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THIRD BIENNIAL REPORT  
OF THE  
STATE  
INSPECTOR OF COAL MINES  
OF THE  
STATE OF COLORADO.

FOR THE YEARS OF 1887-88.



DENVER:  
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*To His Excellency,*

ALVA ADAMS,

*Governor of Colorado:*

HON. SIR—In compliance with the requirements of a law creating the inspection of coal mines, I have the honor, as Inspector, to present to you the third biennial report of this department.

The last legislature passed a bill authorizing the Inspector to appoint an assistant to aid him in the performance of the duties of the office, which had reached such proportions that it was next to an impossibility for the Inspector to accomplish the entire routine of such duties without assistance. After mature consideration as to the gentleman I should select for the position, my conclusions were, that a man who himself was a practical miner and identified with the interests of the coal miners, would be best fitted for the position. I therefore appointed Mr. L. S. Jones, who at once entered earnestly upon the discharge of his duties, relieving me of a large share of the inspection work in the mines.

I sincerely thank him for such an impartial and faithful performance of the work assigned to him.

It affords me much pleasure to state that many improvements in the way of safeguards for the further protection of the miners, have been put in force, in accordance with the requirements of the law, during the last two years.

Hoping that this report will meet with your approval, I have the honor to be, sir,

Yours faithfully,

JOHN MCNEIL,

*State Inspector of Coal Mines.*



## Coal Production.

The following is a summary of the coal statistics of the State for a number of years:

| <i>Years.</i>  | <i>Tons.</i> |
|----------------|--------------|
| 1873 . . . . . | 69,977       |
| 1874 . . . . . | 87,372       |
| 1875 . . . . . | 98,838       |
| 1876 . . . . . | 117,666      |
| 1877 . . . . . | 160,000      |
| 1878 . . . . . | 200,630      |
| 1879 . . . . . | 322,732      |
| 1880 . . . . . | 375,000      |
| 1881 . . . . . | 706,744      |
| 1882 . . . . . | 1,061,479    |
| 1883 . . . . . | 1,220,593    |
| 1884 . . . . . | 1,130,024    |
| 1885 . . . . . | 1,398,796    |
| 1886 . . . . . | 1,436,211    |
| 1887 . . . . . | 1,791,735    |
| 1888 . . . . . | 2,185,477    |

Production of coal for year 1887, by counties, is as follows:

| <i>Counties.</i>                                     | <i>Tons.</i> |
|--|--------------|
| Las Animas (including coal made into coke) . . . . . | 506,540      |
| Fremont . . . . .                                    | 417,326      |
| Boulder . . . . .                                    | 297,338      |
| Gunnison (including coal made into coke) . . . . .   | 243,122      |
| Huerfano . . . . .                                   | 131,810      |
| Weld . . . . .                                       | 39,251       |
| El Paso . . . . .                                    | 47,517       |
| Garfield (including coal made into coke) . . . . .   | 26,000       |
| Pitkin . . . . .                                     | 4,000        |
| La Plata (including coal made into coke) . . . . .   | 22,880       |
| Park . . . . .                                       | 23,421       |
| Arapahoe . . . . .                                   | 16,000       |
| Jefferson . . . . .                                  | 12,000       |
| Douglas . . . . .                                    | 3,500        |
| Dolores . . . . .                                    | 1,000        |
| Total . . . . .                                      | 1,791,735    |

## REMARKS.

That the presence of fine coal dust in quantities throughout a mine is an *important factor* in propagating the flames of a small or local explosion of carbureted hydrogen gas into a general one of gigantic proportions, is a *too well* established fact. The dust is swept before the blast and must undergo combustion; this, in itself, *does* generate gases, and prolongs a living mass of flame just as long as fine coal dust is supplied to feed the fire on its route of death and destruction. Then, again, to meet on its way such large quantities of powder as is now commonly kept in *our* mines would surely give *terrific* force to the already deathly agent in its ruthless blast.

I feel quite sure that if our honorable members of the Legislature now in session could only visit some of our large mines (and which are yet in their infancy) on the first days of any one month, and keep account of the vast number of 25-pound kegs of powder shouldered into them, that it would not require any force of argument from the inspector to have them pass this additional section to our mining law.

As a rule, the quality of the coal in our fiery mines is of a highly bituminized character. Probably there is no place in the world where the coal dust is more combustible or more rapid and complete in its combustion than that of the coking coals of Garfield county. At a new mine near New Castle, which consists of a drift 500 feet, with a few stopes driven from it, the coal dust there was such a source of danger that the miners became afraid to fire shots and remain in the mine, for if such shots should prove to be "flying" ones, or to blow out the tamping, they were almost sure to set the dust on fire. The superintendent, seeing that danger was immi-

ment, gave orders to the foreman that sufficient fuse should be put to all shots so that all the workmen *would* get out of the mine before the shots would go off. Such orders were carried out, and all went well until the third day of December, 1888. (See reports on explosions in another part of this report.) On that date, as usual, the men retired from the mine before the shots went off. But about ten men stood at the entrance of the tunnel to count the number of shots to know that all went off.

Immediately after the report of the second shot there was heard a rushing sound, and before the men could get out of the way they were caught in the blast. A carpenter outside, and in front of the tunnel, was instantly killed, two others have since died from injuries received, and others were seriously injured. This *all* occurred with the apparent absence of gas. None could be detected either before or after these shots were fired. But, although I have been unable to detect any "blowers" or accumulations of gas there, yet I am satisfied that the same is being given off from the veins to a degree, and feel confident that the prolonged flames arising there from shot-firing is caused by the gas, which is just then given off more freely as the new surface is being exposed by the removal of the quantities of coal by the blast

I believe that the introduction of the additional section recommended will arrest a source of danger imminent in some of our coal mining districts.



## LIST OF FATAL ACCIDENTS—1887.

February 23—James Pestona, Francisco Scanzoni and Frank Conway, all at El Moro mine, C. C. & I. Co., Las Animas county, killed by a fall of top coal.

April 15—Frank Winn, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, killed by a fall of slate.

April 26—Edward Cole, at Rockvale mine No. 4, C. C. Co., Fremont county, killed by a fall of rock.

May 9—Martina Giamo, at Cameron mine, C. C. & I. Co., Walsenburg, Huerfano county, killed by a fall of slate.

August 2—Joseph Heckler, at Como mine No. 1, U. C. Co., Park county, killed by a fall of coal.

August 5—Peter Burns, at Crested Butte mine, C. C. & I. Co., Gunnison county, killed by a fall of slate.

August 31—Stephen Casano, rope runner at Como mine No. 1, Park county, killed by being thrown from an ascending train of cars, and falling four hundred feet down the slope, which incline is fifty degrees.

September 3—Andrew Dyke, at Starkville mine, T. C. & C. Co., Las Animas county, injured by a fall of slate and died September 5.

October 5—Vincent Boyer, at Rockvale mine No. 5, C. C. C. Co., Fremont county, killed by a fall of slate.

November 14—Antonia Dijacimo, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, killed by premature blast.



## LIST OF NON-FATAL ACCIDENTS—1887.

January 3—Domnic Satenia, at Coal Creek No. 2, C. C. & I. Co., Fremont county, knee bruised by a fall of coal.

January 6—George Stable, at Louisville mine, M. C. C. & M. Co., Boulder county, leg broken by a fall of coal.

January 6—Pat. Payton, at Marshall mine, M. C. C. & M. Co., Boulder county, two fingers mashed (afterwards amputated) by being caught between cog wheels of an air drill.

January 12—James Cashing, at Crested Butte mine, C. C. & I. Co., Gunnison county, leg broken by a fall of slate.

January 12—George Green, at Jackson mine, Boulder county, foot badly bruised by a pit car.

January 12—Hugh Jones, at Jackson mine, Boulder county, arm cut and bruised by a fall of slate.

January 15—Evan Morgan, at Jackson mine, Boulder county, hand mashed by a pit car.

January 15—Godfred Ruf, at Crested Butte mine, C. C. & I. Co., Gunnison county, leg broken by a fall of slate.

January 19—William Westwood, at Rockvale mine No. 1, C. C. C. Co., Fremont county, back seriously bruised by a fall of rock.

February 7—William Austin, at Louisville mine, Boulder county, finger cut off by a fall of coal.

February 8—John Maghoffer, at Louisville mine, Boulder county, finger cut off by fall of coal.

February 10—Joseph Dellaggano, at Como mine No. 1, U. C. Co., Park county, arm and collar bone dislocated by fall of coal.

February 11—Frank Bieller, at Marshall mine, M. C. C. & M. Co., leg bruised.

February 13—Joseph Ralmer, at Louisville mine, Boulder county, leg broken by a fall of slate.

February 19—Andrew Cobuch, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, body bruised by premature blast.

March 5—William McNeil, at Mitchell mine, Weld county, back seriously bruised by a fall of slate.

April 11—Joseph Miller, at Como mine, U. C. Co., Park county, leg broken.

April 22—Alexander Morrison, at the McGregor mine, Boulder county, face badly cut by being caught between the hoisting cage and shaft timbers, at top landing.

May 9—Llewellyn Hughes, at Rockvale mine No. 1, C. C. C. Co., Fremont county, leg broken by a fall of rock.

June 12—Mike Gallegar, at Anthracite mine, C. F. Co., Gunnison county, head and arms cut and bruised by premature blast.

June 28—William Atkins, at Rockvale mine No. 1, C. C. C. Co., Fremont county, leg bruised by pit car.

July 2—William J. Keist, at Rockvale mine No. 7, C. C. C. Co., Fremont county, seriously crushed by a fall of sand while opening a new drift.

July 2—T. J. Ellis, at same time and place, had hip dislocated from same cause.

July 8—Enoch Westwood, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, hand badly bruised.

July 30—Angiline Lamb, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, ankle bruised.

August 1—Frank Patsko, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, leg broken by fall of coal.

August 6—Peter Tessitan, at Walsen mine, C. C. & I. Co., Huerfano county, leg broken by a fall of slate.

August 6—Joseph Yerling, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, ankle crushed by being caught between two pit cars.

August 7—Joseph Clark, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, finger broken by fall of slate.

August 11—A. P. Barnobo, at Franceville mine, F. C. Co., El Paso county, leg and ankle badly bruised by a fall of coal.

August 16—George Green, at Mitchell mine, M. C. & L. Co., Weld county, collar bone broken by being caught between a pit car and the side of the entry.

August 29—Henry Johnston, at Rockvale mine No. 1, C. C. C. Co., Fremont county, body and arms burned by an explosion of gas and powder.

October 3—Daniel G. Williams, at Rockvale mine No. 1, C. C. C. Co., Fremont county, hand crushed and muscles torn out from wrist to finger ends by being caught between mule's hame hook and a prop.

October 5—Joseph Resconla, at Rockvale Mine No. 1, C. C. C. Co., Fremont county, back and foot bruised by a fall of rock.

October 8—James Dijacomo, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, back badly bruised by a fall of rock.

October 10—Frank Weeks, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, head and arms cut by premature blast.

October 10—Richard Hanook, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, arms and legs bruised by premature blast.

October 10—Frank Salvocha, at No. 2 mine, Coal Creek, C. C. & I. Co., Fremont county, ankle crushed by a fall of Coal.

October 14—Frank Shafter, at Cameron mine, Walsenburg, C. C. & I. Co., Huerfano county, collar bone broken.

October 15—Bartoloro Antonio, at Cameron mine, C. C. & I. Co., Walsenburg, Huerfano county, spine injured.

October 26—Dominic Boline, at Rockvale mine No. 1, C. C. C. Co., Fremont county, head and face cut by a fall of rock.

October 26—Thomas R. Williams, at No. 4, Rockvale, C. C. C. Co., Fremont county, leg broken and back injured by a fall of rock.

October 26—John Corloldo, at Marshall mine No. 5, M. C. C. & M. Co., Boulder county, thigh bone broken by a fall of slate.

October 28—John Anglo, at Coal Creek mine No. 1, C. C. & I. Co., Fremont county, leg and shoulder injured by a fall of rock.

November 1—Walter Ainsley, at Rockvale mine No. 1, C. C. C. Co., Fremont county, foot injured by a fall of coal.

November 2—Thomas Lindly, at Mitchell mine, M. C. & I. Co., Weld county, finger crushed by being caught between pit car and "rib."

November 14—Frank Miller, at Coal Creek mine No. 1, C. C. & I. Co., Fremont county, leg broken by a fall of coal.

November 21—A. A. Hopper, at Marshall mine No. 3, M. C. C. & M. Co., Boulder county, leg broken by a fall of coal.

November 30—Frank Caston, at Coal Creek mine No. 1, C. C. & I. Co., Fremont county, left leg broken above the knee, and right leg broken below the knee by a fall of slate.

December 9—Wm. H. Stage, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, head and face cut by a fall of coal.

December 10—J. Delaqua, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, arm crushed by being caught between pit car and "rib."

December 20—Peter Cassain, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, shoulder dislocated by dumping a pit car.

#### LIST OF FATAL ACCIDENTS—1888.

January 3—William Cox, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, killed by a premature blast.

January 14—Mike McNelty, at Crested Butte mine, C. C. & I. Co., Gunnison county, killed by a fall of slate.

January 14—John McCallum, at Rockvale mine No. 1, C. C. C. Co., Fremont county, burned and otherwise injured by an explosion of carbureted hydrogen (C.H.<sup>4</sup>), and died February 13.



February 1—Thomas Hand, at Stewart mine, Boulder county, killed by being struck over the head by a prop, which was knocked out by a fall of "face" coal.

March 6—Ah Wah, at Como mine No. 1, U. C. Co., Park county, killed by a fall of coal.

March 6—Samuel Prosser, at Rockvale mine No. 7, C. C. C. Co., Fremont county, injured by being run over by a train of loaded cars, and died March 8.

March 14—Rafael Vigil, at El Moro mine, C. C. & I. Co., Las Animas county, killed by being caught between a loaded pit car and prop on "rib" side.

April 23—John Sullivan, at Sunshine mine, G. R. C. & C. Co., Garfield county, killed by a fall of slate.

May 5—George Dijoiro, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, killed by a shot blowing through to his room from another working place.

May 29—Joseph Osti, at El Moro mine, C. C. & I. Co., Las Animas county, killed by a fall of slate.

June 15—William Smally, at Rockvale mine No. 1, C. C. C. Co., Fremont county, killed by a fall of rock.

August 9—Edward Lewis, at McGregor mine, Boulder county, injured by a fall of slate, and lived but a few hours after the accident occurred.

August 9—Ben. Davis, at Rockvale mine No. 4, C. C. C. Co., Fremont county, injured by a fall of rock, from which he died on the tenth instant.

August 11—C. F. Sommers, at Starkville mine, T. C. & C. Co., Las Animas county, killed by a fall of top coal.

August 29—Antono Romero, at Sopris mine, Denver Fuel Co., Las Animas county, killed by a fall of coal.



October 20—Fernando Gaglanio, at Sopris mine, Denver Fuel Co., Las Animas county, injured by a fall of rock, and died a few hours after accident occurred.

October 20—Mike Hing, at Rouse mine, Colorado Fuel Co., Huerfano county, killed by a fall of slate.

October 23—Jules Point, at Marshall No. 5 mine, M. C. C. Co., Boulder county, back and legs seriously injured by a fall of top coal, from which injuries he died on December 7.

November 5—Owen Holt and James Walker, both at Starkville mine No. 2, T. C. & C. Co., Las Animas county, killed by an explosion of carbureted hydrogen gas, the force of which was aggravated by six kegs of blasting powder, which were exploded by the gas. The great quantities of coal dust present also increased the blast.

November 7—Edward McCelevy, at Cameron mine, C. C. & I. Co., Huerfano county, killed by a fall of rock.

November 13—Savatora Garbo, at Chicosa mine, Trinidad Fuel Company, Las Animas county, was injured by a fall of rock, from which he died on the eighteenth of same month.

December 3—William Woods, at New Castle mine, Grand River Coal Company, Garfield county, was instantly killed by an explosion of gas and coal dust. John Lanihan and John Dougherty were severely injured in same explosion, and from such injuries both men died a few days after the accident.

December 10—Henry Wallace and Peter S. Galloway, Coal Creek No. 2 mine, C. C. & I. Co., Fremont county, killed by an explosion of gas.

December 12—James O'Brien, at Rouse mine, Colorado Fuel Company, Huerfano county, injured by being run over by a pit car, and lived but a few days after the accident.

December 31—William Arrowsmith, at Robinson mine, C. C. & I. Co., Walsenburg, Huerfano county, killed by a runaway pit-car on the main slope.

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### LIST OF NON-FATAL ACCIDENTS—1888.

January 2—John Mason, at Rockvale mine No. 1, C. C. Co., Fremont county, hip bruised and knee and ankle sprained by a fall of rock.

January 5—James Quirk, at Crested Butte mine, C. C. & I. C. Co., Gunnison county, hip bruised.

January 12—Evan Morgan, at Mitchell mine, Erie, Weld county, hand bruised by being caught between a pit car and side of "entry."

January 14—David Griffith, Phillip Kopp, Charles Donner and Ben Reese, at Rockvale mine No. 1, C. C. Co., Fremont county, all burned on the body, face and arms, at the same time and place, by carbureted hydrogen gas.

January 19—William Jones, at Rockvale mine No. 1, C. C. C. Co., Fremont county, burned on arms and face by an explosion of carbureted hydrogen gas.

January 24—Joseph Wilson, at El Moro mine, C. C. & I. Co., Las Animas county, leg broken by being caught between a pit car and a tie underlaying the track.

January 27—Patrick Fleming, at Rockvale mine No. 1, C. C. C. Co., Fremont county, leg broken by a fall of rock.

February 1—Thomas Ellis, at Rockvale mine No. 4, C. C. C. Co., Fremont county, leg broken by a fall of rock.

February 4—John Woodson, at Rockvale mine No. 5, C. C. C. Co., Fremont county, two ribs broken and lungs injured by a fall of coal.

February 6—Richard Martin, at Rockvale mine No. 1, C. C. C. Co., Fremont county, hand bruised by a fall of slate.

February 6—Rifjio Guenano, at El Moro mine, C. C. & I. Co., Las Animas county, back bruised by a fall of rock.

February 9—H. F. Smith, at Como mine, U. P. C. Co., Park county, hands and face burned by an explosion of carbureted hydrogen gas.

February 16—Edward Hord, at Como mine No. 1, U. P. C. Co., Park county, hands and face burned by an explosion of carbureted hydrogen gas.

February 20—Henry Mellor, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, hand bruised by being caught between a pit car wheel and a sprag.

March 2—Devist Guppie, at Starkvale mine, T. C. & C. Co., Las Animas county, back injured by a fall of coal.

March 2—William Hewie, at Marshall mine No. 3, M. C. C. & M. Co., Boulder county, foot badly bruised by being caught between pit cars.

March 3—Thomas Shields, Sr., at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, leg broken by being thrown from a train of pit cars.

March 10—Alexander Lex, at Rockvale mine No. 1, C. C. C. Co., Fremont county, wrist dislocated, ankle sprained, head cut and back injured by a fall of rock.

April 11—Samuel Evans and James Toundy, at Robinson mine, C. C. & I. Co., Huerfano county, badly injured by the exploding of a quantity of percussion caps.

April 11—Mike Chase, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, leg bruised by a fall of coal.

April 12—Daniel Harrison, at Rockvale mine No. 1, C. C. C. Co., Fremont county, collar bone and ribs broken by a fall of coal.

April 12—Edward Brown, at Crested Butte mine, C. C. & I. Co., Gunnison county, leg broken.

April 12—Alexander Delpais, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, hand mashed by being caught between a pit car and side of entry.

April 12—Barello Luthewing, at No. 2 mine, Coal Creek, C. C. & I. Co., Fremont county, leg broken by a fall of rock.

April 25—A. Reichett, at El Moro mine, C. C. & I. Co., Las Animas county, face and arms burned by an explosion of carbureted hydrogen.

April 28—George Dick, at Walsen mine, C. C. & I. Co., Huerfano county, leg broken by a fall of coal.

May 3—William Edwards, at Stewart mine, Erie, Weld county, back injured by a fall of slate.

May 5—Mick Massave, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, hand and face cut and burned by a premature blast.

May 9—Thomas McCluskie, at Rockvale mine No. 4, C. C. C. Co., Fremont county, collar bone broken by being struck with pit car.

May 16—Adam Morris, at Valley mine, R. C. & C. Co., Las Animas county, shoulder injured by a fall of rock.

May 25—E. J. Frank, at Garfield mine, Boulder county, foot bruised by being run over with a pit car.

June 6—George Molk, at Rockvale mine No. 1, C. C. Co., Fremont county, arm broken by a piece of slate while dumping a car of slate on dirt dump.

June 7—D. Hopkins, at Marion mine, G. R. C. Co., Garfield county, injured by being caught between a pit car and shute.

June 14—Samuel Richards, at Rockvale mine No. 1, C. C. C. Co., Fremont county, leg broken by a fall of rock.

June 18—R. G. Cheeley, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, thumb mashed between a car wheel and a sprag.

June 19—D. McFadden, at Baldwin mine, U. P. C. Co., Gunnison county, breast injured by fall of slate.

June 28—James Christopher, at Crested Butte mine, C. C. & I. Co., Gunnison county, arm broken.

July 2—Rafael Lacca, at Valley mine, Raton Coal & Coking Co., Las Animas county, leg broken by a fall of rock.

July 10—William Samuels, at Coal Creek No. 2, C. C. & I. Co., face and neck slightly burned by an explosion of carbureted hydrogen gas.

July 16—George Blunt, at Coal Creek No. 2, C. C. & I. Co., back bruised by a fall of coal.

July 21—George H. Yarnes, at Coal Creek No. 2, C. C. & I. Co., Fremont county, leg bruised by pit car.

July 22—B. Fedela, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, leg cut and bruised by fall of rock.

July 31—M. Goodman, at Crested Butte mine, C. C. & I. Co., Gunnison county, leg broken.



August 10—Ferdinand Carridine, at Starkville mine, T. C. & C. Co., Las Animas county, seriously injured by a fall of slate.

August 16—Joseph Clark, at Coal Creek mine No. 2, C. C. & I. Co., finger cut off by fall of rock.

August 28—John Miller, at Coal Creek mine No. 1, C. C. & I. Co., Fremont county, leg broken by pit car on dirt dump.

September 1—James Jameson, at Coal Creek mine No. 2., C. C. & I. Co., Fremont county, arms bruised by carbureted hydrogen gas.

September 14—Ambrozie Assallone, at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, leg bruised by coal in box car.

September 15—Thomas Phillips, at Rockvale mine No. 5, C. C. C. Co., Fremont county, head cut and shoulder bruised by fall of rock.

October 20—H. K. Jerdeau, at Rouse mine, Colorado Fuel Co., Huerfano county, leg broken by fall of rock.

October 23—David Butcher, at Stewart mine, Boulder county, fingers mashed by fall of slate.

October 24—Jules Point, at Marshall mine No. 5, Boulder county, leg broken and back bruised by a fall of coal.

October 26—Rafe. Bracegvordle, at Jackson mine, Boulder county, shoulder fractured by a fall of coal.

November 26—Arnesto Delfino, at Mitchell mine, Colorado Fuel Co., Boulder county, seriously injured by a fall of coal.

November 27—Geo. F. Walker, at Rockvale No. 4 mine, C. C. C. Co., Fremont county, neck bruised by a piece of coal falling down the shaft and striking him while in the act of "caging" a car.



December 3—H. A. Frazer, Matt Hutchins, R. H. Jones, John Hindman, Merritt Wilcox, Frank Grand, Clay Brisco and Hugh Roberts, all at New Castle mine, Grand River Coal Co., Garfield county, were burned and otherwise injured by explosion of gas and coal dust, caused from a blown-out shot.

December 7—Peter Goatena, at Rockvale mine No. 1, Cañon City Coal Co., Fremont county, big toe mashed by a fall of rock, and was afterwards amputated.

December 10—Edward R. Jones, at Rockvale mine No. 1, C. C. C. Co., Fremont county, thigh broken in two places, and side and shoulder bruised by a fall of rock.

December 14—Thomas Owens, at Rockvale mine No. 1, C. C. C. Co., Fremont county, leg broken in two places below the knee by a fall of rock.

December 10—Henry Dodd, James Wallace, Thomas Cunningham and James Cashen, all at Coal Creek mine No. 2, C. C. & I. Co., Fremont county, were slightly burned and seriously injured by an explosion of gas. And Thomas Shields, Jr., John Tinn, James Proven and John Murphy, all at the same time and place, were slightly injured by said explosion.

