SEVENTH BIENNIAL REPORT

OF THE

INSPECTOR OF COAL MINES

OF THE

STATE OF COLORADO

1895-1896

TO THE GOVERNOR

DENVER, COLORADO
THE SMITH-BROOKS PRINTING COMPANY, STATE PRINTERS
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LETTER OF TRANSMITTAL.

TO HIS EXCELLENCY,

ALBERT W. McINTIRE,

GOVERNOR OF COLORADO.

Honorable Sir—In compliance with section 17 of an act entitled "Coal Mines," I have the honor, as Inspector, to present to you the seventh biennial report from this department.

During the past two years, myself, deputy and secretary, have been coöperative in our exertions to maintain and enforce the laws governing coal mining. Our official duties between operators and miners have been amicable; with very few exceptions the operators have readily complied with our suggestions and the requirements of the law. We cordially thank the local superintendents and their subordinates for all extended courtesies, especially for valuable assistance to us in protecting life and providing for the general health of the workmen. We also sincerely thank you, and all state officials, for various courtesies extended to this office.

Allow me to call your special attention to "Recommendations and Amendments," which in my opinion will tend to reduce fatalities to a minimum, and further provide for the health and safety of our coal miners.

I shall feel very grateful if you will mention this subject in your message, and I hope that our honorable legislators will take sufficient interest in the welfare of our coal producers to enhance the provisions for their safety.

Trusting that this report will meet with your expectations and approval, I have the honor to be,

Yours faithfully,

DAVID GRIFFITHS.

SEVENTH BIENNIAL REPORT

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INSPECTOR OF COAL MINES

OF COLORADO.

RECOMMENDATIONS AND AMENDMENTS.

Since the law now governing coal mining in this state was framed, the production of coal has rapidly increased, the conditions and contentions are more diversified; thus, to avoid serious accidents and to provide for the health of the miners, we require precautionary and stringent laws, and I would recommend the following amendments:

Section 2, entitled "Coal Mines," sets forth that "The second outlet need not be made until fifteen thousand (15,000) square yards have been excavated in such mine." This, in my opinion, is an unnecessary privilege to the operators, and the risk of life is entirely too great. During my term of office many new shafts have been sunk in different parts of the state, and extensive operations have been carried on with one opening. In some cases as many as forty miners have been engaged in excavating the allowed 15,000 square yards. The sanitary condition of such mines was far from being satisfactory, because it is impossible to ventilate a mine with any degree of success with only one opening. Again, if by accident or otherwise, the shaft house or other appurtenances should take fire, the lives of the miners therein engaged would be beyond human aid and they would be suffocated. Therefore, the law should be amended so as to read that not more than ten men should be allowed in any mine until there are two openings for the ingress and egress of the men working therein. With due justice to the Rex mine operators and the Gonzales cañon operators,

I will say that they have seen the necessity of having two openings long before the time allowed them by law, thus greatly improving the sanitary condition of their mines, and also providing against serious accidents that might occur with only one opening.

USE OF EXPLOSIVES.

See Vulcan mine report. The precautionary measures there mentioned have been in vogue in detail for a long time at the Newcastle mine, Garfield county, and have been adopted by the officials as safeguards to life and property, thus they ought to be embodied in our mining laws.

GAS DETECTORS, ETC.

There is now on the market a very sensitive mechanical instrument for detecting the percentage of various gases found in coal mines, termed "Shaw's Gas Detector." This instrument has been endorsed by the leading mining men of Europe and America, as a valuable and humane device. Nearly all the coal mine inspectors of the eastern states have been furnished with one of these instruments, and many of them are in daily use in the large and gaseous mines of Pennsylvania, and in order to keep up with the progress of the age, one of them should be furnished this office.

SECRETARY'S SALARY.

The salary of the secretary of this department is only $500 per annum, or about $1.60 per day. This small pittance is entirely too small for services rendered, and I feel perfectly justified in asking your endeavors to have his salary raised to the average salaries paid in other departments in the state house.

REPORTS OF THE DEPARTMENT.

By a law enacted by the last general assembly, entitled "Reports of Officers," the number of reports allowed this office is only 250. This number is entirely too small for the demand. For 1889 and 1890, 2,000 reports were allowed for this department, and of this number there are about one dozen now on hand.

MINING LEGISLATION, AND STATISTICS SHOWING ITS EFFICIENCY IN GREAT BRITAIN AND PENNSYLVANIA.

In every state and country where the coal industry is progressive, legislation and researches for the better protection of the health and safety of the employed have also been pro-

gressive. In France, Belgium, Prussia and Great Britain, thousands of dollars are spent annually by the respective governments in making researches tending to prevent accidents and reduce fatalities to a minimum in their coal mines.

In the history of coal mining, we have on record that serious disasters were the stimulants of legislation, such as the Hartley colliery disaster in England and the Avondale in Pennsylvania. The sad disaster at the Vulcan mine, in this state, is now fresh in our memories, and ought to stimulate us to further provide for the health and safety of our miners. With this in view I would suggest the appointment of a board of commissioners to revise the present mining law, to consist of any desirable number of intelligent miners, and the same number to represent the operators. I have elsewhere stated that many precautionary measures are now in vogue in some of our mines, that the law does not provide for.

The following table of statistics will prove the efficiency of mining legislation in Great Britain:

"During the past forty years there has been a great improvement in the safety of mining. The ratio of deaths by explosion in 1851 was one in every 673 persons employed. In the ten years ending 1861, it was one in 1,008; in the second ten years ending 1871, one in 1,408; in the third ten years ending 1881, one in 1,795, and in the year 1892, one in 5,408.

"The ratio of deaths by accidents from all causes in and about mines shows likewise an improvement. In 1851 it was one in 219; in the ten years ending 1861, one in 245; in the ten years ending 1871, one in 300; in the ten years ending 1881, one in 425; whereas in 1891, the ratio was one in 663, and in 1892, one in 676."

The following table will show what improvement legislation has made in the safety of mining coal in the anthracite region of Pennsylvania:

Year	Number of Employees	Number of Deaths	Number of Employees for Each Death
1871	37,488	210	179
1872	44,745	166	270
1873	48,199	224	215
1874	53,402	231	231
1875	69,966	238	294
1876	70,474	228	309
1877	66,842	194	345
1878	63,964	187	342
1879	68,847	262	263
1880	73,373	202	363
1881	76,031	273	278
1882	82,344	292	282
1883	91,411	323	283
1884	101,078	332	304
1885	100,534	356	282
1886	103,044	279	369
1887	106,547	316	337
1888	117,290	364	322
1889	119,007	384	310
1890	116,232	378	307
1891	117,340	350	335

The foregoing statistics clearly show decided improvements in the safety of coal mining. The statistics for this state will compare very favorably for 1895. In 1896, the Vulcan disaster swells up the list of fatalities, and the ratio of deaths is very high.

The beneficial results obtained in mining cannot be wholly credited to mining legislation and efficiency of inspection. Skilful management and the increased intelligence of the employés are factors worthy of consideration.

RECAPITULATION OF STATISTICS FOR 1895.

The returns of the coal production, etc., made to this office, are as follows:

During the year there was produced 3,339,495 tons of coal and 297,769 tons of coke. Of this amount, about one-third of the production was shipped to the adjoining states, Kansas, Texas, Utah and Nebraska.

The average cost of production, free on board cars, is estimated at $1.25 per ton of 2,400 pounds.

The average value of the coal on the cars is estimated at $1.40 per ton, making the spot value of the coal production for the year, $4,675,293.

The seams worked vary in thickness from three feet, worked on the western outcrop of the Franceville field and at Durango, to fifty feet, worked at the Newcastle mine, in Garfield county. The average price paid to miners for digging, loading and timbering their working places, is about seventy cents per ton of 2,400 pounds. The highest price paid is $1.10 and the lowest is fifty cents.

There occurred during the year nineteen fatal accidents, in which twenty-three lives were lost; seven by falls of rock, five by falls of coal, three by pit cars, one by an explosion of loose powder, one by a blown-out shot, two by falling of pump and timber in a new shaft and four by an explosion of C. $H.^4$ gas; average number of tons mined for each life lost, 145,195; average number of persons employed for each life lost, 320.

There occurred during the year 113 non-fatal accidents; thirty-six by falling rock and slate, thirty-three by falling coal, twenty-five by pit cars, two by falling props, two by being kicked by mules, three by explosions of gas, two by spragging, two by shaft cages, two by coal pick, three while making cap pieces with the axe and three by blown-out shots; average number of tons mined for each non-fatal accident, 29,553; average number of persons employed to each non-fatal accident, 65.

The number of men employed in and around the mines, 7,354.

RECAPITULATION OF STATISTICS FOR 1896.

The returns made to this office of the coal production, etc., with estimates for the month of December, are as follows:

During the year the coal production was 3,371,633 tons; coke, 324,694 tons. About one-third of the production was shipped to the adjoining states. The average cost of production free on board cars is estimated at $1.25 per ton of 2,400 pounds. The average value of the coal on cars is estimated at $1.50 per ton, making the spot value of the coal production $5,057,449.50.

There occurred twenty fatal accidents during the year, in which sixty-eight lives were lost; forty-nine by explosion at Vulcan mine, fifteen by falls of rock, two by falls of coal, one by pit car and one by falling down air course; average number of

tons mined for each life lost, 49,582; average number of persons employed for each life lost, ninety-nine; the number of men employed in and around the mines, 6,716.

There occurred during the year, from January 1 to December 1, fifty-nine non-fatal accidents; twenty-two by falls of rock, fifteen by falls of coal, ten by pit cars, five by explosions of gas, two by machinery, one by railroad cars, one by falling trestle, one by coal mining machine, one by tail rope and one by giant powder; average number of tons mined for each non-fatal accident, 57,146; average number of persons employed to each non-fatal accident, 114.

COAL PRODUCTION.

The following is a summary of the coal statistics of the state from 1873 till 1896, inclusive:

1873	69,977	1885	1,398,796
1874	87,372	1886	1,436,211
1875	98,838	1887	1,791,735
1876	117,666	1888	2,185,477
1877	160,000	1889	2,400,629
1878	200,630	1890	3,075,781
1879	322,732	1891	3,512,632
1880	375,000	1892	3,771,234
1881	706,744	1893	3,947,056
1882	1,061,479	1894	3,021,028
1883	1,220,593	1895	3,339,495
1884	1,130,024	1896	3,371,633

PRODUCTION BY COUNTIES, SHOWING INCREASE AND DECREASE.

Counties	1894	1895	Increase	Decrease
Arapahoe	604	540		64
Boulder	335,807	432,333	96,526	
Dolores		2,500	2,500	
El Paso	64,588	49,938		14,650
Fremont	275,033	383,441	108,408	
Gunnison	193,650	234,839	41,189	
Garfield	82,226	221,549	139,323	
Huerfano	414,884	415,597	713	
Jefferson	39,359	38,460		899
Las Animas	1,181,005	1,213,898	32,893	
La Plata	92,822	103,807	10,985	

PRODUCTION BY COUNTIES, SHOWING INCREASE AND DECREASE—Concluded.

Counties	1894	1895	Increase	Decrease
Mesa	35,990	19,236	----------	16,754
Montezuma	----------	2,000	2,000	----------
Park	97,118	41,881	----------	55,237
Pitkin	43,486	123,928	80,442	----------
Weld	39,456	55,548	16 092	----------
Small Mines, estimated	125,000	----------	----------	----------
Totals	3,021,028	3,339,495	----------	----------

COKE PRODUCTION.

Counties	1894	1895	Increase	Decrease
Gunnison	37,570	39,793	2,223	----------
Las Animas	191,762	190,459	----------	1,303
La Plata	5,000	1,900	----------	3,100
Mesa	400	----------	----------	400
Pitkin	49,213	65,617	16,404	----------
Totals	283,945	297,769	----------	----------

PRODUCTION BY COUNTIES, SHOWING INCREASE AND DECREASE.

Counties	1895	1896	Increase	Decrease
Arapahoe	540	398	----------	142
Boulder	432,333	504,947	72,614	----------
Dolores	2,500	2,100	----------	400
El Paso	49,938	32,016	----------	17,922
Fremont	383,441	282,459	----------	100,982
Gunnison	234,839	269,875	35,036	----------
Garfield	221,549	227,280	5,731	----------
Huerfano	415,597	365,648	----------	49,949
Jefferson	38,460	18,105	----------	20,355
Las Animas	1,213,898	1,331,115	117,217	----------
La Plata	103,807	99,116	----------	4,691
Montezuma	2,000	----------	----------	2,000
Mesa	19,236	20,457	1,221	----------
Park	41,881	33,887	----------	7,994
Pitkin	123,928	162,071	38,143	----------
Weld	55,548	22,159	----------	33,389
Totals	3,339,495	3,371,633	----------	----------

COKE PRODUCTION.

Counties	1895	1896	Increase	Decrease
Gunnison	39,793	50,440	10,647	----------
Las Animas	190,459	195,091	4,632	----------
La Plata	1,900	2,851	951	----------
Pitkin	65 617	76,312	10,695	----------
Totals	297,769	324,694	----------	----------

LIST OF FATAL ACCIDENTS,

1895.

February 1—Matteo Vidolitch, miner, at Sopris mine, Las Animas county, killed by a fall of coal, at face of his own working place.

February 5—James Delaney, miner, at Vulcan mine, Garfield county. Killed by a fall of rock from side of gangway in which he was working.

February 6—Lib Gatuner, machine man, at Tindal mine, Jefferson county. Killed by a massive rock falling off the hanging wall in the gangway where he was engaged.

February 15—Thomas Barrow, fire boss at Rouse, Huerfano county. Killed on the No. 3 slope by a trip of runaway cars, the cars in some unexplained manner being detached while coming down the slope.

February 18—Michael Batch, miner, at Coal Creek, Fremont county. Killed by a blown-out shot in No. 2 room in the ninth north entry, No. 2 mine. On examination of the scene and investigation of the cause of the accident, we found that the deceased, who was working in No. 4 room, in the same entry, had left his own working place, and went into No. 2 room. At the same time the fuse of a top shot had been ignited by the miners therein, they then going to a place of safety, and the deceased, unobserved by them, walked up close to the shot, which exploded, causing severe injuries on face and chest, from the effects of which he died in a few hours after the accident.

March 22—Geovanni Santi, miner, at Rouse mine, Huerfano county, was killed instantly by a massive rock falling on him at the face of his working place, No. 7 room, in third east entry, No. 3 mine. From our investigation of the cause of the accident, it seemed that the deceased was engaged in working off some coal near the roof, on which (an invisible smooth slip penetrating) the roof was partially sustained; the edge thus being liberated, the overhanging weight of the rock caused the props outside to be swung out.

