incompetency of his fellow servant, if it existed, or, being an experienced miner, had equal opportunity of knowing, and could have known by the use of ordinary care, and was aware also of the danger of working in a room insufficiently propped, and continued his work without complaint, such a case of contributory negligence is shown as will prevent a recovery.

Consolidated Coal and Mining Co. v. Clay's Administrator. (Supreme court of Ohio), 38 N. E. Rep., 610.

Liability for Failure to Prop Roof.—Where an experienced coal miner had observed and tested a large rock in the roof of the room where he was working, and found the same to contain natural cracks or slips, and knew the rock to be a bad rock, which certainly ought to be propped, and yet continued his work within a few feet of the rock without propping it until it fell and crushed his arm, he was guilty of contributory negligence such as would bar his action at common law. The primary object of the statute concerning "coal mines" was to secure the health and personal safety of all persons engaged in underground coal mining. While it is the duty of the "mining boss" to see that sufficient timber of suitable lengths and sizes is placed in the working places of the mine, the duty of securely propping the roof of the mine by actually setting such timbers under it, is devolved upon any miner, workman, or other person having the control of any working place in the mine, and the wilful neglect of such duty is a misdemeanor under the statute. Where the miner found that he could not securely prop the roof in the working place under his control, and yet thereafter continued to expose himself to imminent danger from the falling of a large rock in the roof, which he knew to be bad and which he knew ought to be propped, and gave no notice and took no steps to prop the same, and the rock fell and injured him, he was guilty of violating the statute in not taking steps to obtain suitable timber for propping the roof, or in not giving immediate notice of its condition, and his negligence was wilful, since it

indicated a reckless disregard of the consequences to his own life or limb, and that such contributory negligence was a bar to his action under the statute. Greater diligence should not be exacted of miners than common prudence requires them to exercise, considering the circumstances under which their work is carried on. In case of injury to a miner from a defective roof, where its dangerous condition is not obvious without critical inspection, the defect being latent and not actually known to the miner, he may not be held guilty of such contributory negligence as would prevent his recovery.

Victor Coal Company v. Muir. (Supreme court of Colorado), 38 Pac. Rep., 378.

Duty of Master to Servant.—The law does not require that an employer should furnish his servants the newest or safest tools, machinery or appliances for the performance of the work for which they are hired. If the master furnishes such machinery, appliances or tools to the servant as are reasonably safe and fit for the performance of the work in hand, and which the servant in the execution of his work, by the exercise of ordinary care on his part, may use with reasonable safety to himself, the master has discharged his duty in that respect.

Missouri Pac. R. Co. v. Baxter. (Supreme court of Nebraska), 60 N. W. Rep., 1045.

Liability of Master.—Where the servant is injured through failure of the master to use reasonable care to provide a safe working place, the master can not absolve himself from liability by showing that he had delegated to an agent the duty of keeping the place safe.

Muncie Pulp Co. v. Jones. (Appellate court of Indiana), 38 N. E. Rep., 547.

Contributory Negligence of Mine Employe.—Where deceased was employed at the bottom of a coal shaft to load cars on an elevator, and to signal when the cars were ready to be hoisted, and around the elevator there was a passage made for the employes to go from one side to the other of the elevator, and in order to do his work it was not necessary for the deceased to go on the elevator, but it facilitated his work to do so, and he was injured while on the elevator car, he was guilty of contributory negligence, as he knew that the elevator might accidentally be started without warning.

Acme Coal Mining Co. v. McIver. (Ct. App. Colo.,) 38 Pac. Rep., 596.

Knowledge of Employe as to Condition of Premises.—To one engaging in service with knowledge of an unsafe place or appliance, the master is under no obligation to alter or amend the condition of the place or appliance. By entering upon the employment with such knowledge, the employe himself assumes the risk of the dangerous place or appliance. If by due diligence he may ascertain the danger, but chooses rather to forbear the exercise of that care, such opportunity of knowledge is in law the equivalent of actual knowledge.

McDugan v. New York Central & Hudson River Railroad Co. (Com. Pl., New York city), 31 N. Y. S., 135.

Liability of Coal Company for Defects in Railway Cars.—The supreme court of Indiana holds, that one employed by a coal company to inspect cars furnished by a railway company, and to shift them to a point where they could be loaded, is a fellow servant of one employed to load them, and such company is not liable for injuries to the latter, caused by defects in the cars

which the former failed to discover and guard against. The cars are received, not as instruments of the service supplied by the master, but as incidents of its business, and from the dependence of the master upon those not in any manner connected with such business or subject to the master's control. If the defects had been in the original construction of the cars, it could not be said that such defects were chargable to the negligence of the company; nor can it be said with greater reason that the ill repair was from its fault, or that a duty rested upon it to make the repairs. The extent of the company's control over the cars was in the use of them for loading coal, and it was not responsible to the employe or anyone else for their sufficiency as a means of transportation. The failure to inspect, to set the brakes, or to block the wheels when the first car was removed, was negligence in the use and not in the supplying of instrumentalities. One line of distinction between vice principles and co-employes is in the duty, in one instance, to supply or maintain instrumentalities of the service, and in the other to use the instrumentalities supplied. Negligence in the first, though that of a servant, is the master's negligence, while in the second the negligence is that of a fellow servant. This distinction keeps in view the proposition that where the master himself participates in the use, and the negligence is his own, he may not be said to be a fellow servant.

Neutz v. Jackson Hill Coal and Coke Co. (Supreme court of Indiana), 30 N. E. Rep., 324.

Relative rights and duties of miner and mine owner.—In deciding the case of *Coal Company v. Estievenard* (40 N. E. Reporter, 725), the supreme court of Ohio recently said: A miner is under obligation to use ordinary care for his own safety. Whatever he knew, or ought to have known, and failed to act upon with ordinary care for his own safety, constituted such negligence on his part as would prevent a recovery. To warrant a recovery, it must appear that the injury was caused by the want of ordinary care on the part of the employer, and the injury is not so caused when it is caused by the want of ordinary care on the part of the employer, combined with want of ordinary care on the part of the employe. If it took the want of ordinary care of both the employer and employe to produce the injury, both are at fault, and there can be no recovery by either. Where both parties are negligent and the injury is caused by such combined negligence, there can be no recovery by either party.

If the employer has been negligent, either by omission or commission, and the employe knows of such negligence, or ought to have known it, he must act with reference to it, and he cannot shut his eyes and say that he relied upon the employer performing his duties. As to whether an employe is negligent, his actions should be judged by the facts as they existed within his knowledge, or within what he ought to have known at the time he acted or failed to act; and the previous negligence of the employer which was known to the employe or ought to have been known to him, will not excuse him.

The charge of the court to the jury should not be in the abstract; but in the concrete, applicable to the particular facts of the case on trial. Usually the court should say to the jury that the facts as claimed by the employe if found to be true, do not constitute contributory negligence on his part. In like manner the court should say to the jury that the facts as claimed by the employer if found to be true, do not constitute negligence on his part.

