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BIENNIAL REPORT  
OF THE  
**THIRD DISTRICT,**

EMBRACING

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

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JAMES W. MILLER, INSPECTOR.

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LETTER OF TRANSMITTAL.

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*To the Honorable Leslie M. Shaw, Governor of Iowa:*

SIR—In accordance with the law, I have the honor to present herewith the biennial report of the Third district on mines and mining, which contains numerous statistical tables showing the annual output of coal, the amount of money received for the total product at mines, the number of miners and other employes in and about the mines, the total amount of money paid to them annually, the location of mines, by whom operated, the number of fatal and non-fatal accidents, together with such other matters as I deemed of importance in this connection.

Very respectfully,

J. W. MILLER,  
*Inspector Mines, Third District.*



## REPORT OF THIRD DISTRICT.

I assumed the duties of inspector of the Third district May 1, 1899, being transferred from the Second district on the death of Morgan G. Thomas, which occurred on the morning of April 11, 1899.

Mr. Thomas having been ailing for a long time prior to his death, none of the preliminary work had been done on his report for the biennial period ending June 30, 1899. This report is therefore not as complete and accurate as I would desire it should be, and as I would have had it had I been in charge of this district during the whole of that biennial period, or as I am confident it would be had Mr. Thomas been able to attend to the duties of the office up to the time of his death.

Mr. Thomas was born in Wales in the year 1845. Early in his life he emigrated to Australia, where he worked for a number of years in the gold, copper, and coal mines. While in Australia he accumulated considerable wealth. From Australia he returned to his native land, remaining there but a short time, when he sailed for America, in which country he continued to follow mining in its various branches. Mr. Thomas had acquired a large and useful experience in this particular calling, and was recognized by both employer and employe as a man of wide experience in mining; and many times, in his eventful career, was he called upon to express his opinion upon various matters of differences between operator and miner, and rarely indeed was the case that an agreement was not reached wherein both factions were not satisfied and trouble averted, saving many dollars and inconvenience to all concerned. He was known to all to be a plain, practical man, who took particular delight in the sense of right and justice to all. In Des Moines and throughout the state his friends were legion. He was a man of great generosity, one of his chief pleasures being that of charitable work, though very few people knew to what extent he carried it.

Mr. Thomas assumed the duties of inspector December 1, 1889, being appointed by Governor Larrabee to succeed J. E. Stout, who resigned. Mr. Thomas served as mine inspector in the Third district nine years, four months and eleven days, at all times faithfully and impartially filling the office until his death, which occurred at 10:30 A. M. on April 11, 1899.

The Third mining district contains the following coal producing counties, viz: Polk, Boone, Webster, Marion, Greene, Guthrie, Story, Dallas, Hamilton and Hardin. This district produced during the first half of the biennial period ending June 30, 1898, 1,370,457 tons of coal, showing considerable increase in the output over that of the last biennial report, and the tonnage for the whole period reached a total of 2,925,509 tons, never equaled in this district in the history of coal mining in the state. In my report June 30, 1897, I mentioned the fact that if the conditions existing at



that time continued, prices would be better. We find in making up this report that prices are considerably better. Miners and laborers receive better pay for their labor, operators receive higher prices for their product, and, generally speaking, there has been a decided change in favor of those interested in the coal industry throughout the state. The change came at a time when it was appreciated by all concerned, for a great many having money invested in the mining business did not make profit enough on their product to pay a reasonable interest on their investment. This was partially brought about by cutting prices and close competition among the operators, which is too often the case when there is not sufficient demand for the output. Miners were very much dissatisfied, for men were plenty and trade scarce; but the demand for coal has adjusted these matters to a certain extent.

I have been called upon, while having charge of the Second district, also since looking after the Third district, to test quite a number of track and hopper scales, and in each case, where the scales were not in condition to weigh correctly, I condemned them, giving the company a reasonable length of time to repair them, at which time I would again visit the mine and test the scales, and in nearly every instance I found them in proper condition.

TABLE No. 1.

*Showing the number of mines, output of coal, number of miners and other employees, etc., in District No. 3, for the year ending June 30, 1898.*

NAME OF COUNTY.	Number of mines.	Number of tons of coal of all grades produced.	Number of miners employed.	Number of other employees.	Amount paid miners.	Amount paid other employees.	Amount paid for timber, tracking, etc.	Average price paid for lump coal.	Av. selling price for lump coal at mine.
Adair.....	1	7,000	24	8	\$ 8,700	\$ 3,910	\$ 800	\$ 1.10	\$2.00
Boone.....	19	310,967	632	271	271,651	109,815	54,100	.80	1.48
Dallas.....	6	12,400	31	17	12,800	5,950	1,620	.85	1.50
Greene.....	5	21,800	74	38	17,300	1,100	2,600	.80	1.35
Guthrie.....	13	16,000	67	24	17,100	6,710	1,740	1.05	2.00
Marion.....	17	133,980	203	69	83,150	17,753	11,000	.65	1.17
Polk.....	25	707,560	1,060	329	494,316	198,390	64,448	.76	1.34
Story.....	3	9,010	34	13	9,965	3,542	690	.90	1.80
Webster.....	25	141,832	400	96	112,188	47,330	12,700	.78	1.40
Total.....	114	1,870,459	2,627	855	\$ 964,130	\$303,860	\$ 153,398		

TABLE No. 2.

*Showing the number of mines, output of coal, number of miners and other employees, etc., in District No. 3, for the year ending June 30, 1899.*

NAME OF COUNTY.	Number of mines.	Number of tons of coal of all grades produced.	Number of miners employed.	Number of other employees.	Am't paid miners.	Am't paid other employees.	Amount paid for timber, tracking, etc.	Average price paid for mining per ton of lump coal.	Av. selling price of ton of lump coal at mine
Adair.....	1	4,000	18	8	\$ 5,300	\$ 1,500	\$ 650	\$ 1.10	\$2.00
Boone.....	18	371,410	695	300	297,304	108,201	54,300	.80	1.51
Dallas.....	5	13,600	40	21	11,300	7,250	2,000	.85	1.65
Greene.....	5	22,500	75	31	18,000	13,300	2,600	.80	1.43
Guthrie.....	13	16,400	73	28	17,300	5,350	2,100	1.10	2.00
Marion.....	17	141,780	210	74	91,200	28,300	8,300	.67	1.24
Polk.....	24	790,410	980	340	494,000	239,320	57,600	.78	1.37
Story.....	3	9,600	34	11	7,100	3,900	9,600	.90	1.65
Webster.....	24	185,350	398	112	147,321	81,400	11,320	.80	1.43
Total.....	112	1,555,050	2,520	917	\$ 1,089,725	\$ 588,531	\$ 148,470		

TABLE No. 3.