December 17—Joseph Todd, at Rockvale mine No. 7, C. C. C. Co., Fremont county, seriously bruised by being caught between a pit car and prop on entry side.

## REMARKS ON FATAL ACCIDENTS.

I regret to state that the number of fatal accidents for 1887-1888 are in excess of those of 1885-1886, compared with the number of tons of coal mined. The same has set me thinking to find an explanation of the cause.

Upon looking over the files of the accident records, I find that the greater part of the casualties have occurred with Italian and other inexperienced miners. And the evidence taken relating to many of those accidents points to either gross carelessness, or a lack of experience in the knowledge of timbering their working places with a required degree of safety. I am inclined to believe that the latter explains the cause of many of the accidents which have occurred during the last two years.

The mining law requires that it shall be the duty of the mining boss to see that the miners properly timber their working places; and that he shall be a practical miner, having a superior knowledge of mine work in detail. Instructions by them are, to my own knowledge, liberally given in a general way, and especially to Italian and other inexperienced miners; but they are either misunderstood or disregarded.

In several cases of accidents herein tabulated, the men killed had been *commanded* to ward against imminent danger. Had the instructions of the mining boss been followed in these cases the accidents could have been prevented. It is impossible for the boss to be at all times with such miners to see that his orders are carried out; thus, he can not be to blame, unless it would be from the fact that he should discharge such unskilled or careless miners, when knowing them to be such.

During the last two years a large amount of railway building has been going on in our State, and upon the completion of such work at various points, large numbers of men are consequently out of employment. And as there has been a marked degree of development going on in our coal fields, and new mines being opened, the same has offered an opportunity for employment, with fairly good wages, which has tempted many inexperi-

enced men to take to coal mining, sometimes under the care of a friend who may be an experienced miner; but in many cases the calling is adapted, and its hazardous risks are taken by men who are entirely ignorant of coal mining.

Again, the carelessness and want of forethought displayed by the average miner, in not promptly propping the roof as soon as the coal is excavated, has oftentimes explained the cause of an accident. Such a system of propping may appear at times, to the miner, to be premature; but such a thought even is sad to contemplate, for how often do we find it true that on sounding massive rocks that the sound given may create within us a feeling of perfect safety, when upon close examination we have been horrified to find that the same mass of rock was about to fall, it being nearly freed from all binding force by "slips," or fissures, that had been difficult to detect. And while many have been fortunate enough to discover such lurking danger, yet, there have been many victims under the same circumstances who have received serious injury, or death.

Such a rule in propping the roof close up, promptly after the coal has been excavated, should be *strictly enforced*; and to carry out this rule faithfully *must* greatly depend on the miners themselves.

That such a system is not being carried out, has alike been impressed forcibly on the minds of the assistant inspector and myself, on our rounds of inspection. The mining law prescribes "that it shall be the duty of the 'mining boss' to furnish sufficient timber, of suitable lengths and sizes, and shall place the same in the working places where they are to be used."

There is no safeguard for the safety of the miner that is a more important one than the above, and none that receives more attention from the inspector on his visits

of inspection at the mines; and in general I find that supplies of timber are liberally furnished. Any contravention to this rule on part of the boss should be at once reported to this office, which will be received in *all* confidence, and the matter receive immediate attention.

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## EXPLOSIONS.

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We have been more fortunate during the past two years than many other States where coal mining is being extensively followed, in regard to colliery explosions, which are in *all* countries considered to be the greatest deathly enemy to coal miners.

But while we have not experienced, to any great degree, the fearful loss of life common to such catastrophes, still our coal mines have not been free from the sad havoc characteristic to this fell destroying agent, which visited, during the past year—1888—four of our mines, claiming in death, each time, its victims. The number, however, providentially for us, were small.

The first of these accidents occurred at Rockvale mine No. 1, Fremont county, belonging to the Cañon City Coal Company, on the fourteenth day of January, 1888, where five men were burned and otherwise injured by an explosion of gas, which had generated at the face of an entry where two of the men had fired a shot. After firing the shot the men retired for a few minutes until the powder smoke should clear away. On returning to the face of the entry the gas, which had accumulated during their absence, ignited from their naked lamps, thus burning the two miners and three roadmen who were engaged laying track a short distance away.

It appears that the gas was given off from a small vein of coal lying eight feet above the main vein. There



was a "creep" of the strata going on at the time and it is thought that the "brushing" shot that had been fired shattered the roof up to the small vein of coal, from which came the "blower" of gas.

John McCullum, one of the miners, died from injuries then received, on the thirteenth day of February.

I would suggest that in all mines generating explosive gas in any degree, that after firing shots, that the precaution of inspecting such places with a safety lamp be taken before naked lights shall be admitted. Gas is always more freely given off just immediately after shot firing, owing to the new or fresh surface of the vein being exposed.

The second explosion occurred at Starkville mine No. 2, Las Animas county, belonging to the Trinidad Coal and Coking Company, on the fifth day of November, 1888, where James Walker and Owen Holt were killed. This mine consists of two parallel entries, with some other narrow work; there have been no rooms turned; *all* the excavations that had been done are what is shown on the accompanying diagram. The explosion occurred about 5 o'clock a. m.; the two men above mentioned were the only persons in the mine at the time. They had worked throughout the night before at point marked A. (See diagram). It is supposed that, after firing the shots in the morning at A, that they went around to point B to see if such shots had cracked through the pillar between A and B, and had evidently gone towards the face, or point H. Owen Holt's body was found at point marked G, and James Walker's body at point F.

From examination it appears that the explosion originated between F and G, and then traveled by way of the intake, or main entry, which was very dry and dusty. To what extent such accumulations of fine coal

dust aggravated the consequences of this explosion, could be easily traced on examining the course of the blast, which had certainly increased with *terrific* force. At point C there was contained in a box thirty pounds of giant powder, which was swept before the blast, and it was perceptible that it had to a degree aided to the force in its work of destruction.

At point E the ruthless blast was again increased in force by the exploding of six kegs of blasting powder, containing twenty-five pounds each, which had been kept there in store. It could be traced there that the blast spent its force in an inward as well as an outward direction, dislodging the massive entry timbering in both directions like saplings before a tornado.

I have witnessed the destruction of some *very* disastrous colliery explosions, but never did I witness such an enormous degree of destruction as was the result of the explosion in question.

Commencing at the mouth of the main entry and in to a distance of one thousand five hundred feet, it was timbered with timbers fourteen inches in thickness, consisting of three hundred "sets" five feet from center to center, with fourteen feet span and seven feet high. Throughout this entire distance there was not one set left standing, notwithstanding that in places as much as five feet of roof had settled down on top of the timbers. Such was the enormous force of the blast that the "collar" piece of the front set of timber at mouth of the drift (which was twenty inches thick and very heavy) was blown away about three hundred yards, and a part of the roof at mouth of the *drift itself* was removed.

The entire quantity of gas, which was the origin of such a terrific blast, must have been contained between F and H, for the two men had been at all other points where gas could accumulate.

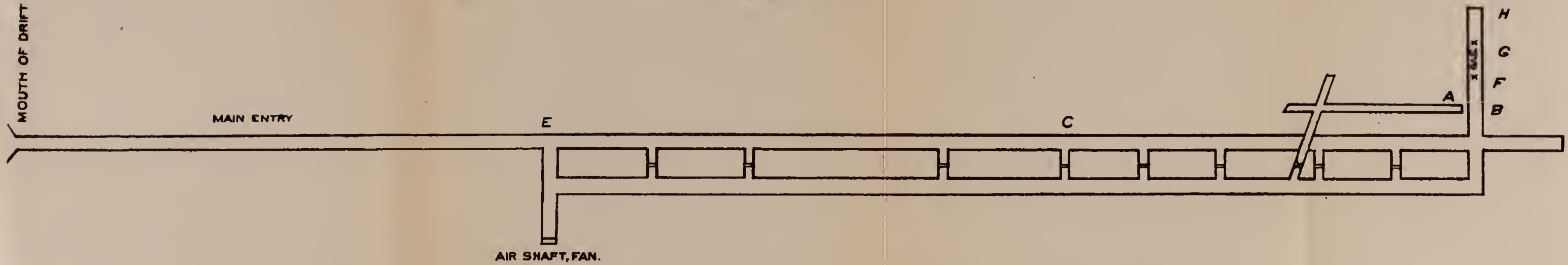


# PLAN SHOWING WORKINGS

OF NO. 2 MINE

AS THEY WERE WHEN EXPLOSION OCCURED

SCALE 200 FT. = 1 IN.





The coal vein is of a highly bituminous character. It is evident that the combustion of fine coal dust and gas generated therefrom *must* have figured to a *very large* per cent. in the force and destruction of this disaster. It was providential that it occurred at the hour it did. Had it been two hours later twenty men would have been in the mine, and had there been five hundred not *one* could have possibly lived after such a blast. I would recommend that in mines of this character that the workings should be sprinkled with water thoroughly and only small quantities of powder kept in the mine.

The third of these accidents occurred in a mine at New Castle, Garfield county, belonging to the Grand River Coal Company, on the third day of December, 1888, where William Wood was instantly killed, and John Lanihan and John Doughter received injuries from which they died on the fifth instant.; three others were seriously injured.

I am rather doubtful whether coal dust is capable of forming an explosive mixture with pure air, in the apparent absence of carbureted hydrogen gas. Yet in this accident it is said that there was no gas present, nor could there be to any extent, it would seem. The entire workings consisted only in a tunnel of about five hundred feet long; from which was driven a few "stopes," having an air shaft connecting them. It is a new mine, and the few places working had men in them only a few minutes previous to the explosion. All were working with naked lights and had never seen any explosive gas. At 5:30 p. m. these men, as was their custom on quitting from their day's work, fired several shots. After lighting the fuse, the men retired to the mouth of the tunnel, where ten of their number were standing when the explosion occurred, which took place immediately after the report of a shot. The force of the explosion threw

the men from the mouth of the tunnel some thirty or fifty feet over on the dump, and the flames rolled out of the tunnel's mouth for some seconds.

William Wood, who was instantly killed was a carpenter, and was engaged in hewing a piece of timber outside and in front of the tunnel.

On making an examination of the scene of this accident, I found at the face of the tunnel the drill hole of a blown-out shot; *i. e.*, the tamping had been blown out, and the same was nearly on a line with the floor. It appeared that quantities of fine coal dust were present. The vein is about eight feet in thickness and on a pitch of fifty degrees, thus the greater part of the tunnel's perimeter consists of a coal surface, which is exceptionally dry, soft and easily pulverized into *very fine dust*.

It is reasonable to suppose that the sides and roof were to a degree, *very* dusty, as well as the floor. And it is also reasonable to suppose that immediately after the discharge of the several shots that were fired, that a small quantity of carbureted hydrogen gas was liberated from the newly exposed surface of the coal seam, and was ignited from the flash of the powder from the blown out shot. Again, the breaking of the coal and concussion of the blasts in such a confined place would raise the coal dust in suspension in the air, which would burn very rapidly with complete combustion. Thus instantly a temperature of *intense* heat would be reached, the expansion of which would be enormous, pressing all gaseous mixtures immediately before it with great force, sweeping *all* fine dust before the blast, the same undergoing combustion and generating gas on its way, thus prolonging a living mass of fire, which emptied itself in the air from the mouth of the tunnel.

The dust from this coal is highly inflammable, compared with most bituminous coals. By taking a hand-

ful of this dust and rubbing it between the hands, and allowing it to fall on the light of a lamp, a flame can be extended from the lamp to the hands for an unusual distance.

I would remark that to operate these mines with *any* degree of safety, that a sprinkling system with water be used, not only on the floor of the workings, but also with water under pressure. Sprinkle the roof and sides as well, care being taken not to saturate the gobs, as such would have a tendency to cause spontaneous combustion.

NEW CASTLE, COLO., December 4, 1888.

Summary of report of inquest held on the body of William Wood, carpenter, who was accidentally killed by an explosion in the New Castle mine of the Grand River Coal and Coke Company, on Monday evening, December 3, 1888:

Coroner Johnson impaneled the following jury at 10 o'clock a. m.: Samuel White, P. S. Hancock, A. J. Stitt, A. A. Harris, P. Schneiders and A. Bennett.

The jury, after viewing the body of the deceased, proceeded to the town hall to hold the inquest.

On the way to the town hall the coroner, accompanied by his clerk, visited one of the wounded miners, James Lanihan, and proceeded to take his version of the accident.

Coroner—Are you rational?

Ans.—I think I am.

Coroner—Do you know how the explosion occurred?

Ans.—I could not tell you how it occurred, but I think it occurred from a blown out shot in the entry. I was running as hard as I could to get out of the mine when it caught me at the mouth of the entry, near the tool box.

Coroner—How many feet were you from the mouth of the entry?

Ans.—About twenty feet.

Coroner—Did you hear the signals given by the foreman in the mine?

Ans.—Yes, I heard them perfectly.

Coroner—Do you attribute the accident in any way to Lewis, the fire boss?

Ans.—It was no fault at all of Lewis'; it occurred from a blown out shot.

Hugh Roberts, another of the injured miners, whose hurts consisted of a burned flank and a few wounds—slight—in the head, and who occupied the adjoining bed, gave the same testimony, but could not give any further particulars.

W. J. Morgan, general superintendent of the company, was then called, and after being duly sworn said: Am a resident of Garfield county, Colorado.

Coroner—What do you know in regard to the explosion at the mine?

Ans.—After making investigation I find that the explosion resulted from a blown out shot.

Coroner—Have you not taken all the precautions in your power to prevent like accidents?

Ans.—I issued instructions to the foreman to employ a man as a fireman, to see to all the shots that were fired; to see that they were mined properly and that a proper quantity of powder was put in; also sufficient fuse. Besides this, foreman had charge of the firing and he was instructed to give signals to give plenty of time for every person to be out of the mine at the time of the firing so that there would be no possible danger to any one engaged in these operations. I had also made arrangements and calculations, and commenced to prepare for a system of water pipes to water all the mines to lay



the dust, and pending this arrangement I had issued instructions to have everybody out of the mine at the time shots were to go off.

Coroner—Mr. Morgan, have you not given the foreman and men working in your mine advice to use every precaution in regard to their work?

Ans.—Our pit boss, Mr. Robinson, in the absence of our regular foreman, is acting in his place, and he was instructed to carry out these instructions accordingly.

A Juror—Have you found out what caused the explosion? Was it the shot or the tamping blowing out of the shot?

Ans.—Partly both. The tamping undoubtedly was not sufficient to resist the pressure of the powder at the mouth of the hole.

A.W. Robinson was then called, and after being duly sworn, stated as follows:

Coroner—Are you temporarily foreman of the mine?

Ans.—Yes.

Coroner—What is the mine called?

Ans.—It is called the Elk Creek mine.

Coroner—Are you a resident of this county?

Ans.—I have been living in Garfield county four years.

Coroner—How long have you been working for the company?

Ans.—About three years.

Coroner—What do you know about this explosion?

Ans.—Yesterday evening about a quarter to 6 p. m., when the fire boss gave the word for the men to fire and come out of the mine, I should say it was from six to eight minutes after he gave the alarm that the explosion took place, and I was sitting right in the office at the time, near the mouth of the tunnel, and I stepped out and found some men hurt, lying around near the mouth

of the tunnel; one man in particular. He was not dead at that moment, but he died shortly afterwards.

Coroner—What is your opinion in regard to the probable cause of the accident?

Ans.—It occurred from a shot in the face of the entry which blew out into the main entry.

Juror—Where was the man, the deceased, when he was struck?

Ans.—That I do not know; he must have been somewhere about the mouth of the entry or outside of it. I could not say positively, but suppose he was right at the mouth of the entry. A great many times the men would stop at the mouth of the entry and listen for the shots to go off.

Juror—How far has this entry been driven?

Ans.—They are in something over four hundred feet.

Juror—Any means of air ventilation?

Ans.—Yes, there is plenty of good air.

Juror—Could the accident of yesterday be prevented by the miners using a longer fuse?

Ans.—That I could not say. Mr. Morgan gave orders to me to have the men use a good long fuse, and a man goes around every noon and every evening and sees that the holes are all loaded and sees that every one is ready to shoot, and then he goes about one hundred feet from the mouth of the entry and gives the alarm for the men to fire, and then they are all ordered to come out—clean outside.

Coroner—Will you please tell me what kind of an alarm he gives?

Ans.—He sounds on a rail with a hammer very loud and plain.

Coroner—I went to the breast, and Mr. Lewis was nearly at the mouth of the entry. He sounded that alarm and I heard it as plain as if he was alongside of me.

Juror—Did the man who was supposed to have lit the blown out shot, get out in time?

Ans.—Yes, he got out all right.

Juror—Is it not more liable to have an explosion where a shot blows out or whether it is a good shot?

Ans.—A blown out shot will more readily cause an explosion, of course.

Juror—Was there anybody in the mine when the explosion occurred?

Ans.—Yes, there was one man, but he was uninjured.

Juror—You are satisfied the alarm was given for firing?

Ans.—Yes, I know it is the rule they go by; it could not have occurred otherwise.

George Carlow was then called, and after the usual formal questions as to residence, etc., testified as follows:

Coroner—You are familiar with coal mining, are you not?

Ans.—I have been around coal mines a good deal, but am not familiar with gas or anything of that kind. I am working at carpenter work, and we get out a little quicker than the regular miners. Work just at the mouth of the tunnel. About fifteen minutes to six I told the rest of the carpenters it was time to knock off, and had started to go home, when I thought of another man who was there. He was doing some grading up on the incline or plane, and I told him we had started to go. We had got but a few feet away when the explosion occurred. We ran back, and I saw three or four men lying there—one man by the name of Wilcox, who had worked with me. He was the first one we came to. He was on the ground, and he said: "My leg is broken." I called an assistant, took him on our shoulders and carried him home.

Coroner—Where was he lying when you picked him up?

Ans.—About thirty feet from the mouth of the entry. We left him on a cot at home and came back, and when we reached there we found the men had all been taken away except the deceased. He was lying about thirty feet from the mouth of the entry. They placed him on two boards and carried him home.

Ques.—Do you know anything about gas?

Ans.—No, sir.

J. D. Lewis, the fire-boss, deposed as follows:

Coroner—You are working for the coal company, are you not?

Ans.—Yes, sir; it is about three weeks, I think, since I took the position of the charge I have of looking after the blasting of the holes, which I have done to the best of my ability to keep down trouble and accidents of this kind.

Coroner—Are you a coal digger?

Ans.—I have dug coal for a little over twenty years, and I am as familiar with the workings of a mine as I ever will be.

Coroner—Who gives the signals to the miners when they are at work in the different rooms?

Ans.—I give the signals.

Ques.—Will you please state how you do it?

Ans.—As a rule, about twenty minutes to twelve, I go around to every man's room and go in and examine their holes. Sometimes I take three-quarters of an hour to do it, and see to the best of my knowledge that they are properly fired. If I think they won't break well, I stop them from blasting. I can recite two or three incidents that have occurred lately of that kind. It does not take but a short time to get into the face of the entry and give the word by mouth to each one to get ready. I then go out to about one hundred and fifty feet from the mouth of the tunnel, and there I have a hammer that



weighs about four pounds, with which I give the signal by rapping on the rail. Every man is supposed to be lighting his hole when this rapping is going on. The last three chutes, I tell them I will give them the word by mouth. I stand about one hundred and fifty feet from the mouth of the tunnel, I judge, when I give them the order to fire, so that they can be down in the entry and they can all go out together; and last evening the raps were given and understood in the usual way, as several gentlemen herewith testify. They all understood the raps perfectly and we started out. I went through the same process as I have described, with the exception of the last three chutes, where I gave the word by mouth. I had been outside the entry and had made some remarks to a teamster and told him to take some coal. Had stood there a few seconds when the first shot went. I heard the first hole distinctly, and I could just about hear the second one, but the roar of the fire interrupted the regular sound; the explosion and the second shot was almost simultaneous. As near as I could judge there were about eight to twelve men standing around. As the first hole went, the boys said, "'There's one,'" and then the explosion occurred. It blew me some ten or twelve feet over some ties, but did not hurt me much.

Coroner—Whereabouts was the deceased when the explosion occurred?

Ans.—I could not say. I could not tell Mr. Woods from Mr. Robinson, standing in the dark. The first I saw of Mr. Woods was him lying out there, all of twenty feet from the mouth of the tunnel. When the explosion occurred, after I had picked myself up, I ran to see how badly he was hurt, and the first man I came across was John Lanihan. He said: "Lewis, I wish to God you would do something for me." Judging him to be badly hurt, I let him down on the ground and started for town for a doctor. I got Dr. Cooke at the drug store, and



going back, I called in and got some blankets, but became so exhausted that I handed the blankets to some others who got there long before I did.

Coroner—After you gave the word to fire, did all the miners have the usual time to get out of the mine?

Ans.—Yes, sir; I think so.

Coroner—Have you any idea or any question to believe that the company have been neglectful in precaution?

Ans.—No, sir; I have reason to believe that the company took all precautions possible. We use a lamp if there is the least suspicion of gas in any place. I feel sure that there was no gas. If I have the least doubt, I take a lamp and go in and satisfy myself.

Coroner—The company is not to blame for any accident that might happen in that respect?

Ans.—No, sir; not as regards gas. I have never detected a particle of gas in the mine.

Coroner—You could not tell what shot caused the explosion?

Ans.—It is more than I could say what hole the shot went off in.

Juror—What kind of a lamp do you use?

Ans.—We use the Davy lamp.

Juror—Do you examine the holes after they are drilled?

Ans.—Yes, sir.

Juror—Do you examine the fuse?

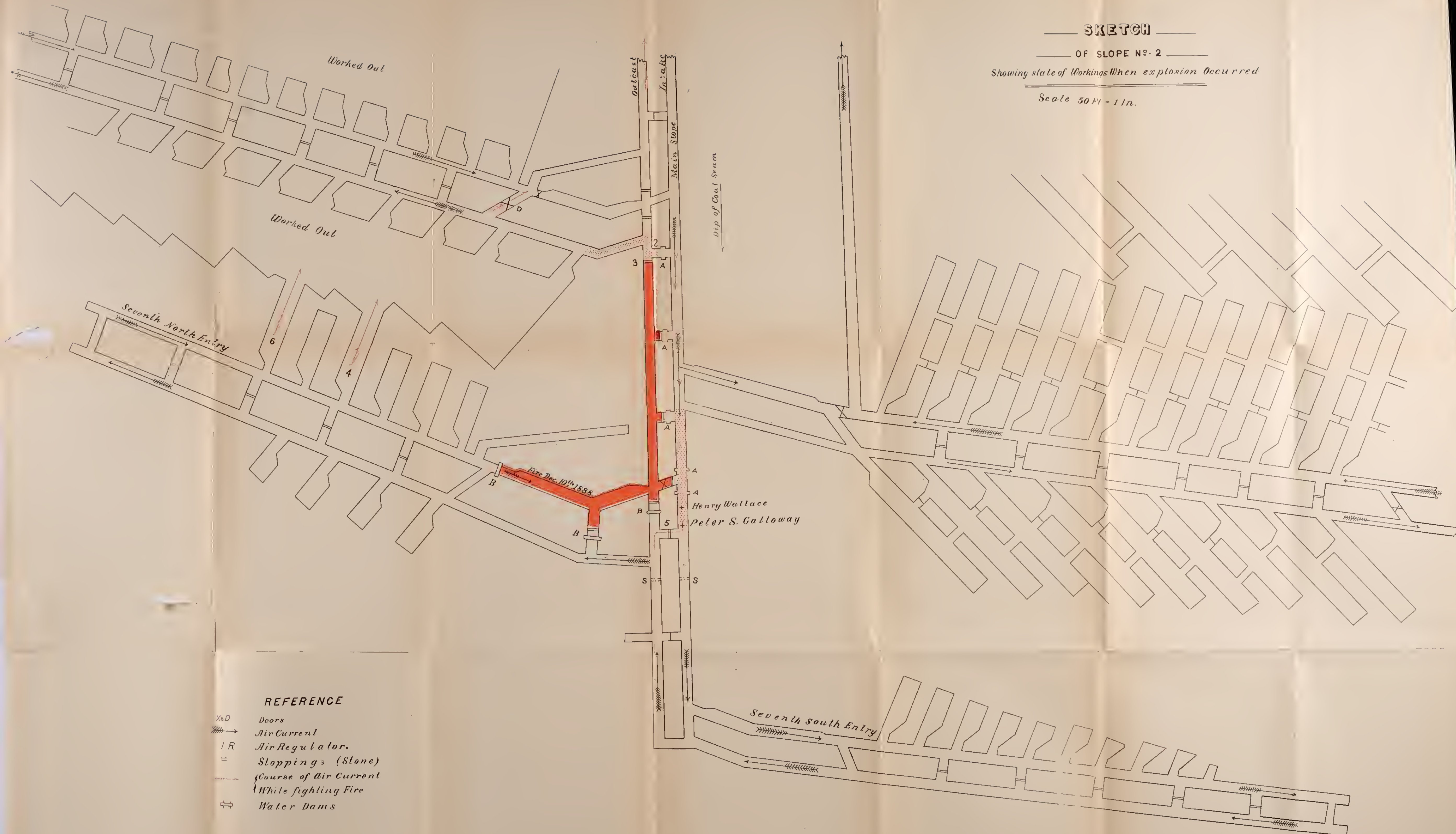
Ans.—Yes, sir. I ask a man how deep his hole is; and what interest would it be to a man to tell an untruth about the depth of his hole. I do not see where it would do a particle of good. So, therefore, I take their word.