Every case turns upon very few controlling facts, usually but one or two, and which ever way these are found by the jury the verdict should go. The attention of the jury should be called to these controlling facts, with an instruction to return their verdict as they shall find such facts. If the criterion in the case is ordinary care, which is usually defined to be "such care as a reasonably prudent and careful man would exercise under the same or similar circumstances," more satisfactory results can be obtained by the court saying to the jury, as a matter of law (if the facts make it a question of law for the court) what, under the circumstances of the case on trial, would constitute such ordinary care. It would then be very easy for the jury to find the facts and return a verdict accordingly.

Assumption of risk by mine employe.—In repairing a place known to be insecure a workman takes upon himself the added risk incident to such condition. *Colorado Coal and Iron Company v. Lamb.* Court of Appeals, Colorado (40 Pac. Rep., 251).

TABLE No. 1.

Approximated tabular statement estimating deficit and loss sustained by employes of the mines of the state during strike of 1894, reckoned on a basis of output and earnings of the year 1893.

YEAR.	Average number of days running during the year.	Average number of miners and employes.	Average number of tons daily per employe.	Aggregate No. of tons mined daily.	Average number of tons mined during the year per employe.	Total number of tons mined during the year.	Average price per ton for mining.	Price paid per ton for mining, including labor.
Number of tons of coal mined daily, annually and totally for production, including mining and labor for the fiscal year ending June 30, 1893	275	10,486	1.6	16,781	441	4,614,872	$ .92	$ 1.16
Number of tons of coal mined daily, annually and totally for production, including mining and labor for the fiscal year ending June 30, 1894	235	10,409	1.6	16,788	359	3,777,373	.90	1.17

YEAR.	Number of days.	Average number of tons daily per employe.	Aggregate No. of tons daily.	Number of tons per employe during the strike.	Total number of tons decrease.	Per cent of loss.
Estimated decrease in the output attributable to the miners' strike for the fiscal year ending June 30, 1894	50	1.6	16,788	80	839,620	18.2

TABLE No. 1—CONTINUED.

YEAR.	Average number of running days during the year.	Average number of miners employed.	Average daily earnings per miner and employe.	Aggregate earnings of all employes per day.	Average earnings during the year per miner and employe.	Total earnings during the year.
Approximate earnings of miners and employes of the state for the fiscal year ending June 30, 1893	275	10,486	$ 1.85	$ 19,468.15	$ 509.75	$5,353,813.95
Approximate earnings of miners and employes of the state for the fiscal year ending June 30, 1894	225	10,499	1.86	19,618.18	420.44	4,414,228.31

YEAR.	Number of days.	Whole number of days.	Loss per day of each employe.	Aggregate loss per day.	Loss during strike per employe.	Total loss during strike.	Per cent of loss.
Estimated deficits and losses attributable to the miners' strike for the fiscal year ending June 30, 1894	59	534,950	$ 1.86	$ 19,618.18	$ 93.00	$980,900.64	18.3

TABLE No. 2.

Approximated statement by districts, showing decrease in output, and the estimated financial loss to miners and employes during the miners' strike of 1894.

NUMBER OF TONS OF COAL MINED BY DISTRICTS, PER CENT OF LOSS, ETC., ACCEPTING THE REPORT OF 1893 AS A BASIS.	DISTRICT NO. 1.				DISTRICT NO. 2.				DISTRICT NO. 3.			
	Number of miners and employes.	Number of tons of coal produced.	Price per ton for mining.	Per cent loss.	Number of miners and employes.	Number of tons of coal produced.	Price per ton for mining.	Per cent loss.	Number of miners and employes.	Number of tons of coal produced.	Price per ton for mining.	Per cent loss.
Fiscal year ending June 30, 1895	4,364	1,697,215	$ .91	.....	3,513	1,784,800	$ .84	.....	2,609	1,192,857	$ .93	.....
Fiscal year ending June 30, 1894	4,346	1,397,631	.91	.....	3,690	1,462,626	.85	.....	2,553	977,116	.91	.....
Total deficit	.....	299,584	.....	17.7	.....	322,174	.....	18.6	.....	215,741	.....	19.

AMOUNT PAID MINERS AND EMPLOYES, COST OF PRODUCTION PER TON, INCLUDING LABOR, TOTAL DEFICIT, ETC.	DISTRICT NO. 1.				DISTRICT NO. 2.				DISTRICT NO. 3.			
	Number of miners and employes.	Total amount paid miners and employees.	Price per ton for mining, including labor.	Per cent loss.	Number of miners and employes.	Total amount paid miners and employees.	Price per ton for mining including labor.	Per cent loss.	Number of miners and employes.	Total amount paid miners and employees.	Price per ton for mining, including labor.	Per cent loss.
Fiscal year ending June 30, 1895	4,364	$ 2,159,341	$ 1.26	.....	3,513	$ 1,848,712	$ 1.01	.....	2,609	$ 1,332,758	$ 1.19	.....
Fiscal year ending June 30, 1894	4,346	1,753,117	1.25	.....	3,690	1,549,454	1.01	.....	2,553	1,097,029	1.19	.....
Total deficit	.....	$ 369,226	.....	16.5	.....	$ 299,257	.....	16.2	.....	$ 235,729	.....	19.3

TABLE No. 3.

Approximated tabular statement estimating deficit and loss sustained by employes of the mines of District No. 3 during the strike of 1894, reckoned on a basis of output and earnings of the year 1893.

YEAR.	Average number of running days during the year.	Average number of miners and employes.	Average number of tons daily per employe.	Aggregate number of tons mined daily.	Average number of tons during the year per employe.	Total number of tons mined during the year.	Average price per ton for mining.	Price per ton for mining, including labor.
Number of tons of coal mined during the year. Cost of production per ton, including mining and labor, for the fiscal year ending June 30, 1893	275	2,609	1.6	4,119	440	1,132,857	$ .93	$ 1.19
Number of tons of coal mined during the year. Cost of production per ton, including mining and labor, for the fiscal year ending June 30, 1894	225	2,553	1.6	4,076	359	917,116	.91	1.19

YEAR.	Number of days	Number of tons daily per employe.	Aggregate number of tons daily.	Number of tons per employe during strike.	Total number of tons decrease.	Per cent of loss.
Estimated decrease in the output of coal, attributable to the miners' strike, for the fiscal year ending June 30, 1894	50	1.6	4,076	80	204,240	19

TABLE No. 3—CONTINUED.