March 27—Jacob Chamack, miner, at the Acme mine, Boulder county. Killed by a fall of rock at the mouth of the room in which he was engaged. From our investigation of the accident, we found that Chamack was at the time of the accident pushing his loaded car out of the room, and the car would not pass the timber at switch; so Mike Iombardo came to assist him to push the car out, and their combined strength was sufficient to displace the leg that supported the frame across the mouth of the room, upon which rested a large rock, which fell on him, causing instant death. The ordinary cars passed in and out without coming in contact with the timber, but the car in question was spread wider than the ordinary car.

March 31—Richard Tomlinson and Gio Manpace, sinkers, at the Gonzales Cañon shaft, Las Animas county, were killed by the sinking pump and some of the shaft timber falling on them. We investigated the cause of the accident and found that all the shaft timber had been put in without any "hitches" being cut into the solid rock for their support, and that the weight and oscillating motion of the pump was entirely dependent upon

these timbers. From our examination, we are of the opinion that the adopted mode of securing the timber by "wedging" was sufficient to support the timbers themselves, but insufficient to support the weight and motion of the pump, and that the constant vibration of the pump loosened the wedges. If hitches had been cut into the solid rock to support the timber, or if the precaution of lashing the pump to the superstructure had been made, we firmly believe that this accident could have been avoided.

April 4—Willfred Lucock, miner, at Otis mine, Lafayette. Killed by a fall of coal. From our investigation we found that deceased, at time of accident, was engaged in loading a car of coal, when a large piece of coal from the side of pillar fell on him, causing his death in a few hours afterwards. It appears that Lucock was aware of the danger, but thought he could fill the car previous to pulling the same down.

April 6—John Smith, miner, Marshall No. 2 mine, Boulder county. Killed by a fall of coal from end of pillar. On investigation we found that deceased was warned of the danger prior to the accident, but being too risky, and not "spragging" the coal, as it is customary, he came to his death.

April 10—Antonio Cardone, miner, Engleville mine, Las Animas county, was killed instantly by a massive rock falling upon him in his working place. From our investigation we found that deceased, with Louis Maglietto, was engaged in drawing a pillar, and there was a little crush on the coal. The working place was in good condition and well timbered, but an invisible slip penetrated the roof and swung out the props, with the aforesaid result.

May 10—C. Laemeringer, B. Rococomich, John Luba and Sylvester Cox, at Sopris mine, Las Animas county, were killed by an explosion of gas CH_4. We investigated the cause of the accident the following day, and found that nearly all the permanent doors and stoppings between the ninth and tenth east entries (the seat of the explosion) had been blown out by the force of the explosion, and had been temporarily replaced with brattice cloth. With the temporary doors and stoppings a great quantity of air was leaking, and the air current in the inner workings was very feeble. Under these conditions we naturally expected to find small accumulations of gas in the face of some of the working places which were known to be generating it, but on a thorough examination of all the rooms and entries, we found every place free of gas. On the 13th of March we made a thorough inspection of this section of the Sopris mine and found it in excellent condition. The volume of air circulating through the workings was adequate to dilute the gas given off, and the air was kept up close to the face in all the places that were generating any gas. From our own knowledge and the evidence of others, we are of the opinion that an explosion could not possibly occur if the air current had been kept in its regular channel. So we conclude that one or the other of the road cleaners, with some intent and purpose, must have opened and "propped" the door between the ninth and tenth east entries, thus admitting the air current to return at that point and not to circulate through the rooms in the tenth entry, which were generating explosive gas. This caused the gas to accumulate in the rooms. The water hauler then, by coming into the tenth east entry from another section of the mine, closed the door, causing the gas accumulated to come in contact with the naked light that he used.

June 21—Sapinero Romero, miner, Starkville mine, Las Animas county. Killed by a fall of rock at the face of his working place. From our investigation we found the place well timbered and in good condition. We are of the opinion that the accident was caused by a sudden crush of the super-strata coming on the props at the end of the pillar, and that being the weakest point of resistance, it caused the lower strata to break without any warning. The evidence obtained from deceased's partner corroborates our views on the cause of the accident.

July 11—Frank Salvo, miner, at Coal Creek mine No. 2, was killed by falling in front of pit cars on entry. The cause of the accident was investigated on the following day. Salvo was engaged as a miner and was working in the mine on an idle day, and he desired the privilege of having a mule to haul his own coal, which was granted to him, and he not being accustomed to driving, it resulted in his death. We consider this privilege of giving mules to miners to haul their own coal a dangerous practice, and should not be permitted. On this occasion we requested the management not to grant mules for the above purpose, and it was prohibited thereafter.

August 22—George Horner, mule driver, at Sunshine mine, Garfield county. Killed by a fall of clay and boulders near the mouth of the mine. On the 19th of June, 1895, we made an inspection of this mine, and we instructed the management by letter to have the tunnel secured. This had been partially done at the date of the accident. However, they had ample time to complete it. George Horner was engaged driving at night, and a small quantity of debris fell on the roadway. This he and another man employed as loader attempted to clean up, so that they could finish their shift, and while so doing a great quantity of clay and boulders fell on deceased, killing him instantly.

October 10—William Blacklock, driver, at Vulcan mine, Garfield county. Killed by being crushed between the cars and the last chute on the west gangway. Deceased evidently missed his calculation of location, and must have been under the impression that he had passed all the chutes. This, however, was not the case, and from the severe injuries received he died in a few minutes after the accident.

December 1—James Visca, roadman, at Victor No. 2 mine, was killed by an explosion of powder. From our investigation and evidence obtained, the deceased had gone to get some powder to use to blast down some roof in the third south entry. He evidently found the powder, and in some mysterious manner must have set it off, the force of which killed him instantly.

December 11—Joseph Vietta, miner, at the Robinson mine, Huerfano county. Killed instantly by a heavy fall of coal. Deceased went under a massive piece of coal, weighing at least eight tons, which had been previously loosened by a shot, and from the evidence of his two brothers, who were engaged with him, he had not worked there many seconds until the massive piece of coal fell upon him, killing him instantly. His brothers insisted upon his not doing so, but being an experienced miner, his word and action prevailed, with the aforesaid result. I am of the opinion that deceased had tested the top coal in the customary manner, by knocking it with the pick, and proclaimed it sound and safe; but in that he was deceived, owing to it being so massive.

December 23—Eli Burton, miner, at the Lister mine, Boulder county, received serious internal injuries by a fall of coal, from which he died on the 26th of the same month. Deceased was an old, practical miner, and was considered to be very careful, but on this occasion he neglected to "sprag" the coal. Jas. Wooley, his partner, stated that they were both aware of the piece of coal in question being loose, but that they had decided it required a little more undermining. Undoubtedly, if their usual precaution of "spragging" had been done, this accident could have been avoided. Accidents of this nature are too common, the experienced miner being too risky, and the inexperienced miner is not aware of the danger.

TABLE SHOWING NON-FATAL ACCIDENTS,

1895.

January 1—George Twombly, miner at No. 2 Victor mine, Victor Coal and Coke Company, Las Animas county; leg broken by pit car.

January 3—Joe Meanpace, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; finger bruised by pit car.

January 9—Joe D. John, miner at Coal Creek, Colorado Fuel and Iron Company, Fremont county; leg broken by fall of coal.

January 9—Anton Rode, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; leg broken by fall of coal.

January 10—Theo. Murie, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; leg bruised by fall of rock.

January 10—John Baird, mule driver at Chandler, Boob Coal Company, Fremont county; head cut by kick from mule.

January 13—Andrew Bursich, miner at Crested Butte, Colorado Fuel and Iron Company, Gunnison county; finger cut by fall of coal.

January 14—Lorribo Cordova, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; leg broken by fall of coal.

January 16—Thomas Johnson, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; body bruised by fall of coal.

January 17—John Swanson, miner at New Mitchell, Rocky Mountain Fuel Company, Boulder county; shoulder bruised by fall of coal.

January 19—John Varcelona, miner at No. 2 Hecla, Citizens' Coal and Coke Company, Boulder county; body bruised by fall of coal.

January 21—John Lanelor, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; side bruised by fall of rock.

January 22—C. A. Bradford, miner at No. 2 Hecla,-Citizens' Coal and Coke Company, Boulder county; leg broken by fall of rock.

January 23—Charles Blomgreen, miner at Franceville, Union Ice and Coal Company, El Paso county; collar bone broken by fall of rock.

January 28—Thomas Vincent, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; knee bruised by a falling prop.

January 30—Ben Trugillo, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; lost portion of finger by fall of rock.

January 30—D. Trugillo, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; arm broken by fall of rock.

January 30—John Rae, miner at Rowland, E. F. Butler Company, Las Animas county; knee dislocated by fall of coal.

February 12—George Mollek, miner at Rockvale, Canon City Coal Company, Fremont county; contusion of hip joint by fall of coal.

February 12—Martin Mollek, miner at Rockvale, Canon City Coal Company, Fremont county; broken rib by fall of coal.

February 12—N. H. Frew, mule driver at Rouse, Colorado Fuel and Iron Company, Huerfano county; hip crushed by pit car.

Product and Cha[illegible]r of Colorado Coal Mines in 1895.