*Output of coal of the counties comprising District No. 3 for the past five years.*

COUNTIES.	1895.	1896.	1897.	1898.	1899.
Adair.....	2,642	1,600	2,500	11,000	1,700
Boone.....	191,972	285,763	329,285	314,997	371,410
Dallas.....	16,503	18,701	16,781	32,400	13,600
Greene.....	38,496	10,328	17,085	21,900	22,600
Guthrie.....	11,240	10,840	11,340	16,000	16,400
Marion.....	150,351	198,554	128,019	133,980	141,780
Polk.....	334,881	415,695	573,595	707,360	790,410
Story.....	4,630	10,340	12,340	9,010	9,600
Webster.....	103,439	103,201	101,643	143,832	187,650
Total tonnage.....	853,954	1,059,022	1,201,788	1,370,459	1,555,150

There were twenty-two fatal accidents reported to this office for the Third mining district during the past biennial period. Yet the large companies and many of the individual operators are taking advantage of every improvement which conduces to the safety of their men and the property under their charge, and they seem anxious to prevent accidents. In looking over the list of fatal accidents and the evidence given by each witness testifying before a coroner's jury, I find at least four-fifths of the unfortunate victims met death by what is termed their own carelessness. I do not wish to be understood as blaming employees for all accidents that happen to them, but I do believe there should be less accidents for the amount of coal produced. In the first place the miner must put into use methods and means which common sense will dictate to him to employ for his own protection, together with the exercise of prudence and good judgment, if he expects to escape the dreadful results that we are required to report yearly. The mine foreman, while it is not his duty according to law, should know as nearly as possible the condition of each place where men are at work, especially inexperienced men and men known to be careless.



When he tells a man to timber his place, it is his duty, as mine foreman, to see that the place is made safe. He should also be courteous to his men, not forgetting to be careful and firm.

At the Des Moines Coal company's mine, at Marquissville, on July 8, 1897, at 8 o'clock P. M., Charles Bloom, 15 years of age, was killed by the descending of the north cage to the bottom of the shaft. The boy was in the act of looking down the shaft when the cage struck him, killing him instantly. He had been working at this mine with his father, but at the present time was working in the mine as trapper during the day.

On October 15th, Andrew Kron was killed by falling down the Eureka coal shaft, a distance of eighty feet. This shaft is located two and one-half miles north of the state capitol, Des Moines. A few days prior to this accident a fire occurred, burning the top works and curbing for a distance of twenty-five feet down the shaft. Mr. Kron had charge of the work of retimbering this shaft where the timbers had been burned out by the fire. There were several men working with him. While standing on the south side of the shaft, the dirt under him gave away, taking him with it to the bottom of the shaft. It was supposed, by the men working with him, that after lighting on the bottom of the shaft he died instantly. The coroner's jury report on this accident was that he met death accidentally.

Ole Sanvick came to his death on the 27th day of October, 1897, at 9 o'clock P. M., in the Boone Coal and Mining company's shaft No. 2, northwest of Boone four and one-half miles. Mr. Sanvick was a machine helper, his work being to remove the cuttings from the machine while it was at work. He was in the act of shoving back the cuttings when some coal that had been undermined, and I understand was also spragged and supposed to be safe by the machine runner, fell on him, causing his death. The coroner's jury's decision was "an unforeseen accident."

At the Des Moines Coal and Mining company's shaft No. 1, located at Marquissville, Polk county, December 18, 1897, Elsie Rhoades, a driver in the company's employ, was killed by falling from the ground landing to the bottom of the shaft, a distance of 225 feet. The supposition is, by those that were near him, that he started for the shaft at 6:50 o'clock A. M., with the intention of going down; and that he opened the door at the ground landing thinking the cage was there, which it was not, stepped into the shaft and fell to the bottom, which caused his death. The coroner's jury's decision was, "The said Elsie Rhoades came to his death by accidentally falling down the Des Moines Coal company's shaft; the same being accidental and not otherwise."

George Peterson and Gus Christenson were driving the second west entry in the Des Moines Coal and Mining company's mine, at Marquissville, Polk county, and on the evening of January 27, 1898, Mr. Peterson had two shots to tamp. He tamped one, and was in the act of tamping the other when the powder in the hole he was tamping ignited, causing a premature explosion of that shot, burning Mr. Peterson so that he died within thirty minutes after the explosion occurred. Coroner's jury's decision was, caused by a premature explosion of powder, accidental.

At Frasier, Boone county, on the 28th day of February, 1898, John A. Johnson was killed at mine No. 3, owned by the Boone Valley Coal and Railway company. The vein in this mine was worked on the longwall

system. While Mr. Johnson was undermining the coal along the face of his room, about one ton of coal which was undermined, fell on him, crushing him and causing instant death. Coroner's jury's decision was, accidental.

On March 7, 1898, at 2:30 P. M., Ole Oleson, a miner employed at the Maple Grove Coal company's mine No. 2, located in Polk county, was injured in his room by falling coal and roof, from which accident he afterwards died. He was working in a room alone. Having fired his usual shots at noon, he went out for dinner, and going back to the room to work about 1 o'clock P. M., while throwing back coal from the face to load in a car, coal and roof fell on him. Coroner's jury's decision was, death accidental, caused by falling roof.

James Husberry was killed at the Evans Coal company's mine, four and one-half miles north of Des Moines, at 9 o'clock A. M., April 27, 1898. He and another man were working at sinking below the coal to be used as a sump. They were hoisting the material out in buckets the same as they would use for sinking a shaft. While a bucket of water was being hoisted out, Mr. Husberry and his partner stepped into an entry that had been driven out from the bottom of this shaft about eight yards. While in this entry a piece of slate fell from the roof, crushing Mr. Husberry inwardly and killing him almost instantly, also injuring his partner, but not seriously. Coroner's jury's decision was, accidental, no blame being attached to anyone.

Joseph Blaske, while in the employ of the Lower Vein Coal and Mining company, at Incline, Boone county, was killed on May 3, 1898. Mr. Blaske was working in his room when a large amount of slate fell on him. He died before he was taken from under the roof. Coroner's jury's decision, accidental.

An accident which afterwards proved fatal happened on December 1, 1897, at 12:15 P. M., to Rees Griffith, a miner employed in the Glenwood Coal company's mine, located two and one-half miles south of Des Moines. While in the act of eating his dinner in the boiler room he was scalded by escaping steam and water from the company's boiler, which exploded, from which he died on December 4, 1897, at 3 o'clock P. M.

John Brunton was killed on February 15, 1899, by a fall of roof in the Clyde Coal and Mining company's mine, located near Incline, Boone county.