YEAR.	Average number of running days during the year.	Average number of miners and employes.	Average daily earnings per miner and employe.	Aggregate earnings of all employes per day.	Average earnings during the year per miner and employe.	Total earnings during the year.	
Approximate earnings of miners and employes of District No. 3 for the fiscal year ending June 30, 1893	275	2,609	$ 1.89	$ 4,921.43	$ 519.75	$ 1,352,758	
Approximate earnings of miners and employes of District No. 3 for the fiscal year ending June 30, 1894	225	2,553	1.91	4,875.68	429.75	1,097,020	

YEAR.	Number of days.	Whole number of days.	Loss per day of each employe.	Aggregate loss per day.	Loss during strike per employe.	Total loss during strike.	Per cent of loss.
Estimated deficits and losses attributable to the miners' strike for the fiscal year ending June 30, 1894	50	127,650	$ 1.91	$ 4,875.68	$ 95.50	$ 243,784	19.3

CONCLUSION.

In concluding this report I have prefaced remarks and comments with approximated tabulations for the purpose of estimating the apparent loss sustained by miners and employes of the state during the miners' strike of 1894.

I do not attempt to discuss the loss to operators, or any of the commercial business avenues that were largely dependent upon this line of industry, as it would make the report excessively voluminous.

I have taken the report of the preceding year, 1893, as a reckoning basis, believing it to be about an average in the production of coal, time worked, wages for miners, and laborers, or employes, as, in the compilation of these estimates we purposely use the word employes in the sense that it be practically construed as including miners, laborers and employes of all kinds in and about the mines. While it is true that if these estimates were reckoned for the biennial period, allowing the preceding biennial as a basis, the report would show a much larger per cent of loss. The decrease in the output of coal for 1895, I attribute to the hard times and general business depression, owing to the partial failure of crops, etc., and to the strike and its subsequent effects that extended into the fiscal year, 1895.

By referring to the preceding tables, it will show that in the state there was a decrease in the output of coal of 839,920 tons, and a deficit in earnings of $980,909, or otherwise a loss of 18 per cent in coal and 17.4 per cent in earnings for the fiscal year ending June 30, 1894. This is wholly attributable to the strike. By comparison, we find that the average production of coal and the average amount of earnings per diem, were a little in excess of what they were for the same time and same labor in the previous year; for instance, take the average daily earnings of each employe for the two years, 1893 and 1894, and we find only a penny's difference, and that in favor of 1894, so that we can safely say that the times were just as prosperous and that miners and employes were producing just as much coal and getting as much money for it up to the date of strike as they were in 1893; consequently, the loss is chargeable alone to the fifty days' strike that was so conspicuous in May and June, 1894.

This loss is divided among the three mining districts about as follows:

First District.—Two hundred and ninety-nine thousand, five hundred and and eighty-four tons of coal, and $399,226 in earnings; or a decrease of 17.7 per cent in coal, and a deficit of 18.5 per cent in earnings.

Second District.—Three hundred and twenty-two thousand, one hundred and seventy-four tons of coal, and $299,257 in earnings; or a decrease of 18.6 per cent in coal, and a deficit of 16.2 per cent in earnings.

Third District.—Two hundred and fifteen thousand, seven hundred and forty-one tons of coal, and $255,729 in earnings; or a decrease of 19 per cent in coal, and a deficit of 19.3 per cent in earnings.

The material difference in the districts is not very great, but it shows the highest per cent of loss in district No. 3 and the lowest in district No. 2. Had not the Consolidation mines at Muchakinock, and the American Coal company's mines at Evans, kept working during the strike, district No. 2 would have sustained a larger per cent of loss, but as it was, with about 600 miners and employes at work, who produced from 50,000 to 100,000 tons of coal, helped to lessen the per cent of loss from what it would have been had these two camps been shut down, and this is also notable in making up the state averages.

The Third district in 1894 employed 2,553 miners and laborers, and the aggregate average daily output of coal was 4,076 tons. It cost to produce this coal and put it on car, or dump, including mining, labor, etc., $1.19 per ton, so that the aggregate earnings of the miners and employes of this district was $4,875 per diem. Allowing fifty days as the time the miners were idle or not running during the strike of 1894, the earnings would naturally show a deficit of fifty times the aggregate average daily earnings, which amounts to $243,784, and a decrease in the annual output of 204,240 tons, or 19 per cent decrease in coal and 19.3 per cent deficit in earnings. This represents a loss to each employe of $1.91 per day, or an average of $95.50 for the fifty days' strike.

Iowa miners were not compelled to sustain this loss for the purpose of adjusting any perplexities or difficulties existing between miner and operator. They did not claim a direct grievance of any kind that would tend to impel a strike, as the grievance was foreign and indirect, and can only be classed as sympathetic. It seems to me that this loss of nearly 20 per cent of earnings of 1894 was in reality a sacrifice for the supposed purpose of assisting eastern miners, or miners of outside territory, in adjusting grievances that if successful could in no wise be of direct benefit to Iowa miners, and as a rule those that are generally responsible for many of these strikes, especially those that are precipitated upon the theory of imaginary oppression, are instigated by agitators that are generally considered as being possessed of more reputation than character, backed by a certain floating or transient mining element who are susceptible to excitable influence. A majority of the resident miners, or those who have permanent homes, are really opposed to, and endeavor to avoid, strikes of all kinds as far as possible, and will only acquiesce in their participations as a last resort in preserving harmony coinciding with organized obligations, or to avoid personal compulsion that sometimes happens in extreme cases.

I recognize the fact that miners and employes are not always accountable for the origin of these mining perplexities, or labor difficulties, as there are operators who are not blameless in furnishing incentives leading to disturbances. There are times that occasion no demand for advantages that are taken by reducing wages for labor, lowering the price of mining, or placing some restrictions upon the employes that act as a lever in the mining camp, and a strike is liable to be the subsequent result. I believe miners are deserving and are entitled to good living wages at all times, as the business is confining, laborious, and attended with more or less danger, and every miner who goes into the pit to dig coal puts up, for value received,

one hundred cents on the dollar in labor. The industrious, intelligent miner, and the level-headed and prosperous business operators are the ones that deprecate these strikes, and could and would adjust these differences by mediation, arbitration, or concessions of some kind; but the trouble is that if one operator conceives the idea that employes are receiving more wages than necessary, or more than he can afford to the detriment of his individual business prosperity, he seeks redress, not through advocating or trying to establish higher prices for his product, but by reducing the price for mining or wages, and the probabilities are that his miners or employes refuse to accede to the propositions, and a strike follows, which is liable to be the primitive move toward a general strike in the state, or throughout the whole country, as those who are in high authority and have the delegated power of the miners' organization to issue orders to that effect, are impelled or governed to a certain extent by the plausible or imaginary grievances of the miners in issuing these orders, believing them to be necessary for influential reasons in forcing operators to recognize the demands of those aggrieved. I question the advisability of proceedings of this kind, for usually the risks involved are too great for the benefits received. It would be advantageous to the coal industry and general business interest of the country if these dissatisfactions were settled in their primary state, and confined to the camps wherein they originated.

Strikes that become general are disastrous to business and result in no direct benefit to organized labor, while it may be true that in this way they have prevented wages from declining as they would otherwise have done, but at a loss to themselves and the business interests of the country, and the burden falls the heaviest, generally, upon those who are the least able to bear it.