Name of Mine	County	Name of Operators and Postoffice Address	Name of General Superintendent	Name of Local Superintendent	Kind of Opening	[illegible]al	Thickness of Coal Seam in feet and inches	Number of Employes	Mine Ventilated by	Volume of Air Current in cubic feet per minute	Has Explosive Gas been detected in your mine	Production of Lump Coal in tons of 2,000 lbs.	Production of Nut Coal	Production of Slack Coal	Total Production of all Coals in tons of 2,000 lbs.	Railroad Connecting Mines	Remarks
[illegible]	Arapahoe	Colorado Eastern Railway and Coal Company, Denver	R. Mellewell	R. Mellewell	Slope		7 feet	4	Natural	5,000	No	540			540	Colorado Eastern	
Baker	Boulder	Peoples Coal Company, Denver	Wm. Shields	Thos. Vaughan	Slope		11 feet	20	Furnace	5,000	No	1,654		530	1,184	Burlington and Missouri River	Operated up till June
Acme	Boulder	United Coal Company, Denver	John H. Simpson	Wm. Beman	Shaft		11 feet	173	Fan	11,500	No	50,941		11,979	62,913	Union Pacific, Denver & Gulf	
Leader	Boulder	Leader Coal Company, Denver	John Cowel	Joe Mechin	Shaft		7 feet	110	Fan	8,000	No	30,149	110	7,336	38,095	Union Pacific, Denver & Gulf	
Caledonia	Boulder	United Coal Company, Denver	John H. Simpson	Wm. Hemen	Shaft	[illegible]	7 feet	75	Fan	11,100	No	9,298		1,316	11,611	Union Pacific, Denver & Gulf	
Hecla No. 1	Boulder	Citizens Coal and Coke Company, Denver	W. H. Brown	Wm. Henderson	Shaft	Lignite	9 feet	90	Fan	19,000	No	31,528		13,501	45,029	Union Pacific, Denver & Gulf	
Hecla No. 2	Boulder	Citizens Coal and Coke Company, Denver	W. H. Brown	John Thomson	Shaft	Lignite	7 feet	140	Fan	15,000	No	11,318		7,211	31,541	Union Pacific, Denver & Gulf	Idle for six months
Rex	Boulder	Rex Coal Company, Denver	L. Andrews	John Hetchinson	Shaft	Lignite	10 feet	20	Natural	5,000	No	1,100		340	2,410	Union Pacific, Denver & Gulf	New mine
Imperial	Boulder	Imperial Coal Company, Louisville	J. V. Williams	J. C. Williams	Shaft	Lignite	6 feet	11	Natural	2,000	No	800		200	1,000	Union Pacific, Denver & Gulf	New mine
New Mitchell	Boulder	Rocky Mountain Coal Company, Denver	Joseph Mitchell, Jr.	Joseph Mitchell, Jr.	Shaft	Lignite	14 feet	61	Fan	13,000	No	11,117		10,169	21,286	Union Pacific, Denver & Gulf	
Spencer	Boulder	United Coal Company, Denver	John H. Simpson	John H. Williams	Shaft	Lignite	11 feet	130	Fan	27,000	No	20,891		5,676	25,567	Union Pacific, Denver & Gulf and B. & M. R.	
Simpson	Boulder	United Coal Company, Denver	John H. Simpson	John H. Williams	Shaft	Lignite	14 feet	80	Fan	17,000	No	11,160		3,783	19,943	Union Pacific, Denver & Gulf and B. & M. R.	
Excelsior	Boulder	United Coal Company, Denver	John H. Simpson	John H. Williams	Shaft	Lignite	14 feet	125	Fan	24,000	No	34,027		10,159	44,315	Union Pacific, Denver & Gulf and B. & M. R.	
Gladstone	Boulder	Gladstone Coal Company, Denver	Wm. Padfield	L. S. Jones	Shaft	Lignite	12 feet	11	Fan	14,000	No	25,000		9,500	34,500	Union Pacific, Denver & Gulf and B. & M. R.	
Ilia	Boulder	Smokeless Coal Company, Denver	C. S. Ott	C. S. Ott	Shaft	Lignite	14 feet	13	Fan	18,000	No	11,881		4,200	16,081	Union Pacific, Denver & Gulf and B. & M. R.	Shut down for three months
Marshall No. 1	Boulder	Marshall Coal Company, Denver	A. G. Gotham	Pelle McKenna	Drift	Lignite	7 feet				No					Union Pacific, Denver & Gulf	
Marshall No. 6	Boulder	Marshall Coal Company, Denver	A. G. Gotham	Pelle McKenna	Slope	Lignite	7 feet	90	Natural	5,000	No	26,104		10,507	17,111	Union Pacific, Denver & Gulf	
[illegible]field No. 1	Boulder	Pallet Coal Company, Erie	James Pallet	Joe Pallet	Shaft	Lignite	1 feet	15	Furnace	5,000	No	5,156		3,731	9,007	Union Pacific, Denver & Gulf	
Stewart	Boulder	Peoples Coal Company, Denver	Wm. Shields		Shaft	Lignite					No					Union Pacific, Denver & Gulf	Not operated in 1895
McGregor	Boulder	Peoples Coal Company, Denver	Wm. Shields	Thos. Reese	Shaft	Lignite	5 feet	10	Fan	1,000	No	669		486	1,155	Union Pacific, Denver & Gulf	Mine idle since July
Standard	Boulder	Standard Coal Company, Boulder			Shaft	Lignite					No					Union Pacific, Denver & Gulf	Not operated in 1895
Allen-Bond	Boulder	Boulder Coal and Fire Clay Company, Boulder			Shaft	Lignite	6 feet	4	Natural	1,000	No	1,000			1,000	Union Pacific, Denver & Gulf	No report—estimated
Chase	Boulder	Chase Coal Company, Denver	Thos. Wooley	Thos. Wooley	Shaft	Lignite					No					Union Pacific, Denver & Gulf	Abandoned
Cleveland	Boulder	United Coal Company, Denver			Shaft	Lignite	5 feet	10	Fan	14,000	No	1,320		470	1,790	Union Pacific, Denver & Gulf	Abandoned
Mel	Boulder	United Coal Company, Denver														Union Pacific, Denver & Gulf	Abandoned
Lister	Boulder	Lister Coal Company, Erie	Albert Stevens	Albert Mason	Shaft	Lignite	1 feet 6 inches	30	Natural	6,000	No	3,200		700	3,900	Union Pacific, Denver & Gulf	New mine
Industrial	Boulder	Industrial Coal Company, Louisville	J. H. Hood	Ramsey	Shaft	Lignite	6 feet	15	Steam	5,000	No	1,430		600	5,010	Union Pacific, Denver & Gulf	New mine
Enterprise	Boulder	Enterprise Coal Company, Louisville	George Frith	George Frith	Shaft	Lignite	6 feet	11	Natural	1,000	No	320			320	No railroad	New mine
Garfield No. 2	Boulder	Peoples Coal Company, Denver	Wm. Shields		Shaft	Lignite	6 feet									Union Pacific, Denver and Gulf	Not operated in 1895
Grand View	Dolores	Grand View Coal Company, Rico			Drift	Semi-Bituminous					No					No railroad	No report
Pasadena	Dolores	Pasadena Coal Company, Rico	W. H. Hess	W. H. Hess	Drift	Semi-Bituminous	1 feet 1 inches	7	Natural	4,500	No	1,500			1,500	No railroad	
Broughton	Dolores	Broughton Coal Company, Rico			Drift	Semi-Bituminous					No					No railroad	No report
Franceville	El Paso	Union [illegible] Coal Company, Colorado Springs	T. R. Thomas	T. R. Thomas	Slope	Lignite	7 feet	45	Fan	18,000	No	5,519		1,424	7,943	Union Pacific, Denver & Gulf	
McFerran	El Paso	Western Coal Company, Colorado Springs	James F. Beattie	James F. Beattie	Shaft	Lignite	7 feet	120	Fan	11,000	No	31,184		10,811	41,995	Union Pacific, Denver & Gulf	
Rockvale No. 1	Fremont	Cañon City Coal Company, Topeka, Kansas	C. J. Devlin	Edward Flynn	Shaft	Semi-Bituminous	3 feet 6 inches	500	Fan	15,000	Yes	151,915	17,151	13,161	184,137	Atchison, Topeka & Santa Fe	
Rockvale No. 4	Fremont	Cañon City Coal Company, Topeka, Kansas	C. J. Devlin		Shaft	Semi-Bituminous	3 feet 6 inches				Yes					Atchison, Topeka & Santa Fe	Not in operation
Rockvale No. 5	Fremont	Cañon City Coal Company, Topeka, Kansas	C. J. Devlin		Shaft	Semi-Bituminous	3 feet 6 inches				Yes					Atchison, Topeka & Santa Fe	Not in operation
Brookside No. 7	Fremont	Cañon City Coal Company, Topeka, Kansas	C. J. Devlin	D. R. Sweet	Slope	Semi-Bituminous	5 feet 6 inches to 8 feet	222	Fan	27,000	Yes	53,[illegible]	29,857	11,130	95,117	Atchison, Topeka & Santa Fe	
Oak Creek	Fremont	United Coal Company, Denver	John H. Simpson	Joe Patterson	Shaft	Semi-Bituminous	3 feet	200	Fan	35,000	Yes	24,151	4,681	1,675	[illegible]	Denver & Rio Grande	
Coal Creek No. 1	Fremont	Colorado Fuel and Iron Company, Denver	W. P. Thompson	Robert Milliken	Slope	Semi-Bituminous	3 feet 6 inches				Yes					Denver & Rio Grande	
Coal Creek No. 2	Fremont	Colorado Fuel and Iron Company, Denver	W. P. Thompson	Robert Milliken	Slope	Semi-Bituminous	3 feet 6 inches	320	Fan	11,000	Yes	41,000	6,417	11,000	10,437	Denver & Rio Grande	
Chandler	Fremont	Western Fuel Company, Pueblo	John Cameron	Geo. Wilson	Shaft	Semi-Bituminous	3 feet 6 inches	117	Fan	10,000	No				10,011	Denver & Rio Grande	Shut down for ten months
Williamsburg	Fremont	Williamsburg Coal Company, Denver	Lee Andrews	Donald Cameron	Shaft	Semi-Bituminous	3 feet	15	Fan	10,000	No	16,750	2,270	1,500	20,470	Denver & Rio Grande	
Wilson	Fremont	Wilson Coal Company, Williamsburg	William Wilson	William Wilson	Shaft	Semi-Bituminous	1 feet	8	Natural	5,000	No				1,000	None	New mine
Williams	Fremont	Williams Coal Company, Williamsburg	M. D. Williams	M. D. Williams	Slope	Semi-Bituminous	3 feet 6 inches	5	Natural	4,000	No				1,297	None	New mine
Brewster	Fremont	Brewster Coal Company, Florence	Chas. Cowen	Chas. Cowen	Drift	Semi-Bituminous	1 feet 6 inches	14	Natural	1,000	No	1,013	298	111	1,541	None	
Crested Butte	Gunnison	Colorado Fuel and Iron Company, Denver	W. P. Thompson	Joe Ball	Drift	Bituminous	3 feet 6 inches	257	Fan	53,000	Yes				150,164	Denver & Rio Grande	59,733 tons coke
Anthracite	Gunnison	Colorado Fuel and Iron Company, Denver	W. P. Thompson	Chas. Myers	Drift	Anthracite	1 feet to 6 feet	101	Fan	11,500	No				50,431	Denver & Rio Grande	Anthracite coal
Baldwin	Gunnison	Union Pacific Coal Company, Denver	D. O. Clark		Shaft	Bituminous										Denver, Leadville & Gunnison	Abandoned
Ruby	Gunnison	Colorado Fuel and Iron Company, Denver	W. P. Thompson			Anthracite										Denver & Rio Grande	Shut down during 1895
Black Diamond	Gunnison	Black Diamond Coal Company, Baldwin	W. Hogan	W. Hogan	Slope	Semi-Bituminous	6 feet	11	Furnace	5,000	No				6,300	None	New mine
White Ash	Gunnison	White Ash Coal Company, Baldwin	Geo. I. Bentley	Geo. I. Bentley	Drift	Semi-Bituminous	5 feet 6 inches	15	Furnace	5,000	No	6,000	500	575	7,075	None	New mine
Sunbeam	Gunnison	Gunnison Coal Company, Baldwin	Thos. Nisbeth	Thos. Nisbeth	Slope	Semi-Bituminous	1 feet	25	Natural	1,000	No	7,500		200	7,700	None	New mine
Kubler	Gunnison	Kubler Coal Company, Baldwin	Aud. Duhlman	Aud. Duhlman	Drift	Semi-Bituminous	6 feet	5	Natural	1,000	No				1,168	None	New mine
Holley	Gunnison	Holley Coal Company, Baldwin	M. Quin	M. Quin	Drift	Semi-Bituminous	6 feet	6	Natural	1,000	No				1,500	None	New mine
Superior	Gunnison	Superior Coal Company, Baldwin	Alex. Waugh	Alex. Waugh	Drift	Semi-Bituminous	4 feet 6 inches	1	Natural	1,000	No				500	None	New mine
New Castle	Garfield	Colorado Fuel and Iron Company, Denver	W. P. Thompson	John Keane	Shaft	Semi-Bituminous	26 feet, 3 veins	135	Two Fans	92,000	Yes				114,913	Denver & Rio Grande and Colorado Midland	
Vulcan	Garfield	Vulcan Coal Company, Topeka, Kansas	C. J. Devlin	R. T. Herrick	Slope	Semi-Bituminous	41 feet	120	Two Fans	75,000	Yes				37,026	Denver & Rio Grande and Colorado Midland	
Sunshine No. 2	Garfield	Sunshine Coal Company, New Castle	P. C. Coryell	P. C. Coryell	Drift	Semi-Bituminous	7 feet	43	Natural	900	No				33,000	Denver & Rio Grande and Colorado Midland	New mine
Sunshine No. 3	Garfield	Ludlum & Renelson Coal Company, New Castle	John Renelson	John Renalson	Drift	Semi-Bituminous	9 feet	26	Natural	8,000	No	5,300	6,773	1,684	14,756	Denver & Rio Grande and Colorado Midland	New mine
Keystone	Garfield	Cohn Coal Company, New Castle	A. Cohn	A. Cohn	Drift	Semi-Bituminous	2 feet	7	Natural	1,000	No	1,700	100	44	1,844	None	New mine
Marion	Garfield	Colorado Fuel and Iron Company, Denver			Drift	Semi-Bituminous											Abandoned
Rouse	Huerfano	Colorado Fuel and Iron Company, Denver	W. P. Thompson	N. C. Wheeler	Slope	Semi-Bituminous	6 feet	340	Two Fans	51,964	Yes	113,971	13,130	31,171	194,105	Denver & Rio Grande	
Pictou	Huerfano	Colorado Fuel and Iron Company, Denver	W. P. Thompson	George Peart	Slope	Semi-Bituminous	5 feet	190	Fan	64,000	Yes	50,604	18,439	22,873	91,916	Denver & Rio Grande	
Robinson	Huerfano	Colorado Fuel and Iron Company, Denver	W. P. Thompson	J. P. Breen	Slope	Semi-Bituminous	7 feet	95	Fan	11,000	Yes				11,470	Denver & Rio Grande	Not operated for eleven months
Walsen	Huerfano	Colorado Fuel and Iron Company, Denver	W. P. Thompson	J. P. Breen	Slope	Semi-Bituminous	7 feet 6 inches	115	Fan	64,000	Yes	64,601	3,760	26,816	95,180	Denver & Rio Grande	
Cameron	Huerfano	Colorado Fuel and Iron Company, Denver	W. P. Thompson		Slope	Semi-Bituminous										Denver & Rio Grande	Abandoned
Solar	Huerfano	United Coal Company, Denver	J. H. Simpson		Shaft	Semi-Bituminous										Denver & Rio Grande	Not operated during 1895
Toller	Huerfano	Toller Coal Company, Denver	John McNeil	Jas. Calderhead	Slope	Semi-Bituminous	4 feet	44	Furnace	14,000	No	14,741	1,777	1,017	17,353	Denver & Rio Grande	New mine
Bright	Huerfano	Cameron Coal Company, Walsenburg	John McDonald	John McDonald	Slope	Semi-Bituminous	1 feet	47	Furnace	6,000	No	1,049	33	1,125	3,700	None	New mine
Adamson	Huerfano	Adamson Coal Company, Walsenburg	Adamson	Adamson	Slope	Semi-Bituminous	1 feet	4	Natural	1,000	No				1,500	None	Estimated
Tredill	Jefferson	Denver Coal Company (Limited), Denver	Samuel Newhouse	John Nichols	Shaft	Lignite	14 feet and 7 feet	65	Fan	5,000	No	[illegible]	[illegible]	1,160	37,000	U. P., Denver & Gulf and D., Lakewood & Golden	
Mount Carbon	Jefferson	Mount Carbon Coal Company, Morrison	Ben Prince	Ben Prince	Drift	Lignite	3 feet and 4 feet	3	Natural	500	No	1,000	150	150	1,300	None	
Sopris	Las Animas	Colorado Fuel and Iron Company, Denver	W. P. Thompson	Wm. J. Murray	Slope	Bituminous	4 feet 6 inches to 7 feet	334	Fan	51,000	Yes				133,111	Union Pacific, Denver & Gulf	56,336 tons coke
Berwind	Las Animas	Colorado Fuel and Iron Company, Denver	W. P. Thompson	W. R. Maltby	Drift	Bituminous	5 feet 6 inches	165	Fan	70,000	Yes				104,383	Union Pacific, Denver & Gulf	
Engle	Las Animas	Colorado Fuel and Iron Company, Denver	W. P. Thompson	J. W. Jones	Drift	Bituminous	6 feet	302	Fan	97,000	No				135,111	Denver & Rio Grande	81,176 tons coke
Chicosa 1 and 2	Las Animas	Trinidad Fuel Company, Trinidad	George M. Forbes	J. Cox	Drift	Bituminous	6 feet	19	Furnace	7,000	No	6,810	1,715	5,906	13,500	Union Pacific, Denver & Gulf	
Victor No. 1	Las Animas	Victor Coal Company, Trinidad	D. A. Chappell	Alex. Pollock, Jr.	Drift	Bituminous	7 feet	131	Furnace	10,000	No				90,000	Union Pacific, Denver & Gulf	
Victor No. 2	Las Animas	Victor Coal Company, Trinidad	D. A. Chappell	G. R. Hill, Jr.	Slope	Bituminous	7 feet	130	Fan	16,000	Yes				16,314	Union Pacific, Denver & Gulf	
Gray Creek	Las Animas	Victor Coal Company, Trinidad	D. A. Chappell	James Lamb	Drift	Bituminous	11 feet	110	Furnace	13,621	Yes	33,111	9,073	11,100	54,452	Union Pacific, Denver & Gulf	1,100 tons coke
Peerless	Las Animas	United Coal Company, Denver	J. H. Simpson	Wm. McNeil	Slope	Bituminous	7 feet	200	Fan	31,000	No	36,342	10,493	15,541	62,376	Union Pacific, Denver & Gulf	
Bloom	Las Animas	Jeffryes Coal Company, Trinidad	Geo. Jeffryes	Geo. Jeffryes	Drifts	Bituminous	7 feet	11	Natural	1,000	No	6,501		1,733	1,551	None	
Rowland	Las Animas	Butler Coal Company, Trinidad	R. L. Butler	R. L. Butler	Drifts	Bituminous	5 feet	8	Natural	1,000	No	8,800		1,800	8,000	None	
Starkville	Las Animas	Trinidad Coal and Coke Company, Topeka, Kansas	C. J. Devlin	D. McLaughlin	Drifts	Bituminous	1 feet 6 inches	580	Fan	12,000	Yes	113,100		136,170	311,670	Atchison, Topeka & Santa Fe	41,317 tons coke
Porter	La Plata	Porter Coal Company, Durango	S. E. Herr	Thos. Mason	Drift	Bituminous	5 feet	70	Natural	13,000	No	11,940	1,711	14,911	10,544	Rio Grande Southern	1,900 tons coke
Hesperus	La Plata	Porter Coal Company, Durango	S. E. Herr	Thos. Mason	Drift	Semi-Bituminous	1 feet	24	Natural	10,000	No	11,173	1,155	4,621	17,000	Rio Grande Southern	
San Juan	La Plata	San Juan Coal Company, Durango	D. J. Blackburn	P. L. McCartney	Drift	Bituminous	1 feet	30	Natural	3,000	No	6,572	1,750	7,128	15,500	Rio Grande Southern	
Black Hawk	La Plata	Champion Coal Company, Durango	G. A. Adkinson	G. A. Adkinson	Drift	Bituminous	3 feet 6 inches	15	Natural	5,000	No	4,111	1,111	1,871	11,111	None	
Ute	La Plata	Ute Coal Company, Durango	L. C. Jakway	L. C. Jakway	Drift	Semi-Bituminous	5 feet	40	Furnace	8,000	No	10,933	4,046	4,091	19,008	Rio Grande Southern	
Book Cliff	Mesa	Book Cliff Coal Company, Grand Junction	W. L. Carpenter	W. L. Carpenter	Drift	Bituminous	5 feet	50	Natural	1,000	No	6,411	1,825	1,150	9,386	Little Book Cliff	
Mount Lincoln	Mesa	Mount Lincoln Coal Company, Grand Junction	W. C. Cross	W. C. Cross	Drift	Bituminous	3 feet	31	Natural	1,000	No	6,600	1,000	1,000	8,600	Denver & Rio Grande	
Palisade	Mesa	Palisade Coal Company, Palisade	Geo. Bailey Scott	Geo. B. Scott	Drift	Bituminous	1 feet	11	Natural	1,000	No	1,090			1,090	None	New mine
Cortez	Montezuma	J. Brown and Company, Mancos	J. Brown	J. Brown	Drift	Bituminous	10 feet	1	Natural	900	No				1,000	None	
Collins	Montezuma	G. M. Gau and Company, Mancos	G. M. Gau	G. M. Gau	Drift	Bituminous	10 feet	2	Natural	500	No				1,000	None	
Como	Park	Park Coal Company, King	D. O. Clark	Joe Watson	Slope	Semi-Bituminous	6 feet	111	Fan	10,000	Yes	24,916		11,079	11,851	Denver, Leadville & Gunnison	
Spring Gulch	Pitkin	Colorado Fuel and Iron Company, Denver	W. P. Thompson	Harry Elliot	Slope	Bituminous	6 feet	110	Fan	18,160	No				111,961	Colorado Midland	61,017 tons coke
Northwestern	Weld	Peoples Coal Company, Denver	Wm. Shields	Thos. Reese	Shaft	Lignite	7 feet 6 inches	70	Fan	10,000	No	5,900		1,110	7,111	Union Pacific	
[illegible]field No. 2	Weld	Peoples Coal Company, Denver	Wm. Shields	G. E. Grell	Shaft	Lignite	6 feet	14	Fan	1,500	No	9,150		1,138	11,681	Union Pacific	
Longs Peak	Weld	Longs Peak Coal Company, Erie	Wm. Nicholson	Wm. Nicholson	Shaft	Lignite	6 feet	46	Fan	16,000	No	20,383		5,389	15,660	Union Pacific	
McKissick	Weld	Peoples Coal Company, Denver	Wm. Shields	Chas. Davis	Shaft	Lignite	5 feet	10	Fan	8,000	No	3,160		1,110	4,270	Union Pacific	
Washington	Weld	Brindle and McDermott, Erie	David Brindle	David Brindle	Shaft	Lignite	5 feet	20	Natural	3,000	No	3,100		1,000	1,500	Union Pacific	New mine
Coal Draw	Weld	Robert Rogers, Eaton	Robt. Rodgers	Robt. Rodgers	Shaft	Lignite	5 feet	3	Natural	500	No				1,000	None	
Platteville	Weld	Johnson Coal Company, Platteville	Robt. Johnson	Robt. Johnson	Shaft	Lignite	2 feet 6 inches	4	Natural	1,000	No				1,000	None	