# SKETCH

OF SLOPE N<sup>o</sup>. 2

Showing state of Workings When explosion Occurred

Scale 50 Ft = 1 in.



## REFERENCE

- XoD Doors
- Wavy Arrow Air Current
- I R Air Regulator
- = Stoppings (Stone)
- - - Course of Air Current While fighting Fire
- Vertical line with crossbar Water Dams





Several other witnesses were called, and testified in very much the same strain, nothing particular being elicited.

After a short deliberation the jury brought in the following verdict: "That said William Woods came to his death by an explosion in the Grand River Coal and Coke Company's Elk creek mines, and no blame is attached to the company, as it was a perfect accident."

(Signed)

SAMUEL WHITE,

*Foreman.*

The fourth of these explosions occurred at Coal Creek mine No. 2, belonging to the Colorado Coal and Iron Company, Fremont county, on the tenth day of December, 1888, where Henry Wallace, foreman, and Peter S. Galloway, fire boss of the mine, were instantly killed, and nine other persons injured.

The circumstances relating to this accident were of a serious and unusual character, and its origin dates back to December 5, 1888, on which, at 6:30 p. m., it is supposed that one John Murphy, a mule driver, while passing through a canvas (used temporarily to conduct air current) had accidentally set it on fire from the light of his lamp.

This canvas, as is shown in the accompanying diagram of a part of the mine in question, was situated just outside the door, at entrance to seventh north entry, where it was evident that the fire had originated.

John Murphy returned to this point after an absence of about twenty-five minutes, and was horrified to find the place on fire, and burning fiercely.

He at once gave the alarm and all men in the mine at the time were promptly notified of the imminent danger, and left their working places; when, with united effort, they commenced to stop the fire in its progress, which had already extended along the main slope from

the seventh north up as far as the sixth south, as is indicated on the map by light shading. Wallace and Galloway, who had charge of the mine, were experienced miners of undoubted ability, and as they lived in proximity to the mine and were immediately notified, thus they were at the scene of the fire shortly after it had been discovered. They at once commenced to direct the work, and for a time it seemed that they would be successful in extinguishing the fire. On the morning of the sixth inst., the fire had been put out on the main slope back as far as the entrance to the seventh north entry, when the intense heat and steam from the fire caused the top coal and roof to fall and made it impossible to follow the fire any further in that direction.

Upon examination of the stopping between slope and main return air-way, it was found that the fire extended to the corner of the first dip room in sixth north air-way, as shown by light shading on map.

Mr. George Hadden, superintendent of the mines, consulted with Wallace and Galloway, giving them directions to follow. Points for putting in stoppings were selected with judicious care.

Stopping at point 2 was removed and the fire put out there.

At point 3 a stone stopping, with a small hole to allow the smoke and gas to escape, was built. Stopping 2 was replaced, with a hole left with a removable cover, so that fire at that point could be examined from time to time.

Dams B. B. B. were built for the purpose of flooding fire on seventh north. For the time being an opening was left in dam at north end of the fire to carry off the smoke from the workmen.

Work was being done at points marked A, for additional dams to be built; when dam at north end of fire



would have been closed, then water would have been run in to fill up the space enclosed by such dams.

It was known that carbureted hydrogen gas was being given off in seventh south entry, and a watchman was kept to notice any accumulation of such, but up until the ninth inst. there was none detected. On the ninth, the fire-boss detected gas accumulating in seventh south entry, and so notified the superintendent.

An effort was made to have the gas removed, but on the tenth inst. it was found that the quantity had not diminished any.

The great raise of temperature had greatly damaged, by falls, the course that the air was traveling, thus reducing the volume. Stoppings were then put in at points marked S. S. to keep back *all* accumulations of gas.

Previous to closing S. S., stopping at point 5 was removed; door at D. had been kept open since the fire had taken place. The course of the air current after closing S. S. is shown on map by red arrows and red points on some black arrows; the black arrows show direction of air current before the fire took place. It appears that after S. S. stoppings were built, that the men thought themselves comparatively safe, as they thought that the gas would then be completely kept back. But just when their hopes for success were brightest, death lurked in the gloom. Wallace and Galloway had made inspection in the vicinity and at stoppings with a safety lamp, and, doubtless, finding no gas, they then took their naked lights to examine more minutely these stoppings, when it is thought that a small leakage of gas from some part of the wall came in contact with their naked lights, which caused the disaster. Wallace's and Galloway's bodies were found at points opposite their names on map,

The assistant inspector and myself reached the mine on the eleventh instant (day after accident occurred), and

as the mine was then being flooded with water, we did not enter to make an examination, deeming it unnecessary, as well as unsafe, to do so.

The above facts were gained from examinations made before the coroner's jury, the superintendent's report and otherwise.

#### CORONER'S INQUEST.

Coroner J. L. Hyde being notified, arrived at Coal Creek on the tenth inst., and summoned the following citizens as jurors: Thos. B. Manning, foreman; Richard Hughes, Jas. Hardy, Robert Kimbly, Wm. Wagstaff and Robert Rushford. The coroner and jury proceeded to the residences of the deceased, Henry Wallace and Peter S. Galloway, and made an examination of the bodies, after which witnesses were summoned to appear at Odd Fellows' hall.

#### TESTIMONY OF WITNESSES.

Wm. Cowan being the first witness, testified as follows: I reside at Coal Creek, Fremont county, Colorado; am employed at C. C. & I. Co.'s mine No. 2. Mine has not been in good working order several days on account of fire. Fire started on the fifth of December; men were employed in subduing the fire. On the tenth Henry Wallace and Peter S. Galloway were among the number at work. After the explosion could not get to where Wallace and Galloway were, on account of bad air and smoke. When the current of air had increased found Wallace about thirty feet below seventh north entry; about twenty feet further down found Galloway. I supposed at the time that Galloway was still alive and Wallace dead. Death was caused by explosion of gas. Both deceased knew that there was gas in the mine. Safety lamps were used between where the men were working and the place where

Galloway and Wallace were. When I left the mine, about 5:30 a. m., it was safe to work with naked lights. Safety lamps were used prior to the explosion. There was gas in the seventh south entry when I left work in the morning.

#### CAMMERON'S TESTIMONY.

Mr. Cammeron testified as follows: I am general superintendent of C. C. & I. Co.'s mines. Mine No. 2 has not been in working order for several days. I was not here when explosion occurred. I was here on the afternoon of the seventh inst. Mr. Hadden has used all precaution to guard against danger, as far as I know. I visited the mine on Friday afternoon; the men were then engaged in trying to subdue the fire. Pipes had been laid down, and the men were trying to quench the fire with water. I have furnished mine superintendent with all necessary apparatus for subduing the fire, as far as I know. When I was last here, according to my own understanding, there was no gas in the mine. I have not been in the mine since the explosion. There were no safety lamps used in the mine at the time I was there. I know nothing of stoppings made to smother the fire until after the explosion.

#### GEORGE HADDEN TESTIFIED.

I have resided at Coal Creek since 1873; am superintendent of Colorado Coal and Iron Company's mines Nos. 1 and 2 at Coal Creek. I am a practical miner, and understand the workings of mines. The condition of No. 2 mine has not been favorable to work since the fifth instant, on account of fire. I have been using my best endeavors to subdue the fire. I have been supplied with all necessary apparatus, and have been trying to subdue the fire by building dams for the purpose of flooding the fire. This diagram illustrates location of the

fire in the mine (showing diagram and explaining same to jury.) I had a party of men employed in the mine at the time explosion occurred. I last saw Wallace and Galloway about 6 o'clock in the evening; they were at the mouth of the slope. I left them there and supposed they went into the mine, as they were both employed there. I knew of an explosion that was caused by gas; when the men went in at the commencement, to try and control the fire, there was no indication of gas. The men knew when they went into the mine that there was gas there; they used precaution in the mine; both safety and open lights were used; after gas was discovered men were stationed for the purpose of watching the gas. The men knew it was dangerous to work with open lights where there was gas. There was no danger with open lights in that portion of the mine where they were used. I consider it safe to work with open lights in a mine where there is gas under certain conditions; that the current of air is sufficiently strong to force the gas in an opposite direction. The explosion was caused by the burning of gas; I know of men hurt at time of explosion; I also know of Henry Wallace and Peter S. Galloway being killed; I think the men used every precaution to avoid an explosion, and to make themselves safe. The men who were killed were superintending the work in the mines at the time of the accident, one was foreman and the other was fire-boss. The stoppings were built close to the roof, in order to make them air tight. I am of the opinion that the gas could not have become ignited by the fire. The men were using safety lamps after they knew there was gas in the mine. I consider it was safe to use open lights where the men were at work. It is my opinion that the gas was ignited by a light of some kind; I am also of the opinion that the accident was unforeseen and could not be avoided.



## GEORGE JAMES TESTIFIED.

I am a music teacher and piano and organ agent; I reside at Coal Creek and know the location of mine No. 2; I know of an accident that happened at that place; I know of men being hurt in the mine; I was in the mine after the explosion. When I heard of the disaster I went to the mine and found several persons at the mouth of the slope; there were some who wanted to descend the slope with naked lights, but I would not agree to do so. While standing there Mr. Hadden came up the slope and asked for help to assist in getting the men out. I and several others went down and met three of the injured men being brought out. The men who were attending them told us to go further down the slope; having done so, we met Mr. Cowan and Mr. Beach, who informed us that they had found two more bodies. On raising the head of one of the bodies we recognized it as Peter S. Galloway, and in examining the other found that it was Henry Wallace. I assisted in taking them out; Mr. Wallace was dead when found, but I believe that Mr. Galloway was still alive. It is my opinion that their death was caused by an explosion of gas in the mine. I saw no signs of stoppings or dams near where the bodies were found. There were several men at the place where the bodies were found before I got there; Mr. Beach and Mr. Cowan were both there.

## JOHN M'NIEL TESTIFIED.

I am State coal mine inspector; it is impossible for me to say whether necessary precautions had been taken or whether such precautions were right or not, unless I had an examination of the scene of accident; and therefore, of my own knowledge, know nothing of the details.



## DR. A. A. EDDY TESTIFIED.

I am a resident of Coal Creek, Fremont county, Colorado. I am a physician and surgeon and in the employ of the C. C. & I. Co. I know location of No. 2 mine, and know of one man, Peter S. Galloway, being killed. I was called to the house of Galloway to see if he was dead. I felt his pulse and examined his heart, but could find no signs of life.

## DR. M'DONALD TESTIFIED.

I am a resident of Rockvale, Fremont county, Colorado. I am a physician. I know location of mine No. 2, at Coal Creek. I know there was an accident in that mine on the evening of December 10. I did not see either of the men who were killed. Two of the men, Cunningham and Shields, informed me that they were hurt through the effect of an explosion of gas in the mine.

## JAMES PROVEN TESTIFIED.

I am a miner in the employ of the C. C. & I. Co. at mine No. 2; have worked there about two years; the mine has not been in good working order for the past two weeks, on account of fire. Fire was first discovered in the mine about a month ago. I have been working in the mine the past few days trying to subdue the fire; I was in the mine on the evening of December 10; I was digging bottom for the purpose of building a dam; was engaged at this work when the explosion occurred; I do not know how the gas ignited; two men, Henry Wallace and Peter S. Galloway, were killed; I was about 150 feet from them when the explosion occurred. When I went into the mine I knew there was gas there; there has always been some gas in the mine, but not enough to be dangerous. I was using a naked light;

no one was instructed to work with a naked light; I knew it was dangerous to work with a naked light when there was gas in the mine. There is a man employed for the purpose of inspecting the mine to ascertain whether or not the mine contains gas; it is his duty to notify all men employed in the mine whenever he finds any gas. When I went to work I did not discover that there was any more than that at any other time. None of the men who were working with me were using safety lamps. I would not have gone to work on the evening of the tenth of December, had I been notified that there was gas in the mine. I do not think that Mr. Wallace, the foreman of the mine, was to blame for having the men go into the mine on that day. I do not think the superintendent of the mine or the company were in any manner to blame for the cause of the accident. I believe that the accident could have been avoided if safety lamps were used. The men all thought the mine was safe on the evening of the accident; under that impression they all went to work. I did not see any safety lamps in the mine when I went to work that night; did not see any one offer a safety lamp to any of the men who went to work, nor did I see any used by anyone where I was working. I was about 150 feet from where the explosion occurred; do not know who was working there at the time. As far as I know, all the men in the mine were working with naked lights. I last saw Mr. Wallace about five or seven minutes before the explosion; I believe he had a naked light at the time. I believe the superintendent was doing the best he could for the safety of the men. When I last saw Wallace he was going down the slope; this was before the explosion; no one was with him. Both Galloway and Wallace were killed by an explosion of gas in the mine.

## THOS. SHIELDS, JR., TESTIFIED.

I am fire boss of slope No. 2, of C. C. & I. Co. I have been employed at this mine about two years. Mine is not in good working order at the present time owing to fire. Mine has been burning since the fifth of December. I have been working in the mine since the fire started; have been running the trip during that time. I was in the mine on the tenth of December; there was an explosion of gas on that date. When I went to work at 3 o'clock in the afternoon the men were at work finishing a stopping. I came out of the mine for timber, and when I had returned the stopping had been finished. I then started to do some timbering, and had completed one set, when I concluded to eat supper. It was while I was eating supper the explosion occurred. I did not know there was gas in the mine when the explosion occurred. I was about sixty feet from Wallace and Galloway, and was in a position where I could plainly see them, and at the time was looking at them from where I was. I could distinguish one man from the other; they were both sitting down, engaged in conversation. Both had naked lights; one of them held his lamp resting across his knee. I saw him raise it above his head as though in the act of explaining something about the stopping, as near as I could judge. The lamp that was raised ignited the gas; of this I am fully satisfied. I did not see any flame at the time of the explosion. I felt the hot dust on my face, and for a moment lost consciousness. Recovering, I started to go up the slope in order to leave the mine, but fell, and again lost consciousness. When I recovered the second time I was with my father, who was assisting to get me into a car. All the men at work were using naked lights. I do not know who was fire-boss since the fire started, but I know that Galloway was fire-boss on the shift that I was

working on at the time of the explosion. As far as I know the company supplied all necessary apparatus for extinguishing the fire. It is my opinion that the gas ignited; came from a leakage in the stopping. I could not see from what other source it could have come. I was cautioned while the stopping was being built not to go below the cross cut with a naked light. Jas. Jameson and Henry Dodd were both closer to Wallace and Galloway at the time of the explosion than I was.

James Jameson's testimony corroborated that of the others.

#### THE VERDICT.

At an inquest held at Coal Creek, Fremont county, Colorado, on the eleventh day of December A. D. 1888, before J. L. Hyde, coroner of said county, upon the dead bodies of Henry Wallace and Peter S. Galloway, lying there dead, by the jurors, whose names are hereto-subscribed, the said jurors, upon their oaths, do say that the said Henry Wallace and Peter S. Galloway came to their death on the evening of December 10, A. D. 1888, by an explosion of gas in mine No. 2, located at Coal Creek, Fremont county, Colorado: Caused by the igniting of said gas with a naked light in the hand of one of the deceased men.

THOS. B. MANNING, *Foreman.*

RICHARD HUGHES,

JAMES HARDY,

ROBERT KIMBLY,

WILLIAM WAGSTAFF,

ROBERT RUSHFORD,

J. L. HYDE, *Coroner, Fremont County.*

## LAS ANIMAS COUNTY—1887.

| NAME<br>OF<br>MINE | Name of company operating mines. | General manager. | General superintendent. | Town and post-office address. | Shaft, slope or drift. | Have your boilers been inspected? | Thickness of coal seam in feet and inches. | Price paid per ton to miners. | Production of coal in tons for year ending December, 1887. | Mine ventilated by— | Volume of air current in cu. ft. per minute. | Have you a map of your mine in inspector's office? | Average number persons employed during the year. | Has there been any explosive gas detected in your mine? | Name of superintendent at the mines. | Post-office address. |
|--------------------|----------------------------------|------------------|-------------------------|-------------------------------|------------------------|-----------------------------------|--|-------------------------------|--|---------------------|--|--|--|---|--------------------------------------|----------------------|
| El Moro .          | { C. C. & I Co.                  | A. H. Danforth   | Jno. Cameron            | Pueblo.                       | Drift.                 | Yes                               | 7-6  | .50                           | 303,070  | Fan                 | 32,000                                       | Yes .  | 236  | Yes .   | Jas. L. Lamb                         | Engle                |
| Starkville .       | { T. C. & C Co.                  | W. W. Allen      | E. G. Savage            | Topeka                        | Drift.                 | Yes                               | 6-6  | .60                           | 181,270  | Fan                 | 18,000                                       | Yes .  | 204  | Yes .   | J. Humphrey                          | Starkville           |

Estimate of production of several small mines near Trinidad, and other points; also of some new development work, 22,200



## LAS ANIMAS COUNTY.

The Trinidad Fuel Company has, during the last year, opened up an extensive colliery, on a portion of what is known as the Chicosa coal field, which is situated about fifteen miles, in a north-westerly direction, from Trinidad, and on the line of the D. & R. G. and D. T. & F. W. railroads. The latter company has run a branch of their road to the mines.

The mines were put in operation during the month of October and have since shipped considerable coal to market.

The coal vein is seven feet in thickness, and lies at a gentle dip in a south-westerly direction; is opened by two parallel drifts from the crop of the vein, which crops out on the hillside, and is thirty feet apart. The quality of the coal is bituminous, of fair coking properties.

The company proposes to erect, in the near future, quite a number of coke ovens, at some point where sufficient water for such purposes can be obtained; unfortunately there is a scarcity of water in the coal fields. It is expected that this company will next year figure among our largest producers.

## DENVER FUEL COMPANY'S MINES.

These mines are situated six miles from Trinidad, in a southern direction, and have been opened during 1888, and for new mines have shipped a remarkable amount of coal in a short space of time. The developments consist of three "drifts," with parallel air-ways, which are opened from a semicircular ridge running back into the mountain side, and are run in on the vein from the crop of the coal; one to the south and dip of the vein, which is about three degrees, and one in an easterly and the other in a westerly direction from the base of the hill-side.

The coal seam is about seven feet in thickness, is comparatively clean and of a fine coking quality. The roof is composed of arenaceous slate, and the floor of dark shale.

The capacity of these openings, at present, is about 1,000 tons per day. The pit cars are run from the drifts to the railroad (a branch of the Denver, Texas and Fort Worth railroad), a distance of eighteen hundred feet, by an improved system of tail rope haulage. The necessary power is furnished by a suitable engine, located near the openings. At the tippie a "Ramsey" car loader is used for loading the coal into railroad box cars. The slack from the chutes is conveyed to the coke ovens, . . . . in number, that have been erected by the company in proximity to their tippie.

The plant of this company, in all its details, is modern, and is so constructed as to insure a large output.

The three drifts are ventilated separate and independent of each other. In the east and west drifts the ventilation is produced by massively built and well regulated furnaces; the air shafts are, however, too shallow for such a mode of producing ventilation, for, owing to the shortness of the heating column, the rarified air, in passing through the furnace, scarcely commences to ascend with any velocity before reaching the surface, thus rendering their useful effect low. However, there has not yet been any reason to complain of an insufficient ventilating current.

The opening to the south is ventilated by a fan of twenty feet in diameter, which propels an abundance of air throughout the workings.

Much credit is due to Mr. J. A. Kebler, the company's general manager, for the rapidity and manner in which he opened these mines, and worked them up to an output of 1,000 tons per day, and for the completeness of all other improvements in detail there.

# Section of Strata

Passed through in drill hole on  
The Denver Fuel Co's Coal Lands.

| Names of Strata.           | Ft. In. |    | Intervals | Depth. |         |
|----------------------------|---------|----|-----------|--------|---------|
| Drift                      | 3       |    |           |        |         |
| Sandstone                  | 1       |    |           |        |         |
| Coal                       | 2       | 7  |           | 67     | 4       |
| Shale                      |         | 5  |           |        | 6 7     |
| Hard Sand Shale            | 6       |    |           | 0'     |         |
| Sandstone                  | 2       |    |           |        |         |
| Coal                       |         | 7  |           |        | 15 15 7 |
| Brown Sandstone            | 5       |    |           |        |         |
| Sandstone                  | 6       |    |           |        |         |
| Sandstone mixed with coal  | 3       |    |           | 25' 6" |         |
| Dark shale                 | 3       |    |           |        |         |
| Sandstone                  | 6       |    |           |        |         |
| Drab Shale                 |         | 7  |           |        | 39 2    |
| Coal                       | 1       | 11 |           |        | 41 1    |
| Boney shale                |         | 6  |           |        |         |
| Dark sand shale            | 12      |    |           |        |         |
| Sandstone                  | 3       |    |           |        |         |
| Rock mixed with Coal       | 1       |    |           | 36' 6" |         |
| Dark Shale                 | 7       |    |           |        |         |
| Sandstone                  | 8       |    |           |        |         |
| Lava with coke             | 3       | 2  |           |        |         |
| Coke                       | 1       | 10 |           |        | 75 9    |
|                            |         |    |           |        | 77 7    |
| Sand stone                 | 11      |    |           | 16' 0" |         |
| Thin layers of coal & Rock | 4       | 7  |           |        |         |
| Boney Coal                 | 1       | 2  |           |        | 93 2    |
|                            |         |    |           |        | 94 4    |



# The Denver Fuel Co's Coal Lands.

## Continued

| <i>Names of Strata.</i>      | <i>Ft.</i> | <i>In.</i> | <i>Intervals</i> | <i>Depth.</i> |
|------------------------------|------------|------------|------------------|---------------|
| <i>Dark Shale</i>            | 2          | 3          |                  |               |
| <i>Sand Stone</i>            | 1          |            |                  |               |
| <i>Dark Shale</i>            | 13         |            |                  |               |
| <i>Hard Dark Shale</i>       | 3          |            |                  |               |
| <i>Sand Shale</i>            | 6          | 7          |                  |               |
| <i>Coal</i>                  | 1          |            |                  |               |
| <i>Sand Stone</i>            | 3          | 6          |                  | 120 2         |
| <i>Shale</i>                 | 1          |            |                  | 121 2         |
| <i>Sand Stone</i>            |            | 5          |                  |               |
| <i>Coal</i>                  |            | 7          |                  | 126 1         |
| <i>Dark Shale</i>            | 2          |            |                  | 126 8         |
| <i>Shale mixed with coal</i> |            | 3          |                  | 128 5         |
| <i>Coal</i>                  |            | 10         |                  | 129 8         |
| <i>Dark Shale</i>            |            | 2          |                  | 130 6         |
| <i>Coal</i>                  |            |            |                  | 130 8         |
| <i>Sand Stone</i>            | 8          |            |                  |               |
| <i>Dark Shale</i>            | 2          |            |                  |               |
| <i>Sand Stone</i>            | 3          |            |                  | 143 8         |
| <i>Coal</i>                  |            | 4          |                  | 144           |
| <i>Dark Shale</i>            | 2          | 8          |                  |               |
| <i>Sand Stone</i>            | 28         |            |                  |               |
| <i>Coal</i>                  | 4          | 8          |                  | 174 8         |
| <i>Sand Stone</i>            |            | 6          |                  | 179 4         |
| <i>Dark Shale</i>            | 1          | 4          |                  | 26 181 2      |
| <i>Coal</i>                  |            | 8          |                  | 181 10        |
| <i>Dark Shale</i>            | 1          | 4          |                  | 183 2         |
| <i>Coal</i>                  | 1          | 1          |                  | 184 3         |
| <i>Dark Sandy Shale</i>      | 6          | 7          |                  | 190 10        |





*The Denver Fuel Co's Coal Lands.*  
*Continued*

[illegible]



## RATON COAL AND COKING COMPANY.

This colliery is situated about three miles south from the colliery of the Denver Fuel Company. It was opened during 1888, and consists of a drift opening with a parallel air-way on each side, and are run in on the vein from the croppings. The vein is four feet six inches in thickness, and is interstratified with three to eight inches of slate near the center.