Observations of local and general strikes for the past twenty years justify the assertion that no substantial benefits have ever been placed to the commercial credit of the Iowa miners through their influence. When the strike has terminated, the miner always feels financially poorer, and for many months he councils economy in home comforts for the purpose of assisting in recuperating depleted finances, as he resumes work generally at the same or less wages.

In summarizing the strike of last year, we believe Iowa miners made a mistake through sympathy, incurring a loss of nearly a million dollars in earnings for the purpose of sustaining miners in other states in their efforts to compel a recognition of their demands, a majority of whom are of a certain foreign element, who, intellectually and morally, are inferior to the miners of this state.

Iowa mining camps have not been so unfortunate as to be burdened with cheap imported labor of a class which has no respect for American institutions or American laws, only as it is forced to submit to them by the iron hand of justice. These cheap imported laborers, by which some other states are so sadly afflicted, do not as a rule make desirable citizens, and as a matter of fact seldom take out naturalization papers. Those who do rarely affiliate with Americans, and apparently make no effort to put themselves in accord with American ideas. Their importation to this country was chiefly through the efforts of those who were unscrupulous and wanted to introduce cheap labor, regardless of moral or social influence; a class that are incapable of appreciation and would not hesitate to take the

place of those who placed them under obligations during the miners' strike, if there was any plausible excuse for solicitations of this kind of labor in the state.

The miners of Iowa are morally and intellectually their superiors and cannot afford to be led by or to be followers of this element, as they are amply able to protect their own interests without the assistance of any other state, and the edict should go forth that they can wisely and judiciously accomplish this without assisting any other state by resorting to sympathetic strikes.

SUMMARY.

In order that a complete review of the mining industry may be had, we have summarized the reports of the three districts in the following tables:

TABLE No. 1.

Showing number of mines, number of tons of coal produced, number of miners and other employes, total amount paid miners and other employes, value of product at mines, etc., for the year ending June 30, 1894.

NO. OF DISTRICT.	Number of mines.	Number of tons of coal produced.	Number of miners employed.	Number of all other employes.	Average price per ton paid for mining.	Total amount paid miners.	Total amount paid all other employes.	Average selling price per ton at mines.	Total value of product at mines.
District No. 1	136	1,307,631	3,186	1,173	$ .91	$1,104,283	$ 507,811	$1.40	$1,908,016
District No. 2	74	1,462,626	2,384	902	.84	1,120,003	204,310	1.49	2,172,883
District No. 3	113	917,116	1,925	628	.95	824,262	245,047	1.63	1,499,797
Total	329	3,777,363	7,495	2,703	$ .90	$3,048,548	$1,047,168	$1.49	$5,580,436

TABLE No. 2.

Showing the number of mines, output of coal, number of miners and other employes, amount paid employes, value of products at mines, etc., for the year ending June 30, 1895.

NO. OF DISTRICT.	Number of mines.	Number of tons of coal produced.	Number of miners employed.	Number of all other employes.	Average price per ton paid for mining.	Total amount paid miners.	Total amount paid all other employes.	Average selling price per ton at mines.	Total value of product at mines.
District No. 1	105	994,054	3,145	1,044	$ .92	$ 709,093	$ 298,216	$1.28	$ 1,272,053
District No. 2	81	1,347,890	2,405	936	.82	1,018,786	296,101	1.58	1,854,621
District No. 3	95	853,902	2,528	864	.93	711,005	251,670	1.46	1,249,758
Total	342	3,195,836	8,178	2,814	$ .89	$2,498,884	$ 845,077	$1.37	$ 4,376,434

TABLE No. 3.

Showing the grand total for the state for the biennial period ending June 30, 1895.

NO. OF DISTRICT.	Average No. mines in operation.	No. of tons of coal produced.	Average No miners employed.	Average No. of all other employes.	Average price per ton paid for mining.	Total amount paid miners.	Total amount paid all other employes.	Average selling price per ton at mine.	Total value of product at mines.
District No. 1.....	158	2,391,685	3 176	1,110	$ .92	$1,873,286	$ 806,027	$1.35	$3,220,071
District No. 2.....	78	2,810,456	2,440	934	.83	2,138,819	598,781	1.43	4,027,504
District No. 3.....	104	1,771,068	2,232	746	.94	1,535,297	496,717	1.55	2,749,495
Grand total....	340	6,973,209	7.848	2,790	$ .90	$5,548,402	$1,901,525	$1.43	10,007,070

OWEN BROMLEY,
Secretary.

IOWA MINING LAWS.

IOWA MINING LAWS.

CHAPTER 140, LAWS 1886.

PROVIDING FOR MINE INSPECTORS, THEIR APPOINTMENT, DUTIES AND COMPENSATION.

AN ACT to repeal Sections 1, 2, 3, 4, 5 and 6, of Chapter 21, Acts of the Twentieth General Assembly, and enact substitutes therefor providing for Mine Inspectors, their manner of appointment, compensation and defining their duties and terms of office.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That there shall be appointed by the governor with the advice and consent of the senate three inspectors of mines, who shall hold their offices for two years, the said inspectors subject however to be removed by the governor for neglect of duty or malfeasance in office. Said term of office shall commence on the first day of April of each even numbered year. Said inspectors shall have a theoretical and practical knowledge of the different systems of working and ventilating coal mines and of the nature and properties of the noxious and poisonous gases of mines and mining engineering, and said inspectors before entering upon the discharge of their duties shall take an oath or affirmation to discharge the same faithfully and impartially, which oaths or affirmations shall be endorsed upon their commissions, and their commissions so endorsed shall be forthwith recorded in the office of the secretary of state, and such inspectors shall each give bonds in the sum of two thousand (2,000) dollars, with sureties, to the approval of the governor, conditioned for the faithful discharge of their duties. The governor shall divide the state into inspection districts and shall assign the inspectors to duty in such place or district as he shall deem proper.

The state shall be divided into districts.

SEC. 2. Said inspectors shall give their whole time and attention to the duties of their offices respectively, and shall examine all the mines in this state as often as their duties will permit, to see that the provisions of this act are obeyed, and it shall be lawful for such inspectors to enter, inspect and examine any mine in this state and the works and machinery belonging thereto, at all reasonable times by night or day, but so as not to unnecessarily obstruct or impede the working of the mines, and to make

inquiry and examination into the state and condition of the mine as to ventilation and general security as required by the provisions of this act.

Inspectors shall make a record of all examinations.