On March 21, 1899, Swan Johnson was killed by falling roof in a mine owned by W. D. Johnson, two miles west of Boonesboro, Boone county.

There was an accident at Gibson Coal company's mine, No. 2, on March 15th. John Lee was working in his room when a piece of slate fell, breaking his leg and injuring him internally, from which accident he died the following day at 9 o'clock P. M., being the evening of the 16th day of March, 1899.

William Timmons, a miner and employee of the Keystone Coal company, was killed April 23, 1899, at 11:55 A. M. The accident happened in his room, which was on the fourth south entry of their mine No. 1.

On March 17, 1899, Thomas Dooley was found dead under a piece of slate in his room No. 7 on first south entry in the Proctor Coal mine, south of Des Moines. He had fired two shots in the coal in his room the evening before. On the fatal morning, after going into the room to work, he loaded one car and was supposed to have been in the act of gathering coal



together when the piece of slate from the roof fell, crushing him between the slate and the floor of the room. He had plenty of props in the room, but the shots had likely knocked some of the timber out the evening before, and Mr. Dooley had failed to reset them on going to work in the morning. He was working in the room alone. John Cotton worked in the next room south of him, being room No. 8, and on the other side of his room, being room No. 6, James Haslep worked. The rooms were singly worked, there being only one man working in each room. The accident occurred about 7:40 o'clock A. M.

Edward Fredregill, a fireman in the employ of the Christy Coal company, was internally burned at 10:30 o'clock A. M., August 6, 1898, by the explosion of the company's No. 3 boiler. Mr. Fredregill was taken from the mine to Des Moines on the train, met there by Mr. Christy, and taken to Mercy hospital in Des Moines, at which place, after considerable suffering, he passed away at 5 o'clock P. M.

Thomas Thompson, a miner in the employ of Crow & Marshall in their mine located at Incline, Boone county, was working along the wall, undermining, when a piece of roof fell on him, causing internal injuries from which he died October 22, 1898.

On December 26, 1898, at 7:15 A. M., Robert Taylor, of Lehigh, Webster county, while in the employ of the Crooked Creek Coal company in its mine No. 4, was killed. Mr. Taylor was mining coal on longwall face in the next room to Floyd Ewing. The day before this accident Mr. Taylor had mined under his longwall face, and before leaving that evening he had put in several sprages under the face of coal which is customary in that kind of work. On going to work the morning of December 26th he knocked out the sprages, letting part of the coal that was undermined the previous evening fall. The coal in leaving the roof was followed by a piece of slate which was three feet long and ten inches thick, striking him on the back of the head and causing instant death. Coroner's jury's decision was, no blame attached to any one.

Lewis Lund, an employe mining coal for the Bloomfield Coal and Mining company, was killed at the company's mine No. 2 on January 4, 1899. Mr. Lund was 70 years of age. He was drawing pillars on the first east entry. While in the act of taking down some loose coal, there seemed to be a piece of slate not seen by Mr. Lund, which fell shortly after the coal was taken down, killing him instantly. The accident occurred at 10 o'clock A. M.

C. W. Hayes, a miner in the employ of the Webster County Coal and Land company, was killed January 7, 1899. Thomas Billings was working with Mr. Hayes, and, the work being longwall, Mr. Billings was mining under the coal face. While Mr. Hayes was loading the last car that evening, and was getting ready to put up props along the face of roadway, a piece of roof fell, weighing five or six hundred pounds, pinning him to the floor, crushing him inwardly, so that he died shortly after being taken out on top.

## POLK COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Power used.	Shipping or local.
Des Moines Coal and Mining Co.	Charles Morris	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
J. M. Christy Coal and Mining Co.	George Grylls	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
Gibson Coal and Mining Co.	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
Wild Rose Coal and Mining Co.	George Ramsey	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Saylor Coal and Mining Co.	D. B. Fleming	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Evans Coal and Mining Co.	L. Evans	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Western Coal and Mining Co.	Charles Lee	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Bloomfield Coal and Mining Co.	John Yarn	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Glenwood Coal and Mining Co.	Wm. Edge	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Proctor Coal and Mining Co.	Joseph Ramsey	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
West Riverside Coal and Mining Co.	John McKay	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Keystone Coal and Mining Co.	E. M. Gray	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Lake Park Coal and Mining Co.	Edw. Herdsman	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Flint Brick Coal and Mining Co.	Michael Qulnan	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Eagle Coal and Mining Co.	G. M. Holmes	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Oak Park Coal and Mining Co.	Benj. Woods	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Midway Coal and Mining Co.	C. H. Fullerton	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Beck Coal and Mining Co.	Thomas Beck	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Commerce mine	James Stiles	Commerce	Shaft	Longwall	Fan	Horse	Local
A. Merchant mine	A. Merchant	Commerce	Shaft	Longwall	Fan	Horse	Local

## BOONE COUNTY.

Boone Valley Coal and Ry. Co. No. 2	O. M. Carpenter	Boone	Shaft	Longwall	Fan	Steam	Shipping
Boone Valley Coal and Ry. Co. No. 3	O. M. Carpenter	Boone	Shaft	Longwall	Fan	Steam	Shipping
W. D. Johnson Coal and Mining Co.	W. J. Morgan	Boonsboro	Shaft	Longwall	Fan	Steam	Shipping
Lower Vein Coal and Mining Co.	Thomas Carpenter	Boone	Shaft	Longwall	Fan	Steam	Shipping
Clyde Coal and Mining Co.	O. M. Carpenter	Boonsboro	Shaft	Longwall	Fan	Steam	Shipping
Crow & Marshall	John Marshall	Boonsboro	Shaft	Longwall	Fan	Steam	Shipping
Boone Coal and Mining Co. No. 1	Thomas Carpenter	Boone	Shaft	Longwall	Fan	Steam	Shipping
Boone Coal and Mining Co. No. 2	Thomas Carpenter	Boone	Shaft	Longwall	Fan	Steam	Shipping
Zimbleman Coal and Mining Co.	George Zimbleman	Boonsboro	Shaft	Longwall	Fan	Steam	Shipping
Garden Hill Coal and Mining Co.	Andrew Heaps	Boonsboro	Shaft	Longwall	Fan	Steam	Shipping
Morgan & Canfield	W. D. Morgan	Boonsboro	Shaft	Longwall	Fan	Steam	Shipping
Wilson mine	James Wilson	Pilot Mound	Shaft	Room and pillar	Furnace	Horse	Local