The company considered that the further development of their property might produce more encouraging prospects than that indicated at the crop. So, with this view, fairly good improvements were made. The work of drifting in on the vein was followed by a double shift with a full force of workmen. At one time the indications were quite encouraging, and for some months the mine reached a capacity of 500 tons per day, and doubtless was operated at a good profit. But after drifting numerous excavations in various directions to a distance of about 1,000 feet, it was found that the coal seam was faulted by dislocations in the strata, and that near such disturbances the coal was much stratified with "bone" and other impurities. At present the outlook for the life of this property as an extensive producer would seem to point to a short duration. However, beyond such dislocations an area of coal can be expected to be found that will furnish an output of a few hundred tons per day for quite a time to come.

The ventilation was produced by two temporary furnaces, one situated at the entrance of each of the air-ways, at either side of the main drift, which formed an intake to both furnaces; but as there was not sufficient heating column for such a mode of ventilation, it was found to be inadequate to cope with the requirements needed, and in summer weather the workings were not ventilated as well as they should have been. The atten-

tion of the superintendent was called to the matter, and a ventilating fan recommended. Lately a twelve foot diameter fan has been erected.

There are doubtless tracts of good coal land to be found in the vicinity of this colliery, and as this coal company forms a part and parcel of the Denver, Texas & Fort Worth Railroad Company, it is, therefore, safe to predict that they will prospect in the near vicinity, and find another and better field, where the active operations of such a large coal company can continue.

#### TRINIDAD COAL AND COKING COMPANY.

The Starkville mine No. 1, has been for a number of years an extensively worked mine, and has been one of our largest producers. But during the last two years it has fallen short of its usual output. The main entries, when in a distance of 2,500 feet, run into low as well as impure coal, thus demonstrating that which has been found true at other points of our coal fields, that our best, as well as thickest veins, have been found within 2,000 to 3,000 feet from the crop.

The pillars and crop coal are now being taken out. The ventilation is produced by a six-foot "Murphy" fan; the mine is in as good condition as can be expected. It will doubtless soon be abandoned.

No. 2 mine is a new opening, and consists of parallel entries, which are driven in to a distance of 3,000 feet, and has been in operation over two years, but there has been no coal shipped from it. The vein at the crop was very thin, and interstratified with slate and "bone," and, being nearly worthless, it was dumped over the rock dump.

The company kept pushing these entries, however, on their inward march night and day, with the expectations of reaching a good vein of coal. And with such a view, the main entry was made suitable for a double



track, on which could be operated an improved system of endless or tail rope haulage. The entry was kept on a uniform grade, and fourteen feet wide by seven feet high, and timbered with "sets" five feet apart, the dimension of which was fourteen inches at the small end of timbers. Altogether, it was the finest and most expensive piece of work of its kind ever done in the State, or probably west of Pennsylvania; thus its looks were far from being a prospect tunnel.

The company, however, is now rewarded for such perseverance and expense, by finding a six foot vein of clean coal, which is thought to be of a good coking quality, which, under the circumstances, is quite fortunate for them, as they have an expensive plant of coke ovens, screening and dumping appliances, which must have soon been lying idle, as it is evident that their No. 1 mine, at best, can not be operated long.

The coal from No. 2 mine will be hauled to the No. 1 plant by a small locomotive, or by an endless rope system.

It is hoped, for the welfare of the general public in that vicinity, as well as for that of the company, that their operations at No. 2 will prove to be both extensive and profitable to all concerned.

#### EL MORO MINE.

This mine has been by far the largest producer in the State, having in 1888 produced 302,000 tons of coal. It is a drift opening, and the haulage on the main drift, or entry, is done by a mine locomotive. The mine is owned by the Colorado Coal and Iron Company.

#### GRAY CREEK MINE.

This mine has been recently opened. It is owned by Chapele & Co., but is leased by the Colorado Coal and Iron Company.

## FREMONT COUNTY.

The Cañon City Coal Company has, during the past two years, been very active in the rapid developing of extensive mining properties, and has spared no expense on the many valuable improvements made at their mines, which, in the way of hoisting and elevating machinery and dumping appliances, are *all* of the latest improved kind, and designed especially for operating coal mines on a large scale.

From the present outlook of things it would seem that, in the near future, this company must monopolize the coal mining operations of this county.

## NO. 1 MINE

Is located at Rockvale; consists of a shaft opening three hundred feet deep; thickness of coal seam is three feet three inches, and is worked by the long-wall system. The ventilation is produced by an eight-foot diameter "Murphy" fan. The main air current is split in two separate splits near the bottom of the shaft. The total volume of air has been greatly increased since writing my last report. The air shaft has been made larger, and overcasts of a large area have been made where the separate splits pass under and over each other, and the area throughout the entire air courses has been largely increased, the same giving best of results.

On the thirtieth of July, 1888, the chutes, elevators, "Ramsay" loader and all adjoining buildings were destroyed by fire, the origin of which is unknown. The same greatly decreased the production of this mine. The chutes have been rebuilt and very much improved, with new elevator, engines, screens, new tipple and railroad track scales under chute.

TABLE SHOWING NUMBER OF MINES, ETC., IN FREMONT COUNTY—1887.

| NAME OF MINE.              | NAME OF COMPANY OR INDIVIDUAL OPERATING MINE. | GENERAL MANAGER.         | GENERAL SUPERINTENDENT.     | TOWN AND POST-OFFICE ADDRESS OF GENERAL OFFICE. | Shaft, slope or drift. | Power used. | Mine ventilated by | Volume of air current at inlet per minute in cubic feet. | Production of coal for year ending Dec. 31, 1887, in tons. | Price paid per ton to miners. | Thickness of seams in feet and inches. | Average number of persons employed during the year. | Name of superintendent at mines. | POST-OFFICE ADDRESS.          | Have you two separate openings? | Have your boilers been inspected? | Has there been explosive gas detect'd in your mine? | Have you a map of your mine in Inspector's office? |
|----------------------------|---|--------------------------|-----------------------------|---|------------------------|-------------|--------------------|--|--|-------------------------------|--|---|----------------------------------|-------------------------------|---------------------------------|-----------------------------------|---|--|
| Rockvale No. 1 . . . . .   | Cañon City Coal Co. . . . .                   | W. W. Allen . . . . .    | Col. E. G. Savage . . . . . | Topeka, Kansas . . . . .                        | Shaft . .              | Steam . .   | Fan . .            | 75,000   | 252,564  | \$1 15                        | 3' 3"                                  | 335   | Robert Savage                    | Rockvale, Colorado. . . . .   | Yes . .                         | Yes . .                           | Yes . .   | Yes . .  |
| Rockvale No. 4 . . . . .   |   |                          |                             |   | Shaft . .              | Steam . .   | Fan . .            | 30,000   |  |                               |  |   |                                  |                               | Yes . .                         | Yes . .                           | Yes . .   | Yes . .  |
| Rockvale No. 5 . . . . .   |   |                          |                             |   | Slope . .              | Steam . .   | Fan . .            | 12,000   |  |                               |  |   |                                  |                               | Yes . .                         |                                   | Yes . .   | No . .   |
| Rockvale No. 7 . . . . .   |   |                          |                             |   | Slope . .              | Steam . .   | Furnace . .        | 9,000  |  |                               |  |   |                                  |                               | Yes . .                         |                                   | No . .  | No . .   |
| Coal Creek No. 1 . . . . . | Colorado Coal & Iron Co . . . . .             | A. H. Danforth . . . . . | John Cameron . . . . .      | Pueblo, Colorado . . . . .                      | Slope . .              | Steam . .   | Fan . .            | 30,000   | 154,520  | 90                            | 4' 6"                                  | 210   | Geo. Hadden                      | Coal Creek, Colorado. . . . . | Yes . .                         | Yes . .                           | Yes . .   | Yes . .  |
| Coal Creek No. 2 . . . . . |   |                          |                             |   | Slope . .              | Steam . .   | Fan . .            | 25,000   |  |                               |  |   |                                  |                               | Yes . .                         | Yes . .                           | Yes . .   | Yes . .  |
| Mellor Mine . . . . .      | Mellor Bros. Coal Co. . . . .                 | A. E. Mellor . . . . .   |                             | Williamsburg, Colo. . . . .                     | Drift . .              | Horse . .   | Nat. . .           |  | 1,042  | 1 15                          | 3' 8"                                  | 8   |                                  |                               | Yes . .                         |                                   |   |  |

Estimate on some small mines near Cañon City, 9,200.



There is now being placed a pair of first motioned 22"x36" cylinder engines, which, when put in operation, will hoist from an underground slope connecting the dip workings of the mine.

The engines are placed on the surface; the haulage rope will work through a vertical drill hole connecting with the underground slope. These improvements are calculated to greatly increase the output of coal, as far as the underground haulage is concerned.

#### NO. 4 MINE

Is situated a little over two thousand feet north from No. 1 mine, and is working on the same vein. The mines are connected by a communication entry, used as a traveling way. The ventilation is produced by a ten-foot diameter "Guebal" fan.

There has been added to the boiler capacity during the past year, two 34"x30' long cylinder boilers and stack.

#### NO. 3 MINE

Is abandoned; worked out.

#### NO. 5 MINE.

This mine is situated one and a half miles south-east from Cañon City. The coal vein is six feet in thickness.

During the past year, the small engine originally there, has been replaced by a pair of second motioned 22"x36" cylinder winding engines, with 1½" diameter rope.

The chutes have been entirely rebuilt, with the addition of a fully equipped elevating and screen house, with new elevating and screening machinery. Railroad track scales have been put in under the chute. Two 34"x36' cylinder boilers, with new stacks, have been added to the boiler plant.



An air shaft of about seventy feet area has been sunk for ventilation.

The slope has been graded, re-timbered and laid throughout with heavy rails. Mine cars of two tons capacity will be added to the equipment, so as to insure a large output.

#### NO. 7 MINE.

This mine has been opened during the past year. It is located about two and a half miles, in an easterly direction from No. 5 mine.

The coal seam is six feet in thickness. It is a slope opening, which is run down on the pitch of the vein.

Large double winding engines and improved elevating and screening machinery, railroad scales under chute, a 20-foot diameter "Guebal" fan, large compressor and mining machinery, improved tipple and chutes, etc., have been put in place and are now in operation. It is expected that this mine will produce a large output during the next year. A very fine system of water works has been put in for supplying the little mining town called Brookside, which has sprung up there since the mines were opened. A large pump is placed at a reservoir near to the side of the Arkansas river, which passes about one and a half miles from the mines. The water is pumped into a large tank, which is situated about sixty feet above the level of the town, from which it passes under pressure through cast iron pipes, through every street. Thus the people and the mines are furnished with an abundance of pure mountain water. The mines of this company are reached by branches of the A., T. & S. F. R. R.'s extension to Cañon City.

#### COAL CREEK SLOPE NO. 1,

Is situated at the town of Coal Creek. It is owned by the Colorado Coal and Iron Company. The property is reached by a branch of the Denver and Rio Grande

Railroad, which has, during the past year, laid a third rail from its main line to the mines, thus giving the coal company the advantage of shipping coal to points on standard gauge as well as on narrow gauge railroads.

This mine has been in active operation for the past fifteen years, being one of the first coal mines opened in the State. It has given employment to a large number of persons, and until late years it was one of our most extensive mines, and few were operated with more success.

But that the mine's best days are now over can not be disputed, the haulage distance from some of its points being over 6,000 feet, on dip grades from  $2^{\circ}$  to  $4^{\circ}$ .

The coal vein, although about the same in quality, is *far* from being as desirable or as profitable to either the miner or the company as it was heretofore, owing to quantities of slate that have to be removed and handled by all concerned.

It would seem that if the Colorado Coal and Iron Company would keep pace with its competitors it must open new mines and equip them with improved modern machinery, and judging from the undoubted reputation of this company, and its able manager and superintendents in the coal business, it can be hoped, for the good of all concerned, that it will be able to see bright prospects in the coal fields of Fremont county, and, in the way of opening new mines, give this county a share of its capital and enterprise.

COAL CREEK NO. 2, COLORADO COAL AND IRON  
COMPANY.

This mine is located a little over half a mile in a southerly direction from slope No. 1. Considerable improvements have been done at this mine during the past two years, with a view to increase the output and the

ventilating current. The main slope was made wider and retimbered and graded. The track gauge was widened suitable for the use of larger pit cars.

The coal field at this point looks favorable, and things in general indicate that this mine will be operated both extensively and profitably. The ventilation is produced by a fifteen-foot fan.

Two small openings are in operation in this county, one near Cañon City and one at Williamsburg.

## BOULDER COUNTY.

Boulder county embraces within its boundary lines an area of seven hundred and sixty-eight square miles, in the form of a parallelogram thirty-two miles long by twenty-four miles broad.

The western two-thirds of its area consists chiefly in mountains, which run in chain-like ridges in a westerly direction towards the Continental Divide, towering up majestically to an altitude of about 13,000 feet above sea level. Through the mountains are numerous cañons, ravines and gulches, where streams have cut through the rocks from their source at the Divide to the prairies.

Contained in these mountains are a number of metaliferous mines which yield the various precious metals, which add much to the wealth of Boulder county.

But one of its chief items of wealth lies in the great coal beds which are found to exist in numerous veins under the rolling prairie land which form the eastern one-third of its area.

In the south-eastern portion six separate strata of coal are contained in two hundred feet of the coal measures, which occur in a series of dark shales, soap-stone and thin layers of soft and compact sandstone.

TABLE SHOWING NUMBER OF MINES, ETC., IN BOULDER COUNTY—1887.

| NAME OF MINE.  | NAME OF OPERATORS. | Post-office address of general office. | Shaft, slope or drift | Power used. | Have you safety catches on cages? | Mine ventilated by | Volume of air current in cubic feet per minute. | Have you a map of your mine in inspector's office? | Thickness of coal seam in feet and inches | Price paid per ton to miner | Production of coal for year ending December 31, 1887, in tons | Average number of men employed during the year | Have you two separate openings? | Has there been any explosive gas detected in your mine? | Have your boilers been inspected? | Quality of coal | Name of Superintendent at Mines | POST-OFFICE ADDRESS |
|----------------|--------------------|--|-----------------------|-------------|-----------------------------------|--------------------|---|--|---|-----------------------------|---|--|---------------------------------|---|-----------------------------------|-----------------|---------------------------------|---------------------|
| Louisville,    | Marshall & C. Co.  | Denver,                                | Shaft,                | Steam       | Yes,                              | Furnace            | 12,000  | Yes  | 8' 0"                                     | \$ 0.92½                    | 58,347  | 123  | Yes                             | Yes,  | Yes,                              | Lignite         | Charles McNeil,                 | Louisville, Colo.   |
| McGregor,      | Francis & Reese    | Denver,                                | Shaft,                | Steam       | Yes                               | Fan                | 16,000  | Yes  | 4' 6"                                     | 1.12½                       | 7,516   | 20   | Yes                             | No  | Yes,                              | Lignite         | T. G. Reese,                    | Erie, Colo.         |
| Star,          | M. Brennan         | Caulfield                              | Shaft,                | Steam       | Yes,                              | Fan                | 17,200  | Yes  | 5' 0"                                     | 1.12½                       | 11,000  | 25   | Yes                             | No  | Yes,                              | Lignite         | M. Brennan                      | Caulfield, Colo.    |
| Marshall No. 3 | M. C. C. Co.       | Denver,                                | Slope,                | Steam       |                                   | Fan                | 22,500  | Yes  | 5' 0"                                     | 92½                         | 100,000   | 235  | Yes                             | No  | Yes,                              | Lignite         | Charles McNeil,                 | Louisville, Colo.   |
| Marshall No. 5 | M. C. C. Co.       | Denver,                                | Slope,                | Steam       |                                   | Fan                | 21,700  | Yes  | 7' 0"                                     | 92½                         |   |  | Yes                             | No  | Yes,                              | Lignite         | Charles McNeil,                 | Louisville, Colo.   |
| Jackson,       | Jackson Coal Co.   | Denver,                                | Shaft,                | Steam       | Yes,                              | Fan                | 9,000   | Yes  | 5' 0"                                     | 1.12½                       | 29,273  | 65   | Yes                             | No  | Yes,                              | Lignite         | Thos. Wolley,                   | Erie, Colo.         |
| Standard       | Standard Coal Co.  | Denver,                                | Shaft,                | Steam       | Yes,                              | Fan                | 10,800  | Yes  | 4' 3"                                     | 1.12½                       | 8,836   | 20   | No                              | No  | Yes,                              | Lignite         | William McNeil                  | Caulfield, Colo.    |
| Cleveland,     | Thos. Fall         | Erie                                   | Shaft,                | Steam       | Yes,                              | Fan                | 13,000  | Yes  | 4' 6"                                     | 1.12½                       | 11,548  | 25   | Yes                             | No  | Yes,                              | Lignite         | Thos. Fall                      | Erie, Colo.         |
| Stewart        | Goodridge & Marfel | Denver,                                | Shaft,                | Steam       | Yes,                              | Fan                | 11,000  | Yes  | 4' 6"                                     | 1.12½                       | 25,110  | 50   | Yes                             | No  | Yes,                              | Lignite         | H. Marfell                      | Erie, Colo.         |
| Garfield,      | Pollock & Padfield | Denver,                                | Shaft,                | Steam       | Yes,                              | Fan                | 12,000  | Yes  | 4' 6"                                     | 1.12½                       | 10,022  | 22   | Yes                             | No  | Yes,                              | Lignite         | Wm. Padfield                    | Erie, Colo.         |
| Fox,           | Fox Coal Co.       | Langford                               | Slope,                | Steam       |                                   | Furnace            | 13,500  | Yes  | 9' 0"                                     | 92½                         | 26,565  | 43   | Yes                             | No  | No                                | Lignite         | M. F. Fox                       | Langford, Colo.     |
| Baker,         | Daniel Davis,      | Erie                                   | Slope,                | Steam       |                                   | Furnace            | 10,000  | Yes  | 10' 0"                                    | 1.12½                       | 9,120   | 48   | Yes                             | No  | No                                | Lignite         | Daniel Davis,                   | Erie, Colo.         |





Their general dip is from  $2^{\circ}$  to  $5^{\circ}$  in an easterly direction, but towards the crop of the coal basin, and in proximity to "faults," the dip is often much more, in places being as much as  $25^{\circ}$ .

Only three of these beds are yet found to be of workable thickness, viz: Nos. 4, 5 and 6. Taking a transverse section of the strata at the mines of the Stewart, Cleveland and the McGregor collieries, situated in section 24, township 1, range 69, we find that the three workable veins are known to exist. Nos. 4 and 5 have been reached by shafts and No. 6 by drill holes. In places No. 6 is reported to be divided by a stratum of slate about the center of the vein.

No. 4 vein is four feet six inches thick, and from its floor to the top of No. 5 is a distance of about eighteen feet, consisting in soft gray shale. The vein (No. 5) is five feet in thickness.

Developments have, during the last year, demonstrated that in a south-westerly direction from the above collieries, that Nos. 4 and 5 veins increase in thickness, while the shale between them decreases and finally disappears, and the two veins form into one, and is found in places nine to fourteen feet thick. It is also found that where the vein is so thick that it does not run with the same uniformity throughout the field as where the veins are of less thickness. In section two (2), township one (1), range sixty-nine (69) west, the vein now being worked there has been thoroughly prospected, and is found to be from five to fourteen feet. J. J. Thomas & Company, of the Standard Coal Company, drilled the south part of the field and found the vein, in one of the drill holes, five feet eight inches in thickness. James Cannon, Jr., & Co., and Simpson & Son, have both opened in the same section during the past year, and are now shipping coal to market; the vein there is from

twelve to fourteen feet thick. (See section of measures taken at the Simpson mine).

From a section taken at the Stewart, Cleveland and McGregor mines, No. 6 vein is found at a depth of about forty feet lower than No. 5 vein. It has a uniform thickness of five feet six inches. Whether this vein exists to a workable thickness throughout the coal basin or not, remains to be demonstrated by future prospecting. The strata between Nos. 5 and 6 veins consist chiefly of black shale; massive sand stone underlies No. 6 vein, below which point no workable veins have been found.

In a drill hole, however, that has been recently put down at the McGregor colliery for water, in it a six-inch seam of coal was struck, at a depth of about 120 feet below No. 6 vein.

In the vicinity of Canfield, the Star, Standard and Jackson collieries are working exclusively on the No. 6 vein. Some of the upper small veins at this point are wanting, being very probably cut out by denudation. Nos. 4 and 5 veins are found thinner and much nearer to the surface.

The coal measures exist over a large area in the south-easterly portion of this country, and it can be expected that good fields of coal will yet be found, but just to what extent it would be premature for the most experienced geologist to say before boring.

It is the opinion, however, of the writer, that the coal fields of Boulder county are not so limited as is generally supposed, but that the coal veins may be found in numerous basins, isolated from each other by dykes, eruptions and denudation.

The veins now being worked are termed lignites. They are free burning, easily ignited, comparatively free from impurities and are much liked for general use in the Denver and outside markets. Their analyses

show from 46 to 57 per cent. fixed carbon and about 33 per cent. volatile matter, the balance of 100 parts being largely moisture and ash.

#### LOUISVILLE MINE NO. 1.

This mine was abandoned during the last year. The pillars were worked out, and the hoisting machinery, etc., have been moved away. The property was leased by the M. C. C. Co.

#### LOUISVILLE MINE NO. 2.

This mine was opened during the past year. The company had drilled their coal field, on the adjoining forty acres to where they sunk their shaft, and found the coal vein to be about nine feet in thickness, but, unfortunately for them, their shaft went down on low coal, about three feet thick. It appears, from further boring, that a thin ridge of coal, several hundred feet wide, runs through their field. They are now drifting from their new shaft to reach the vein in its full thickness at another point in the field.

The shaft, machinery and all other appliances are of the latest improved kind and first-class in all their details.

A large compressor plant has been put in to run the Leg machines. The coal will be mined exclusively by Leg machines and rotary air drills. In a few months it is expected that this mine will be in extensive operation. It is owned by the Marshall Consolidated Coal Company.

#### MARSHALL MINES NOS. 3 AND 5,

Are located about six miles from Boulder, and are reached by a branch of the Union Pacific Railroad. The mines are owned and operated by the Marshall Consolidated Coal Company. The coal is about nine feet in thickness; is worked by the double entry system.

The ventilation is produced by fans. The coal was mined exclusively by Leg machines, but the mines are now about worked out and the pillars are being mined out by hand mining.

#### THE FOX MINE.

This mine is in proximity to the Marshall mines, and is working on the same vein, which is nine feet in thickness. It is owned and operated by Messrs. Fox and Patterson. The ventilation is produced by a furnace.

#### THE M'GREGOR MINE

Is situated on the branch of the narrow gauge system of the Burlington and Missouri Railroad. It is a shaft opening, about one hundred feet deep. The mine is ventilated by an eight-foot fan, which has been put up since writing last report.

#### THE CLEVELAND MINE

Is in proximity to the McGregor mine, and is working the same vein. The mine is ventilated by an eight-foot diameter fan.

#### THE GARFIELD MINE

Is also on line of the narrow gauge system of the Burlington and Missouri Railroad. The mine is ventilated by a ten-foot fan.

#### THE STEWART MINE

Is situated on branch of the Union Pacific Railroad, is a shaft opening, and is ventilated by a ten-foot diameter fan.

#### THE STAR MINE

Is a shaft opening, and is located on branch of the Union Pacific Railroad, and is ventilated by a ten-foot fan.