February 13—Romolo Tregello, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; body bruised by fall of rock.

February 13—Dan Darragh, miner at Coal Creek, Colorado Fuel and Iron Company, Fremont county; both ankles sprained by fall of slate.

February 13—Mike Hogan, miner at Coal Creek, Colorado Fuel and Iron Company, Fremont county; leg broken by fall of slate.

February 13—Alex. Young, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; hand cut by fall of coal.

February 15—W. McKenzie, trapper at Rouse, Colorado Fuel and Iron Company, Huerfano county; head cut by runaway pit cars.

February 18—Rumon Pachico, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; head cut by pit cars.

February 19—Sam Livingston, mule driver at Sopris, Colorado Fuel and Iron Company, Las Animas county; finger lacerated, caught by sprag.

February 21—John Cinotts, miner at Oak Creek, United Coal Company, Fremont county; shoulder bruised by falling prop.

February 22—Frank Gonzalez, mule driver at Sopris, Colorado Fuel and Iron Company, Las Animas county; thumb lacerated, caught by sprag.

February 25—Joseph Golobich, mule driver at Crested Butte, Colorado Fuel and Iron Company, Gunnison county; leg cut by pit car.

February 28—George Smith, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; head cut by pit car.

February 28—Fritz Sternbacker, miner at Keystone, Keystone Coal Company, Garfield county; head cut by fall of slate.

March 13—P. Mastang, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; back bruised by fall of coal.

March 19—James Cameron, mule driver at Williamsburg, Williamsburg Coal Company, Fremont county; face cut by pit car.

March 21—Rufus Bailey, miner at New Mitchell, Rocky Mountain Coal Company, Boulder county; hand bruised by fall of coal.

March 22—Joe Yoedis, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; foot bruised by fall of coal.

April 3—J. M. Yadvoseill, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; face and hands burned by blow-out shot.

April 6—Edward Deer, tippleman at Vulcan, Vulcan Coal Company, Garfield county; leg bruised by pit car.

April 9—Hugh Jones, blaster at New Castle, Colorado Fuel and Iron Company, Garfield county; face and hands burned by gas explosion.

April 19—Ed. Flaherty, rope rider at Vulcan, Vulcan Coal Company, Garfield county; back bruised by pit car.

April 20—John Stubb, miner at New Mitchell, Rocky Mountain Coal Company, Boulder county; broken rib by fall of coal.

April 24—Gaitano Digulie, miner at Vulcan, Vulcan Coal Company, Garfield county; leg bruised by pit car.

April 24—John Job, miner at No. 1, Rockvale, Cañon City Coal Company, Fremont county; shoulder bone broken by fall of rock.

April 26—Frank Tonilli, mule driver at Rouse, Colorado Fuel and Iron Company, Huerfano county; collar bone broken by pit car.

May 1—Usillo Sonta, miner at Starkville, Trinidad Coal and Coke Company, Las Animas county; small bone of leg broken by fall of coal.

May 3—Joe Batista, miner at No. 2, Coal Creek, Colorado Fuel and Iron Company, Fremont county; back bruised by fall of slate.

May 3—John O'Heagon, miner at Toltec, Toltec Coal Company, Huerfano county; leg fractured by fall of rock.

May 8—James Welch, miner at McFerran, McFerran Coal Company, El Paso county; wrist sprained by pit car.

May 8—John Martinello, miner at Spring Gulch, Colorado Fuel and Iron Company, Pitkin county; wrist cut by an axe.

May 28—Robert Brown, cager at No. 1 Hecla, Citizens' Coal and Coke Company, Boulder county; shoulder bone broken by pit cage.

June 4—John Strauss, miner at McFerran, McFerran Coal Company, El Paso county; knee sprained by pit cage landing too fast.

June 6—Joe Mason, miner at Coal Creek, Colorado Fuel and Iron Company, Fremont county; back bruised by fall of slate.

June 7—H. Bundy, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; shoulder cut by coal from a shot.

June 16—James McClosky, mule driver at Starkville, Trinidad Coal and Coke Company, Las Animas county; foot bruised by pit car.

June 17—James Canda, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; hurt internally by fall of slate.

June 17—B. Verobtre, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; chest bruised by fall of slate.

June 26—C. Carlson, miner at Tindale, Denver Fuel Company, Jefferson county; shoulder bone broken by fall of coal.

June 28—Manuel Medina, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; leg broken by fall of coal.

June 28—Joe Ritch, timberman at Spring Gulch, Colorado Fuel and Iron Company, Pitkin county; foot bruised by fall of rock.

June 28—William Abernethey, mule driver at Excelsior, United Coal Company, Boulder county; finger broken by pit car.

July 3—John Gardiner, miner at Crested Butte, Colorado Fuel and Iron Company, Gunnison county; leg broken by fall of rock.

July 3—Valinten Zilinger, miner at Black Diamond, Black Diamond Coal Company, Gunnison county; leg broken by fall of coal.

July 9—John Bonder, miner at Engle, Colorado Fuel and Iron Company, Las Animas county; leg broken by pit car.

July 10—John Raybush, miner at Spring Gulch, Colorado Fuel and Iron Company, Pitkin county; arm bruised by fall of coal.

July 16—Dan Doyle, loader at Sunshine, Sunshine Mining Company, Garfield county; body bruised by pit car.

July 26—Pietso Ozelle, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; leg broken by fall of coal.

July 27—William McClosky, miner at Starkville, Trinidad Coal and Coke Company, Las Animas county; loss of thumb, making caps.

August 1—Lorenzo Pio, miner at Starkville, Trinidad Coal and Coke Company, Las Animas county; arm broken by fall of rock.

August 5—John Sueide, water hauler at Sopris, Colorado Fuel and Iron Company, Las Animas county, body bruised by water car.

August 13—Vincenzo Vitole, miner at No. 1 Victor, Victor Coal Company, Las Animas county; back injured by fall of rock.

August 21—S. Fortorelli, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; leg bruised by fall of coal.

August 21—J. Galtaina, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; leg bruised by pit car.

August 22—Harry Baillie, timberman at Sunshine, Sunshine Mining Company, Garfield county; shoulder bruised by fall of slate.

August 26—Paul Savage, miner at Excelsior, United Coal Company, Boulder county; foot bruised by fall of coal.

August 27—Verbano Odorizzi, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; jaw fractured by fall of rock.

August 30—Pat Nilond, miner at No. 1 Garfield, J. Pallet Coal Company, Boulder county; ankle dislocated by fall of coal.

September 10—Nicol Robertson, miner at No. 2 Coal Creek, Colorado Fuel and Iron Company, Fremont county; side bruised by fall of slate.

September 10—Samuel Rickard, miner at Starkville, Trinidad Coal and Coke Company, Las Animas county; shoulder bruised by fall of slate.

September 17—Alex. Carlson, timberman at Sopris, Colorado Fuel and Iron Company, Las Animas county; head bruised by fall of coal.

September 23—Bert Hurd, driver at Gladstone, Gladstone Coal Company, Boulder county; ankle bruised by pit car.

September 27—S. D. Davis, miner at No. 2, Coal Creek, Colorado Fuel and Iron Company, Fremont county; shoulder bruised by fall of rock.

October 8—William Jamieson, miner at Starkville, Trinidad Coal and Coke Company, Las Animas county; back bruised by fall of slate.

October 10—Ant Corradina, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; head cut by pit car.

October 10—Frank Corradina, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; thumb cut, making caps.

October 11—George Cooley, miner at Starkville, Trinidad Coal and Coke Company, Las Animas county; arm broken by fall of rock.

October 11—George Jameison, miner at Starkville, Trinidad Coal and Coke Company, Las Animas county; hand bruised by fall of coal.

October 14—Sylvester Mayer, miner at Tindale, Denver Coal Company, Jefferson county; chin cut by fall of coal.

October 16—Barney McHevee, miner at Starkville, Trinidad Coal and Coke Company, Las Animas county; both legs broken by fall of rock.

October 16—Mike Fagowski, water hauler at Sopris, Colorado Fuel and Iron Company, Las Animas county; leg broken by pit car.

October 18—Joe Manapace, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; head cut and rib broken by fall of slate.

October 20—Will Gillen, driver at Starkville, Trinidad Coal and Coke Company, Las Animas county; internal injuries, crushed by mule.

October 29—Ed Dabrgani, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; body bruised by fall of rock.

October 29—Joe Massarro, miner at Acme, United Coal Company, Boulder county; two ribs broken by fall of coal.

November 4—Louis Pangressi, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; eye cut by coal from pick.

November 4—Ernest White, driver at No. 2 Garfield, People's Coal Company, Weld county; finger taken off by pit car.

November 6—J. J. Howells, miner at No. 2 Coal Creek, Colorado Fuel and Iron Company, Fremont county; ankle broken by fall of coal.

November 7—Joe Pokorny, miner at No. 1 Rockvale, Cañon City Coal Company, Fremont county; leg broken by fall of rock.

November 7—John Costo, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; head cut by blown-out shot.

November 11—J. W. Linzilin, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; body bruised by fall of slate.

November 14—Jim Vertange, miner at No. 2 Coal Creek, Colorado Fuel and Iron Company, Fremont county; leg bruised by fall of rock.

November 16—Marlen Virgil, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; body bruised by fall of rock.

November 19—David Jenkins, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; body bruised by pit car.

November 29—John Henchmer, miner at Star, Baldwin Star Coal Company, Gunnison county; foot hurt by coal pick.

December 4—Joe Haines, miner at Acme, United Coal Company, Boulder county; leg broken by fall of rock.

December 6—V. Antoncich, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; leg fractured by fall of coal.

December 9—James Parsons, miner at Como, Park Coal Company, Park county; burned by fire-damp.

December 11—Joe Vietti, miner at Robinson, Colorado Fuel and Iron Company, Huerfano county; back bruised by fall of coal.

December 16—William Foley, miner at Bright, Cameron Coal Company, Huerfano county; leg fractured by fall of rock.

December 23—Steve Fisher, miner at Como, Park Coal Company, Park county; ribs broken by fall of coal.

December 28—Joe Dencehelle, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; burned by gas.

December 31—J. L. Roberts, miner at Rockvale, Cañon City Coal Company, Fremont county; shoulder dislocated by fall of coal.