## WEBSTER COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Power used.	Shipping or local.
Crooked Creek Coal Co., No. 4.....	W. O. Wilson.....	Lehigh.....	Slope...	Longwall.....	Furnace.....	Steam..	Shipping.
Crooked Creek Coal Co., No. 5.....	W. O. Wilson.....	Lehigh.....	Shaft...	Longwall.....	Fan.....	Steam..	Shipping.
Webster County Coal and L. Co., No. 1.....	John Sullivan.....	Lehigh.....	Slope...	Longwall.....	Fan.....	Steam..	Shipping.
Webster County Coal and L. Co., No. 2.....	John Sullivan.....	Lehigh.....	Slope...	Longwall.....	Fan.....	Steam..	Shipping.
Pleasant Valley Coal and Mining Co.....	Jerry Dawson.....	Kalo.....	Shaft...	Room and pillar.	Fan.....	Steam..	Shipping.
Samuel McClure Mining Co.....	Samuel McClure.....	Coalville.....	Shaft...	Room and pillar.	Furnace.....	Steam..	Shipping.
Craig Coal and Mining Co., No. 1.....	Jerry Dawson.....	Kalo.....	Slope...	Longwall.....	Fan.....	Steam..	Shipping.
Craig Coal and Mining Co., No. 2.....	Jerry Dawson.....	Kalo.....	Shaft...	Room and pillar.	Fan.....	Steam..	Shipping.
Corey Coal and Mining Co., No. 2.....	Rees Stephens.....	Lehigh.....	Shaft...	Longwall.....	Fan.....	Steam..	Shipping.
Gleason Coal and Mining Co.....	James Gleason.....	Coalville.....	Shaft...	Longwall.....	Furnace.....	Horse..	Local.
Halder Creek Coal Co., No. 1.....	Isaac Rhodes.....	Coalville.....	Slope...	Longwall.....	Furnace.....	Horse..	Local.
Halder Creek Coal Co., No. 2.....	Isaac Rhodes.....	Coalville.....	Slope...	Longwall.....	Furnace.....	Horse..	Local.
Martin mine.....	Rante Martin.....	Coalville.....	Slope...	Longwall.....	Furnace.....	Horse..	Local.
Davis Coal Co.....	Alford Davis.....	Coalville.....	Slope...	Longwall.....	Furnace.....	Horse..	Local.
Collins mine.....	Frank Collins.....	Coalville.....	Shaft...	Longwall.....	Fan.....	Steam..	Shipping.
Johnson Coal Co.....	David Johnson.....	Kalo.....	Shaft...	Longwall.....	Fan.....	Steam..	Shipping.
Mills Coal Co.....	Thomas McClellan.....	Kalo.....	Slope...	Longwall.....	Furnace.....	Horse..	Local.
Carlson Coal Co.....	Thomas Foster.....	Kalo.....	Slope...	Longwall.....	Furnace.....	Horse..	Local.
Bennett Coal Co.....	Wesley Burnett.....	Kalo.....	Slope...	Longwall.....	Furnace.....	Horse..	Local.
Johnson mine.....	James Johnson.....	Kalo.....	Slope...	Longwall.....	Furnace.....	Horse..	Local.
Porter & Miller.....	James Porter.....	Kalo.....	Slope...	Longwall.....	Furnace.....	Horse..	Local.
Johnson mine.....	Erick Johnson.....	Kalo.....	Slope...	Longwall.....	Furnace.....	Horse..	Local.
Timmons mine.....	Hugh Timmons.....	Fort Dodge.....	Shaft...	Longwall.....	Furnace.....	Horse..	Local.
Owen mine.....	Frank Owen.....	Fort Dodge.....	Shaft...	Longwall.....	Furnace.....	Horse..	Local.

## MARION COUNTY.

Wild Rose Coal and Mining Co.....	George Ramsey.....	Des Moines.....	Shaft...	Room and pillar.	Fan.....	Steam..	Shipping.
Black Swan Coal and Mining Co.....	Thomas Beck.....	Swan.....	Shaft...	Room and pillar.	Fan.....	Steam..	Shipping.
Booth Coal and Mining Co.....	Harry Booth.....	Flagler.....	Slope...	Room and pillar.	Furnace.....	Horse..	Shipping.
York Coal and Mining Co.....	G. W. York.....	Hamilton.....	Shaft...	Room and pillar.	Fan.....	Steam..	Shipping.
Oak Hill Coal and Mining Co.....	Samuel Rollings.....	Flagler.....	Slope...	Room and pillar.	Fan.....	Steam..	Shipping.
Otley Coal and Mining Co.....	Peter Runnells.....	Otley.....	Shaft...	Room and pillar.	Fan.....	Steam..	Shipping.
Hawkeye Coal and Mining Co.....	Samuel Rollins.....	Flagler.....	Shaft...	Room and pillar.	Fan.....	Steam..	Shipping.
Fair Coal and Mining Co.....	M. Hawkins.....	Hamilton.....	Shaft...	Room and pillar.	Fan.....	Steam..	Shipping.
Evans & Clark.....	H. Evans.....	Hamilton.....	Shaft...	Room and pillar.	Fan.....	Steam..	Shipping.

Hamilton Coal Co.....	J. T. Jones.....	Hamilton.....	Shaft...	Room and pillar.	Furnace.....	Horse..	Local.
J. A. Boudinot mine.....	J. A. Boudinot.....	Hamilton.....	Shaft...	Room and pillar.	Furnace.....	Steam..	Shipping.
Clark & York mine.....	Thomas Clark.....	Hamilton.....	Shaft...	Room and pillar.	Furnace.....	Steam..	Shipping.
O. K. Coal Co.....	J. A. J. Powers.....	Bussey.....	Shaft...	Room and pillar.	Furnace.....	Steam..	Shipping.
Eagle mine.....	J. A. J. Powers.....	Bussey.....	Slope...	Room and pillar.	Furnace.....	Horse..	Shipping.
John Youser.....	John Youser.....	Marysville.....	Slope...	Room and pillar.	Furnace.....	Horse..	Local.
David Fry.....	David Fry.....	Marysville.....	Slope...	Room and pillar.	Furnace.....	Horse..	Local.
Crawford & Miller mine.....	Crawford & Miller.....	Otley.....	Slope...	Room and pillar.	Furnace.....	Horse..	Shipping.
Hugh McNish.....	Hugh McNish.....	Monroe.....	Slope...	Room and pillar.	Furnace.....	Horse..	Local.
Success Coal Co.....	John Crookham.....	Dunreath.....	Slope...	Room and pillar.	Furnace.....	Horse..	Shipping.