*Section of Strata  
Passed through in Sinking  
the Simpson & Son's Shaft.*

NAMES OF STRATA      FT. IN.      INTERVALS      DEPTH

*Surface Clay & Gravel*

22

*Soft Soapstone*

41

71' 8"

*Black Slate*

8

*Coal*

8

*Silicious Rock (Hard)*

4

71' 8"

*Sandstone*

8

*Arenaceous Slate*

36

60' 8"

*Black Slate*

12

*Coal*

8

131' 8"

132' 4"

*Blue Indurated Clay*

26

26' 9"

*Coal*

9

158' 4"

*Silicious Rock*

5

159' 1"

*Sand Stone*

21

*Arenaceous Slate*

20

*Compact Sandstone*

5

87'

*Arenaceous Slate*

22

*Coal*

14

232' 1"

246' 1"





## THE STANDARD MINE

Is situated on branch of the Union Pacific Railroad, is a shaft opening, and is ventilated by a ten-foot fan. The Harrison mining machines were put into this mine about a year ago, and were worked very successfully until a month or so ago, when the miners refused to load coal by the day (at \$3.00 per day), and demanded 68 cents per ton. The company refused to pay it and laid its machines aside, and is now working the mine by hand mining.

## THE SIMPSON MINE.

This mine has been opened during the past year. It is a shaft opening. The coal vein is fourteen feet in thickness. The mine is equipped with all modern appliances. A compressor plant is in operation, running five of the Harrison coal mining machines, which work very successfully.

In the future it is expected that this mine will figure among our largest producing mines. The company expects soon to sink another shaft, which will be used as a hoisting shaft, as well as complying with the law in using it as an air-shaft, as it will be connected with their present hoisting shaft. This mine is owned by Mr. Simpson and sons.

## THE JACKSON MINE

Is located near the town of Canfield, is a shaft opening, is ventilated by a ten-foot fan. The coal is mined by Harrison machines.

## THE CANNON MINE

Is opened in the same section of land as is the Simpson mine, which has also been opened during the past year. The coal vein is fourteen feet in thickness. The plant at this mine is first-class in all its details. The company has spared no expense in putting the mine in good condition, and expect to operate it on a large scale.

## HUERFANO COUNTY—1887.

| NAME<br>OF<br>MINE. | Name of company.           | (General manager. | General superintendent. | Town and post-office<br>address of general<br>office. | Shaft, slope or drift. | Have your boilers been<br>inspected? | Thickness of coal seam<br>in feet and inches. | Price paid per ton to<br>miners. | Production of coal in<br>tons for year. | Mine ventilated by— | Volume of air cur-<br>rent in cubic feet per<br>minute. | Have you a map of<br>your mine in inspec-<br>tor's office? | Average number of per-<br>sons employed during<br>ing the year. | Has there been any ex-<br>plosive gas detected<br>in your mine? | Name of superintendent<br>at the mines. | Post-office address. |  |
|---------------------|----------------------------|-------------------|-------------------------|---|------------------------|--------------------------------------|---|----------------------------------|---|---------------------|---|--|---|---|---|----------------------|--|
| Walsen . .          | C.C.&I. Co. A. H. Danforth | Jno. Cameron      | Pueblo.                 | Slope   | Yes                    | 6-0                                  | .75   | }                                | Fan 26,000                              | Yes .               | 150   | Yes .  | Chas.Lamb   | Walsenburg  |   |                      |  |
| Cameron .           | C.C.&I. Co. A. H. Danforth | Jno. Cameron      | Pueblo.                 | Slope   | Yes                    | 3-6                                  | 1.00  |                                  | 131,810                                 | Fan 18,200          | Yes .   | 110  | Yes .   | Chas.Lamb   | Walsenburg                              |                      |  |
| Robinson .          | C.C.&I. Co. A. H. Danforth | Jno. Cameron      | Pueblo                  | Slope   | . .                    | 5-6                                  | .75   |                                  | Nat 7,000                               | No. .               | 14  | No. .  | Chas.Lamb   | Walsenburg  |   |                      |  |

HUERFANO COUNTY.

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A number of new openings have been made during the past year in this county. Six of them have been put in operation during the last three months.

In 1889, it is safe to say that the coal production of Huerfano county mines will multiply itself at least four fold.

There are three of these openings made at Rouse, called the Rouse mines, which are owned by the Colorado Fuel Company, where there are now employed 600 men; and judging from the enterprise of this company and the development work already done, and the modern appliances erected there for the speedy handling of coal in large quantities, it would be safe to say that an output of fifteen hundred tons per day may be reached. The company has spared no expense in putting up all their improvements after the latest improved plans. They have erected a large boarding house to accommodate one hundred men; also, a large number of comfortable houses for their miners having families. These mines were put in operation on September 1, and are under the able management of J. A. Kebler, general manager for the company. The mines are reached by a branch of the D. T. & F. W. railway.

Three new openings have been opened at Loma, three miles north of Walsenberg, on a branch of the Denver and Rio Grande Railroad, and consist of three slopes, which are owned and now operated by the Southern Colorado Coal Co. This company was organized last spring for the purpose of furnishing fuel and traffic for the Chicago, Kansas and Nebraska railway.

Their No. 1 slope is put down on a grade of ten feet to the hundred, reaching a seven-foot seam of coal.

No. 2 slope is put down at a grade of fifteen feet to the hundred, reaching a seam of clean coal, varying from five feet six inches to six feet in thickness, which lies about forty feet below the other vein.

These two slopes are operated with a double cylinder, double drum Jackson hoister, with tail rope attachments.

The coal from these two slopes is hoisted on to one trestle, which is very wide, with plenty of room for four tracks, but is dumped into two chutes.

The screens are so arranged as to make lump, egg and nut coal, and each can be loaded into box cars. The entire plan and workmanship of these chutes and screening appliances is first-class in every respect.

Both of these slopes make considerable water, which is pumped from the mine with improved Cameron pumps, two of which are in constant operation.

The steam power is furnished by two pair of steel cylinder boilers made especially for use at coal mines. Their attachments are all of the latest improved kind and of the most approved workmanship.

The boiler and engine houses are of corrugated iron, and the blacksmith shop and carpenter's shop and the other necessary buildings, consist of substantially built frame buildings.

Number 3 slope is being put down about one thousand feet north of slopes numbers 1 and 2 and will connect with the seventh north entry of the number 2 slope, which will then be used as a second entrance to the mine, as provided by law. The coal from this slope is now being brought to the main chutes on a tramway, operated by mules.

The ventilation of this mine will be produced by a twenty-foot fan, and as the air-courses are being made large, it can be expected that it will at least put in mo-





COAL 1'4"

SLATE 2 TO 4"

COAL 3'6"

SOFT. CLAY 2"

COAL 1'8"

FIRE CLAY



BLACK SLATE

CLEAN COAL 5'6" TO 6'

FIRE CLAY



tion an air current of 120,000 cubic feet per minute, if such a volume should be required.

The company has, at present, a large boarding house, capable of accommodating sixty men, and also has in process of construction, fourteen four-room houses for the accommodation of miners' families.

These houses are models in their way, being built from the best material, lathed and plastered, having brick chimneys, and will be the most complete and comfortable coal miners' houses in the State. Good water will be supplied through a pipe line to the vicinity of each house from a reservoir constructed for the purpose, and I understand that it is the intention of the company to make such liberal arrangements as to allow the miners to become owners of a house and home if they should so desire.

The plans and construction of this plant, etc., in detail have been designed and superintended personally by Mr. J. K. Robinson, late assistant general superintendent of the Colorado Coal and Iron Company.

The first shipments from these mines were on December 1, 1888, and it is the intention of the company to push the developments of these mines until they have them capable of a production of 1,000 tons per day.

Mr. Charles B. Patterson, of Denver, is president of the company, and Mr. James K. Robinson is vice president and general manager.

The quality of the coal from these mines is very good, and is adapted for either steam or domestic purposes. The diagrams on opposite page show sections of the two coal seams which they are operating.

## PITKIN COUNTY—1887.

| NAME OF MINE. | NAME OF COMPANY.     | NAME OF<br>GENERAL SUPER-<br>INTENDENT. | POST-OFFICE<br>ADDRESS. | Kind of opening. | Thickness of coal<br>seam. | Production of coal in<br>tons for year. | QUALITY<br>OF<br>COAL. | Average number of<br>persons employed<br>for the year. | Has there been any<br>fire damp detected<br>in your mine? |
|---------------|----------------------|---|-------------------------|------------------|----------------------------|---|------------------------|--|---|
| Spring Gulch. | Grand River Coal Co. | G. C. Hewitt                            | Glenw'd Spgs.           | Drift.           | 4-6                        | 4,000                                   | Bituminous.            | 20   | Yes   |

These mines were opened during the year.

## GARFIELD COUNTY—1887.

| NAME OF MINE. | NAME OF COMPANY.     | NAME OF<br>GENERAL SUPER-<br>INTENDENT. | POST-OFFICE<br>ADDRESS. | Kind of opening. | Thickness of coal<br>seam. | Production of coal in<br>tons for year. | QUALITY<br>OF<br>COAL.             | Average number of<br>persons employed<br>for the year. | Has there been any<br>explosive gas de-<br>tected in your mine? |
|---------------|----------------------|---|-------------------------|------------------|----------------------------|---|------------------------------------|--|---|
| Marion        | Grand River Coal Co. | G. C. Hewitt                            | Glenw'd Spgs.           | Drift.           | }                          | 16,000                                  | { Bituminous . .<br>Semi-bitumin's | 35   | Yes   |
| Sunshine      | Grand River Coal Co. | G. C. Hewitt                            | Glenw'd Spgs.           | Drift.           |                            |   |                                    | 30   | Yes   |

Estimate for the South Cañon Coal Company and other small openings, 10,000 tons.

## PITKIN AND GARFIELD COUNTIES.

Much already has been said about the great coal fields of these counties, relative to their numerous veins, their character, quality and area.

Although a large amount of exploration and prospecting work had been done in tracing the croppings of the series of pitching veins, which were found at many points, but beyond such preliminary examinations but little development work had been done until during the past year.

The Grand River Coal and Coke Company has opened four mines, one in Pitkin county and three in Garfield county, from which has been shipped 150,000 tons of coal, which was principally disposed of for fuel to the Colorado Midland Railroad. The mines are reached by branches from this road, and are operated for the mutual interests of the coal and railway companies. The company has in operation one hundred "bee hive" coke ovens at Cardiff, and now under construction one hundred more, which will be completed by spring. They made during the last year 15,000 tons of coke. The coal from which the coke was made was mined from the Spring Gulch mine, in Pitkin county, which is considered to be the finest quality of coal for coking purposes in Colorado, and second to none in the United States.

The company has a large demand for coke, but is reluctantly compelled to refuse orders, not being able to fill them. During 1889, it is expected to manufacture coke to the capacity of two hundred ovens.

The Spring Gulch mine is situated at the terminus of the Jerome Park branch of the Colorado Midland Railroad. It is opened by a drift on the edge of the



vein, it being pitching on an angle of forty to forty-five degrees. The vein is four feet six inches in thickness. A slope is now being sunk on the pitch of the vein, so that a second level can be run parallel to the drift opening. The vein is worked by stopes, with shutes from the levels. Cross-cuts are now also being driven to cut Nos. 2 and 3 veins.

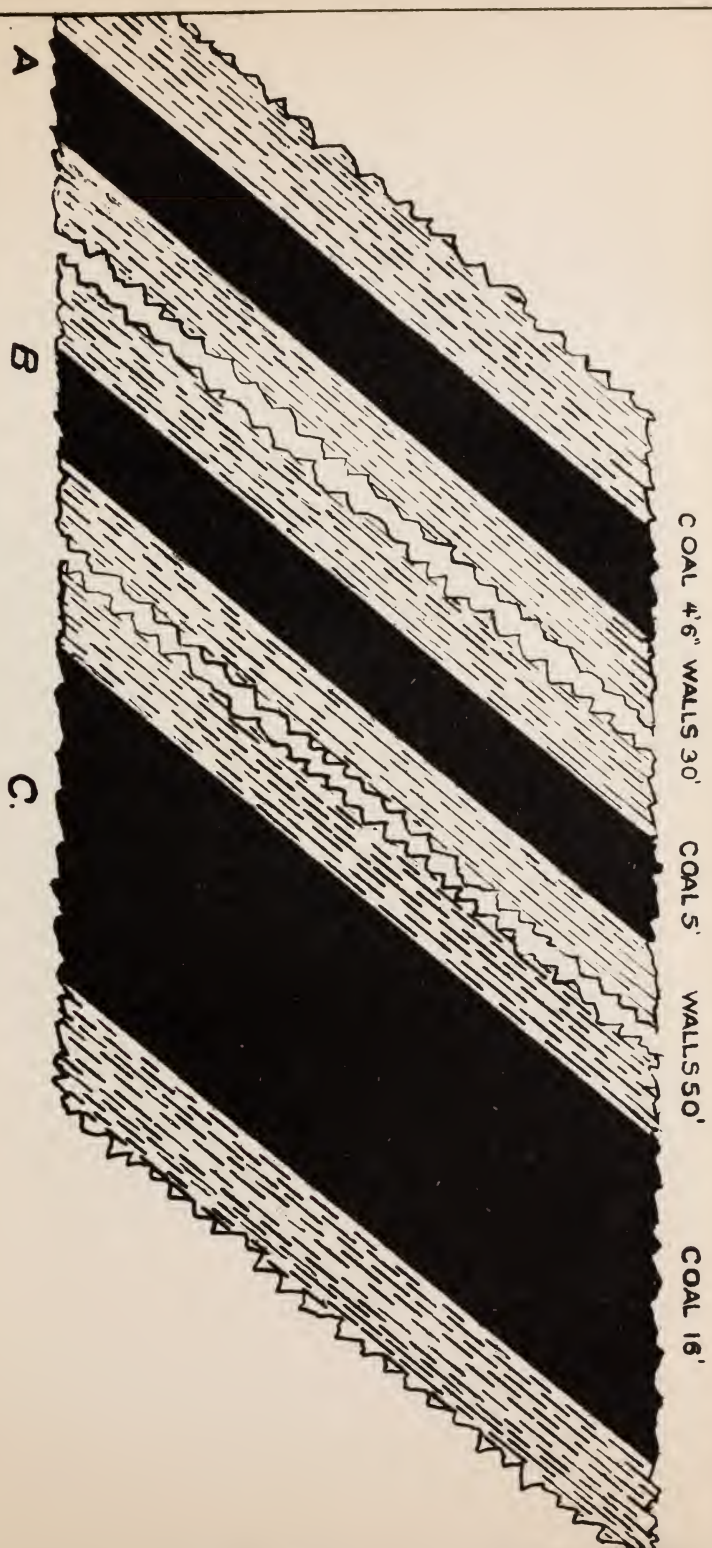
The diagram on the opposite page is a section, showing the position and thickness of the veins.

The Marion mine is situated about two miles, in a north-westerly direction from Spring Gulch, and is also owned by the Grand River Coal and Coking Company.

It consists of a drift opening, run in on the vein, which lies at an angle of about 45 degrees, is five feet six inches in thickness and is an extension of the vein found at Spring Gulch. The other two veins are here also found. The quality of coal and other conditions are about the same as at Spring Gulch.

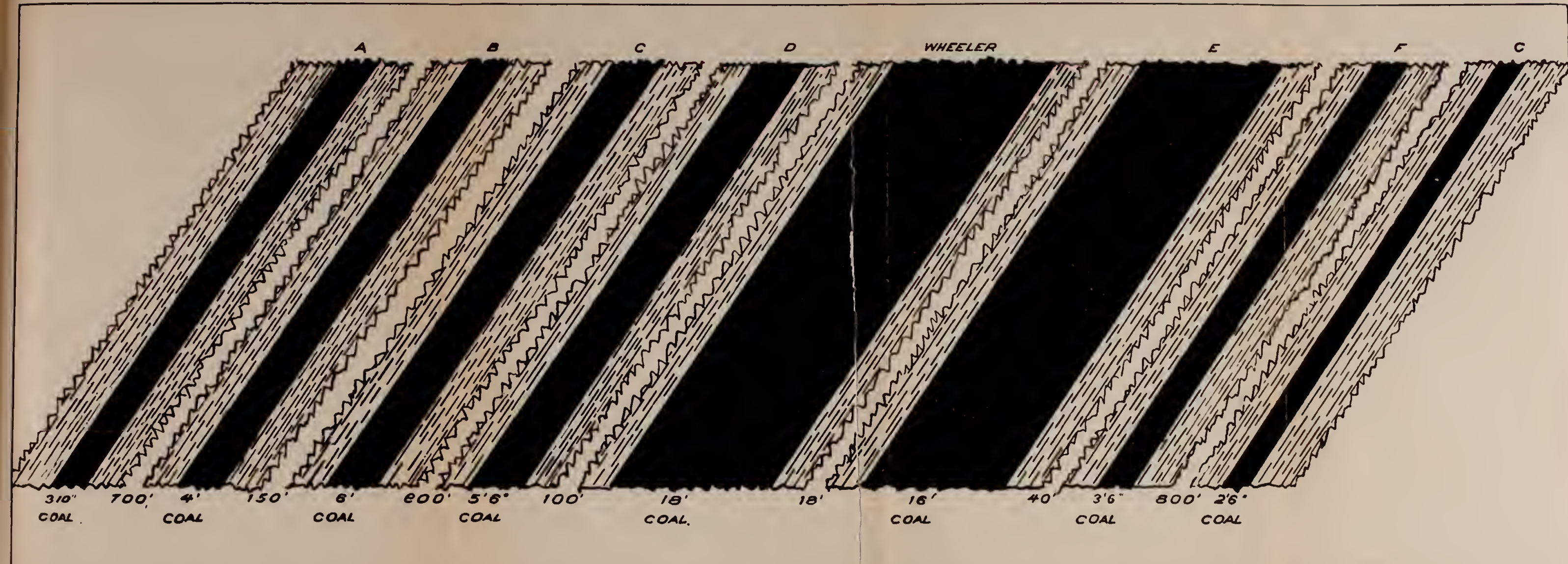
The Sunshine mine is situated about five miles, in a north-westerly direction from the Marion. This mine also consists of a drift opening, which is driven in on the vein to a distance of about 2,000 feet. The vein is about nine feet in thickness and is worked by stopes from the main drift. The quality of the coal is a semi-bituminous, and is a favorite coal for steam and domestic purposes.

There are now in progress two new slopes, being driven down on the pitch of the vein, on a dip of 45 degrees, and are now down to a distance of 200 feet; and also, a new water level tunnel is being driven in the vein, which will give room for one set of stopes to be worked above water level. There are here three parallel coal veins, from four feet six inches to nine feet. This property is also owned by the G. R. C. & C. Co.













## NEW CASTLE MINES.

These mines also belong to the G. R. C. & C. Co., and consist of five tunnels, which are driven in on separate veins, two of which are now in a distance of five hundred feet. The development work at these mines has been done during the latter part of 1888. They will soon be in condition to ship large quantities of coal. Coal of all characters and quality are found in this series of veins, eight in number, which are contained in less than 3,000 feet of the measures, which are pitching on an angle of about 55 degrees.

The opposite diagram shows position and thickness of the series of veins:



TABLE SHOWING NUMBER OF MINES, ETC., IN GUNNISON COUNTY—1887.

| NAME OF MINE         | NAME OF COMPANY OR INDIVIDUAL OPERATING MINE | GENERAL SUPERINTENDENT | TOWN AND POST-OFFICE ADDRESS OF GENERAL OFFICE | GENERAL MANAGER | shaft, slope or drift | Thickness of coal seams, in feet and inches | Price paid per ton to miners | Production of coal for year ending December 31, 1887, in tons. | Mine ventilated by | Volume of air current at inlet per minute, in cubic feet | Have your boilers been inspected? | Have you a map of your mine in inspector's office? | Has there been any fire-damp detected in your mine? | Quality of coal | Name of superintendent of mines. | POST-OFFICE ADDRESS  |
|----------------------|--|------------------------|--|-----------------|-----------------------|---|------------------------------|--|--------------------|--|-----------------------------------|--|---|-----------------|----------------------------------|----------------------|
| Crested Butte, No. 2 | Colorado Coal & Iron Co.                     | John Cameron           | Pueblo, Colorado                               | A. B. Danforth  | Drift                 | 6' 6"                                       | \$ 75                        | 161,390  | Fan                | 70,000   | Yes                               | Yes  | Yes   | Bitu            | John Gibson                      | Crested Butte, Colo. |
| Anthracite           | Colorado Fuel Co.                            | J. A. Kebler           | Denver, Colorado                               | — Osgood        | Drift                 | 5' 4"                                       | 75                           | 36,000   | Furnace            | 14,000   | Yes                               | Yes  | No  | Anth            | Henry Carter                     | Crested Butte, Colo. |
| Baldwin              | Union Coal Co.                               | D. O. Clark            | Omaha, Nebraska                                | .               | Shaft                 | 4' 6"                                       | 1 00                         | 42,732   | Fan                | 25,000   | Yes                               | Yes  | Yes   | Semi-Bi         | J. P. Chumisky                   | Baldwin, Colo.       |

Estimate for Mount Carbon, Richardson and other small openings, 3,000 tons. The number of tons tabulated includes coal made into coke.



## GUNNISON COUNTY.

The Anthracite mine is situated at the terminus of the Crested Butte branch of the Denver and Rio Grande Railway. The quality of the coal is a true anthracite. During the year a tail rope haulage system has been put in on main entry. This property is leased and operated by the Colorado Fuel Company.

## BALDWIN MINE.

This mine is owned by the Union Coal Company. There has been very little changes or improvements made at this mine since writing last report. It is a shaft opening, and is ventilated by a Murphy fan, and is in good condition.

## CRESTED BUTTE MINE.

Since writing last report, the eight-foot Murphy fan that had heretofore ventilated the mine, was replaced by a twenty-foot fan of the Guebal make, which produces an abundance of air to ventilate the workings.

A compressor plant has also been put in to furnish compressed air, to run a stationary hoister to haul coal from the dip workings. This property belongs to the Colorado Coal and Iron Company.



## WELD COUNTY—1887.

| NAME OF MINE | NAME OF COMPANY OR OPERATOR | NAME OF MANAGER | POST-OFFICE ADDRESS | Kind of mine. | Thickness of coal seam. | Price paid to miner per ton. | Production of coal, in tons, for year. | Average No. of persons employed for year | Mine ventilated by— | Volume of air current in cubic feet per minute, at inlet. | Have you two separate openings? | Have your boilers been inspected? | Quality of coal |
|--------------|-----------------------------|-----------------|---------------------|---------------|-------------------------|------------------------------|--|--|---------------------|---|---------------------------------|-----------------------------------|-----------------|
| *Mitchell    | Mitchell Coal and Land Co.  | L. M. Fontz     | Denver, Colo.       | Shaft.        | 5' 6"                   | \$1.12½                      | 31,288                                 | 62                                       | Fan.                | 15,480  | Yes.                            | Yes.                              | Lignite         |
| Eaton        | H. S. Eaton                 |                 | Eaton, Colo.        | Shaft.        |                         |                              | 1,600                                  |  | Nat.                |   |                                 |                                   | Lignite         |
| Brown        | M. Brown                    |                 | Eaton, Colo.        | Shaft.        |                         |                              |  |  | Nat.                |   |                                 |                                   | Lignite         |
| Vernon       |                             |                 |                     | Shaft.        |                         |                              | 1,650                                  |  | Nat.                |   |                                 |                                   | Lignite         |
| McKissic     |                             |                 | Eaton, Colo.        | Shaft.        |                         |                              | 740                                    |  | Nat.                |   |                                 |                                   | Lignite         |

Estimate on some small mines which did not report, 4,003 tons.

\*This mine was sold to the Colorado Fuel Company on the fifteenth day of November, 1887

## WELD COUNTY.

The only extensive operations now being carried on in this county is at the colliery of the Colorado Fuel Company, which is situated twenty-three miles north of Denver, on the line of the narrow gauge system of the Burlington and Missouri Railroad (originally the Denver, Utah and Pacific Railroad). This property was transferred to the Colorado Fuel Company by the Mitchell Coal and Land Company, on the fifteenth day of November, 1887.

Some substantial improvements have since been made by the new company. The vein worked by the Mitchell Coal and Land Company has been abandoned, and another one opened about forty feet lower in the measures.