The inspectors shall make a record of all examinations of mines inspected by them showing the date when made, the condition in which the mines are found, the extent to which the laws relating to mines and mining are observed or violated, the progress made in improvement and secured by the provisions of this chapter, number of accidents, injuries or deaths in or about the mines, the number of mines visited, the number of persons employed in or about the mines, together with all such facts and information of public interest concerning the condition of the mines as they may think useful and proper, or so much thereof as may be of public interest to be included in their biennial report. The owner and agents of all coal mines are hereby required to furnish the means necessary for such inspection, and it shall be the duty

In case of accident to give notice to inspector and to coroner of county.

of the persons having charge of mines whenever any loss of life shall occur by accident connected with the workings of such mine to give notice forthwith by mail or otherwise to the inspector of mines of his district and to coroner of the county in which such mine is situated, and the coroner shall hold an inquest on the body of the person or persons whose death has been caused, and inquire carefully into the cause thereof, and shall return a copy of the verdict and all testimony to the said inspector. No person having a personal interest in or employed in the mine where a fatal accident occurs shall be qualified to serve on the jury empaneled on the inquest, and the owner or agent of all coal mines shall report to the inspector all accidents to miners in and around the mines, giving cause of same, such report to be made in writing and within ten days from the time any accident occurs.

SEC. 3. Said inspectors while in office shall not act as agents or managers or mining engineers or be interested in operating any mine, and

Inspector to make report to governor.

the inspector shall biennially on or before the 15th day of August preceding the regular session of the general assembly make a report to the governor of their proceedings and the condition and operation of the mines in this state, enumerating all accidents in or about the same, and giving all such information as they may think useful and proper, and making such suggestions as they may deem important as to future legislation on the subject of mining.

SEC. 4. The inspectors provided for in this act shall receive a salary of twelve hundred dollars ($1,200) per annum, payable monthly, and shall be furnished with necessary stationery and actual traveling expenses, not to exceed five hundred dollars ($500) per annum; *provided*, that each inspector shall file at the end of each quarter of his official year with the auditor of state a sworn statement of his actual traveling expenses incurred in the performance of his official duty for such quarter, the said salary and expenses to be paid by the state as the salaries and expenses of other state officers are provided for. They shall have and keep an office in the capitol at Des Moines, in which shall be kept all records, correspondence, papers, apparatus and property pertaining to their duties belonging to the state, and which shall be handed over to their successors

Each inspector to have a residence and office in his district.

in office. And each inspector shall, during his term of office, have and keep a residence in the district to which he has been assigned without expense to the state, also

have and keep an office at a place designated by the governor, accessible to railroad and telegraph in their respective districts where at reasonable times and when not actually engaged elsewhere such inspectors shall be found.

SEC. 5. Any vacancy occurring in the office of inspector when the

Vacancies to be filled by the governor.

senate is not in session, either by death or resignation, removal by the governor or otherwise, shall be filled by appointment by the governor, which appointment shall hold good until his successor is appointed and qualified.

SEC. 6. There shall be provided for such inspectors all instruments necessary for the discharge of their duties under this act, which shall be paid for by the state on the certificate of the inspectors and shall be the property of the state.

CHAPTER 21, LAWS 1884.

MINES AND MINING.

AN ACT to regulate mines and mining, and to repeal Chapter 202 of the Acts of the Eighteenth General Assembly.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 7. The agent or owner of every coal mine shall make or cause to be made an accurate map or plan of the working of each mine on a scale

Owner or agent of mines shall make a map or plan of same.

of not less than one hundred feet to the inch, showing the area mined or excavated. Said map or plan shall be kept at the office of such mine. The agent or owner shall, on or before the first day of September of each year, cause to be made a statement and plan of the progress of the workings of such mine up to said date, which statement and plan shall be marked on the map or plan herein required to be made. In case of refusal on the part of said owner or agent for two months after the time designated to make the map or plan, or addition thereto, the inspector is authorized to cause an accurate map or plan of the whole of said mine to be made at the expense of the owner thereof, the cost of which shall be recoverable against the owner in the name of the person or persons making said map or plan; and the owner or agent of all coal mines hereafter wrought out and abandoned, shall deliver a correct map of said mine to the inspector to be filed in his office.

SEC. 8. It shall be unlawful for the owner or agent of any coal mine worked by a shaft to employ or permit any person to work therein unless

There shall be two separate outlets to every seam of coal worked.

there are to every seam of coal worked in such mine at least two separate outlets, separated by natural strata of not less than one hundred feet in breadth, by which shafts or outlets distinct means of ingress and egress are always available to the persons employed in the mine, but in no case shall a furnace shaft be used as an escape shaft; and if the mine is a slope or drift opening, the escape shall be separated from the other openings by not less than fifty feet of natural strata, and shall be provided with safe and available traveling ways, and the traveling ways to the escapes, in all coal mines shall be kept free from water and falls of roof, and all escape shafts shall be fitted with safe

and convenient stairs at an angle of not more than sixty degrees descent, and with landings at easy and convenient distances, so as to furnish easy escape from such mine; and all air shafts used as escapes where fans are employed for ventilation shall be provided with suitable appliances for hoisting the underground workmen, said appliances to be always kept at the mine ready for immediate use, and in no case shall any combustible material be allowed between any escape shaft and hoisting shaft, except such as is absolutely necessary for the operation of the mine, provided that where a furnace shaft is large enough to admit of being divided into an escape shaft and a furnace shaft, there may be a partition placed in said shaft, properly constructed so as to exclude the heated air and smoke from the side of the shaft used as an escape shaft, such partition to be built of incombustible material for a distance of not less than fifteen feet up from the bottom thereof; and provided that where two or more mines are connected underground, each owner may make joint provisions with the other for the use of the other's hoisting shaft or slope as an escape, and in that event the owners thereof shall be deemed to have complied with the requirements of this section; and, provided further, that in any case where the escape shaft is now situated less than one hundred feet from the hoisting shaft there may be provided a properly constructed underground traveling way from the top of the escape shaft, so as to furnish the proper protection from fire for a distance of one hundred feet from the hoisting shaft, and in that event the owner or agent of any such mine shall be deemed to have complied with the requirements of this section; and, provided further, that this act shall not apply to mines operated by slopes or drifts, openings where not more than five persons are employed therein [and provided further, that any escapement shaft that is hereafter sunk and equipped, before said escapement shaft shall be located or the excavation of for it begun, the district inspector of mines shall be duly notified to appear and determine what shall be a suitable distance for the same. The distance from main shaft shall not be less than three hundred feet without the consent of the inspector, and no building shall be put nearer the escape shaft than one hundred feet, except the house necessary to cover the fan.]—*Chapter 56, Laws of 1888, Section 1.*

SEC. 9. In all mines there shall be allowed one year to make outlets as provided in section eight, when such mine is under two hundred feet in depth, and two years when such mine is over two hundred feet in depth, but not more than twenty men shall be employed in such mine at any one time, until the provisions of section eight are complied with, and after the expiration of the period above mentioned, should said mines not have outlets aforesaid, they shall not be operated until made to conform to the provisions of section eight [and, provided further, that this act shall not apply to mines where the escape way is lost or destroyed by reason of the drawing of pillars preparatory to the abandonment of the mine, provided that not more than twenty persons shall be employed in said mine at any one time].