TABLE SHOWING TONS OF COAL PRODUCED FOR EACH FATAL AND NON-FATAL ACCIDENT, 1895.

Counties	Tons of Coal Produced	Number of Lives Lost by Fatal Accidents	Number of Persons Injured by Non-Fatal Accidents	Tons Raised for Each Life Lost	Tons Raised for Each Non-Fatal Accident
Arapahoe	540				
Boulder	432,333	4	13	108,083.20	33,256.30
Dolores	2,500				
El Paso	49,938		3		16,646.00
Fremont	383,441	2	17	191,720.50	22,555.30
Gunnison	234,839		5		46,967.80
Garfield	221,549	3	8	73,849.60	27,693.60
Huerfano	415,597	3	19	138,532.30	21,873.50
Jefferson	38,460	1	2	38,460.00	19,230.00
Las Animas	1,213,898	10	41	121,389.80	29,607.20
La Plata	103,807				
Mesa	19,236				
Montezuma	2,000				
Park	41,881		2		20,940.50
Pitkin	123,928		3		41,309.30
Weld	55,548				
Totals	3,339,495	23	113	145,195.40	29,553.05

LIST OF FATAL ACCIDENTS,

1896.

February 8—Jacob Runkle, miner at Holley mine, Baldwin, Gunnison county, was instantly killed by a fall of rock at the face of the room in which he was engaged. We investigated the cause of the accident and we are of the opinion that the deceased could have had his place timbered better than it was, and that if he had taken the customary precaution of testing the roof, he must have known that the rock that fell on him was in a bad condition.

February 11—Henry Tweedle, driver at Engleville mine, Las Animas county, was instantly killed by a fall of timber and rock. We investigated the cause of the accident and found that the deceased was bringing out a loaded car from room 2, fourteenth entry, off the third east, and as the car came on to the switch it jumped the track and knocked out two sets of timbers, the timber and the rock it sustained falling on deceased (who was riding on the hind end of the car), with the aforesaid result. From evidence obtained from the brothers of the deceased, who were engaged as tracklayers and timbermen, the timber in question had been there for over two years, and that in their opinion the place was perfectly safe, but they thought that in coming down the grade towards the switch the car must have been coming quicker than usual, and that from some cause or other it jumped the track.

February 18—The Vulcan disaster. See special report.

March 10—James Menillo, miner at the Starkville mine, Las Animas county, was killed instantly by a fall of rock in room 53, No. 3 entry. Deceased, accompanied by two other miners, was engaged in drawing a pillar in the above room. On our examination of the scene of the accident, we found the working place in good condition and an ample supply of timber of suitable length in the place. From the testimony of deceased's partners, a sudden "crush" came on the pillar, causing the rock to break near the edge of the pillar, without any warning, the same in falling causing the death of Menillo, and a broken leg to one of his partners.

March 13—Antonio Boffo, miner at Sopris mine, Las Animas county, received severe internal injuries, from which he died on March 18. As his injuries were not expected to be fatal, we were not notified until after his death, and operations had been resumed in his working place. We investigated the cause of the accident, and from deceased's partner, Chiotto Antonio, we learned that previous to the accident Boffo had tested the roof above his head and proclaimed the same safe. However, this was not the case, and a small quantity of rock fell on his back, crushing him against the coal face, and the injuries thus received proved fatal.

April 7—John Obweger, miner at Porter mine, La Plata county, received severe injuries by a fall of rock, and in a few hours he died from their effects. On investigation of the cause of the accident, we found by the testimony of Frank Leckner, deceased's partner, that they were both aware of the rock being bad, and that they had, previous to the accident, placed some props under same in order to secure it. The place appeared to be in

good condition and was well timbered, but the rock being liberated by two slips, that could not be seen, owing to a thin layer of coal which had been left sticking to the roof, and was very massive next to the coal face, thus it swung the props out and in falling resulted as aforesaid.

April 10—Edward Robson, miner at the Leader mine, Boulder county, was killed instantly by a fall of coal in No. 18 room, third west entry. On investigation of the cause of the accident, Frank Filley said that he was working with deceased at the time of the accident and was aware of the coal being loose, but did not think it would fall of its own accord. Deceased was loading a car, and the massive piece of coal in falling caught him on the small of the back and knocked him against the car which he was loading.

April 16—Andreas Cruz, miner at Berwind mine, Las Animas county, was instantly killed by a fall of "bony" at the face of his working place, No. 8 room, first north entry. At the time of the accident Cruz was digging off some coal that was attached to the bony. The bony was about fourteen inches thick, and usually very difficult to pull down, but in this case a slip ran parallel to face of coal and one parallel to rib; thus it was unattached on two sides, and deceased, in picking off the coal, removed the sustaining point. The mass itself in falling was not the direct cause of death, but he was knocked against a rail that was slightly projecting over the ties on the road head.

May 12—Mike Scavardo, miner at Brookside mine, Fremont county, was killed instantly by a fall of rock in room 6, fourth east entry. Scavardo at the time of the accident was fastening the door of a car which he had pushed up the room, and while so doing a rock weighing about 250 pounds fell on his head, fracturing it so that death must have been instantaneous. Scavardo was working alone, and we could find no evidence that the rock was known to be bad. The room was well timbered, but several pieces of bad rock were overhanging on the roadway.

May 25—Phillip Pino, miner at No. 1½ mine, Hastings, Las Animas county. Deceased and Aaron Bair were engaged in driving a narrow place from the first north entry through the pillar into the parallel air course. The place was only in about eight feet from the entry. The switch was well secured by a frame of timber, the place being very narrow, only eight feet in width. Aaron Bair, who had his leg broken at the same time, stated that they had often tested the roof and thought it was safe, and that if they had thought otherwise they would have secured it. The rock was a large circular pot hole, about six feet in diameter and about two feet thick in the center, tapering to a feather edge all around. This, on falling, killed Pino instantly.

June 8—Phillip Crapa, miner at Engleville mine, Las Animas county, received severe injuries from a fall of rock, and died in a few hours after the accident. We examined the scene of the accident and found that the deceased, with Eugene Kerchbanner, was engaged in drawing a pillar and that the roof had previously caved very high; the edge over the coal was shattered and they had succeeded in propping it up, when a large stone came sliding down over the cave, knocking out several props, causing the shattered roof to fall on Crapa, and resulted as aforesaid.

June 9—John McLaughlin, driver at the Starkville mine, Las Animas county, received bodily injuries, simple fracture of the left thigh and a compound fracture of the right thigh, and in a few days after he succumbed from the injuries. On the following morning the scene of the accident was duly examined, and we found the track in good condition, the curve around the switch natural, and ample room under ordinary circumstances. Probably the driver was coming out over the switch quicker than usual, and the front car may have been defective. Coal had been hauled over this switch for three or four years, and we could not make any suggestions whereby it could be improved.

July 5—Herbert A. Mackey, pumpman at Como mine, Park county, was found dead in the south parallel air course to the slope. The cause of the accident was investigated, and we found that it was customary for the pumpman to examine the condition of the steam and water pipe in this air course, and that on this day he was attending to his usual duties. From the position his body was found in and the contusions thereon, we are of the opinion that he must have lost his footing on the stairway (45° pitch), and by falling he was stunned, and that before he regained consciousness he was suffocated in the superheated air course. The temperature on the day of examination was 105° Fahrenheit, and the volume of air 21,600 cubic feet per minute. This intense heat is unbearable. However, it was aiding the ventilation of the interior of the mine, because it rarified the air column in the upcast.

August 10—Noverto Blea, miner at Starkville mine, Las Animas county, received severe internal injuries, which proved fatal in a few hours after the accident. Deceased was working in room 20, west third entry, and was "brushing" his roadway when the accident occurred. The roof in this section of the mine is very fragile and treacherous. Overlying the coal there is a soft, shaly slate, about one foot thick (this on the roadway of the rooms is taken down), and above it is a slippy soapstone. The room was well timbered and showed evidence of care and attention, but the rock that fell on deceased was on the road head, and could not be well secured by props.

August 10—Peter Gambrino, miner at Starkville mine, Las Animas county, was instantly killed by a fall of rock in room 14, A. 8 entry. Gambrino was working at night and had just commenced his shift at the time of the accident. The room had been finished by getting in contact with a dyke, and Gambrino and his partner had been ordered to cut through the pillar into No. 13 room. This made the place very wide. However, it was well timbered, but the roof all over was loose and sustained by the props. The rock that fell on deceased was very massive and had discharged seven or eight props in falling. Gambrino was a practical miner and had worked at Starkville for many years.

September 18—Frank Simick, miner at the Williamsburg mine, Fremont county, was instantly killed by a fall of rock. On our examination of the scene and the cause of the accident, we found that deceased and Joseph Pulscah were engaged in drawing a pillar; that the place was very sparsely timbered, and no timber in the working place or on the top of the shaft. On this very morning a change of leasers took place, and that accounts for no timber being on the ground.

October 3—John Wallace, miner at Franceville mine, El Paso county, was instantly killed by a very small rock falling on his head, crushing his skull. Deceased at the time of the accident was drilling a hole in the coal at the face of the room. The room was in good condition and well timbered. Wallace was an old miner and much respected.

October 6—J. B. Cruz, miner at the Walsen mine, Huerfano county, was instantly killed by a fall of rock in room 5, sixth east entry. We investigated the cause of the accident and found the place exceptionally well timbered, and an ample supply of timber in the working place. Frank Upshur, deceased's partner, stated that he had a narrow escape, and that a few minutes previous to the accident they had tested the roof.

October 27—Henry Jones, miner at Engleville mine, Las Animas county, was killed instantly by a fall of rock in room 16, tenth east entry. We investigated the cause of the accident and found that deceased and August Went were engaged in drawing the right hand pillar in the aforesaid place. August Went visited the scene of the accident with us, and stated that the place was well timbered and that, in his opinion, it could not be bettered. On the edge of the pillar a smooth slip was encountered. The timber not being over three feet from the coal, the overhanging

weight of the rock was sufficient to discharge the timber, and the massive rock fell on deceased. The place was well timbered and an ample supply of timber laying in the place.

December 12—Jas. Case, miner at the Rowland mine, near Trinidad, received injuries of a serious nature, compound fracture of the left thigh, etc. He died the following morning. We investigated the cause of the accident and found the place in good working order. The coal is about nine feet in thickness. The bottom bench, about five and one-half feet, is worked out first, and the top bench, about three and one-half feet, generally had to be blasted down. At the time of the accident deceased was working bottom coal, when a piece (weighing about 500 pounds) of top coal fell on him, with the aforesaid results.

TABLE OF NON-FATAL ACCIDENTS,

1896.

January 3—Simon Arjiekos, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; foot bruised by fall of rock.

January 4—A. F. Rassmeian, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; leg broken by fall of rock.

January 5—Harry Hardy, miner at Acme, United Coal Company, Boulder county; ankle bruised by fall of coal.

January 7—Antoni Rochive, miner at No. 2 Coal Creek, Colorado Fuel and Iron Company, Fremont county; foot bruised by fall of rock.

January 7—Mark Ogolim, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; body bruised by pit car.

January 9—Peter Aussetla, miner at Vulcan, Vulcan Fuel Company, Garfield county; scalp wound by fall of coal.

January 17—Albert Mason, dumper at Lister, Lister Coal Company, Boulder county; eye hurt by railroad car.

January 25—J. R. Miller, washer foreman at Sopris, Colorado Fuel and Iron Company, Las Animas county; ankle dislocated, caught in belt.

January 25—M. McEwen, loader at Sunshine, Renstrom Coal Company, Garfield county; foot crushed by pit car.

January 27—Albert Saracina, miner at No. 1 Coal Creek, Colorado Fuel and Iron Company, Fremont county; head and arm bruised by fall of slate.

January 27—Jean D. Cruz, miner at No. 1 Monarch, Trinidad Fuel Company, Las Animas county; lip cut by fall in wagon.

January 28—C. Martinez, driver at No. 1 Monarch, Trinidad Fuel Company, Las Animas county; ankle bruised by fall of rock.

February 3—William Warrick, roadsman at Starkville, Trinidad Coal and Coke Company, Las Animas county; back bruised by fall of rock.

February 29—Charles Furringreen, roadsman at Como, Park Coal Company, Park county; hands and face burned by explosion of gas.

March 6—Thomas Onurcine, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; back bruised by fall of rock.

March 9—Thomas Abernethy, miner at Excelsior, United Coal Company, Boulder county; legs bruised by fall of coal.

March 9—W. D. Collins, weigher at San Juan, San Juan Coal Company, La Plata county; foot bruised by pit car.

March 10—Antoni Jackamonic, miner at Starkville, Trinidad Coal and Coke Company, Las Animas county; leg broken by fall of slate.

March 14—Robert Pilkinton, machine runner at Acme, United Coal Company, Boulder county; finger broken by machine.

March 19—M. S. Gavia, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; collar bone broken by fall of coal.

March 23—H. McIntyre, miner at Como, Park Coal Company, Park county; burned slightly by gas.

March 26—Ernest Bandueu, roadsman at Gonzales Cañon, Broadhead Coal Company, Las Animas county; head cut by fall of rock.

March 28—John O'Brien, mule driver at Gonzales Cañon, Broadhead Coal Company, Las Animas county; rib broken by pit car.

March 28—Lewis Saunders, miner at No. 1 Coal Creek, Colorado Fuel and Iron Company, Fremont county; shoulder bruised by fall of slate.

April 8—Joseph Feranda, miner at No. 1 Victor, Victor Coal Company, Las Animas county; body bruised by fall of coal.

April 16—John Beakem, miner at No. 2 Victor, Victor Coal Company, Las Animas county; burned slightly by gas.

April 24—Barney Madonna, miner at Victor No. 1, Victor Coal Company, Las Animas county; leg bruised by fall of coal.

May 2—Chas. Weahl, miner at Spencer mine, United Coal Company, Boulder county; body bruised by fall of rock.

May 2—J. D. Bobo, blacksmith at Sopris, Colorado Coal and Iron Company, Las Animas county; arm bruised by a wheel.

May 7—Joseph Gunther, miner at Porter, Porter Coal Company, La Plata county; leg broken by careless handling of giant powder.

May 12—Chris Skrapona, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; leg broken by fall of coal.

May 19—Daniel Lucino, mule driver at Walsen, Colorado Fuel and Iron Company, Huerfano county; foot bruised by empty car.

May 25—Aaron Bair, miner at No. 1 Victor, Victor Coal Company, Las Animas county; leg broken by fall of rock.