The improvements and development there are being done with a view to handle a large output. The coal seam ranges about five and one-half feet in thickness, the floor is composed of a dark, calcareous sandstone, and the roof of arenaceous shale; the vein dips easterly. There is, no doubt, quite an area of coal in this county yet awaiting the ring of the prospector's drill. The coal is of a fairly good quality, and, notwithstanding the fact that it is termed a lignite, yet in quality it is rather above the term that word would indicate; they may be classed as true coals. Their analyses show from 45 to 60 per cent. fixed carbon and from 5 to 8 per cent. ash, and some of the lower veins as low as 5 per cent. moisture.

These coals give good satisfaction for generating steam, either under stationary or locomotive boilers, and are admirably adapted for domestic purposes, especially for use in stoves and grates, wherein they are more desirable than that of the more highly bituminous coals,

owing to their freeness in burning and their remarkable absence from clinker, soot and injurious odors. Of course, these coals have a tendency to slack when exposed to the weather, as they will absorb water, but they will stock good if placed in sheds. With the exception of blacksmithing, coking and gas-making purposes, they may be safely considered adaptable for use for all other ordinary purposes.

Near to the town of Eaton, which takes its name from our honorable ex-Governor, several small shaft openings have been put down to a vein of coal, from four to four feet six inches in thickness, found at a depth of from seventy to one hundred feet from the surface, and lying nearly horizontal, having a very gentle dip, a little south of an easterly direction. The strata over and under the coal compares with that occurring in the Erie coal basin.

It is safe to say that other veins are to be found in the Eaton field lower in the measures. It has been proved that in all coal basins so far explored in Colorado that at least two or more workable seams are found.

Judging from the favorable location of the Eaton coal field, it may be expected that extensive coal mines will, sooner or later, be operated there, from the fact that they would be so much nearer to Cheyenne, Wyoming, and points in Nebraska and the western part of Kansas, which must depend chiefly on Colorado for their fuel supply.

## EL PASO COUNTY—1887.

| NAME OF MINE.          | NAME<br>OF<br>COMPANY.     | NAME<br>OF<br>MANAGER. | POST-OFFICE<br>ADDRESS. | Post-office address of<br>general office. | Kind of opening. | Thickness of coal seam. | Price paid to miner. | Production of coal in<br>tons for year. | Mine ventilated by— | Volume of air current<br>at inlet in cubic feet<br>per minute. | Average number of per-<br>sons employed during<br>the year. |
|------------------------|----------------------------|------------------------|-------------------------|---|------------------|-------------------------|----------------------|---|---------------------|--|---|
| *Franceville . . . . . | D., T. & G. C. Co. . . . . | Jno. Hopkin . . . . .  | Franceville, . . . . .  | Denver . . . . .                          | Slope . . . . .  | 7-6 . . . . .           | .55 . . . . .        | 47,017 . . . . .                        | Fan . . . . .       | 28,000 . . . . .   | 65 . . . . .  |
| McFerran . . . . .     | . . . . .                  | . . . . .              | Colo. Springs . . . . . | . . . . .                                 | Shaft . . . . .  | 7-9 . . . . .           | . . . . .            | 500 . . . . .                           | Nat. . . . .        | 3,000 . . . . .  | 2 . . . . .   |

\*This mine has been sold to the Colorado Western Coal Company.

## EL PASO COUNTY.

During the past year the Western Coal and Mining Company has opened up an extensive mine on what is known as the McFerran coal property, situated twelve miles in an easterly direction from Colorado Springs, and is reached by a branch of the Chicago, Kansas and Nebraska railway from Manitou Junction, a distance of two and one-half miles. The mine consists in a slope opening; the coal vein is six feet in thickness. The mine commenced producing in November, 1888.

## FRANCEVILLE MINE.

This mine is owned and operated by the Denver, Texas and Fort Worth railroad. An air-shaft has been sunk there during the year.



## PARK COUNTY—1887.

| NAME OF MINE. | NAME OF COMPANY. | NAME OF GENERAL MANAGER. | POST-OFFICE ADDRESS OF GENERAL OFFICE. | Shaft, slope or drift? | Have your boilers been inspected? | Thickness coal seam in feet and inches. | Price paid to miners per ton. | Production of coal in tons for year. | Mine ventilated by— | Volume of air current in cubic feet per minute. | Have you two separate openings? | Have you a map of your mine in inspector's office? | Av. No. persons employed during year. | Has there been any explosive gas detected in your mine? |
|---------------|------------------|--------------------------|--|------------------------|-----------------------------------|---|-------------------------------|--------------------------------------|---------------------|---|---------------------------------|--|---------------------------------------|---|
| *Como No. 1   | Union Coal Co.   | D. O. Clark              | Omaha, Neb.                            | Slope                  | Yes                               | 10-0                                    | \$ 0 60                       | 23,421                               | St'm jet            | 20,000  | Yes                             | Yes  | 80                                    | Yes   |
| †Como No. 4   | Union Coal Co.   | D. O. Clark              | Omaha, Neb.                            | Slope                  | Yes                               | 10-0                                    | 0 60                          |                                      | Natural             | 20,000  | Yes                             | Yes  |                                       | Yes   |

\*This mine was closed down several months owing to gob fires.

†This mine is abandoned.

## PARK COUNTY.

The only coal mining done in this county is that being operated by the Union Coal Company at Como.

## COMO NO. 1 MINE

Is opened by a slope on the pitch of the coal, which is about  $45^{\circ}$ . The vein is seven feet in thickness, and is worked by stopes from main levels. The ventilation is aided by steam pipe heat and pump exhaust.

## COMO NO. 5 MINE.

This is a new mine, and has been opened during the past year. It is located about half a mile north of No. 1 mine. The slope is now down over 200 feet, at which point two entries have been run about 400 feet, all in good coal, averaging about seven feet in thickness. Hoisting engines, steam boilers and other necessary appliances have been completed, and it is expected that 200 tons per day will be taken from this opening by January next.

## LA PLATA COUNTY—1887.

| NAME OF MINE.           | NAME OF COMPANY.     | NAME OF MANAGER.   | POST-OFFICE ADDRESS. | Quality of Coal. | Kind of opening. | Thickness of coal seams. | Price paid per ton to miners. | Productions of coal in tons for year. | Average number of persons employed during year. | Has there been any fire-damp detected in your mine? |
|-------------------------|----------------------|--------------------|----------------------|------------------|------------------|--------------------------|-------------------------------|---------------------------------------|---|---|
| San Juan . . . . .      | San Juan Coal Co . . | T. F. Barbour . .  | Durango, Colo . .    | Bituminous .     | Drift            | 3' 6"                    | \$ 1 00                       | 14,000                                | 20  | No  |
| Porter . . . . .        | Porter Coal Co . . . | J. A. Porter . . . | Durango, Colo . .    | Bituminous .     | Drift            | 3' 3"                    | ..                            | 2,880                                 | 10  | No  |
| Black Diamond . . . . . | . . . . .            | B. Whitehead . .   | Durango, Colo . .    | Bituminous .     | Drift            | 4' 0"                    | ..                            | 600                                   | 4   | No  |
| Carter . . . . .        | City Mine . . . . .  | Robert Carter . .  | Durango, Colo . .    | Bituminous .     | Drift            | 4' 0"                    | ..                            | 1,400                                 | 6   | No  |

Estimate for Port Lewis mines, and other small openings, 4,000 tons.

## JEFFERSON COUNTY—1887.

| NAME OF MINE. | NAME OF SUPERINTENDENT. | POST-OFFICE ADDRESS. | Kind of mine. | Thickness of coal seam, in feet and inches. | Production of coal, in tons, for the year. |
|---------------|-------------------------|----------------------|---------------|---|--|
| White Ash     | Paul Lannis             | Golden               | Shaft         | 8' 0"                                       | 10,000                                     |
| Golden Star   | T. L. Billam            | Golden               | Shaft         | 8' 0"                                       | 2,000                                      |

## DOUGLAS COUNTY—1887.

| NAME OF MINE.     | NAME OF SUPERINTENDENT.   | POST-OFFICE ADDRESS. | Kind of mine. | Thickness of coal seam in feet and inches. | Production of coal in tons for the year. |
|-------------------|---------------------------|----------------------|---------------|--|--|
| Douglas . . . . . | James Cainon, Jr. . . . . | Denver . . . . .     | Shaft         | 8' 0"                                      | 3,500                                    |



ARAPAHOE COUNTY—1887.

| NAME OF MINE | NAME OF COMPANY                    | NAME OF MANAGER | Post-office address. | Thickness of coal seam in ft. and in. | Price per ton paid to miners. | Production of coal for the year in tons. | Kind of opening. | Quality of coal. | NAME OF SUPERINTENDENT AT MINE. | POST-OFFICE ADDRESS. |
|--------------|------------------------------------|-----------------|----------------------|---------------------------------------|-------------------------------|--|------------------|------------------|---------------------------------|----------------------|
| Scranton.    | Denver Railroad, Coal and Land Co. | C. W. Wicker    | Denver               | 6' 9"                                 | \$0.90                        | 16,000                                   | Slope            | Lignite          | Daniel McNeil                   | Scranton             |

## DOLORES COUNTY—1887.

| NAME OF MINE.  | NAME OF SUPERINTENDENT. | NAME OF COMPANY.      | POST-OFFICE ADDRESS.             | Thickness of coal seam in feet and inches. | Price per ton paid to miners. | Kind of mine. | Production of coal for the year, in tons. |
|----------------|-------------------------|-----------------------|----------------------------------|--|-------------------------------|---------------|---|
| Rico . . . . . | W. W. Paishall. . .     | G. V. M. & S. Co. . . | Rico, Dolores county, Colo . . . | 1' 8"                                      | \$ 2 00                       | Drift . .     | 1,000                                     |

## ARAPAHOE COUNTY.

An extensive area of lignite, or brown coal, exists in the easterly portion of this county. The crop of the seam is found about sixteen miles east of Denver, and can be traced in south-easterly direction for a distance of about seventy miles. It has been fully demonstrated by drill-holes and openings that at least two workable veins of coal exist, having a uniform thickness of about seven feet. Some openings have been made on the top vein in the vicinity of Deer Trail, and, also, at River Bend, in Elbert county, on the line of the Kansas Pacific Railroad. The most extensive openings on this isolated coal basin are situated at Scranton, about seventeen miles in an easterly direction from Denver, where extensive operations were carried on in 1886-1887, by the Denver Railroad Land and Coal Company, whose possessions there consist of four thousand acres. The development work done there consists of a slope opening, which is driven down to the coal through one hundred feet of strata, on a pitch of about  $12^{\circ}$ , the inclined distance being five hundred feet.

From the bottom of the slope, two parallel entries are driven in a southerly direction to a distance of about nineteen hundred feet, where they are connected with a vertical shaft of two hoisting compartments, one hundred and forty feet deep. From this shaft the parallel entries are still continued southward a distance of three hundred feet, at which point two entries are turned to the east.

It is seldom that a coal seam is found more uniform in its thickness, or with more regularity of dip, than at the Scranton mine. The coal lies nearly horizontal, having a gentle dip easterly. The roof immediately over the coal consists of thin alternate stratum of shale and coal,

*Section of Strata  
Passed through in Sinking  
the Scranton Coal Co's Shaft.*

| NAMES OF STRATA        | FT. IN. | INTERVALS | DEPTH   |
|------------------------|---------|-----------|---------|
| <i>Calcareous Clay</i> | 124     |           | 140'    |
| <i>Gray Slate</i>      | 5       |           | 129     |
| <i>Coal</i>            | 3       | 2         |         |
| <i>Slate</i>           | 1       | 6         |         |
| <i>Coal</i>            | 6       | 4         | 140'    |
| <i>Gray Slate</i>      | 24      |           |         |
| <i>Soapstone</i>       | 20      |           | 110' 8" |
| <i>Dark Gray Slate</i> | 60      |           |         |
| <i>Coal</i>            | 6       | 8         | 244     |
|                        |         |           | 250' 8" |





three feet in thickness, over which is a tenacious gray slate, and the floor is a mixture of hard, black slate and fire-clay.

The company, with a view to cheap transportation for their coal, built a narrow gauge railroad from Denver to their mines, and equipped it with the necessary cars and locomotives suitable to operate the mines with a large output. It was based upon an estimate of figures that at least eight hundred tons per day could be disposed of, owing to the very low price that the company could have sold their coal, as compared with other operators; and, no doubt, such an estimate was conservative enough, if the quality of the coal had been only fairly good. But here is wherein this large enterprise became a failure.

Those coal lands, although classed (by some geologists) to be in the cretaceous age of coal measures, in which our bituminous and true coals are found chiefly in Colorado, yet, from an examination of location, character of the coal seams and strata, it is evident that the coal basin there is of a much more recent origin, and not of the same horizon, as the coal series of true coals found in other parts of Northern Colorado, viz: The Erie, Boulder, Louisville and Golden collieries.

It has been claimed that the coal field in question is identical with the coal formation northerly, of which it is a part, separated by denudation for a distance of some twenty-five miles. Such a theory can not be correct, for the character of the measures, as well as the coal veins found in Arapahoe county, are entirely foreign to those found in Boulder or Weld counties.

The quality of coal is based principally upon the amount of fixed carbon it contains, but the percentage of ash, moisture and impurities contained in the vein should also be carefully considered. Chemical analysis of the Arapahoe coals show them to be remarkably low

in fixed carbon and noticeably high in their percentage of moisture and ash. The veins, as a whole, contain about eight per cent. of impurities, consisting in very thin stratum (1-16 to  $\frac{1}{2}$  inch thick) of tenacious slate, which is very difficult to separate from the coal.

Those veins can be truly termed lignite at an early stage, as they retain, to a remarkable degree, the texture of the wood and vegetation from which they were formed.

It is rather unfortunate that such a large body of coal, lying so near to the Denver markets, can not be utilized for some purpose.

From close observation and careful tests in burning this coal, I find that in heating stoves and open grates (with close grate bars), it burns passably, but in cooking stoves it fails to give a required degree of satisfaction. Under stationary boilers, with a large grate surface of fine perforated bars, the coal can be used with fair results and with some economy, too, over other coals, considering the price it could be got for per ton. But it will hardly ever become popular among firemen or engineers.

PRODUCTION OF COAL, ETC., FOR 1888.

| NAME OF MINE.              | COUNTY     | OPERATORS                                   | KIND OF OPENING. | CHARACTER OF COAL | Thickness of coal seam in feet and inches | Number of employees. | MINE VENTILATED BY | Volume of air circulated in cubic feet per minute | Production of lump coal in tons of 2,000 pounds | Production of nut coal | Production of slack coal | Total production of all coals in tons of 2,000 pounds | REMARKS  |
|----------------------------|------------|---|------------------|-------------------|---|----------------------|--------------------|---|---|------------------------|--------------------------|---|--|
| El Moro . . . . .          | Las Animas | Colorado Coal and Iron Co. . .              | Drift            | Bituminous        | 7-6                                       | 500                  | Fan                | 55,000  |   |                        |                          | 302,000   | Run of mine, coke made 95,000 tons   |
| Starkville . . . . .       | Las Animas | Trinidad Coal and Coking Co                 | Drift            | Bituminous        | 5   | 409                  | Fan                | 23,000  | 99,867  |                        | 43,665                   | 143,532   | 19,634 tons of coke were made  |
| Chicosa . . . . .          | Las Animas | Trinidad Fuel Co . . . . .                  | Drift            | Bituminous        | 7   | 80                   | Furnace            | 12,000  | 11,337  | 1,868                  | 3,761                    | 16,966  |  |
| Mine A, Sopris . . . . .   | Las Animas | The Denver Fuel Co . . . . .                | Drift            | Bituminous        | 6   | 500                  | Fan                | 30,000  |   |                        |                          | 134,557   | Mine run 6,000 tons coke   |
| Valley . . . . .           | Las Animas | Raton Coal and Coke Co . . . . .            | Drift            | Bituminous        | 4-6                                       | 100                  | Furnace            | 13,000  |   |                        |                          | 91,650  | Mine run   |
| Gray Creek . . . . .       | Las Animas | Colorado Coal and Iron Co. (leased)         | Drift            | Bituminous        |   | 40                   |                    |   |   |                        |                          | 14,000  | New mine   |
| Small mines not reported   | Las Animas |   |                  | Bituminous        |   |                      |                    |   |   |                        |                          | 3,750   | Estimated small mines near Trinidad  |
| Fort Lewis . . . . .       | La Plata   | United States Army                          | Drift            | Bituminous        | 9   | 4                    | Natural            | 3,000   |   |                        |                          | 1,750   | Estimated  |
| Rockvale No. 1 . . . . .   | Fremont    | Cañon City Coal Co . . . . .                | Shaft            | Semi-bituminous   | 3-4                                       | 460                  | Fan                | 63,000  | 124,275   | 10,580                 | 31                       | 134,886   |  |
| Rockvale No. 4 . . . . .   | Fremont    | Cañon City Coal Co . . . . .                | Shaft            | Semi-bituminous   | 3-5                                       | 270                  | Fan                | 28,000  | 95,638  | 16,959                 |                          | 113,597   |  |
| Rockvale No. 5 . . . . .   | Fremont    | Cañon City Coal Co . . . . .                | Slope            | Semi-bituminous   | 6   | 21                   | Fan                | 20,000  | 12,265  |                        | 2,070                    | 14,335  | New mines  |
| Rockvale No. 7 . . . . .   | Fremont    | Cañon City Coal Co . . . . .                | Slope            | Semi-bituminous   | 6   | 120                  | Fan                | 70,000  | 12,403  | 566                    | 500                      | 13,271  |  |
| Coal Creek No. 1 . . . . . | Fremont    | Colorado Coal and Iron Co . . . . .         | Slope            | Semi-bituminous   | 4-6                                       | 450                  | Fan                | 43,000  |   |                        |                          | 37,000  |  |
| Coal Creek No. 2 . . . . . | Fremont    | Colorado Coal and Iron Co . . . . .         | Slope            | Semi-bituminous   | 3-9                                       |                      | Fan                | 35,000  |   |                        |                          | 122,000   |  |
| Oak Creek . . . . .        | Fremont    | Mellor Bros . . . . .                       | Drift            | Semi-bituminous   | 3-5                                       | 14                   | Furnace            | 4,000   |   |                        |                          | 2,500   | Small opening  |
| Alkali Gap . . . . .       | Fremont    | Moore Bros . . . . .                        | Slope            | Semi-bituminous   | 3   | 10                   | Natural            | 2,500   | 1,200   |                        |                          | 1,200   | Estimated, small mine near Cañon City  |
| Marshall No. 3 . . . . .   | Boulder    | Marshall Consolidated Coal Mining Co        | Slope            | Lignite           | 8   | 130                  | Fan                | 20,000  | 85,000  |                        | 25,000                   | 110,000   |  |
| Marshall No. 5 . . . . .   | Boulder    | Marshall Consolidated Coal Mining Co        | Drift            | Lignite           | 8   |                      | Fan                | 22,000  |   |                        |                          |   |  |
| Fox . . . . .              | Boulder    | Fox & Patterson                             | Slope            | Lignite           | 9   | 57                   | Furnace            | 10,640  | 28,667  | 7,700                  | 2,150                    | 38,517  |  |
| Standard . . . . .         | Boulder    | Standard Coal Co . . . . .                  | Shaft            | Lignite           | 4-6                                       | 35                   | Fan                | 14,000  | 18,600  |                        | 5,000                    | 23,600  |  |
| Star . . . . .             | Boulder    | Star Coal Co . . . . .                      | Shaft            | Lignite           | 4-6                                       | 33                   | Fan                | 14,000  | 15,020  |                        | 4,000                    | 19,020  |  |
| McGregor . . . . .         | Boulder    | McGregor Coal Co . . . . .                  | Shaft            | Lignite           | 4-6                                       | 25                   | Fan                | 13,000  | 6,700   | 1,500                  | 3,000                    | 11,200  |  |
| Cleveland . . . . .        | Boulder    | Cleveland Coal Co . . . . .                 | Shaft            | Lignite           | 4-6                                       | 35                   | Fan                | 12,000  | 5,600   | 2,500                  | 144                      | 11,244  |  |
| Garfield . . . . .         | Boulder    | Garfield Coal Co . . . . .                  | Shaft            | Lignite           | 5   | 25                   | Fan                | 20,000  | 10,630  | 1,900                  | 2,500                    | 15,030  |  |
| Baker . . . . .            | Boulder    | Baker Coal Co . . . . .                     | Slope            | Lignite           | 12  | 13                   | Furnace            | 6,000   | 8,000   | 2,200                  | 100                      | 10,300  |  |
| Davidson . . . . .         | Boulder    | Edwards & Lewis Co . . . . .                | Shaft            | Lignite           | 2-9                                       | 4                    | Natural            | 4,000   | 150   |                        |                          | 150   | This company is just opening   |
| Cannon . . . . .           | Boulder    | Cannon Coal Co . . . . .                    | Shaft            | Lignite           | 14-8                                      | 40                   | Natural            | 5,600   | 600   |                        |                          | 600   | New mine   |
| Stewart . . . . .          | Boulder    | Goodredge & Marfel                          | Shaft            | Lignite           | 5   | 55                   | Fan                | 16,000  | 21,302  | 7,791                  |                          | 29,093  |  |
| Jackson . . . . .          | Boulder    | Jackson Coal Co . . . . .                   | Shaft            | Lignite           | 5   | 50                   | Fan                | 18,000  | 26,700  | 2,800                  | 700                      | 30,200  |  |
| Simpson . . . . .          | Boulder    | Simpson Coal Co . . . . .                   | Shaft            | Lignite           | 14  |                      | Natural            | 6,000   | 8,826   |                        | 2,300                    | 11,126  | New mine, commenced September, 1888  |
| Lehighville . . . . .      | Boulder    | Loch & Co . . . . .                         | Shaft            | Lignite           | 8   | 20                   | Furnace            | 14,000  | 4,255   |                        | 820                      | 5,075   |  |
| Como No. 1 . . . . .       | Park       | Union Coal Co . . . . .                     | Slope            | Semi-bituminous   | 8   | 156                  | Steam heat         | 18,480  | 42,107  | 1,736                  | 2,745                    | 46,588  |  |
| Como No. 5 . . . . .       | Park       | Union Coal Co . . . . .                     | Slope            | Semi-bituminous   | 8   |                      | Steam heat         |   |   |                        |                          |   |  |
| Mesa . . . . .             | Mesa       | Book Cliff Coal Co . . . . .                | Drift            | Bituminous        | 4-6                                       | 13                   | Natural            | 5,000   | 300   |                        |                          | 300   | New mine   |
| Grand View . . . . .       | Dolores    | Grand View Mining and Smelting Co           | Drift            | Bituminous        | 1-8                                       | 4                    | Natural            | 3,000   | 200   |                        |                          | 200   |  |
| Anthracite No. 1 . . . . . | Gunnison   | Colorado Fuel Co . . . . .                  | Drift            | Anthracite        | 5   | 100                  | Furnace            | 15,000  | 37,291  |                        | 7,500                    | 44,791  | This coal is sized in three grades   |
| Crested Butte . . . . .    | Gunnison   | Colorado Coal and Iron Co . . . . .         | Drift            | Bituminous        | 6   | 240                  | Fan                | 75,000  |   |                        |                          | 156,000   | Coke made, 40,700 tons   |
| Baldwin . . . . .          | Gunnison   | Union Coal Co . . . . .                     | Shaft            | Semi-bituminous   | 5-6                                       | 130                  | Fan                | 44,000  | 56,224  | 724                    | 635                      | 57,583  |  |
| Mitchell . . . . .         | Weld       | Colorado Fuel Co . . . . .                  | Shaft            | Lignite           | 5   | 60                   | Fan                | 15,000  | 21,558  | 4,996                  |                          | 26,554  |  |
| Brown . . . . .            | Weld       | M. Brown . . . . .                          | Shaft            | Lignite           | 4   | 2                    | Natural            | 1,500   |   |                        |                          | 500   |  |
| Walsen . . . . .           | Huerfano   | Colorado Coal and Iron Co . . . . .         | Slope            | Semi-bituminous   | 6-6                                       | 125                  | Fan                | 35,000  |   |                        |                          | 57,400  |  |
| Cameron . . . . .          | Huerfano   | Colorado Coal and Iron Co . . . . .         | Slope            | Semi-bituminous   | 3-6                                       | 75                   | Fan                | 22,000  |   |                        |                          | 29,200  |  |
| Redington . . . . .        | Huerfano   | Colorado Coal and Iron Co . . . . .         | Slope            | Semi-bituminous   | 7   | 25                   | Fan                | 11,000  |   |                        |                          | 19,400  |  |
| Rouse . . . . .            | Huerfano   | Colorado Fuel Co . . . . .                  | Slope            | Bituminous        | 6   | 600                  | Furnace            | 15,000  | 37,828  | 9,997                  | 1,975                    | 49,710  | Mine opened September 1, 1888  |
| Indian Creek . . . . .     | Huerfano   | John F. Moore . . . . .                     | Drift            | Semi-bituminous   | 3   | 3                    | Natural            |   | 600   |                        |                          | 600   |  |
| Loma No. 1 . . . . .       | Huerfano   | Southern Colorado Coal Co . . . . .         | Slope            | Semi-bituminous   | 7   |                      |                    |   |   |                        |                          |   | These mines have been opened during 1888, and commenced shipments on December 1. Mines will be ventilated by a 20' dia fan |
| Loma No. 2 . . . . .       | Huerfano   | Southern Colorado Coal Co . . . . .         | Slope            | Semi-bituminous   | 5-8                                       | 100                  | Fan                |   | 3,300   |                        |                          | 3,300   |  |
| Loma No. 3 . . . . .       | Huerfano   | Southern Colorado Coal Co . . . . .         | Slope            | Semi-bituminous   | 5-8                                       |                      |                    |   |   |                        |                          |   |  |
| Franceville . . . . .      | El Paso    | Denver, Texas & Fort Worth Coal Co          | Slope            | Lignite           | 8   | 75                   | Fan                | 23,000  | 30,096  | 6,032                  | 3,916                    | 39,144  |  |
| McFerran . . . . .         | El Paso    | Western Coal and Mining Co . . . . .        | Slope            | Lignite           | 6   | 38                   | Natural            | 7,000   | 4,000   | 600                    | 400                      | 5,000   | New mine, first shipment, November, 1888   |
| San Juan . . . . .         | La Plata   | San Juan Coal Mining Co . . . . .           | Drift            | Bituminous        | 4   | 20                   | Natural            | 8,000   | 20,000  | 2,500                  | 3,500                    | 26,000  |  |
| Porter . . . . .           | La Plata   | Porter Coal Co . . . . .                    | Drift            | Bituminous        | 3-4                                       | 4                    | Natural            | 5,000   | 2,200   | 7                      | 500                      | 2,775   |  |
| City Coal . . . . .        | La Plata   | Robert Carter . . . . .                     | Drift            | Bituminous        | 3   | 2                    | Natural            | 4,000   | 1,000   |                        |                          | 1,000   |  |
| Champion . . . . .         | La Plata   | Champion . . . . .                          | Drift            | Bituminous        | 4-6                                       | 3                    | Natural            | 2,500   | 900   |                        | 200                      | 1,100   |  |
| Black Diamond . . . . .    | La Plata   | B. Whitehead . . . . .                      | Drift            | Bituminous        | 4   | 3                    | Natural            | 2,000   | 1,000   |                        |                          | 1,000   | Estimated  |
| White Ash . . . . .        | Jefferson  | Golden Fuel Co . . . . .                    | Shaft            | Lignite           | 7   | 20                   | Fan                | 3,000   | 9,000   |                        |                          | 9,000   |  |
| Seranton . . . . .         | Arapahoe   | Denver Railroad, Land and Coal Co . . . . . | Slope            | Lignite           | 7   | 2                    | Natural            | 5,000   | 1,700   |                        |                          | 1,700   |  |
| McKissie . . . . .         | Weld       | John McKissie . . . . .                     |                  |                   |   |                      |                    |   |   |                        |                          | 1,000   | Estimated for McKissie and other small mines   |
| Pearl Ash . . . . .        | Douglas    | W. T. Wells . . . . .                       | Shaft            | Lignite           | 9   | 20                   | Natural            | 5,000   | 400   |                        |                          | 400   | Mine re-opened December 7, 1888  |
| Marion . . . . .           | Garfield   | Grand River Coal and Coke Co . . . . .      | Drift            | Bituminous        | 5-6                                       | 10                   | Natural            | 14,000  |   |                        |                          | 60,000  | Mine run   |
| Sunshine . . . . .         | Garfield   | Grand River Coal and Coke Co . . . . .      | Drift            | Semi-bituminous   | 5-6                                       | 35                   | Natural            | 12,000  | 25,930  | 8,010                  | 6,000                    | 40,000  |  |
| New Castle . . . . .       | Garfield   | Grand River Coal and Coke Co . . . . .      | Drift            | Bituminous        | 8   | 40                   | Natural            | 11,000  |   |                        |                          | 15,000  | Mine run   |
| Spring Gulch . . . . .     | Pitkin     | Grand River Coal and Coke Co . . . . .      | Drift            | Bituminous        | 4-6                                       | 40                   | Natural            | 8,000   |   |                        |                          | 28,000  | Mine run, 15,000 tons coke made  |
| Thompson . . . . .         | Pitkin     | Colorado Coal and Iron Co . . . . .         | Drift            | Bituminous        |   |                      |                    |   |   |                        |                          | 113   | New mine   |