## GUTHRIE COUNTY.

Renslow Coal Co.....	Fred Renslow.....	Fansler.....	Shaft...	Longwall.....	Furnace.....	Horse..	Local.
Caleb Thompson mine.....	Caleb Thompson.....	Fansler.....	Shaft...	Longwall.....	Furnace.....	Horse..	Local.
Scott Bros.....	M. Scott.....	Fansler.....	Shaft...	Longwall.....	Furnace.....	Horse..	Local.
Thomas mine.....	Harry Thomas.....	Fansler.....	Shaft...	Longwall.....	Furnace.....	Horse..	Local.
Merchant mine.....	William Merchant.....	Fansler.....	Shaft...	Longwall.....	Furnace.....	Horse..	Local.
June Butler.....	June Butler.....	Fansler.....	Shaft...	Longwall.....	Furnace.....	Horse..	Local.
Phil Raynor.....	Phil Raynor.....	Fansler.....	Shaft...	Longwall.....	Furnace.....	Horse..	Local.
Rittner mine.....	William Rittner.....	Fansler.....	Shaft...	Longwall.....	Furnace.....	Horse..	Local.
Hughes mine.....	Site T. Hughes.....	Fansler.....	Shaft...	Longwall.....	Furnace.....	Horse..	Local.
Rees mine.....	D. B. Rees.....	Panora.....	Shaft...	Longwall.....	Furnace.....	Horse..	Local.
Buckeye shaft.....	Walker Embrey.....	Panora.....	Shaft...	Longwall.....	Furnace.....	Horse..	Local.
White Ash Coal and Mining Co.....	Morris Canary.....	Panora.....	Shaft...	Longwall.....	Furnace.....	Horse..	Local.

## DALLAS COUNTY.

Anderson Coal Co.....	J. W. Anderson.....	Dawson.....	Shaft...	Longwall.....	Fan.....	Steam..	Local.
Platt Pressed and Fire Brick Co.....	J. L. Platt.....	Van Meter.....	Shaft...	Longwall.....	Fan.....	Steam..	Local.
James Tudor.....	James Tudor.....	Dawson.....	Shaft...	Longwall.....	Furnace.....	Steam..	Local.
Mills Coal Co.....	John Mills.....	Linden.....	Shaft...	Longwall.....	Fan.....	Horse..	Local.
Morris Coal Co.....	Joseph Topping.....	Linden.....	Slope...	Longwall.....	Furnace.....	Horse..	Local.

## STORY COUNTY.

North Star Coal and Mining Co.....	John Marshall.....	Summit.....	Shaft...	Room and pillar.	Fan.....	Steam..	Shipping.
Story County Coal Co.....	Wm. Benson.....	Summit.....	Shaft...	Room and pillar.	Fan.....	Steam..	Shipping.
Zenorville mine.....	J. York.....	Gilbert.....	Shaft...	Room and pillar.	Furnace.....	Horse..	Local.
Hutchinson Bros.....	Hutchinson Bros.....	Gilbert.....	Shaft...	Room and pillar.	Furnace.....	Horse..	Local.



## POLK COUNTY.

Polk county is the banner county as a coal producer in the Third mining district. It is one among three of the largest coal producing counties in the state. The output of all grades of coal in this county during the first half of our biennial period ending June 30, 1898, was 707,360 tons. The output for the last half of the biennial period ending June 30, 1899, was 790,760 tons, which makes an increase of 83,400 tons over the preceding year. This output of coal gives employment to 1,320 men in and around the mines. The mines of this county may be divided in two classes, namely, shipping and local. The shipping mines of this county produce four-fifths of the entire output. Formerly in this county the largest output of coal came from South Des Moines, or within a radius of one and one-half miles of Sevastopol; but as the mines in this section became exhausted drilling began quite extensively in other parts of the county, and during the years 1880 to 1885, there were a number of large mines opened up near the northeast city limits of Des Moines, where quite an extensive business was done for several years. Later developments showed coal in paying quantities east of Four Mile creek, where there are still three large mines in operation. Coal was also found near Saylor and along the Des Moines river northwest of the city limits, where quite a large number of local mines are in operation. The most important mines, with their location, are as follows: The Christy Coal and Mining company's mine, located on the Chicago, Rock Island & Pacific railway, employing an average of 235 men in and around the mine; the Carbondale Coal and Mining company's mine, located five miles east of Des Moines on a switch from the Chicago, Rock Island & Pacific railway. This company gives employment to about 227 men in and around the mine. Gibson Coal and Mining company's mine is situated one-half mile east of the Christy mine, on the Chicago, Rock Island & Pacific railway, and employs about 100 men. The mines located on the Chicago & North-Western railway are the Des Moines Coal and Mining company's mine, which company has in its employ something like 275 men, and is located four and one-half miles north of Des Moines. There is a switch branching off of the Chicago & North-Western railway near Saylorville and running west two miles, where the Saylor Coal and Mining company has opened up a new mine, the same being 215 feet deep. It is among the best equipped mines in the state, and promises to give employment to a large number of men. The Maple Grove Coal and Mining company has its mine No. 2, three miles northeast of the capitol, on the Chicago Great Western railway, and employs ninety men. North of the Maple Grove mine is located the Western mine. Two miles east of Saylorville the Evans Coal and Mining company has opened up within the last fifteen months a new mine. It employs 135 men.

The local mines in this county are well equipped with steam hoisting appliances, and while they are termed local mines, for the reason that they are not located on a railroad, some do quite an extensive railway business, hauling the product to the cars in wagons. The most important local mines are: The Bloomfield Coal and Mining company's mine No. 2, located on the northern limits of the city of Des Moines, and during the winter seasons giving employment to 150 men. The Keystone Coal and Mining company's mines No. 1 and No. 2 are located west of the Bloomfield mine three-fourths of a mile, and give employment to 100 men. West Riverside mine No. 1 is located three-fourths of a mile north of Keystone No. 2. Eagle Coal and Mining company's mine No. 1 is located near the Keystone No. 2. The Flint Brick and Mining company's mine No. 1 is situated on the Des Moines street railway, west of Highland Park three-fourths of a mile. The Oak Park Coal and Mining company's mine No. 1 is located one-half mile north of the Flint Brick coal mine. The Lake Park Coal company's mine No. 1 is located south of the Flint Brick mine one-half mile and is on the Des Moines Street Railway company's car line. The Glenwood Coal and Mining company's mine is situated two miles southeast of Sevastopol. There are several other small local mines located in various parts of the county.