May 26—Angelo Zaeotti, miner at Sopris, Colorado Coal and Iron Company, Las Animas county; leg broken by fall of coal.

May 28—Frank Walock, miner at Rouse, Colorado Coal and Iron Company, Huerfano county; head cut by fall of slate.

June 9—George Cavin, driver at No. 1 Rockvale, Cañon City Coal Company, Fremont county; leg broken by fall of rock.

June 10—John X. Evans, miner at No. 1 Rockvale, Cañon City Coal Company, Fremont county; ankle bruised by fall of coal.

June 15—C. V. Griffin, tippleman at Union mine, Union Coal and Coke Company, Pitkin county; thumb bruised while spragging car.

June 17—John Campbell, miner at Union mine, Union Coal and Coke Company, Pitkin county; collar bone broken by fall of coal.

June 25—Joe Blanco, miner at Union mine, Union Coal and Coke Company, Pitkin county; thumb crushed by fall of coal.

July 17—Henrice Domage, loader at Newcastle, Colorado Fuel and Iron Company, Garfield county; leg broken by fall of rock.

July 22—John Grobolo, miner at Sopris, Colorado Fuel and Iron Company, Las Animas county; leg broken by fall of rock.

August 1—Pat Logan, miner at Rouse, Colorado Fuel and Iron Company, Huerfano county; back bruised by fall of slate.

August 1—Paul Bazote, miner at Spring Gulch, Colorado Fuel and Iron Company, Pitkin county; back bruised by fall of rock.

August 12—Matt Harraciell, miner at Sopris mine, Colorado Fuel and Iron Company, Las Animas county; leg crushed by a fall of rock.

August 29—John Wilson, blacksmith at Union mine, Union Coal and Coke Company, Pitkin county; thumb bruised while spragging car.

August 29—Martin Bresnuk, miner at Spring Gulch, Colorado Fuel and Iron Company, Pitkin county; leg bruised by a pit car.

September 11—John Madone, miner at No. 1 Coal Creek mine, Colorado Fuel and Iron Company, Fremont county; leg broken by a fall of rock.

September 27—Aug. Johnson, miner at Sunshine mine, J. Renstrom, lessee, Garfield county; finger fractured by a fall of coal.

September 27—Joseph Christian, blacksmith at Marshall mine, Marshall Coal Company, Boulder county; internal injuries by a falling trestle.

September 30—Jos. Barra, miner at Newcastle mine, Colorado Fuel and Iron Company, Garfield county; leg broken by a fall of coal.

September 30—Frank Lundegan, miner at Gonzales Cañon mine, Broadhead Bros., Las Animas county; face cut by a fall of rock.

October 3—Wm. Wilcox, mule driver at Starkville mine, Colorado Fuel and Iron Company, Las Animas county; collar bone fractured by trip leaving track.

October 6—J. B. Cruz, miner at Walsen mine, Colorado Fuel and Iron Company, Huerfano county; hip dislocated by a fall of rock.

October 18—Chris Shepherd, miner at Gonzales Cañon mine, Broadhead Bros., Las Animas county; face and hands burned by gas.

October 23—And. Johnson, miner at Gonzales Cañon mine, Broadhead Bros., Las Animas county; face and hands burned by gas.

October 27—Chas. H. Newsonie, miner at Excelsior mine, United Coal Company, Boulder county; leg fractured by a fall of coal.

October 28—Dennis Kane, engineman at Crested Butte mine, Colorado Fuel and Iron Company, Gunnison county; leg broken; got caught with tail rope.

November 18—James Gorlow, miner at No. 1 Victor mine, Victor Coal and Coke Company, Las Animas county; back seriously injured by a fall of coal.

TABLE SHOWING TONS OF COAL PRODUCED FOR EACH FATAL AND NON-FATAL ACCIDENT, 1896.

Counties	Tons of Coal Produced	Number of Lives Lost by Fatal Accidents	Number of Persons Injured by Non-Fatal Accidents	Tons Raised for Each Life Lost	Tons Raised for Each Non-Fatal Accident
Arapahoe	398				
Boulder	504,947	1	7	504,947.00	72,135.00
Dolores	2,100				
El Paso	32,016	1		32,016.00	
Fremont	282,459	2	6	141,229.50	47,076.50
Gunnison	269,875	1	1	269,875.00	269,875.00
Garfield	227,280	49	5	4,638.30	45,456.00
Huerfano	365,648	1	6	365,648.00	60,941.00
Jefferson	18,105				
Las Animas	1,331,115	11	24	121,010.40	55,463.00
La Plata	99,116	1	2	99,116.00	49,558.00
Mesa	20,457				
Montezuma					
Park	33,887	1	2	33,887.00	16,943.00
Pitkin	162,071		6		27,011.80
Weld	22,159				
Totals	3,371,633	68	59	49,582.00	57,146.00

NAMES AND LOCATION OF MINES.

LAS ANIMAS COUNTY MINES.

GREY CREEK MINES.

These mines are located about eight miles east of Trinidad and consist of three openings with their respective tracks leading into one tipple. They are operated by The Victor Coal and Coke Company. During 1895 and 1896 operations have been very irregular, and they are now closed down indefinitely. The coal is bituminous in character and a fair quality of coke is made from the slack. The quality of the coke was greatly improved by the use of washing machines. The ventilation of the mines is not very good. Haulage ways are wide and roomy and well secured.

ENGLEVILLE MINE

Is located about two miles east of Trinidad, is owned and operated by The Colorado Fuel and Iron Company. This mine is one of the oldest mines in southern Colorado, and has been and is now one of the largest producers in the state. The coal is bituminous, of excellent quality. The lump is mostly used for railroad purposes, and the slack is converted into good coke at the El Moro ovens. The mine is ventilated by two fans of the compressive type. Considering the extensiveness of the workings it is fairly well ventilated. Haulage ways are wide and roomy and well timbered where needed; in some places they are dry and dusty and the amount of water available is limited for sprinkling purposes.

STARKVILLE MINE.

This mine is located on the Atchison, Topeka & Santa Fe railroad, about four miles from Trinidad. Until August, 1896, it was owned and operated by The Trinidad Coal and Coke Company. Since, it is operated by The Colorado Fuel and Iron Company. It is the largest producer in the state. The workings are very extensive and in good condition. The air courses and

haulage ways are spacious and kept in excellent condition. The condition of the interior and exterior of this mine is evidence of skilful and systematic management.

SOPRIS MINE.

This mine is located about four miles in a southerly direction from Trinidad. Is owned and operated by The Colorado Fuel and Iron Company. It is one of the large producers of the state. The main opening is driven on the pitch of the seam, which is of a gentle gradient. Double entries are turned off at right angles to the slope, about 600 feet apart. The main haulage is done by a tail rope engine. The mine is ventilated by a large fan of the compressive type, and each section of the mine receives a fresh and independent current of air. The air courses are spacious and well maintained. The ventilation of this mine has received marked attention from the commencement of operations, and now, when the workings of the mine have become very extensive, the efficiency and economy of the adopted system is a factor of importance. This mine is a model in regard to the distribution of air, and great credit is due the management for such satisfactory results. During the past year a large washing plant has been erected, by the use of which a better grade of coke is produced. Two hundred and twenty ovens are supplied with coal from this washing plant, and the result is very satisfactory.

BALD MOUNTAIN.

This is a small mine being opened and developed this year, located about six miles north of Trinidad. The coal is bituminous, of excellent quality and about seven feet in thickness. Natural ventilation, which is not reliable or satisfactory; however, the management has promised to have same remedied as soon as practical, by producing ventilation by artificial means. No railroad connections. The product is now hauled by teams.

CHICOSA MINES.

This group of mines consists of four openings, all leading into one common dumping point. The coal is of excellent quality and the equipment is modern. During the term very little coal has been produced and the mines are now indefinitely abandoned.

BERWIND MINE.

The mine is owned and operated by The Colorado Fuel and Iron Company and in the near future will be one of the largest

producers in the state. The coal is bituminous in quality and from six to seven feet in thickness. The roof is of a fragile nature, thus requiring great care and attention in maintaining air ways and haulage ways. During the past year great improvements have been made in securing the haulage ways, and they are now in a safe condition. The main air ways through the old workings are in bad condition, thus the ventilation is not very good. The cleaning and repairing of the airways is progressing rapidly and in the near future the mine will be in excellent condition.

VICTOR MINES.

This group of mines consists of three openings and two dumping departments. No. 1 and 1½ coal is dumped together, and No. 2 product is dumped on the other department. They are owned and operated by The Victor Coal and Coke Company. No. 1 mine, ventilation not very good; haulage ways in fair condition. No. 1½, ventilation not very good; haulage ways are in good condition, with the exception of being very dusty. No. 2 mine is a slope-opening, with a parallel man way, both of which are in excellent condition; ventilation, good; haulage ways well secured and in good condition. The slack is converted into coke of a fair quality, and by the use of washing machines the coke product has been greatly improved.

PEERLESS MINE.

This mine is located in Apishapa cañon. Is owned and operated by The United Coal Company. The coal is bituminous in quality, of a hard and compact texture. The ventilation is produced by a large fan twenty-four feet in diameter; the current therefrom is fairly distributed through the workings. Haulage ways are well secured and in good condition.

GONZALES CANON MINE.

This is a new mine, owned and operated by the Brodhead Bros. During the latter part of 1895 and the fore part of 1896 the present shaft was sunk to the coal, and since then a considerable amount of money has been expended in development on the property. They are now engaged in sinking another shaft, which will soon be completed. On our last inspection, the sanitary condition of the mine was not very good, and we urged the necessity of having a second opening for the purpose of better ventilation and also for egress to the inside workmen

in case of fire or breakage in the hoisting shaft. When this shaft, now in progress, will be completed, the mine will be in good condition.

SMALL MINES.

There are several small mines in this county, the product of which is used for domestic purposes, and have no railroad facilities.

HUERFANO COUNTY MINES.

SANTA CLARA MINES.

This group of mines has not been operated during 1895 and 1896.

ROUSE MINES.

This group of mines consists of three openings, and are owned and operated by The Colorado Fuel and Iron Company. Located about six miles south of Walsenburg. During 1896 the No. 2 mine was finished, all pillars being drawn and the mine abandoned. In No. 1 mine a great inflow of water was encountered and the pumps were overpowered and lost. There are now large electric pumps in operation, and the lost workings will soon be regained and operations will be resumed as soon as possible. Nearly all the coal now produced is obtained from the No. 3 opening. This opening is ventilated by the same fan as No. 1, and the air current is well distributed through all the workings. Haulage ways are in good condition and all air courses well maintained.

WALSEN MINE.

This mine is located about one mile west of Walsenburg. Owned and operated by The Colorado Fuel and Iron Company. The mine is opened by a slope and parallel air course started on the crop and driven on the pitch of the seam. The slope is well maintained and in good condition. The parallel main air course has been neglected and is not in a very good condition, however, on my last inspection, there were men engaged in enlarging and securing the same, and when this is completed I am of the opinion that a perceptible increase of the air volume will be obtained and the miners will have a safe traveling way to and from their working places. The haulage ways are in good condition with the exception of poor drainage in some places, and it is very difficult to keep the roads free of water.

ROBINSON MINE.

This mine is located a short distance west of the Walsen mine. Is owned and operated by The Colorado Coal and Iron Company. During 1895 and 1896 operations have been very irregular. Ventilation is good and well distributed. The roof is very massive and treacherous, and requires great care and attention to keep the haulage ways secured. However, on the whole, the mine is in good condition.

BRIGHT MINE.

This is a small mine opened during the past year. Is owned and operated by The Cameron Coal Company. Seam is thin, good in quality and used for domestic purposes. No railroad connections.

TOLTEC MINE.

This is a new mine opened on a small scale during the past year. It is owned and operated by The Toltec Coal Company. The vein is thin, about four feet in thickness, of a good quality for domestic and steaming purposes. Ventilation is produced by a temporary furnace. Haulage ways are well maintained, but not very spacious owing to the vein being so thin.

PICTOU MINES.

This group of mines consists of two openings on different seams. Is owned and operated by The Colorado Fuel and Iron Company. The product of both seams is dumped on one tipple. The coal is of good quality for domestic or steaming purposes. Ventilation is produced in both mines by a large fan and is fairly well distributed through the working places. Haulage ways are not very spacious, but well secured and in good condition.

SMALL MINES.

There are a few mines in operation in the county besides the above, the number of men working therein not coming under the jurisdiction of this office.

FREMONT COUNTY MINES.

COAL CREEK MINES.

This group of mines consists of four openings. They are owned and operated by The Colorado Fuel and Iron Company.

No. 1 and No. 2 mines are ventilated by a large fan, and the air current is well distributed through all the workings. The haulage ways are in fair condition, some places being very low and narrow. This is due to the creep of the strata. No. 3 and No. 4 are small drift openings. The coal is very thin and is extracted by the long-wall method. The ventilation is produced by a small furnace and is not very satisfactory. To ventilate these mines with a degree of success is very difficult, for several reasons, the seam is thin and the quantity of stowage is great, thus the sectional area of the air channel through the faces is small, and on idle days the working face often caves, thus obstructing the whole current.

ROCKVALE MINE.

This mine is now operated by The Colorado Fuel and Iron Company, and is the largest producer in Fremont county. The coal is extracted very successfully by the long-wall system. The ventilation is produced by two fans, and is well distributed and conducted through the face of the workings. In the innermost workings the temperature of the air current is greatly increased. The main haulage ways are spacious and in good condition; the tributary entries are not as good—in many places they are low and narrow. When we consider the method of working and the extensiveness of the mine, on the whole it is in good condition.

WILLIAMSBURG MINE.

This is a small mine, operated by The Williamsburg Coal Company. The ventilation is produced by a small fan, and the quantity circulated by the same was inadequate to keep the working places in a sanitary condition. This, in our opinion, was mainly due to the location of the fan and the great quantity of carbonic acid gas, $C\ O_2$, given off from the old workings. On our last inspection we urged the moving of the fan to its present location, and we are confident of better results. The haulage ways have been unsafe and in bad condition, but on our last inspection they were greatly improved, and we were assured that they would be put in good shape.

FREMONT OR OAK CREEK MINE.

This mine is operated by The Colorado Fuel and Iron Company. Ventilation is produced by a large fan and is well distributed through all the workings. During this year considerable "crush" has been experienced, and the old workings had to be abandoned and a new system of mining has been adopted.

CHANDLER CREEK MINE.