## COAL MINES.

AN ACT TO AMEND CHAPTER SIXTEEN OF THE GENERAL STATUTES OF THE STATE OF COLORADO, ENTITLED "COAL MINES," APPROVED FEBRUARY 24, 1883.

*Be it enacted by the General Assembly of the State of Colorado:*

SECTION 1. That said chapter XVI. be amended so as to read as follows: SECTION 1. That the owner or agent of each coal mine or colliery in this State, employing ten or more men, shall make, or cause to be made, within six months after the passage of this act, an accurate map or plan of the workings of such coal mine or colliery, on a scale not exceeding one hundred feet to the inch, showing the bearings and distances of the workings, with the general inclinations of the stratum, and any material deflections in such workings, and the boundary lines of such coal mine or colliery, which shall be kept for the use of the Inspector, at the office of the said mine in the county where such mine or colliery is located, and which shall be kept up every three months; and shall also deposit a true copy of such map or plan with the Inspector of Coal Mines, and with the recorder of the county in which said coal mine or colliery is situated, to be filed in their respective offices; and said owner or agent shall cause, on or before the tenth day of January every year, a statement of the workings of such coal mine during the year past, from the last report to the end of the December month just preceding, to be marked on the original map or plan of said coal mine or colliery; *Provided*, If the owner or agent of any coal mine shall neglect, or refuse, or for any cause fail, for the period of one month after the time prescribed, to furnish said map or plan as hereby required, or if the Inspector shall find, or have reason to believe, said plan or map is inaccurate in any material part, he is hereby authorized to cause a correct map or plan of the actual workings of such coal mine or colliery to be made at the expense of the owner thereof, the cost



of which shall be recoverable from said owner by an action, as in cases of other debts, and shall cause a copy of the same to be filed in the office of the recorder of the county in which said coal mine or colliery is situated.

SEC. 2. It shall not be lawful, after six months from the passage of this act, for the owner or agent of any coal mine, wherein over fifteen thousand square yards have been excavated, to employ or permit more than fifteen persons to work therein, except in opening shafts or outlets, unless there are to every seam of coal worked in each mine at least two separate outlets, separated by natural strata of not less than one hundred feet in breadth, by which shafts or outlets, distinct means of ingress or egress are always available to the persons employed in the mine, and air shafts, in which are constructed and maintained ladder ways, shall be deemed and held to be an escape shaft within the provisions of this act, and no escape shaft be required; but it is not necessary for the two outlets to belong to the same mine; the second outlet need not be made until fifteen thousand square yards have been excavated in such mine, and to all other coal mines, whether opened and worked by shafts, slopes or drifts to such openings or outlets, must be provided within twelve months after fifteen thousand square yards have been excavated therein; and in case such outlets are not provided as herein stipulated, it shall not be lawful for the owner or agent of such mine to permit more than fifteen persons to work therein during each twenty four hours. In case a coal mine has but one shaft, slope or drift for the ingress or egress of the men working therein, and the owner thereof does not own suitable surface ground for another opening, he may select and approximate any adjoining land for that purpose, and for approach thereto, and shall be governed in his proceedings in appropriating such land by the provisions of law in force providing for the appropriation of private property by corporations, and such appropriation may be made whether he is a corporator or not; but no land shall be appropriated under the provisions of this act until the court is satisfied that suitable premises can not be obtained by contract upon reasonable terms.

Escapement shafts or other communication with a contiguous mine, as aforesaid, shall be constructed in connection with every vein or stratum of coal worked in such coal mine or colliery, as provided herein.

SEC. 3. In all cases where the human voice can not be distinctly heard, the owner or agent shall provide and maintain a metal tube from top to the bottom of the slope or shaft, or a telephone connection suitably adapted to the free passage of sound, through which conversation may be held between persons at the bottom and at the top of the shaft or slope; also, the ordinary means of signaling to and from the top and bottom of the shaft or slope; and in the top of every shaft shall keep an approved safety gate and an approved safety catch, and sufficient cover overhead on every carriage used for lowering and hoisting persons; and the said owner or agent shall see that sufficient flanges or horns are attached to the sides of the drum of every machine that is used for lowering and hoisting persons in and out of the mine, and also, that adequate brakes are attached thereto; the main link attached to the swivel of the wire rope shall be made of the best quality of iron, and shall be tested by weights satisfactory to the Inspector of Mines of the State; and bridal chains shall be attached to the main link from the cross pieces of the carriage; and no single link chain shall be used for lowering or raising persons into or out of said mine; and not more than five persons for each ton capacity of the hoisting machinery used at any coal mine shall be lowered or hoisted by the machine at any one time.

SEC. 4. The owner or agent of every coal mine or colliery, whether shaft, slope or drift, shall provide and maintain for every such mine an amount of ventilation not less than one hundred cubic feet, and such additional number of cubic feet as may be ordered by said Mine Inspector, per minute per person employed in such mine; and also an amount of ventilation of not less than five hundred cubic feet per minute for each mule or horse used in said mine, which shall be circulated and distributed throughout the mine in such a manner as to dilute and render harmless and repel the poisonous and noxious gases from each and every working place in the mine;

and break-throughs or air-ways shall be driven as often as the Inspector of Mines may order, at the different mines inspected by him; and all break-throughs or air-ways, except those last made near the working faces of the mines, shall be closed up and made air-tight by brattice, trap-doors or otherwise, so that the current of air in circulation in the mine may sweep to the interior of the mine, where the persons employed in such mine are at work; and all mines governed by this statute shall be provided with artificial means of producing ventilation, when necessary to provide a sufficient quantity of air, such as fanning, or suction fans, exhaust steam furnaces, or other contrivances of such capacity and power as to produce and maintain an abundant supply of air; but in case a furnace shall be used for ventilating purposes, it shall be built in such a manner as to prevent the communication of fire to any part of the works, by lining the upcast with an incombustible material for a sufficient distance up from the said furnace. All mines generating fire damp shall be kept free from standing gas, and every working place shall be carefully examined every morning with a safety lamp, by a competent person or persons, before any of the workmen are allowed to enter the mine; and the person making such examination shall mark on the face of the workings the day of the month; and in all mines, whether they generate fire damp or not, the doors used in assisting or directing the ventilation of the mine shall be so hung and adjusted that they will shut up of their own accord and can not stand open; and the owner or agent shall employ a practical and competent inside overseer, to be called a "mining boss," who shall keep a careful watch over the ventilating apparatus, and the air-ways, traveling-ways, pumps, timbers and drainage; also, shall see that, as the miners advance their excavations, that all loose coal, slate and rock overhead are carefully secured against falling in or upon the traveling ways, and that sufficient timber, of suitable lengths and sizes, is furnished for the places where they are to be used, and placed in the working places of the mines; and he shall measure the ventilation at least once a week, at the inlet and outlet, and also at or near the face of all the entries; and the measurement of air so made shall be

noted on blanks furnished by the Mine Inspector; and on the first week day of each month the "mining boss" of each mine shall sign one of such blanks, properly filled, and forward the same by mail to said Mine Inspector, a copy of which shall be filed at the office of the coal company, subject to inspection by miners.

SEC. 5. No person shall be knowingly employed as an engineer or mining boss, or take charge of any machinery or appliance whereby men are lowered into or hoisted out of any mine, but an experienced, competent and sober person, and no person shall ride upon a loaded wagon or cage used for hoisting purposes in any shaft or slope. No young person under twelve years of age, or woman or girl of any age, shall be permitted to enter any coal mine to work therein, nor any person under the age of sixteen years, unless he can read and write.

SEC. 6. All safety lamps used for examining or working coal mines shall be the property of the owner of the mine, and shall be under the charge of the agent thereof. The term "owner" in this act shall mean the immediate proprietor, lessee or occupier of any coal mine or colliery, or any part thereof; and the term "agent" shall mean any person having, on behalf of the owner as aforesaid, the care and management of any coal mine or colliery, or any part thereof.

SEC. 7. All boilers used in generating steam in and about coal mines and collieries shall be kept in good order, and the owner or agent, as aforesaid, shall have said boilers examined and inspected by a competent boiler-maker, or other well qualified person, as often as once every six months, and the result of such examination shall be certified, in writing, to the mining inspector; and every steam boiler shall be provided with a proper steam gauge, water gauge and safety valve; and all underground, self-acting or engine planes, or gangways, on which coal cars are drawn and persons travel, shall be provided with some proper means of signaling between the stopping places and the ends of said planes or gangways; and sufficient places of refuge, at the sides of said planes or gangways, shall be provided, at



intervals of not more than fifty feet apart; and there shall be cut, in the side of every hoisting shaft, at the bottom thereof, a traveling way, sufficiently high and wide to enable persons to pass the shaft, in going from one side of the mine to the other, without passing over or under the cage or hoisting apparatus.

SEC. 8. Whenever loss of life, or serious personal injury, shall occur by reason of any explosion, or of any accident whatsoever, in or about any coal mine or colliery, it shall be the duty of the owner or agent thereof to give notice to the mine inspector, and if any person is killed thereby, to the coroner of the county, also; and the Inspector shall immediately go to the scene of said accident and render such assistance as he may deem necessary for the safety of the men, and shall ascertain, by the testimony before the coroner, or by taking other evidence, the cause of such explosion or accident, and file record thereof in his office.

SEC. 9. In all coal mines in the State the miners employed and working therein, the owners of the land, or other persons interested in the rental or royalty of any such mine, shall at all proper times have full right of access to, and examination of, all scales, machinery, or apparatus used in or about such mine; to determine the quantity of the coal mined, for the purpose of testing the accuracy of all such scales, machinery or apparatus; and such land owners, or other persons, may designate or appoint a competent person to act for them, who shall, at all proper times, have full right of access to, and examination of, such scales, machinery or apparatus, and seeing all weights and measures of coal mined, and the accounts kept of the same; but not more than one person, on behalf of the land owners, or other person interested in the rental or royalty, jointly, shall have such right of access, examination and inspection of scales, weights, 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; and the miners employed in any mine may, from time to time, appoint two of their number to act as a committee to inspect, not oftener than once in every month, the mine



and the machinery connected therewith, and to measure the ventilating current, and if the owner, agent, or manager so desires, he may accompany said miners, by himself, or two or more persons whom he may appoint for that purpose. The owner, agent, or manager shall afford every necessary facility for making such inspection and measurement; but the said miners shall not in any way interrupt or impede the work going on in the mine at the time of such inspection and measurement.

SEC. 10. Any miner, workman, or other person, who shall intentionally injure any shaft, lamp, instrument, air-course or brattice, or obstruct or throw open air-ways, or open a door and not close it again, or carry lighted pipes or matches into places that are worked by safety lamps, or handle or disturb any part of the machinery, or enter any place of the mine against caution; or who wilfully neglects or refuses to securely prop the roof of any working place under his control, or disobey any order given in carrying out the provisions of this act, or do any other act whereby the lives or the health of persons, or the security of the mines or machinery is endangered, shall be deemed guilty of a misdemeanor, and upon conviction, may be punished by a fine of not less than twenty-five dollars nor more than two hundred dollars, or may be imprisoned in the county jail not less than thirty days, nor more than one year, or may be punished by both such fine and imprisonment, at the discretion of the court.

SEC. 11. In case any owner or agent disregards the requirements of this act, any court of competent jurisdiction may, on application of the Inspector, by civil action in the name of the State, enjoin or restrain the owner or agent from working or operating such mine with more than twelve miners underground during each twenty-four hours, until it is made to conform with the provisions of this act. And such remedy 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.

SEC. 12. For any injury to person or property occasioned by any violation of this act, or any wilful failure to comply with its provisions, by any owner or lessee or

operator of any coal mine or opening, a right of action against the party at fault shall accrue to the party injured for the direct damages sustained thereby, and in any case of loss of life by reason of such violation or failure, a right of action against the owners and operators of such coal mine or colliery, shall accrue to the widow and lineal heirs of the person whose life shall be lost, for like recovery of damages for the injury they shall have sustained.

SEC. 13. The provisions of this act shall not apply to or affect any coal mine in which not more than ten men are employed underground during each twenty-four hours, but on the application of the proprietor, or of the miners in any such mine, or when the Mine Inspector may deem it necessary, said Mine Inspector shall make, or cause to be made, an inspection of such mine, and shall direct and enforce any regulations in accordance with the provisions of this act, that he deems necessary for the safety and health of the miners.

SEC. 14. That the board of examiners, heretofore appointed under the provisions of this act concerning coal mines, approved February 24, 1883, and amended by this act, shall hold their office for and during the time for which they were appointed, to wit: until January 1, A. D. 1887. And it shall be the duty of the board of examiners to meet at such times, and at such places within this State, as may be directed by the Governor of this State, and examine such persons as may present themselves for examination, touching their qualifications for the office of Mine Inspector, as provided in this act, and shall inquire into their character and qualifications, and shall certify the names of such persons as they shall find to be competent to fill such office of Mine Inspector, to the Governor, which list of names, so certified, shall be placed on file in the office of the Secretary of State. Members of such board of examiners shall, before entering upon their duties, take and subscribe the following oath, viz: We, the undersigned, do solemnly swear (or affirm) that we will perform the duties of examiners of applicants for appointment of Inspector of Coal Mines, to the best of our abilities, and that in recommending or rejecting said applicants, we will be governed by the evidence of qualifications to fill the position under the

law creating the same, and not by any consideration of political or personal favors; that we will certify to all whom he may find qualified, according to the true intent and meaning of the act, and none others, to the best of our judgment. The qualifications of candidates for said office of Inspector of Mines, to be inquired into and certified by said examiners, shall be as follows, namely: They shall be citizens of the United States, of temperate habits, of good repute as men of personal integrity, shall have obtained the age of thirty years, and shall have had at least one year's experience in the working of coal mines of Colorado, and five years of practical experience in the working of coal mines in the United States, and have a practical knowledge of mining engineering, and of the different systems of working and ventilating coal mines, and of the nature and properties of the noxious and poisonous gases of mines, particularly fire-damp. The board of examiners shall receive six dollars per day, and same mileage as is allowed to members of the legislature, to be paid out of the State treasury, upon the filing of the certificates of the examining board in the office of the Secretary of State, as hereinbefore provided. As often as vacancies in said office of Inspector of Mines shall occur, by death, resignation, or malfeasance in office, which shall be determined in the same manner as in the case of any other officer of the State government, the Governor shall fill the same, by appointment, for the unexpired term, from the names on file in the office of the Secretary of State, as hereinbefore mentioned as having passed examination. On January 1, A. D. 1887, and every four years thereafter, the Governor shall appoint one reputable mining engineer, of known ability, and shall notify the judges of four of the judicial districts of the State, within which coal mines are being operated, to each appoint one reputable coal miner, of known experience and practice, from their respective districts, and the five so appointed shall constitute a new board of examiners, whose duties, term of service and compensation, shall be the same as those provided for by this section; and from the names that may be certified by them, the Governor shall appoint the Inspector of Mines provided for in this act. Nothing in this act shall be construed to

prevent the re-appointment of any Inspector of Coal Mines. The Inspector of Coal Mines shall receive for his services an annual salary of two thousand dollars, and ten cents per mile mileage for all distances traveled in the discharge of his official duties, to be paid monthly by the State Treasurer; and said Inspector shall reside in the State, and shall keep an office at the capitol, or other building, in which the offices of the State are located. Each Inspector is hereby authorized to procure such instruments, and chemical tests, and stationery, from time to time, as may be necessary to the proper discharge of his duties under this act, at the expense of the State, which shall be paid by the State Treasurer, upon accounts duly certified by him and audited by the proper department of the State. All instruments, plans, books, memoranda, notes, etc., pertaining to the office, shall be the property of the State, and shall be delivered to their successors in office.

SEC. 15. The Inspector of Coal Mines shall, before entering upon the discharge of his duties, give bond in the sum of five thousand dollars, with sureties, to be approved by the judge of the district court in which he resides, conditioned for the faithful discharge of his duty, and take an oath (or affirmation) to discharge his duties impartially and with fidelity, to the best of his knowledge and ability.

SEC. 16. No person acting as manager or agent of any coal mine, or as a mining engineer for any coal mining company, or to be interested in operating any coal mine, shall at the same time act as an Inspector of Coal Mines under this act.

SEC. 17. The Inspector of Coal Mines shall devote the whole of his time to the duties of his office. It shall be his duty to enter into and thoroughly examine all coal mines in the State in which more than ten men are employed, at least once each quarter, to see that all the provisions of this act are observed and strictly carried out, and the Inspector may enter, inspect and examine any coal mine in the State, and the works and machinery belonging thereto, at all reasonable times, by night or day, but so as to not unnecessarily obstruct or



impede the workings of the mine and the owner or agent of such mine is hereby required to furnish the means necessary for such entry and inspection. The Inspector shall make to the Governor of the State a biennial report, which shall show the number of coal mines, and development on the same, during each year, and of persons employed in and about each mine, and the extent to which the law is obeyed, the progress made in the improvement sought to be secured by the passage of this act, the number of accidents and deaths resulting from injuries received in coal mines; as also statistics showing output of coal and development made annually at each mine, with all facts concerning the production and transportation of coal to market, and other facts of public interest coming under the provisions of this act; which record shall be filed in the Inspector's office. The Secretary of State is hereby authorized to have printed one thousand copies of said biennial report, at the expense of the State, for distribution to members of the Legislature, mine owners, superintendents of mines, and others interested in coal mines; said report shall be printed on or before December 31, preceding the biennial session of the Legislature. And the Inspector is hereby authorized to employ clerical or other assistance, at an expense not to exceed one thousand five hundred (1,500) dollars in any one year, which shall be paid out of any moneys appropriated for that purpose, on certificate of said State Inspector of Coal Mines, showing the services rendered and the amount thereof, and on presentation of such certificate to the State Auditor by the person entitled thereto, he shall issue his warrant on the State Treasurer for the amount thereof, to be paid out of any appropriation as aforesaid.

SEC. 18. That the owner, agent or lessee of each coal mine or colliery in this State, employing ten or more men, shall, when working in close proximity to an abandoned mine, or part of a mine, containing water or fire-damp, cause bore holes to be kept at least twelve feet in advance of the coal face and sides of all working places in such mine or colliery known to be approaching old and abandoned workings, side holes to be not more than ten feet apart; and said owner or agent shall



cause all abandoned shafts, air shafts, slopes, slack piles or cave holes to be securely and safely fenced off, and in all coal mines coming under the provisions of this act, where gob fires or spontaneous combustion are known or even suspected to exist, a careful inspection shall be made daily of the workings by the mine boss and another competent person, and if an increase of temperature be localized in any part of the gobs, prompt action shall be taken to remove the heated gob or debris, or extinguish the fire by water or other contrivance; but if the fire has already reached such proportions that it is impossible to extinguish it in that way, then it shall be the duty of the superintendent, or mine boss in the absence of the superintendent, to at once flood with water the site of the fire, or build suitable stoppings of double walls of a concave shape, and at least one foot apart, with ends built back into cuttings made in the coal or rock, and the center between the walls to be built with sand closely tamped, so as to fill up all cracks and crevices, the outside of said walls to be carefully plastered with lime and cement, so as to completely isolate the fire from the air; and that on all cars double drawbars shall be attached to the bottom or other parts of the car, so that two separate couplings may be used to connect each and every car loaded or hoisted on any slope coming under this act, and that the hooks which connect with the drawbar of the car shall be constructed with a clevice or other contrivance, so as to prevent them from becoming detached while the cars are in motion on the slope; also, that double chains, with approved safety hooks, shall be attached to the socket of the hoisting rope; *Provided*, That any appliance, other than those herein required, may be used in the construction and hoisting of cars which may accomplish the same result with equal safety and security to life and limb.