## BOONE COUNTY.

Boone county has long been known as a large coal producer, coal having been mined within a radius of three and one-half miles of Boone for more than thirty years. The first shipping mines were opened along in the early seventies. Since that time there have been large, well equipped mines continually in operation. Later drillings showed workable coal north of Boone, known now as Frasier, where there are two large, modern equipped mines, controlled by the Boone Valley Coal and Railway company, having a connection with the Minneapolis & St. Louis railway, which gives them a good market for their product. The most important mines in and around Boonsboro are: The W. D. Johnson plant, one and one-half miles northwest, located on a switch from the Chicago & North-Western. The Zimbleman mine, one mile west, is located on same branch of the Chicago & North-Western. The Garden Hill Coal company has a mine north one-half mile above the Zimbleman mine. There are five or six mines at Milford, which is northwest of Boonsboro three and one-half miles, from which mines the coal is handled by the Chicago & North-Western railway. The following companies have mines located there: The Boone Coal and Mining company, Crow & Marshall and the Clyde Coal company, which companies have their general offices in Boone. There are several local mines located in different parts of the county.

## WEBSTER COUNTY.

The extreme northwest limit of workable coal yet developed lies within the borders of Webster county, which gives those connected with mining



interests a decided advantage as regards prices and railway rates over those farther away from the northwest market.

Webster county has twenty-five mines—twelve shipping and thirteen smaller mines. They produced, during our last biennial period, ending June 30, 1899, 331,482 tons of coal, this being considerably the largest output for any two years since the biennial report containing the years 1882 and 1883. The coal varies in thickness from two and one-half feet to four feet, and is a very good quality. Lehigh is, at the present time, the largest coal-producing point in the county. The largest and most important mines here are the Crooked Creek Coal company's mines, located on the company's own railway, running from Webster City to the mines, one-half mile below Lehigh, and the Webster County Coal and Land company's mine, located on the Mason City & Ft. Dodge railway. There are several shipping mines within a radius of one and one-half miles of Coalville, located on a switch from the Mason City & Ft. Dodge railway; also, the Pleasant Valley Coal company's mine, Collins Bros.' mine, McClure Coal company's mine and the Gleason Coal company. The last named sunk and equipped a new shaft. Kalo, seven miles southeast of Ft. Dodge, was some years ago a very large shipping point, but the coal seems to have been in small pockets cropping out in the bluffs of the river, and when it was worked back any great distance the roof seemed to get soft or sandy, which under such circumstances is very expensive to work, even if possible. The Craig Coal company has been mining coal here for a number of years, and still has two mines here, located on the Minneapolis & St. Louis railway, which gives them a good outlet for their product. The Mills Coal company and the Carlson Coal company have mines near the Craig Coal company's mines.

#### MARION COUNTY.

Marion county joins some of the largest coal-producing counties we have, and is underlaid with a number of large basins of coal, which have from time to time been well tested by competent drillers. But, owing to the fact that railway facilities are not as near to the deposits as in some other localities, some of the largest basins of coal have been left undeveloped, although the large amount of prospecting being done the past year and the interest taken by some of our largest operators indicates that Marion will greatly increase her output of coal during the next year, for I am satisfied it has the coal, and all that is necessary to produce it is for capital and labor to take hold; which done, there is no doubt that Marion county can be placed in the front ranks as a coal-producing county of Iowa.

At the present time the largest coal-producing points, where also are the most mines, are Hamilton and Bussey. At Hamilton the York Coal & Mining company has finished sinking its main shaft a distance of 168 feet, and it is now at work putting down an air and escape shaft. This mine is located between the Chicago, Burlington & Quincy and the Wabash railways, having at present a switch from the Wabash. There are quite a number of local mines within a radius of three miles of Hamilton that do quite a shipping business during the year, hauling their product by wagon.

At Bussey there is quite a large shipping mine known as the O. K. Coal company. The company has its own locomotive engine to move its product from the mine, one and one-half miles west of Bussey, to the Chicago, Burlington & Quincy railway. There are several mines around Flagler. The Hawkeye Coal company, working from twenty to fifty men; the Harry Booth mine, working fifteen to thirty-five men, and several other mines, working from five to twenty men. In the north part of the county there are two shipping mines. The Wild Rose Coal company has one mine at Morgan Valley working from twenty-five to eighty men, and at Dunreath the Success Coal company has its mines.

#### GREENE COUNTY.

Greene county some years ago ranked among the large coal-producing counties, but later years have gradually decreased her output until at present there are only a few local mines doing any business.

#### GUTHRIE COUNTY.

Guthrie county has some twenty mines, all told. The coal is exposed in several places along the Raccoon river, running diagonally through this county. Quite a number of the mines being worked are slopes, the balance shafts. The most important coal-producing points are Fansler, Bayard and Panora. All the mines in this county are classed as local mines, some working the year round, but most of them only during the cold weather, at which time those who have their mines in shape to do business have the trade and make money; while on the other hand, those running mines and waiting till the trade comes before they get ready for it, have neither the men at work nor a place to put them; because when a farmer, or one wanting coal, drives out to a mine and there is no coal on hand, he drives where there is some on hand, and he tells his neighbors where they can get a load of coal any time they go to the place. This is one reason why railways haul so much coal into counties having only local mines, and the reason their home production is so small.

#### DALLAS COUNTY.

Dallas county formerly produced considerably more coal than at present. It has two shipping mines. The Van Meter Coal company has a mine located at Van Meter, on the Chicago, Rock Island & Pacific railroad, where, having a brick yard in connection, it consumes its own coal. Dawson Coal company has a mine at Dawson, located on the Chicago, Milwaukee & St. Paul railway. There are several small local mines located near Linden. The coal averages in thickness about two and one-half feet, and is worked on the longwall system. The coal measures lie deeper than in most coal-producing counties, which is one reason why there are no new developments.



STORY COUNTY.

Story county has three mines, one shipping and two locals. The shipping mine is located at Summit, on a switch from the Chicago & North-Western railway, and is owned by the Story County Coal company, which has in its employ from twenty to sixty men. The work is on the room and pillar system. The local mines are located near Zanorville, three and one-half miles west of Gilbert.

ADAIR COUNTY.

The vein of coal being worked and the prospecting that has been done show the first workable vein of coal lies at a depth of from 240 to 350 feet. There is at present only one mine in operation, the same being a shaft 240 feet in depth. The coal is worked on the longwall plan. This company gives employment during the winter season to from ten to fifteen men.

FATAL ACCIDENTS.

Table showing the number and cause of all fatal casualties in District No. 3 for the biennial period ending June 30, 1899.