Is operated by The Colorado Fuel and Iron Company. The ventilation is produced by a large fan and is well conducted through the working places. The pillars between the entries in this mine are very small, and may be the cause of serious trouble in the future, however, so far, no danger has arisen from this source. Haulage ways are all in good condition.

BROOKSIDE MINE.

This mine is located about three miles southeast of Cañon City. Is now operated by The Colorado Fuel and Iron Company. Ventilation produced by a large fan. Main air courses well maintained and the air well distributed through all the workings. Haulage ways are well maintained and are in good condition.

SMALL MINES.

There are several small mines operating in this county. Their product is used for domestic purposes and is hauled by teams. Nearly all these small mines are dependent on natural ventilation, and the working places are not in a sanitary condition.

EL PASO COUNTY MINES.

BICKERTON MINE.

This is a small mine opened on the crop of the seam, located about a mile east of Franceville. The coal is of a lignite character, equal in quality to anything yet discovered in this field. The product is used for domestic purposes. No railroad connections.

FRANCEVILLE MINE.

This mine is located about fourteen miles east of Colorado Springs. Is operated by The Union Ice and Coal Company. The coal is lignite in character, of a fair quality and about six feet in thickness. The ventilation is produced by a fan and is fairly well distributed through the workings. Air courses and haulage ways are well secured and in good condition.

McFERRAN MINE.

This mine is located about eleven miles east of Colorado Springs, and was operated by The McFerran Coal Company. It

is now abandoned. During the past two years a considerable sum of money has been expended on the property, but it appears that the mine has never been on a paying basis.

SMALL MINES.

There are several small mines in operation on the western extremity of this lignite coal field. The vein is thin and the coal is of an inferior quality. It is hauled by teams and used for domestic purposes in the surrounding neighborhood.

JEFFERSON COUNTY MINES.

TINDAL MINE.

This mine is located about six miles north of Golden. Is owned and operated by The Denver Coal Company. The coal is lignite in character, of a superior quality. The seam is about fourteen feet in thickness, and is pitching about 84°, which makes it expensive to operate and very difficult to ventilate. The shaft is in very bad condition, and it is the only way of ingress and egress into the workings. The ventilation is produced by a small fan of the compressive type, which is running at a very high speed. The air current thus produced is carried into the mine through a metal pipe sixteen inches in diameter, and distributed into the rooms or "stopes" through a four-inch pipe. To ventilate this mine with any degree of efficiency would be difficult at best, and with only one opening it is impossible to keep the working faces in a healthy condition.

SMALL MINES.

This fall several parties are opening small mines on the outcrop of the Golden seam. The product will be hauled by teams and mostly used for domestic purposes in the town of Golden.

PARK COUNTY.

COMO MINE.

This was the only coal mine in the county. It was owned and operated by The Park Coal Company. It was abandoned on the 10th day of November, 1896.

PITKIN COUNTY MINES.

SPRING GULCH.

This mine is owned and operated by The Colorado Fuel and Iron Company. The coal produced is nearly all converted into coke, at Cardiff, where the coke ovens are located. The mine is ventilated by a fan, and the air current is well distributed through all the workings. Considerable "crush" is experienced on the main air courses and haulage ways, but with great care, attention and expense they are well maintained.

UNION MINE.

This is a new mine opened on the same seams as they are working at Spring gulch. It is owned and operated by The Union Coal and Coke Company. On our last inspection the ventilation was not very good and in order to improve the same, we have desired the management to increase the sectional area of the air ways and to use artificial means to procure a reliable current.

GARFIELD COUNTY MINES.

MIDLAND MINE.

This mine is located in Sunshine gulch, about ten miles from Cardiff. Is owned and operated by The Midland Coal Company. The condition of this mine is not very good. On our last inspection the haulage ways needed considerable repairs and the ventilation in the working places was not satisfactory. The coal is semi-bituminous in character and is mostly used for steaming purposes.

SUNSHINE MINE.

This mine is located in Sunshine gulch and is operated under lease by Renstrom Bros. The coal is of excellent quality for domestic purposes. The mine has been shut down for several months during this year for the purpose of isolating a fire, which originated through spontaneous combustion. The ventilation is produced naturally and is fairly well distributed, but not very reliable. The haulage ways are well maintained and are in a safe condition. All of the veins in Sunshine gulch are pitching from 35° to 50° from the horizontal.

ELK CREEK MINE.

This is a small mine operated by D. S. Llewelyn and others, located about two miles northwest of Newcastle. The coal is semi-bituminous in character and a good article of fuel for domestic purposes. Ventilation "natural" and the haulage way in good condition.

KEYSTONE MINE.

This is a small mine operated by A. Cohn, of Newcastle. The coal is semi-bituminous in quality and is mostly used for domestic purposes. Ventilation is not very good. The haulage way or drift on the seam is in good condition.

NEWCASTLE MINE.

This is the largest producer in Garfield county. It is owned and operated by The Colorado Fuel and Iron Company. The seams are pitching from 50° to 60°, and four seams of an aggregate thickness of ninety-six feet are cut by a horizontal tunnel from the bottom of the shaft. Carbureted hydrogen gas is emitted freely from the seams, especially in the "Wheeler" and "Allen" seams. The ventilation is produced by two large fans, the combined volume of which is about 125,000 cubic feet per minute. This great volume of air is well distributed through all the working places and the gas emitted is diluted and rendered harmless. The haulage ways are wide and roomy, well maintained and in excellent condition. While the mine is considered dangerous, it is worthy of note that there has not been a single fatal accident therein during my official term. This is due to the stringent discipline and the precautionary measures adopted as safeguards to life and property by the company. During the past two years they have adopted many precautionary measures, such as changing their safety lamps and adopting the "Wolf" safety lamps exclusively. This change entailed a great expenditure of money, at least $1,000. Wood pulp is used for tamping all holes and the powder used, the "Atlantic Dynamite Flameless Powder," is considered the best known to mining men, as being the least productive of flame, etc.

SMALL MINES.

There are several small mines operating on a small scale in this county, the number of men working therein being below the limit allowed them by law to be subject to its provisions.

GUNNISON COUNTY MINES.

CRESTED BUTTE MINE.

This mine is owned and operated by The Colorado Fuel and Iron Company. The coal is about five feet six inches in thickness, bituminous in quality and an excellent grade of coke is produced from the slack. The ventilation is produced by a large fan of the compressive type, the mining operations being very extensive, it is taxed to its full capacity. The air current is well distributed and conducted through all the working places, the temperature of the air is rather high in the innermost workings. The main haulage ways are wide and roomy, the tributary entries are not so well maintained, but they are in a safe condition. Small quantities of CH_4 gas are sometimes encountered and safety lamps are used exclusively. The company have adopted the Wolf safety lamp and prohibited the use of the Clanny lamps, which were previously used. This change entailed an expenditure of about $1,500. It is worthy of mention that during the past two years there has not been a fatal accident in this mine. This, in my opinion, is due to strict discipline on the part of the local management, and that the miners using safety lamps of about .45 candle power are not too risky and are very cautious as to their own security. During the past year a new mine has been opened on the seam overlying the one worked in the old mine. A small fan has been erected ready for any emergency, but at present the mine is well ventilated "naturally."

ANTHRACITE MINE.

This mine is owned and operated by The Colorado Fuel and Iron Company. The coal varies from four feet to six feet in thickness and is a good grade of anthracite. This anthracite field is not very extensive and very little development work is now done in the mine. The ventilation is produced by a large fan. The air current is well conducted and the working places are kept in a sanitary condition. The haulage ways are not very roomy, but are well secured and in a safe condition.

RUBY MINE.

This is owned and operated by The Colorado Fuel and Iron Company. The coal is about three feet six inches on an average in thickness, and an excellent grade of anthracite. The dip of the measures is about 18° or 20°. This makes the mining opera-

tions rather difficult, especially the mining and handling of the coal, thus making the production expensive. During the year 1895, the demand for this class of coal did not justify the operation of the mine. In the fall of this year they resumed operations and are now producing about 200 tons per day of prepared coal. The capacity of the breaker is about 1,000 tons per day. The mine at present is dependent on natural ventilation; at time of last inspection it was very good, however, it is not reliable, and the company in the near future will put up a large fan. The haulage ways are not very extensive yet. The roof being good they are in good condition.

KUBLER MINE.

This mine is located about one and one-half miles from the town of Baldwin. This fall it has changed hands and the present owners intend to operate on a large scale; they are now developing the property. A new branch of the Denver, Leadville & Gunnison railroad has been built up to the mine. Tramways, tipples, etc., are in course of construction. By the first of the year they intend to be able to ship about 200 tons per day. The equipment is modern and electricity will be used as motive power.

SUNBEAM MINE.

This is a small mine operated by The Sunbeam Coal and Coke Company. The vein is between six and seven feet in thickness, semi-bituminous in quality and a good fuel, either for domestic or steaming purposes. Ventilation produced by a temporary furnace. Haulage ways in good condition. Coal hauled by teams to the railroad.

SMALL MINES.

There are several small mines operating in this field. The Star, Holly, Black Diamond and others. The coal is of a good quality and is hauled by teams to the Denver, Leadville & Gunnison railroad.

MESA COUNTY MINES.

BOOK CLIFF MINE.

This is a small mine located about twelve miles north of Grand Junction, operated by The Book Cliff Railway and Coal Company. The coal is about four feet six inches, on an average,

in thickness, excellent in quality and free from impurities. During the past two years operations have been very irregular. Ventilation is very good. Haulage ways in good condition.

PALISADE MINE.

This is a very small mine, located near Palisade. No railroad connections; product hauled by teams to railroad.

MOUNT LINCOLN MINE.

This is a small mine located about one mile east of Palisade, operated by The Mount Lincoln Coal Company. The seam is about three feet six inches in thickness and a good fuel for domestic purposes. The ventilation is not very good. Haulage ways are very low but well secured.

SMALL MINES.

There are several small mines opened on the crop of the Book Cliff mountains, operated and used by neighboring farmers, etc.

LA PLATA COUNTY MINES.

BLACK HAWK MINE.

This is a small mine, leased and operated by G. A. Adrianson, of Durango. The coal is about three feet six inches in thickness, good in quality and mostly converted into coke for use at the smelter. Ventilation is not very good. The haulage ways are low, but in a safe condition.

SAN JUAN MINE.

This mine is operated by The San Juan Coal Company. On last inspection the ventilation was improved, but it is not very good yet. Haulage ways are in good condition. The coal is about three feet six inches in thickness. It is of good coking quality.

PORTER MINE

Is owned and operated by The Porter Coal Company. During the past year this company has made considerable improvements on their property. The old mine on the right side of the cañon will soon be worked out and abandoned, the new openings on the left side of the cañon being now their greatest producers. Coke ovens have been built on the property, and

some of the product has been converted into an excellent grade of coke. Ventilation not very good on our last inspection. Haulage ways in excellent condition.

HESPERUS MINE

Is owned and operated by The Porter Coal Company. The coal is semi-bituminous in quality and is mostly used for domestic purposes in the towns on the Rio Grande Southern railroad. Ventilation fairly good. Haulage ways in good condition.

UTE MINE

Is owned by The Ute Coal Company. During the past year they have greatly improved the condition of the haulage ways. Ventilation of the mine is not very good.

BOULDER COUNTY MINES.

All the coal found and operated on in this county is lignitic in character, the Louisville district being considered a little the best in quality. The mines in general are in good condition. With a few exceptions the haulage ways are well maintained and in excellent condition. The quantity of air produced is very good, but the conduction of the air current through the working places does not receive the attention it should. In many cases there is a good current of air passing on the entries, and the rooms turned therefrom are not in a sanitary condition. The expense incurred to conduct the air current through the workings would be very small, and the beneficial results will well repay for the same.

ACME MINE

Is owned and operated by The United Coal Company. During the past year considerable crush has been experienced, closing up several of the entries. Due to this, operations have been very irregular. The company is now repairing the mine and will, in the near future, put the same in a safe and workable condition.

CALEDONIA MINE

Is owned and operated by The United Coal Company. During the past two years the main and air shafts have been sunk into the lower seam and considerable development work has been

done in the interior of the mine. The workings are not very extensive. Ventilation is good and the haulage ways are in fair conditon. Coal mined by machinery.

HECLA NO. 1 MINE

Is owned and operated by The Citizens' Coal and Coke Company. It is ventilated by a fan producing about 20,000 cubic feet of air per minute. This current is fairly well conducted through the working places. The haulage ways are in good condition. Most all the coal is mined by machinery.

LEADER MINE

Is owned and operated by The Leader Coal Mining Company. The ventilation was not very good on last inspection. Haulage ways in fair conditon. Coal mostly mined with machines.

IMPERIAL MINE

Is owned and operated by The Imperial Coal Company. There is only one opening and the sanitary condition of the working places is not very good. The haulage ways are in good condition.

REX MINE

Is owned and operated by The Rex Coal Company. This is a new mine, being opened and developed during the past two years. At one time there were about fifty miners engaged in this mine, with only one opening. An effort was made to ventilate it by a temporary furnace connected to a small section of the main shaft, but this mode of ventilation was insufficient to keep the working places in a sanitary condition. The air shaft is now sunk and the company will place a fan on it in the near future. Haulage ways are in excellent condition.

ENTERPRISE MINE

Is operated by The Louisville Enterprise Coal Company. Only one opening. Ventilation poor. The haulage ways are in fair condition. Long-wall operations have been commenced on the south side of the shaft. This mine was opened during the past year.

INDUSTRIAL MINE

Is owned and operated by The Industrial Coal Company. Of late a fan has been erected and a good current of air is produced through a section partitioned off in the shaft. This is fairly well distributed through the working places. Only one opening for egress and ingress to the interior of the mine. Haulage ways are in good condition.

PLUTO MINE

Is owned by The Pluto Coal Company. Very little work has been done at this mine and it is now shut down.

MARSHALL NO. 6

Is operated by Austin G. Gorham, lessee. The ventilation is not very reliable, as it changes with the change of the outside temperature of the atmosphere. Haulage ways not in the best of condition on our last inspection, but by this time they have been repaired and secured.

MARSHALL NO. 2

Is operated by Austin G. Gorham, lessee. Natural ventilation. Haulage ways safe and secure. This mine will soon be worked out, as the coal measure is limited in area at this point.

SIMPSON-SPENCER MINES

Are owned and operated by The United Coal Company. The ventilation is produced by a fan and the quantity passing through the entries is good. All the haulage ways are in excellent condition. The coal is mostly mined by machinery.

EXCELSIOR MINE

Is owned and operated by The United Coal Company. The mine is well ventilated, but some of the rooms would be better if some of the air passing on the entries was conducted into them. The haulage ways are wide and roomy and in excellent condition. The coal is mined by machinery.