SEC. 19. The mining boss, or other competent person, shall make daily inspection of ropes, chains, cages and other hoisting appliances, guides and shaft timbers, and make a record of such daily inspection in a book, kept at the office of the mine, for that purpose, and the fire boss shall keep a daily record of any defects in the ventilating appliances, and any standing gas that may be found in said mine, designating the entry and room

in which said gas is found. Each of the records herein required to be kept, shall be open at all times to the Mine Inspector's and miners' committee's inspection, and a copy thereof shall be filed in the office of the said Mine Inspector on the first Monday of December of each year.

SEC. 20. The neglect or refusal to perform the duties required to be performed by any section of this act, or the violation of any of the provisions hereof, shall be deemed a misdemeanor, and any person so neglecting or refusing to perform such duties, or violating such provisions, shall, upon conviction, be punished by a fine of not less than one hundred dollars, nor exceeding five hundred dollars at the discretion of the court, and all penalties recovered under this act shall be paid into the treasury of the State.

SEC. 21. All acts or parts of acts, inconsistent with the provisions of this act, are hereby repealed.

SEC. 22. An emergency exists; therefore, this act shall take effect and be in force from and after its passage,

Approved April 8, 1885; amended April 2, 1887.

## MINING LAWS OF WYOMING TERRITORY.

AN ACT RELATING TO COAL MINES, AND PROVIDING FOR THE LIVES, HEALTH, SAFETY AND WELFARE OF THOSE EMPLOYED THEREIN.

*Be it enacted by the Council and House of Representatives of Wyoming Territory:*

SECTION 1. That the owner, operator or superintendent of every coal mine shall make or cause to be made an accurate map or plan of such coal mine, on a scale not exceeding two hundred feet to the inch; which map or plan shall exhibit all the openings or excava-

tions, the shafts, tunnels, slopes, planes, gangways, entries, cross headings, rooms, etc., and shall show the direction of the air-currents therein, and shall accurately delineate the boundary line between said coal mine and adjoining mines, and show its relation and proximity thereto. The said map or plan, or a true copy thereof, shall be kept at such mine by the said owner, operator or superintendent for the use of the Territorial Inspector of Coal Mines, and for the inspection of any miner working in said mine, whenever said miner shall have cause to fear that the place where he is working is becoming dangerous by reason of its proximity to other workings, which may be supposed to contain water or dangerous gases. The said owner, operator or superintendent, shall as often as once in every six months, accurately place or cause to be placed on a map or plan of said coal mine a plan of the excavations made of all the working places or other parts of such coal mine during the preceding six months; and whenever the workings or excavations of said coal mine, or any part of the same, have been driven to within ten feet of the boundary line; or when said coal mine or any part of the same is abandoned, the owner, operator or superintendent thereof, shall furnish the Territorial Inspector of Coal Mines, within three months thereafter, the proximity to the boundary line as aforesaid, or after abandonment of the said mine, or any part of the same, with a correct copy on muslin or blue print, of the map or plan of said mine, which shall accurately show all excavations and workings of such mine to date, exhibiting clear the part or parts abandoned and the part or parts in proximity to the boundary line aforesaid. The several coal maps or plans of mines in the Territory which are furnished to the Territorial Inspector of Coal Mines, as last aforesaid, shall be the property of the Territory, and shall remain in the care of the said Territorial Inspector of Mines, to be transferred by him to his successor in office, and in no case shall any copy of the same be made without the consent of the owner, operator, or his agent. If the said Territorial Inspector of Coal Mines shall find or have good reason to believe that any map or plan of any coal mine made or furnished in pursuance of the provisions of this act is materially inaccurate or imperfect, he is hereby authorized to cause a correct plan

or map of said coal mine to be made at the expense of the owner or operator thereof, the cost of which shall be recoverable from the said owner or operator, in the name of the Territory, as other debts are recoverable by law; *Provided, however,* That if the map or plan which is claimed to be inaccurate shall prove to have been correct, then the Territory shall be held liable for the expenses incurred in making such test survey, and the same shall be paid by the Territorial Treasurer upon the warrant of the Territorial Auditor, who shall require proper vouchers and satisfactory proof of the same.

SEC. 2. It shall not be lawful for the owner, operator, contractor, lessee or agent of any coal mine, or for any firm, company, corporation or association, their clerks, servants, agents or employes, to employ any person at work within any coal mine, or permit any person to be in any coal mine for the purpose of working therein, unless such mine is in communication with at least two openings, if the mine be worked by shaft or slope, which two shafts or slopes shall be separated by natural strata at all points, by a distance of not less than fifty feet, except in drift mines heretofore opened, where the Mine Inspector shall deem it impracticable; *Provided, however,* An aggregate number not exceeding twenty persons may be employed in the mine at any one time until the second opening shall be reached and made available, which said second opening the said Inspector of Coal Mines shall cause to be made without unnecessary delay, and in case of furnace ventilation being used before the second opening is reached, the furnace shall not be placed within forty feet of the foot of the shaft, slope or drift, and shall be well secured from danger from fire, by brick or stone walls of sufficient thickness.

SEC. 3. When a second opening or outlet is made, which does not exceed seventy-five feet in vertical depth from the surface to the seam or strata of coal that is being mined, it shall be set apart exclusively for the purpose of ingress or egress to or from the mine by any person or persons employed therein, and it shall always be kept clear of any obstruction; and if the opening is a shaft, it shall be so fitted with safe and convenient stairs, not less than two feet wide, and not to exceed an



angle of sixty degrees descent, and landings of not less than eighteen inches wide and four feet long, at easy and convenient distances, and all water coming from the surface or out of the strata in the shaft, shall be so conducted as to be prevented from falling down the shaft on the stairs, or on persons ascending or descending the stairway of the shaft. If the second opening is a slope for a traveling way, and has a grater angle of descent than twenty-five degrees, it shall be provided with suitable stairs not less than two feet wide; but when the seam or stratum of coal at main outlet or escapement shaft in connection with any mine exceeds seventy-five feet in vertical depth from the surface, the miners or other employés in the mine shall be lowered into or raised from said mine by machinery, and when the employés are lowered into or raised from said mine at the main outlet, the escapement shall be fitted with safe and available machinery, or safe and convenient stairs, by which persons employed in the mines may readily escape in case of accident. The hoisting machinery and stairs used for lowering or raising the employés into or out of the mine shall be kept in a safe condition, and inspected once each twenty-four hours by a competent person employed in whole or in part for that purpose, and such machinery and the method of its inspection shall be approved by the Territorial Inspector of Coal Mines.

SEC. 4. The owner or agent of any coal mine, whether shaft, slope or drift, shall provide and maintain for every such mine, ample means of ventilation, affording not less than one hundred cubic feet per minute for each and every person employed in said mine, and as much more as the circumstances may require, which shall be circulated around the main headings and cross headings and working places to an extent that it will dilute, carry off and render harmless the noxious or dangerous gases generated therein; and all mines generating fire-damp shall be kept free of standing gas in the worked-out or abandoned parts of the same, and the entrance thereto shall be properly closed, and cautionary notice shall be posted to warn persons of danger; and every working place and all other places where gas is known or supposed to exist shall be carefully examined



by the fire-boss, within three hours immediately before each shift, with a safety lamp; and in making said examination, it shall be the duty of the fire-boss at each examination to leave at the face of every place examined evidence of his presence; and it shall not be lawful for any miner to enter any mine, or part of a mine, generating fire-damp, until it has been examined by the fire-boss aforesaid, and by him reported to be safe.

SEC. 5. It shall be unlawful for any miner, fire-boss, employé in any mine, or other person, to brush fire-damp from any place in a coal mine by means of a coat, sack, sail cloth, or any like article or material; and any person so offending shall be deemed guilty of a misdemeanor, and upon conviction shall be imprisoned for the term not exceeding six months or fined in any sum not to exceed one hundred dollars, or punished by both such fine and imprisonment. And any owner or superintendent, mine boss or fire-boss, who shall knowingly employ any person to perform or engage in any such work prohibited by this section, or shall knowingly permit the same to be done, shall be deemed guilty of a misdemeanor, subject to the same penalty as hereinbefore prescribed.

SEC. 6. In order to better secure the proper ventilation of every coal mine and promote the health and safety of the persons employed therein, the owner or agent shall employ a competent and practical inside overseer, to be called mining boss, who shall be an experienced coal miner, and who shall keep a careful watch over the ventilating apparatus and the air-ways, traveling ways, pumps and drainage, and shall see that, as the miners advance their excavations, all loose coal, slate and rock overhead are carefully secured against falling on the traveling ways, and that sufficient props and timbers are furnished, upon order of the miner, of suitable size, and cut square at both ends, and as near as practicable to a proper length for the places where they are to be used; and such props, caps or timbers shall be delivered at the mouth of the rooms; and shall see that all water be drained or hauled out of all working places before the miner enters, and, as far as practicable, kept dry while the miner is at work; and it shall be the further duty of the mining boss to see that the proper cut-

throughs are made in the room pillars of the miners' places, at intervals of not more than sixteen yards, for the purpose of ventilation; and in all hauling roads, holes for shelter shall be made at least every thirty yards, and be kept whitewashed, when a space two feet and six inches between the wagon and the rib shall be deemed sufficient for shelter; and the mining boss shall measure the air current at least once a week at the inlet and outlet, and at or near the face of the headings, he shall keep a record of such measurements, which shall be placed by him in a book kept for that purpose, said book to be opened for the examination of the said Territorial Inspector; he shall, also, on or about the fifteenth day of each month, mail to the Territorial Inspector of Coal Mines, a true copy of the air measurements given, stating, also, the number of persons employed in or about said mine, the number of mules and horses used, and the number of days worked in each month, for which purpose blanks shall be furnished by the said Inspector. It shall be the further duty of the mining boss to immediately notify the owner or agent of the mine of his inability to comply with the provisions of this section; it shall then become the duty of the said superintendent, operator, owner or agent, at once to attend to the matter complained of by the mining boss, and to comply with the provisions hereof. The safety lamps used for examining mines, or which may be used in working therein, shall be furnished by and be the property of the owner of said mine, and shall be in charge of the agent of such mine, and in all mines the doors used in assisting or directing the ventilation of the mine shall be so hung and adjusted that they will close themselves, or be supplied with springs or pulleys so they can not be left standing open; and bore holes shall be kept not less than twelve feet in advance of the face of every working place, and when necessary, on the sides of the same when they are being driven towards and in dangerous proximity to an abandoned mine or part of a mine, suspected of containing inflammable gases, or which is inundated with water. The mining boss or his assistant shall visit and examine every working place in the mine at least once every alternate day while the miners of such place are or should be at work, and shall

direct that each and every working place is properly secured by props or timber, and that safety in all respects is assured, and that no person shall be permitted to work in an unsafe place, unless it be for the purpose of making it safe. All owners and operators of coal mines shall keep posted in a conspicuous place about their mine, printed rules submitted to and approved by the Territorial Inspector, defining the duties of all persons employed in or about said coal mines, which said notices shall be printed in the language or languages used by the miners working therein.

SEC. 7. Any miner, workman or other person who shall intentionally injure any shaft, lamp, instrument, air-course or brattice, or obstruct or throw open air ways, or carry lighted pipes or matches into places that are worked by safety lamps, or handle or disturb any part of the machinery, or open a door and not close it again, or enter any place of the mine against caution, or disobey any order given in carrying out the provisions of this act, or do any other act, whereby the lives or the health of persons or security of the mines or machinery is endangered, shall be deemed guilty of a misdemeanor, and may be punished in a manner provided in the twentieth section of this act. All machinery about mines shall be properly fenced off, and there shall be cut in the side of every hoisting shaft, at the bottom thereof, a traveling way sufficiently wide and high to enable persons to pass the shaft in going from one side of the mine to the other, without passing over or under the cage or other hoisting apparatus.

SEC. 8. The Governor shall nominate, and by and with the consent of the council appoint, during the present session of the Legislative Assembly, and every two years thereafter, a Territorial Inspector of Coal Mines, who shall hold his office for two years and until his successor is duly appointed and qualified, who shall be a man having thorough knowledge of practical mining and mining engineering, and who shall not be an employé, owner or part owner in any coal mine in the Territory. He shall be not less than thirty years of age, a citizen of the United States and, if practicable, of this Territory, of good repute and temperate habits. The

said Territorial Inspector of Coal Mines shall receive an annual salary of two thousand five hundred dollars and actual traveling expenses while in the discharge of his duties, to be paid quarterly by the Territorial Treasurer, upon warrants of the Auditor, and he shall make his residence and keep his office as near as practicable to the mines under his jurisdiction. Said Inspector is hereby authorized to procure such instruments and chemical tests and stationery, and to incur such expense of communication from time to time as may be necessary to the discharge of his duties under this act, at the cost of the Territory, subject to the approval of the Governor of said Territory, which shall be paid out of the Territorial treasury, upon accounts duly certified by him and audited by the Auditor. All instruments, plans, books, memoranda, notes and other property pertaining to the office hereby created shall be the property of the Territory, and shall be delivered by each Inspector to his successor in office, and said Inspector shall be allowed all expenses necessarily incurred in enforcing the provisions of this act in the courts of the Territory, when such expenses are certified to be correct by the courts before which the proceedings were had.

SEC. 9. The Territorial Inspector of Coal Mines shall, before entering upon the discharge of his duties, give bond to the Territory of Wyoming in the penal sum of ten thousand dollars, with sufficient sureties, to be approved by the Chief Justice of the Supreme Court, said bond to be filed in the office of the Territorial Auditor, which bond shall be conditioned for the faithful discharge of his duties, and he shall take and subscribe an oath or affirmation to discharge his duties impartially and with fidelity, to the best of his knowledge and ability. The said Inspector shall devote the whole of his time to the duties of his office. It shall be his duty to examine the coal mines of the Territory as often as possible, which shall not be less than once in three months, and report the number of times he has visited each mine in a year, to see that all the provisions of this act are observed and strictly carried out, and he shall make records of all examinations of mines, showing the condition in which he finds them, especially in reference to ventilation and drainage, the number of



mines in the Territory, the number of persons employed in each mine, the extent to which the laws are obeyed, the progress made in the improvement sought to be secured by the passage of this act, the number of accidents and deaths resulting from injuries received in or about the mine, with cause of such accident or death, said report to be made quarterly and published in at least one paper in each county in which any coal mines are located at least one time.

SEC. 10. That the Territorial Inspector of Coal Mines shall have the right at all times to enter any coal mine to make examinations or obtain information, and the owner or superintendent shall afford any assistance necessary to the said Inspector in making such examination. The said Inspector shall notify the owner, lessee, superintendent or mining boss, immediately of the discovery of any violation of this act, and of the penalty imposed thereby for such violation, and in case of such notice being disregarded for the space of five days, he shall institute proceedings against the owner, agent, lessee, or mining boss, under the provisions of section 20 of this act; in case, however, where, in the judgment of the said Inspector, delay may jeopardize life or limb, he may at once enter proceedings (except the defects be remedied) to restrain working of the mine, and the cost of said proceeding, including the charge of the attorney prosecuting the same, shall be borne by the owner, lessee or superintendent, against whom such proceedings are had; *Provided*, That no attorney fee exceeding the sum of fifty dollars shall be taxed in any one case for the prosecution of such case; *And, provided further*, That if the court shall find the cause not sufficient, then the case shall be dismissed and the costs be borne by the Territory.

SEC. 11. Whenever by reason of any explosion or any other accident in any coal mine or the machinery connected therewith, loss of life or serious personal injury shall occur, it shall be the duty of the person having charge of such mine or colliery to give notice thereof forthwith to the said Territorial Inspector, and if any person is killed thereby, to the coroner of the county, who shall give due notice of the inquest to be held. If



the coroner shall determine to hold an inquest, the Inspector shall be allowed to testify, and offer such testimony as he shall deem necessary to thoroughly inform the said inquest of the cause of death, and the said Inspector shall have authority at any time to appear before said coroner and jury and question or cross-question any witness; and in choosing a jury for the purpose of holding such inquest, it shall be the duty of the coroner to empanel at least three experienced miners on such jury. It shall be the duty of the said Inspector, upon being notified as herein provided, to immediately repair to the scene of accident and make such suggestions as may appear necessary to secure the future safety of the men; and if the result of the explosion or accident do not require an investigation by the coroner, he shall proceed to investigate and ascertain the cause of the explosion or accident and make a record thereof, which he shall file as provided for; and to enable him to make the investigation, he shall have the power to compel the attendance of persons to testify, and to administer oaths or affirmations; the cost of such investigation shall be paid by the county in which the accident occurred, in the same manner as costs of coroner's inquests are paid by law.

SEC. 12. The district court within the proper county, or judge thereof in vacation or recess, upon a petition signed by not less than fifteen reputable citizens, who shall be miners, owners or lessees of mines, and with the affidavit of one or more of said petitioners attached, setting forth that the Territorial Inspector of Coal Mines neglects his duty or is incompetent, or that he is guilty of malfeasance in office, shall issue a citation in the name of the Territory to the said Inspector, to appear upon a day to be therein fixed and stated before said court, which notice shall be served at least fifteen days before the time fixed to appear, at which time the court or judge thereof, in vacation or recess, shall proceed to inquire into and investigate the allegations of the petitioners, and if the court find that said Inspector is neglectful of his duties, or is incompetent to perform the duties of his office, or if he is guilty of malfeasance therein, the court or judge shall certify the same to the Governor, who shall thereupon declare the office of said

Inspector vacant and proceed to supply said vacancy by appointment; and all vacancies in said office shall be filled by appointment by the Governor; the costs of said investigation shall, if the charges are sustained, be taxed against the Inspector, but if the charges be not sustained, they shall be taxed against the petitioners.

SEC. 13. The Inspector shall exercise his sound discretion in the enforcement of the provisions of this act, and if the operator, owner or miners shall not be satisfied with any decision of the Inspector, rendered in the discharge of his duties under this act, which said discretion shall be in writing, and signed by said Inspector, the said owner, operator, miner or miners may, within fifteen days after such decision is rendered, appeal to the District court of the county in which the mine concerned is located, and said court shall speedily determine the point involved in said decision and appeal, which said decision shall be binding and conclusive, subject only to an appeal to the Supreme court of the Territory. The court in its discretion may appoint three practical, competent and disinterested persons, whose duty it shall be, under instructions of the said court, to forthwith examine such mine and make report, under oath, of the facts as they exist or may have been, together with their opinion thereon, which report of such board shall become absolute, unless exceptions thereto shall be filed within ten days after the notice of the filing thereof, to the operator, miner or miners, or Inspector, and if exceptions be filed, the court shall at once hear and determine the same, and the decision shall be final and conclusive, subject only to appeal as aforesaid. If the court shall finally sustain the decision of the Inspector, then the appellants shall pay all costs of such proceedings, and if the court shall not sustain the decision of the Inspector, then such costs shall be paid by the county or by the appellants and county in such proportion as the court shall determine. That no appeal from any decision made by any Inspector shall work as a *superse-deas* during the pendency of such appeal, but all such decisions shall be in full force until reversed or modified by the court.

SEC. 14. On the petition of the Mining Inspector, the District court in any county in this Territory shall, at the first term after the passage of this act, appoint an examining board for such county, consisting of the Territorial Inspector of Coal Mines, an operator of a coal mine and a coal miner, who shall be citizens of the United States, and the latter two of which board shall have at least five years' experience in the mines of the Territory, whose duty it shall be to examine any person applying thereto as to his competency and qualifications to discharge the duties of mining boss; said board of examiners shall meet at the call of the Inspector, and they shall grant certificates to all persons whose examination shall disclose their fitness for the duties of mining boss, and such certificate shall be sufficient evidence of the competency and qualification of the holders for the duties of said office; *Provided*, That any person who shall have been employed as a miner at least five years in the coal mines of Wyoming, and as mining boss continuously by the same person, or firm, or corporation, for the period of one year preceding the passage of this act, may be entitled, if in the judgment of the Inspector he be qualified, to a certificate without undergoing such examination; but he shall not be employed by any other person, or firm, or corporation, without having undergone such examination. The members of the examining board, other than the Inspector, shall hold their office for the period of two years from the date of their appointment, and shall receive five dollars per day for each day necessarily and actively employed, and mileage at the rate of fifteen cents per mile for each mile necessarily traveled, to be paid by the Territory. Vacancies in the membership of the board shall be filled by the court of the proper county, except the vacancy in the office of the Inspector. Sessions of the examining board shall not exceed three days in each quarter, and for any certificate granted the board shall receive the sum of one dollar, the same to be paid into the Territorial treasury. No person shall act as fire-boss unless granted a certificate of competency by the Territorial Inspector of Coal Mines. After the passage of this act, no owner, operator, contractor, lessee or agent, shall employ any mining boss or fire-boss who does not have

the certificate of competency required. Said certificate shall be posted up in the office at the mine; and if any accident shall occur in any mine in which a mining boss or fire-boss shall be employed, who has no certificate of competency as required by this act, by which any miner shall be killed or injured, he or his estate shall have a right of action against such operator, owner, lessee or agent, and shall recover the full damages sustained; in case of death, such action shall be brought by the administrator of his estate within three years after date of accident, the proceeds recovered to be divided among the heirs of the deceased, according to law.

SEC. 15. No boy under the age of fourteen years, and no woman or girl of any age, shall be employed or permitted to be in or about any coal mine for the purpose of employment therein; *Provided, however,* That this provision shall not affect the employment of a boy or female of suitable age in an office, or in the performance of clerical work at such mine or colliery.

SEC. 16. For any injury to person or property occasioned by any violation of this act, or any willful failure to comply with its provisions, a right of action against the party at fault shall accrue to the party injured, for the direct damages sustained thereby, and in any case of loss of life, by reason of such violation or willful failure, a right of action against the party at fault shall accrue to the administrator of the estate whose life shall be lost, for like recovery of damages for the injuries they shall have sustained; *Provided,* That nothing in this act shall be construed to prevent the recovery of any lawful damages against the person, persons or company operating any mine, if said company shall be found in fault, or should have contributed to any accident by means of carelessness on their part; *Provided, further,* That in no case shall the Territory of Wyoming be liable for damages under this act.

SEC. 17. It shall be the duty of owners, operators, lessees, superintendents and agents of coal mines, to keep at the mouth of the drift, shaft or slope, or at any such other place or places as shall be designated by the



Inspector, stretchers in such number as the Inspector shall designate, properly constructed for the purpose of carrying away any miner or employé working in and about such mine, who may in any way be injured in or about his employment.

SEC. 18. It shall be the duty of the Territorial Inspector of Coal Mines on each visit to any mine, to make out a written or partly written and partly printed report of the condition in which he finds such mines, and post the same in the office at the mine; the said report shall give the date of visit, the number of visits during the year, the total number of mines in the Territory, the number of feet of air in circulation and where measured, and such other information as he shall deem necessary, and the report shall remain posted in the office for one year, and said report may be examined by any miner or person employed in and about such mine.

SEC. 19. On or before the thirty-first day of January in each year, the owner, operator or superintendent of every mine or colliery shall send to the Territorial Inspector a correct report, specifying with respect to the year, ending the thirty-first day of the preceding December, the name of the owner, operator and officers of the mine, and the quantity of coal mined, and the number of men employed; the report shall be in such form and give such information as may be from time to time required and prescribed by the Inspector; blank forms for such report shall be furnished by the Territory.

SEC. 20. The neglect or refusal to perform the duties required to be performed by any section of this act by the parties therein required to perform them, or the violations of any of the provisions or requirements thereof shall be deemed a misdemeanor, and shall upon conviction, except wherein otherwise provided, be punished by a fine of not less than two hundred dollars and not exceeding five hundred dollars, at the discretion of the court; *Provided*, That in case the neglect, failure, or violation occurs in the case of the Territorial Inspector of Coal Mines, if such violation, failure, or neglect is shown to have been willful, such punishment shall be by a fine of not less than five hundred dollars nor more than one



thousand dollars, or by imprisonment not less than six months nor more than one year, or by both such fine and imprisonment, and in default of payment of any fine imposed upon any person under this act, such person may be committed to jail until the same shall be paid.

SEC. 21. The provisions of this act shall not apply to any mine employing an average of less than ten persons during any one twenty-four hours.

SEC. 22. All acts and parts of acts inconsistent or in conflict herewith are hereby repealed.

SEC. 23. This act shall take effect and be in force from and after its passage.



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