DATE.	NAME OF DECEASED.	OCCUPATION.	CAUSE OF CASUALTY.	NAME OF COMPANY OR FIRM.	WHERE LOCATED.
July 8, 1897	Charles Bloom.....	Trapper.....	Caught in cage.....	Des Moines Coal and Min. Co.	Marquissville.
October 15, 1897	Andrew Kron.....	Miner.....	Fell down shaft.....	Eureka Coal Co.....	Des Moines.
October 23, 1897	Ole Sandvick.....	Miner.....	Falling coal.....	Boone Coal and Mining Co...	Incline.
December 24, 1897	Rees Griffith.....	Miner.....	Explosion of boiler.....	Glenwood Coal and Min. Co..	Des Moines.
December 18, 1897	Elsie Rhodes.....	Miner.....	Fell down shaft.....	Des Moines Coal and Min. Co.	Marquissville.
January 27, 1898	George Peterson.....	Miner.....	Explosion of powder.....	Des Moines Coal and Min. Co.	Marquissville.
February 23, 1898	John A. Johnson.....	Miner.....	Falling coal.....	Boone Val. Coal and R. R. Co	Fraser.
March 7, 1898	Ole Oleson.....	Miner.....	Falling roof.....	Maple Grove Coal and M. Co.	Des Moines.
April 27, 1898	Joseph Handbury.....	Miner.....	Falling roof.....	Evans Coal Co.....	Delaware Tp., Polk Co.
May 3, 1898	Jacob Blaske.....	Miner.....	Falling roof.....	Clyde Coal Co.....	Incline.
August 6, 1898	Edward Fredregill.....	Miner.....	Boiler explosion.....	Christy Coal and Mining Co..	Four Mile Tp., Polk Co.
October 22, 1898	Thomas Thompson.....	Miner.....	Falling roof.....	Crow & Marshall.....	Incline.
December 26, 1898	Robert Taylor.....	Miner.....	Falling roof.....	Crooked Creek Coal Co.....	Lehigh.
January 5, 1899	Lewis Lund.....	Miner.....	Falling roof.....	Bloomfield Coal Co.....	Des Moines.
January 5, 1899	Charles Wesley Hayes..	Miner.....	Falling roof.....	Webster Co. Coal and L. Co..	Lehigh.
February 15, 1899	Johart Bruton.....	Miner.....	Falling roof.....	Clyde Coal Co.....	Incline.
March 6, 1899	A. R. Moore.....	Miner.....	Fell down shaft.....	Saylor Coal Co.....	Saylor Tp., Polk Co.
March 15, 1899	John Lee.....	Miner.....	Falling roof.....	Gibson Coal Co.....	Four Mile Tp., Polk Co.
March —, 1899	Thomas Dooley.....	Miner.....	Falling roof.....	Procter Coal Co.....	Des Moines.
March 21, 1899	Swan Johnson.....	Miner.....	Falling roof.....	W. D Johnson.....	Boonsboro.
April 23, 1899	William Timmins.....	Miner.....	Falling roof.....	Keystone Coal Co.....	Des Moines.



## NON-FATAL ACCIDENTS.

Table showing non-fatal casualties in the Third Mining District.

DATE.	NAME.	OCCUPATION.	CHARACTER OF INJURY.	CAUSE OF ACCIDENT.	RESIDENCE.
August 27, 1897	John Johnson.	Miner	One leg broken.	Falling roof.	Marquisville.
August 27, 1897	John Eklund.	Miner	Jaw broken.	Falling roof.	Marquisville.
January 19, 1898	John Johnson.	Miner	Face and shoulder bruised.	Powder explosion.	Marquisville.
March 12, 1898	Fred Burham.	Miner	Right leg broken.	Falling coal.	Marquisville.
April 12, 1898	Ed Ash.	Miner	Back bruised.	Falling roof.	Marquisville.
June 11, 1898	John Holmberg.	Miner	Slightly bruised.	Falling roof.	Des Moines.
June 8, 1898	Elmer McCarthy.	Driver.	Wrist bones broken.	Elbow struck roof.	Marquisville.
June 28, 1898	Thomas Hamilton.	Nine foreman.	Breast and shoulder bruised.	Falling roof.	Des Moines.
July 9, 1898	Frank Gordon.	Trackman.	Right leg broken.	Struck by crossbar.	Swal.
August 4, 1898	Hans Norman.	Miner	Shoulder blade broken.	Struck safety catch.	Marquisville.
August 9, 1898	Frank Konyan.	Day man below.	Two ribs broken.	Falling roof.	Incline.
September 7, 1898	Gus Isaacson.	Miner	Compound fracture of leg.	Falling roof.	Des Moines.
October 23, 1898	Roy Jones.	Trapper.	Left arm broken.	Jumped in moving car.	Marquisville.
December 22, 1898	Joe Adam.	Miner	Back injured.	Falling roof.	Smoky Hollow.
December 23, 1898	J. A. Hammans.	Miner	Head, neck and left arm burned.	Powder shot.	Carbondale.
December 23, 1898	Samuel Hunt.	Shoveler.	Right leg badly crushed.	Falling coal.	Incline.
December 23, 1898	George Sinker.	Miner	Left arm broken.	Falling roof.	Marquisville.
December 27, 1898	Hans Anders n.	Miner	Slightly bruised.	Slip in roof.	Des Moines.
March 17, 1899	Charles Broad.	Miner	Slightly bruised.	Falling roof.	Des Moines.

## COAL OUTPUT FOR BIENNIAL PERIOD.

The amount of coal produced in Iowa during the last biennial period, ending June 30, 1899, as follows:

YEARS.	DISTRICT NO. 1.	DISTRICT NO. 2.	DISTRICT NO. 3.
1898 .....	1,354,350	1,672,913	1,370,459
1899 .....	1,520,467	1,873,793	1,555,050
Total.....	2,874,817	3,546,706	2,925,509

Total tons for the state, 1898..... 4,397,722  
Total tons for the state, 1899..... 4,949,310

Average number of miners and other employes working in and around the mines during the last biennial period:

District No. 1.....	3,930
District No. 2.....	3,435
District No. 3.....	3,440
Total .....	10,805

Making an average of 432 tons of coal for each person employed.