SEC. 10. The owner or agent of any coal mine, whether it be operated by shaft, slope or drift, shall provide and maintain for every such mine an amount of ventilation of not less than one hundred cubic feet of air per minute for each person employed in such mine, and not less than five hundred cubic feet of air per minute for each mule or horse employed in the same,

which shall be distributed or circulated throughout the mine in such manner as to dilute, render harmless and expel the poisonous and noxious gases from each and every working place in the mine, and whenever the inspector shall find men working without sufficient air or under any unsafe conditions he shall first give the operator or his agent a reasonable notice to rectify the same and upon a refusal or neglect so to do the inspector may himself order them out until said portion of said mine shall be put in proper condition, and all mines governed by the provisions of this act shall be provided with artificial means for producing ventilation such as exhaust or forcing fans, furnaces or exhaust steam or other contrivances of such capacity and power as to produce and maintain an abundant supply of air for all the requirements of the persons employed in the mine; but in case a furnace is used for ventilating purposes it shall be built in such manner as to prevent the communication of fire to any part of the works by lining the upcast with incombustible material for a sufficient distance up from said furnace to insure safety.

A metal tube shall be put in shaft for communication from top to bottom.

SEC. 11. The owner or agent of every coal mine operated by a shaft or slope in all cases where the human voice cannot be distinctly heard shall forthwith provide and maintain a metal tube or other suitable means for communication from the top to the bottom of said shaft or slope, suitably calculated for the free passage of sound therein, so that communication can be held between persons at the bottom and top of the shaft or slope, and there shall be provided a safety catch of approved pattern and a sufficient cover overhead on all carriages used for lowering and hoisting persons, and on top of every shaft an approved safety gate and also an approved safety spring on top of every slope, and an adequate brake shall be attached to every drum or machine used for raising or lowering persons in all shafts or slopes, and a trial shall be attached to every train used on a slope, all of said appliances to be subject to the approval of the inspector.

Engineers must be experienced, competent and sober.

SEC. 12. No owner or agent of any coal mine operated by shaft or slope shall knowingly place in charge of any engine used for lowering into or hoisting out of such mine persons employed therein, any but experienced, competent and sober engineers, and no engineer in charge of such engine shall allow any person except such as may be deputed for that purpose by the owner or agent, to interfere with it or any part of the machinery, and no person shall interfere or in any way intimidate the engineer in the discharge of his duties, and the maximum number of persons to ascend out of or descend into any coal mine on one cage, shall be determined by the inspector, but in no case shall such number exceed ten, and no person shall ride upon or against any loaded cage or car in any shaft or slope except the conductor in charge of the train.

Number of persons on cages to be determined by inspector.

No boy under twelve years of age permitted to work in coal mines.

SEC. 13. No boy under twelve years of age shall be permitted to work in any mine, and parents or guardians of boys shall be required to furnish an affidavit as to the ages of their boys when there is any doubt in regard to their age, and in all cases of miners applying for work the agent or owner of the mines shall see that the provisions of this section are not violated.

SEC. 14. In case any coal mine does not in its appliances for the safety of the persons working therein conform to the provisions of this act, or the owner or agent disregards the requirements of this act for twenty days after being notified by the inspector, any court of competent jurisdiction, while in session, or the judges in vacation, may, on application of the inspector, by civil action in the name of the state, enjoin or restrain by writ of injunction the said agent or owner from working or operating such mines with more persons at once than are necessary to make the improvements needed, except as provided in sections eight and nine, until it is made to conform with the provisions of this act, and such remedies shall be cumulative, and shall not take the place of or affect any other proceedings against such owner or agent authorized by law, for the matter complained of in such action, and for any willful failure or neglect to comply with the provisions of this law by any owner, lessee or operator of any coal mine or opening whereby any one is injured, a right of action shall accrue to the party so injured for any damage he may have sustained thereby, and in case of loss of life by reason of such willful neglect or failure aforesaid, a right of action shall accrue to the widow, if living, and if not living to the children of the person whose life shall be lost, for like recovery of damages for the injury they shall have sustained.

Owner or agent liable for damages in case of negligence.

SEC. 15. Any miner, workman or other person who shall knowingly injure or interfere with any air-course or brattice, or obstruct or throw open doors or disturb any part of the machinery, or disobey any order given in carrying out the provisions of this act, or ride upon a loaded car or wagon in a shaft or slope, except as provided in section twelve, or do any act whereby the lives and health of the persons or the security of the mines and machinery is endangered, or if any miner or person employed in any mine governed by the provisions of this act shall neglect or refuse to securely prop or support the roof and entries under his control, or neglect or refuse to obey any order given by the superintendent in relation to the security of the mine, in the part of the mine under his charge or control, every such person shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding one hundred dollars or imprisonment in the county jail not exceeding thirty days.

Misdemeanor for miners to neglect to prop the roof of rooms in their charge.

SEC. 16. Whenever written charges of gross neglect of duty or malfeasance in office against any inspector shall be made and filed with the governor, signed by not less than fifteen miners or one or more operators of mines, together with a bond in the sum of five hundred dollars, payable to the state and signed by two or more responsible freeholders and conditioned for the payment of all cost and expenses arising from the investigation of such charges, it shall be the duty of the governor to convene a board of examiners to consist of two practical miners, one mining engineer and two operators, at such time and place as he may deem best, giving ten days' notice to the inspector against whom charges may be made, and also the person whose name appears first in the charges, and said board when so convened and having first been duly sworn or affirmed truly to try and decide the charges made, shall summon any witnesses desired by either party and

Inspector may be removed for malfeasance in office or incompetency.

examine them on oath or affirmation which may be administered by any member of the board and depositions may be read on such examination, as in other cases, and report the result of their investigation to the governor, and if their report shows that said inspector has grossly neglected his duties or is incompetent, or has been guilty of malfeasance in office, it shall be the duty of the governor forthwith to remove said inspector and appoint a successor; and said board shall award the cost and expenses of such investigation against the inspector or person signing said bond.

SEC. 18. The owner, agent or operator of any coal mine shall keep a sufficient supply of timber, to be used as props, so that the workmen may at all times be able to secure the workings from caving in, and it shall be the duty of the owner, agent or operator to send down all such props when so required.

Owners or agents shall furnish timber for props whenever required.

SEC. 19. Any person willfully neglecting or refusing to comply with the provisions of this act when notified by the mine inspector to comply with such provisions, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding five hundred dollars, or imprisonment in the county jail not exceeding six months, except when different penalties are herein provided.

Failure to comply with this section a misdemeanor.

SEC. 20. Chapter 202 of the acts of the Eighteenth General Assembly is hereby repealed.

SEC. 21. That chapter 21, laws of the Twentieth General Assembly, be and the same is hereby amended by enacting the following supplementary section:

SEC. 22. The executive council shall appoint a board of examiners, composed of two practical miners, two mine operators, and one mining engineer who shall have had at least five years' experience in his profession. The members of said board shall be of good moral character, and citizens of the United States and state of Iowa, and they shall before entering upon their duties take the following oath (or affirmation): "I ——, do solemnly swear (or affirm) that I will perform the duties of examiner of candidates for the office of mine inspector to the best of my ability, and that in recommending any candidate I will be governed by the evidence of qualification to fill the position under the law creating the same, and not by any consideration of political or personal favors; that I will grant certificates to candidates according to their qualifications and the requirements of the law." They shall hold their office for two years.