## AMOUNT OF COAL MINED IN IOWA SINCE 1881.

YEARS.	DISTRICT NO. 1.	DISTRICT NO. 2.	DISTRICT NO. 3.	TOTALS.
1881.....	845,600	1,426,744	990,430	3,262,774
1882.....	940,000	1,258,146	1,010,000	3,208,146
1883.....	1,099,503	1,470,024	1,413,419	3,989,946
1884.....	1,040,895	1,413,811	1,447,585	3,902,291
1885.....	1,156,224	1,231,983	1,194,469	3,582,656
1886.....	1,204,433	1,488,200	900,741	3,593,374
1887.....	1,426,841	1,645,978	791,071	3,863,890
1888.....	1,528,967	1,663,206	931,727	4,123,900
1889.....	1,395,158	1,461,518	896,064	3,752,740
1890.....	1,314,767	1,598,950	1,060,787	3,974,504
1891.....	1,136,190	1,533,496	1,051,295	3,720,981
1892.....	1,380,880	1,695,735	970,884	4,047,500
1893.....	1,697,215	1,784,800	1,132,857	4,614,872
1894.....	1,397,631	1,462,626	1,643,934	3,778,691
1895.....	994,051	1,347,850	853,952	3,195,853
1896.....	980,768	1,476,700	1,050,022	3,525,490
1897.....	1,025,706	1,572,240	1,201,788	3,799,734
1898.....	1,354,350	1,672,913	1,370,459	4,442,222
1899.....	1,520,467	1,873,793	1,555,050	4,949,310
Total.....	21,723,027	29,285,673	18,634,204	69,642,904

Within the borders of the United States, and during the year ending December 31, 1898, there were in operation 2,691 coal mines, not including mines working less than ten men. The average production of all grades



of coal for each mine was about 59,980 tons, giving employment to 248,960 men in and around the mines, who worked on an average 198 days. The amount of coal produced per day for each man employed was three and one-tenth tons, mine run.

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

10 A. M., MARCH 7, 1898.

1. 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. The written examination will consist of twenty-eight questions, and will be given in four sections, the board holding two sessions daily, of three hours each. 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. 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. 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.

5. 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.

6. Each candidate must interpret the meaning of the written questions according to his own judgment. No information of this kind will be given by the board.

7. 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.

8. Questions not answered will count zero.

9. All candidates whose examination (written or oral) shall show an average of 80 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.

10. No applicant for examination will be registered or received after the date and hour above given.

February 17, 1898.

FLOYD DAVIS,  
Secretary.

WRITTEN EXAMINATION—FIRST SESSION, MARCH 7, 1898.

1. What is the reading of the water-gauge, when the pressure producing ventilation is 66 ozs. per square foot?

2. If the ventilating pressure at the surface is 65 lbs. per square inch, and at the bottom of a shaft 66.5 lbs. per square inch, how deep is the shaft?

3. If 24,000 cubic feet of air circulate through a mine when the water-gauge is 5-10 inch, what volume will circulate through it when the water-gauge reads 3 inches?

4. If the water-gauge reads 13 inches when the ventilating fan makes 75 revolutions per minute, what will be the reading of the water-gauge when the fan revolves 100 times per minute?

5. How many foot pound units of work are performed in raising a weight of 927 lbs. through a vertical space of 290 feet?

6. What weight can be moved at the rate of 8 feet per minute up an inclined plane, rising 12 feet in 163 feet of its length, by a force of 230 lbs. moving with a velocity of 75 feet per minute?

7. A mine is ventilated by three airways, A, B and C. When 6,000 cubic feet of air per minute is given to the mine, A receives 1,500, B 2,000 and C 2,500 cubic feet. If 75,000 cubic feet per minute is given to the same mine, how will the air be distributed?

WRITTEN EXAMINATION—SECOND SESSION, MARCH 8, 1898.

8. What is the specific gravity of a material, a cubic foot of which weighs 2,800 pounds?

9. How many horse power are required to ventilate a tramway of 100 square feet area, with an air current having a velocity of 600 feet per minute, when the water-gauge reads 1 inch?

10. The engine of a ventilating fan of an airway, 10 feet square and 600 feet long, is 40 horse power. If the water-gauge registers 1.5 inches, what is the efficiency of the fan? and what quantity of air is forced through the airway?

11. A ladder 46 feet long when standing in the street will reach 26 feet high if turned against a building on one side, and 35 feet high if turned to the building on the other side of the street. How far apart are the buildings?

12. Give the dimensions of two airways whose perimeters are square, so that one may have  $1\frac{1}{2}$  times the area of the other.

13. What should be the area of an airway receiving 24,000 cubic feet of air per minute, that it may have the proper velocity of current passing through it?



14. In a certain mine which is to be closed temporarily, all water is removed at time of suspension. It remains closed for  $10\frac{1}{2}$  days, and then requires 6 days' pumping of 24 hours each to remove all the water. From these facts, how many hours each day of 24 hours must the pump be operated to keep out the water?

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WRITTEN EXAMINATION—THIRD SESSION, MARCH 8, 1898.

15. If a pressure of 10 lbs. produces 20,000 cubic feet of ventilating air per minute in a mine, what volume of air will a pressure of 12 lbs. produce?

16. What volume of air should you get from a fan of 50 per cent efficiency, propelled by a 30-horse-power engine, when the water-gauge stands at 3.3 inches?

17. With furnace ventilation, the downcast shaft of a certain mine is  $65^{\circ}$  Fahr. and the upcast is  $140^{\circ}$  Fahr. If the shafts are 150 feet deep, what is the motion column?

18. If the velocity of an air current is 375 feet per minute, and the area of the air passage is 48 square feet, what volume of air passes each minute?

19. If the resistance from friction on an inclined plane is 20 lbs. per ton, find the work in moving 2 tons up the plane, a distance of 100 feet, when the rise is 1 foot in 25 feet.

20. The total length of the arm of a safety-valve is 40 inches, and the distance between the valve and fulcrum is 12 inches. The diameter of the valve is 4 inches, and weight of valve and its stem is 15 lbs. The arm is of uniform dimensions and weighs 10 lbs. The weight at the end of the arm is 40 lbs. To what pressure per square inch will the boiler be subjected before the safety-valve will open?

21. What horse-power is required to propel a fan making 40 revolutions that will produce 80,000 cubic feet of air per minute, when the water-gauge stands at 2 inches? If the volume of air be increased to 100,000 cubic feet, what then will be the speed of the fan, horse-power required and reading of water-gauge?

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WRITTEN EXAMINATION—FOURTH SESSION, MARCH 9, 1898.

22. When the water-gauge reads 2.3 inches, what pressure does that indicate per square foot of surface?

23. When water can be raised 33 feet in an absolutely perfect suction pump, what is the reading of the mercurial barometer?

24. In an airway 3,600 yards long, 6 feet high, and 9 feet wide, what is the rubbing surface per square foot of section?

25. An incline to a mining shaft rises 2 inches in a yard. A load of 60 cars of 10 cwt. each is drawn up this by an engine. What strength of rope is required?

26. When the efficiency of a fan is 60-horse power, and the water-gauge stands at 2.1 inches, what volume of air should be set in circulation per minute?

27. If the water-gauge reads 1.5 inches when the velocity of the air-current is 600 feet per minute, what will be the speed of the air-current when the water-gauge reads 2.6 inches?

28. Draw a map of an ideal mine, having a capacity of 400 tons per day, showing the system of ventilation, doors, stoppings, etc.