The executive council shall appoint a board of examiners.

SEC. 23. Said board shall meet biennially on the first Monday in April of each even numbered year, except that for the year 1883, said board shall meet on the second Monday, in the office of the state mine inspector, in the capitol, and they shall publish in at least one newspaper published in each mining district of the state the date fixed by them for the examination of candidates. They shall be furnished with the necessary stationery and other necessary material for said examination in the same manner as other state officers are now provided. They shall receive as compensation the sum of $5.00 per day for time actually employed in the duties of their office and actual traveling expenses. The said compensation and expenses shall be paid in the same manner as the salaries and expenses of other state

officers are now paid; *provided*, that in no case shall the per diem received by any member exceed $50.00 for each biennial session.

SEC. 24. Certificates of competency shall be granted only to citizens of the United States and state of Iowa, of good moral character, not less than twenty-five years of age, who shall have had at least five years' experience in the mines, and who shall not have been acting as agent or superintendent of any mine for at least six months prior to their appearance for examination.

SEC. 25. The examination of candidates for the office of mine inspector shall consist of oral and written questions in theoretical and practical mining and mine engineering, on the nature and properties of noxious and poisonous gases found in mines, and on the different systems of working and ventilating of coal mines. The candidates shall not be allowed to have in their possession at the time of their examination, any books, memoranda or notes to be used as aids in said examination. The board of examiners shall give to all persons examined, who in their judgment possess the requisite qualifications, certificates of such qualification, and from the persons holding such certificates the governor shall appoint the state mine inspector.

SEC. 26. This act being deemed of immediate importance shall take effect on and after its publication in the Iowa State Register and Des Moines Leader, newspapers published in Des Moines, Iowa.

Approved April 12, 1888.

CHAPTER 53, LAWS OF 1888.

PROVIDING FOR THE WEIGHING OF COAL AT MINES.

AN ACT to amend Chapter 21 of the Acts of the Twentieth General Assembly, providing for the weighing of coal at mines.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That the owner or agent of each coal mine within this state, at which the miners are paid by weight, shall provide at such mines suitable scales of standard make for the weighing of all coal mined.

SEC. 2. The owner or agent of such mine shall require the person authorized to weigh the coal delivered from said mine to be sworn before some person having authority to administer an oath, to keep the scales correctly balanced, to accurately weigh, and to record a correct account of the amount weighed of each miner's car of coal delivered from such mine, and such oath shall be kept conspicuously posted at the place of weighing. The record of the coal mined by each miner shall be kept separate and shall be open to his inspection at all reasonable hours, and also for the inspection of all other persons pecuniarily interested in such mine.

SEC. 3. In all coal mines in this state the miners employed and working therein may furnish a competent check-weighman, who shall at all proper times have full right of access and examination of such scales, machinery or apparatus, and seeing all measures and weights of coal mined and accounts kept of the same, provided that not more than one person on behalf of the

miners collectively shall have such right of access, examination and inspection of scales, measures and accounts at the same time, and that such person shall make no unnecessary interference with the use of such scales, machinery or apparatus. The agent of the miners, as aforesaid, shall before entering on his duties, make and subscribe to an oath before some officer duly authorized to administer oaths, that he is duly qualified and will faithfully discharge the duties of check-weighman. Such oath shall be kept conspicuously posted at the place of weighing.

SEC. 4. Any person, company, or firm having or using any scale or scales for the purpose of weighing the output of coal at mines so arranged or constructed that fraudulent weighing may be done thereby, or who shall knowingly resort to or employ any means whatsoever by reason of which such coal is not correctly weighed or reported in accordance with the provisions of this act, or any weighman or check-weighman who shall fraudulently weigh or record the weights of such coal, or connive at or consent to such fraudulent weighing, shall be deemed guilty of a misdemeanor, and shall, upon conviction, for each such offense be punished by a fine of not less than two hundred dollars ($200) or more than five hundred dollars ($500), or by imprisonment in the county jail for a period not to exceed sixty days, or by both such fine and imprisonment; proceedings to be instituted in any court of competent jurisdiction.

SEC. 5. Any person, owner or agent operating a coal mine in this state who shall fail to comply with the provisions of this act, or who shall obstruct or hinder the carrying out of its requirements, shall be fined for the first offense not less than fifty dollars ($50) nor more than two hundred dollars ($200); for the second offense not less than two hundred dollars ($200) nor more than five hundred dollars ($500); and for a third offense not less than five hundred dollars ($500); provided, that the provisions of this act shall apply only to coal mines whose products are shipped by rail or water.

SEC. 6. That section 17 of chapter 21 of the laws of 1884 are hereby repealed.

Approved April 6, 1888.

CHAPTER 54, LAWS OF 1888.

WEIGHING COAL AT MINES.

AN ACT to establish a uniform system of weighing coal at the mines of this state, and to punish certain irregularities connected therewith.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That all coal mined in this state under contract for payment by the ton or other quantity shall be weighed before being screened unless otherwise agreed upon in writing, and the full weight thereof shall be credited to the miner of such coal; and eighty pounds of coal as mined shall constitute a bushel, and two thousand pounds of coal as mined shall constitute a ton. Provided that nothing in this act shall be so construed as to compel payment for sulphur, rock, slate, black jack or other impurities, including slack and dirt which may be loaded with or amongst such coal.

SEC. 2. Each state mine inspector shall procure from the state superintendent of weights and measures, at the expense of the state, a full and complete set of standards, balances and other means of adjustment such as are necessary in the comparison and adjustment of the scales, beams and other apparatus used in weighing coal at the mines to the state standards of weight; and it shall be the duty of said inspectors to examine, test and adjust as often as occasion demands all scales, beams, and other apparatus used in weighing coal at the mines.

SEC. 3. Any person damaged by reason of coal mined not having been weighed and credited to him in accordance with the provisions of this act may recover his damage in a civil action against the employer, but such action must be begun within two years after the right thereto accrued; but his right to recover in such action shall not be barred by reason of his having knowledge of the violation of this act at the time.

Approved April 12, 1888.

CHAPTER 55, LAWS OF 1888.

PROTECT WORKMEN IN MANAGEMENT AND CONTROL OF WAGES.

AN ACT to provide for the payment of wages of workmen employed in mines in the state of Iowa, in lawful money of the United States, and to protect said workmen in the management and control of their own earnings.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. It shall be unlawful for any person, firm, company or corporation, owning or operating coal mines in the state of Iowa, to sell, give, deliver or in any manner issue, directly or indirectly, to any person employed by him or it, in payment for wages due for labor, or as advances on wages of labor not due, any script, check, draft, order or evidence of indebtedness, payable or redeemable otherwise than in their face value in money; and such person, firm, company or corporation who shall violate any of the provisions of this section, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding three hundred dollars ($300) nor less than twenty-five dollars, and the amount of any script, token, check, draft, order or other evidence of indebtedness, sold, given, delivered or in any manner issued in violation of the provisions of this act, shall recover in money at the suit of any holder thereof, against the person, firm, company or corporation, selling, giving, delivering, or in any manner issuing the same; provided that this act shall not apply to any person, firm, company or corporation employing less than ten (10) persons.

SEC. 2. Whoever compels, or in any manner seeks to compel or coerce an employe of any person, firm, company or corporation, to purchase goods or supplies from any particular person, firm, company or corporation, shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine not exceeding five hundred (500) dollars or imprisoned in the county jail, not exceeding sixty days, or both, at the discretion of the court

SEC 3. The county attorney of any organized county, upon complaint being made to him of the violation of any of the provisions of this act within this county, shall cause such complaint to be investigated before the grand jury of the county where such wrong has been complained of, at its next session following the time such complaint is made.

Approved April 6, 1888.

CHAPTER 57, LAWS OF 1888.

TO PREVENT BLACK LISTING.

AN ACT for the protection of discharged employes and to prevent black listing.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That if any person, agent, company or corporation, after having discharged any employe from his or its service shall prevent or attempt to prevent by word or writing of any kind such discharged employe from obtaining employment with any other person, company or corporation, except by furnishing in writing on request a truthful statement as to the cause of his discharge, such person, agent or corporation shall be guilty of a misdemeanor and shall be punished by a fine not exceeding five hundred dollars nor less than one hundred dollars, and such person, agent, company or corporation shall be liable in penal damages to such discharged person to be recovered by civil action; but this action shall not be construed as prohibiting any person or agent of any company or corporation setting forth a truthful statement of the reasons for such discharge.

SEC. 2. If any railway company, any other company or partnership or corporation in this state shall authorize or allow any of its or their agents to black list any discharged employe or attempt by word or writing or any other means whatever to prevent such discharged employe or any employe who may have voluntarily left said company's service from obtaining employment with any other person or company except as provided for in section 1 hereof, such company or co-partnership shall be liable in treble damages to such employe so prevented from obtaining employment, to be recovered by him by civil action.

SEC. 3. This act being deemed of immediate importance shall be in force and take effect from and after its publication in the Iowa State Register and Des Moines Leader, newspapers published in the city of Des Moines and the state of Iowa.

Approved April 16, 1888.

CHAPTER 46, LAWS OF 1890.

ESCAPE SHAFTS IN COAL MINES.

AN ACT to amend Section 9, Chapter 21, of the Acts of the Twentieth General Assembly, as amended by Section 2, Chapter 56, Acts of the Twenty-second General Assembly, relative to escape shafts in coal mines.

Be it enacted by the General Assembly of the State of Iowa:

Chap. 21, acts 20th G. A., chap. 56, acts 22d G. A. amended.

SECTION 1. That section 9, chapter 21, of the acts of the Twentieth General Assembly, as amended by section 2, chapter 56, acts of the Twenty-second General Assembly, be so amended as to read as follows:

Time allowed to make outlets.

Number of men employed.

SEC. 9. In all mines there shall be allowed one year to make outlets as provided in section eight, when such mine is under two hundred feet in depth; and two years when such mine is over two hundred feet in depth; but not more than twenty men shall be employed in such mine at any one time until the provisions of section eight are complied with [provided that in the case of mines over two hundred feet in depth, there shall be allowed three years on the condition that during the third year not more than ten men shall be employed in such mine at any one time, and provided further, that in cases where the two years shall already have expired, a third year shall be allowed after the taking effect of this act]; and after the expiration of the period above mentioned should said mines not have the outlets aforesaid, they shall not be operated until made to conform to the provisions of section eight. And provided further, that this act shall not apply to mines where the escape way is lost or destroyed by reason of the drawing of pillars preparatory to the abandonment of the mine; provided that not more than twenty persons shall be employed in said mine at any one time.

Abandoned mines.

Ten men may be employed at all times.

SEC. 2. And provided further that ten men or less may be lawfully employed in any coal mine without reference to the provisions of this or any other act.

Approved April 17, 1890.

CHAPTER 47, LAWS OF 1890.

PROTECTION OF LABORERS.

AN ACT to protect laborers and miners for labor performed in developing and working in coal mines, additional to Chapter 100, Acts of the Sixteenth General Assembly, and Chapter 179, Acts of the Twentieth General Assembly.

Be it enacted by the General Assembly of the State of Iowa:

Labor performed in opening and developing mines a lien upon the property.

SECTION 1. Every laborer or miner who shall perform labor in opening and developing any coal mine, including sinking shafts, constructing slopes, or drifts, mining coal and the like, shall have a lien upon all the property of the person, firm or corporation, owning, constructing or operating such mine, used in the construction or operation thereof, including real estate, buildings, engines, cars, mules, scales and all other personal property, for the value of such labor, for the full amount thereof, upon the same terms with the same rights and to be secured and enforced as mechanics' liens are secured and enforced.

Publication.

SEC. 2. This act being deemed of immediate importance shall take effect and be in force from and after its publication in the Iowa State Register and Des Moines Leader, newspapers published in Des Moines, Iowa.

Approved April 30, 1890.

CHAPTER 98, LAWS OF 1894.

PAYMENT OF WAGES.

AN ACT to provide for the payment of wages of workmen employed in mines in the State of Iowa in lawful money of the United States, and to protect said workmen in the management and control of their own earnings.

Be it enacted by the General Assembly of the State of Iowa:

Mines employing more than two men.

Pay day the first and third Saturday of each month.

More than three weeks' earnings not to be withheld.

SECTION 1. That any person, firm or corporation operating any coal mine in Iowa in which more than two men are employed shall, upon demand, pay their employes in lawful money of the United States, the first and third Saturdays of each month the full amount of wages earned by them and remaining unpaid for the two weeks next preceding the week in which payments are made, and in no case shall any person, firm or corporation operating coal mines in this state withhold from their employes more than the amount of three weeks' earnings at any one time.

SEC. 2. Any person, firm or corporation who shall refuse, neglect or fail for five days after demand of payment in writing has been made by any employes for their labor, in conformity with the provisions of this act, shall be liable to such employe, or employes, for the full value of his or their labor remaining unpaid at time such demand was made, which shall be added a penalty of one dollar for each succeeding day, not exceeding double the amount of wages due, and a reasonable attorney's fee, to be recovered in a civil action. Said written demand for payment delivered to any officer or agent of said firm, corporation or person, shall be held a good and sufficient service of notice, verified by affidavit of the person making such demand and service of notice.

Failure to comply with the law.

Penalty.

Written demand for payment a service of notice.

SEC. 3. All acts or parts of acts inconsistent herewith are hereby repealed.

Inconsistent acts repealed.

Approved April 24, 1894.