GLADSTONE MINE

Is owned and operated by The Gladstone Coal Company. During the year the Burlington & Missouri River railroad has been connected with the mine, thus having shipping facilities over two railroads. The ventilation is good and fairly well conducted. The haulage ways are wide and roomy and well secured. On the whole, this mine and the Excelsior are in better condition, as to their safety, than any mine in the county. The coal is mostly mined by machinery.

NEW MITCHELL MINE

Is owned and operated by The Rocky Mountain Fuel Company. During the year the company has put in compressors and mining machines, and most of the coal is now mined by machines.

Considerable crush has been experienced all over the workings. This has now ceased and the haulage ways are well secured. Ventilation good.

LISTER MINE

Is owned and operated by A. Stevens and others. It is a new mine. Shafts sunk, tipple erected, etc., during the past two years. The workings are not very extensive. Ventilation fairly good, and the haulage ways are in good condition.

SMALL MINES.

There are several small mines in operation in this county besides those remarked upon. The quantity of coal extracted, etc., will be seen in tabulated form.

WELD COUNTY MINES.

There are several small mines operating in this county, only two or three of them working the number of men required by law to become subject to the regulations of our mining laws. The ventilation in the small mines we have inspected is very poor. The tonnage and number of men employed will be found in tabulated form.

THE VULCAN EXPLOSION.

A Description of the Mine and the Conditions Existing Therein.

On Tuesday morning, February 18, 1896, an explosion occurred at the Vulcan mine, operated by The Atchison, Topeka & Santa Fe Coal Company, one and one-half miles southeast of the town of Newcastle, Garfield county, Colo., which resulted in the death of forty-nine men, including James Harrison, the mine foreman; John Funke, assistant mine foreman, and Thomas Larrigan, fire boss.

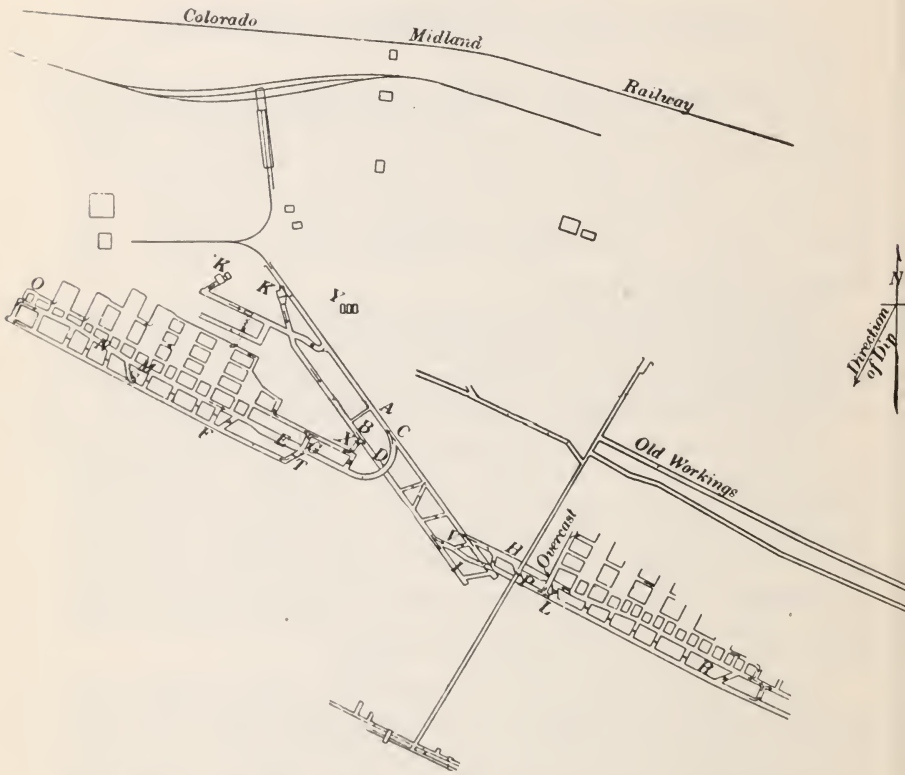
The coal-bearing strata at this mine pitches about $47\frac{1}{2}°$, and the strike of the seam is southeast and northwest. There are several workable seams of coal on the property, the Wheeler and Allen seams having an aggregate thickness of about 70′.

The mine is under the management of Mr. C. J. Devlin, general manager of The Atchison, Topeka & Santa Fe Railroad Company's coal properties; Mr. Robert T. Herricke, local superintendent, and Mr. Joseph Fletcher, the company's mine inspector, who inspects and reports on all the mines owned by the company about every three months. The immediate officials at the mine were the foreman with an assistant and three fire bosses, who each worked eight-hour shifts.

The accompanying map of the mine on a scale of 400′ to the inch will enable the reader to arrive at a good idea of the conditions existing at the mine, and will make clear the statement of my investigations as to the cause of the explosion. The mine is opened by a slope, *A*, driven on a pitch of 5° 43′ for 250′ through the surface wash and the measures underlying the Wheeler seam. At this point the bottom slate of the seam is encountered and the slope is continued in a direct course on the bottom slate diagonally across the pitch. From the point where the slope strikes the bottom slate of the seam, the average pitch is about 30°. The air course, *B*, parallel to the slope, is driven on nearly the same pitch as the slope with the exception that near the surface it is driven on about 40° pitch, thus shorten-

ing the distance for the connection at the crop entry. The total length of the slope and parallel air course is about 840′ from the mouth.

At a point about 460′ from the mouth of the slope, the right, or west entry, *C*, is turned off on a pitch of 27°, forming a very short curve and a steep grade for haulage. Over this entry a wooden air bridge, *D*, is constructed for the main slope air course, and about 75′ above this air bridge a shaft, *X*, is



sunk from the top of the seam to the bottom of the parallel air course, and the right entry is driven to the west boundary line. At 250′ from the slope the right entry runs on the strike of the seam and a double parting about 13′ wide and 100′ long is constructed for the purpose of facilitating the haulage. This is shown at the point *E* on map.

At the outside end of the parting, close to the point of strike, a cross-cut is driven to the top of the seam and from this point another air course, *F*, is driven parallel to the entry and to the

west boundary line. The upper and top slate air courses are connected by an air bridge driven through the solid coal across the main right entry at *G*. At 180′ from the outside end of the parting, the first room or breast is turned off. In this entry there are eight rooms and sixteen chutes, as shown on the map, and the inside room is driven up nearly on the boundary line. The distance from the point where the entry begins to run on the strike of the seam to the face is 710′. At a point 730′ from the mouth of the slope, the left or east entry, *H*, is turned off on an easy grade and curve. A parallel air course along the top slate is driven through the slope from the main slope air course. (See *I*.) The main left entry and parallel air course are about 920′ from the slope. In this entry there are eight rooms and sixteen chutes.

The rooms are all turned off the main entry and on the bottom slate of the seam; they are 40′ wide with 40′ pillars between them. There are two chutes to each room, thus forming an entry pillar of about 25′ between the chutes. At a point about 30′ up the pitch, the chutes are connected by a cross-cut and the face of the room is then formed. The miners take out from 7′ to 8′ of the coal seam and 40′ wide in the breast. There is a manway built on each side of the breast about 3′x8′, or 24 square feet sectional area for ingress and egress and for ventilation of the face of the workings. The rooms are driven up about 175′ from the entry and then stopped, after which all the cut coal is taken out of the room.

Another operation then takes place. Men selected for the purpose, called "topmen," are put to work to cut the seam at right angles to the pitch and up to the top rock, then the whole thickness of the seam, about 45′ of coal, is blasted down and taken away through the chute below, care being taken not to draw out too much, so as to give the men something to stand on and keep them close to their work. On arriving at the top of the room in taking down the top coal, the breast is tapered off so that there will not be any point of it higher than the top cross-cut in the bottom coal. This is necessary, because if the top coal was excavated higher than the air current there would be an accumulation of fire-damp. The first operation of working up the room is done by the yard and the top coal men are paid by the day. As soon as the top coal operation is finished, all the coal is taken out as rapidly as possible, because if left for any length of time it is liable to spontaneous combustion. The coal is loaded by men selected for that purpose, who are paid by the day.

At the time of the explosion, the mine was ventilated by two fans, *K K*, of the compressive type. One was a Guibal fan, 12′ in diameter, with blades 5′ 6″ in width, and the other was a double Murphy fan, 6′ in diameter. These fans were capable of producing from 38,000 to 40,000 cubic feet of air per minute separately, and from 54,000 to 60,000 cubic feet of air when working together. The interior of the mine was so arranged that if one fan was disabled the one fan would ventilate the whole mine. The right and left entries had separate and distinct currents of fresh air from the outside. Each current was again split in the mine, this giving a separate current for the room workings and the entries. The split currents joined at the face of the entries and returned through the main entries. Air crossings were built or formed in all practical points in order to avoid doors and to keep a continuous air current through the workings. The mode of ventilation and its distribution received great attention and was, in my opinion, well conducted.

The management recognized the danger incident to the presence of coal dust and took the following precautions: Under the brow of the hill and about 50′ above the mouth of the mine three large wooden tanks, *Y*, were constructed, into which water from the Grand river was pumped. The tanks are connected with a 6″ wrought iron pipe, and the pipes running into the rooms are connected to 4″ pipe on the entries, which are reduced to 2″ in the rooms. Two-inch valves are used on the room connections; some of the rooms have pipes near the face but generally a hose connection is made and the hose is moved to the point of watering. The hose has a reducing nozzle and by the use of it every section of the mine can be reached from the nearest connection. The altitude of the tanks, which are about 330′ or more above the entries, yields a pressure of nearly 140 pounds to the square inch. There was a man engaged for the purpose of extending the pipes and sprinkling. I consider the system as good as can be adopted.

The subject of dampening or sprinkling the dust in the mines of Colorado is gaining favor among the mine officials, and there are very few officials who do not recognize the importance of keeping the dust from contaminating the air current. Some of the extensive mines in the southern part of the state are now watering all their haulage ways, and the officials state that great benefits have been derived; the quantity of air is increased and improved in quality, and besides there is a perceptible decrease of temperature in the mine. Where explosives are used

to mine, the coal dust question is a matter of great importance, and should not be neglected at any time, and it should be borne in mind that sprinkling is not sufficient to overcome this dangerous element. In order to be on the safe side the dust must be well watered. The Prussian fire-damp commission and other authorities say that the dust must be dampened with 50% of its own weight of water before any degree of efficiency is obtained.

Previous to the explosion I made several inspections of the mine in company with Mr. R. T. Herricke, superintendent, and Mr. Connors, who was then the mining boss, and invariably found the mine in good condition. At the time of one visit we discussed the question of safety lamps, and the management informed me that they had decided on the use of the Mueseler lamp to replace the Clanny lamp then in use. I approved of the change, and that was the lamp used by all workmen except the fire bosses at the time of the explosion. On the whole, I considered the mine in excellent condition, and had no suggestion to make to the management whereby a greater degree of safety could be secured. There were no rooms in operation at the times of my visits, all places being worked in eight-hour shifts in order to make speedy developments.

On September 20, 1895, Mr. John D. Jones, deputy inspector, made an examination of every working place in the mine, accompanied by Mr. R. T. Herricke, superintendent; Mr. James Fletcher, inspector of mines in behalf of The Atchison, Topeka & Santa Fe Railroad Company; Mr. James Harrison, mine foreman, and Mr. John Funke, his assistant. This was Mr. Harrison's initiation to the mine. He was anxious to see every place as to its condition, etc., and he was satisfied that everything was well conducted. Deputy Inspector Jones reported as follows: "Quantity of air entering per minute, 32,500 cubic feet. A current of air is carried through all the working faces, also a supply of water to sprinkle the rooms. The haulage ways are well timbered. A new fan will be put up in the near future which will undoubtedly be of great benefit."

This additional fan was put in operation on the 15th of October, 1895, and the two fans gave a combined volume of 50,000 cubic feet of air per minute, with neither fan running at full capacity. We were notified of this by the officials, and we felt assured that another safeguard had been added to the Vulcan mine. On February 8, 1896, I made another inspection of the mine in company with Messrs. Herricke, Harrison and Funke. On this day the mine was not working. There were a few

company men at work in No. 1 room on the left entry. I inquired of Mr. Herricke as to the condition of the mine previous to entering, and he informed me that the mine was in better condition than ever before. We walked down the slope to the left entry and there met Mr. Harrison, and we examined the main and back entry. We then came back and went up to the top coal room where there were five men at work blasting down top coal. Here I found a good current of air and a hose for the purpose of sprinkling the dust. The dust had just been sprinkled at the time and six shots were charged ready to fire. We examined the highest point in the top coal with a Davy safety lamp, but found no traces of fire-damp. I inquired if there were any more rooms in the mine working top coal, and the answer was in the negative. We then came up the slope and the six shots were fired. By the time we arrived on the knuckle we heard the six shots in the top coal room going off quite distinctly. On leaving Mr. Herricke, Mr. Harrison asked me if I had any suggestions to make and I answered no, but that they had a mine to look after that required great care and attention. I did not visit all the working faces, but was satisfied from what I had seen that the local management was doing everything for the safety of life and property. In many cases where the miners are of the opinion that the officials do not comply with the law regarding coal mining, we receive complaints, but in this case we have never received a complaint, either by word or letter.

On the 23d of February I received a communication from Governor McIntire as follows: "I desire to call your attention to the necessity of the most careful and scrutinizing investigation on your part into the causes of the recent terrible disaster at Newcastle so that the responsibility for the awful loss of life may be placed exactly where it belongs. Allow no stone to be left unturned in getting at the exact truth."

I can conscientiously say that I did as the governor directed me. However, my endeavors were fruitless, and I am sorry to say that no definite cause could be found for the disaster. If the exact cause could be found and the blame placed where it belonged we would obtain some satisfaction for the relatives of the ill-fated miners and probably prevent a repetition of a similar accident at this mine or at other mines working under the same conditions.

There are many causes by which an explosion may occur at the mine in question. If a door was left open for a short period, an accumulation of gas would be the result and a de-

fective safety lamp would ignite the mixture. Under the same conditions a careless miner might open his lamp and set off the gas, or a blown-out shot might cause the disaster; a too heavily charged shot may do the same thing. A sudden outburst of gas may take place and impregnate the ventilating current and form an explosive mixture and the same coming in contact with a naked light or a flame cause the explosion. Other modes could be enumerated by which a disastrous explosion might occur in a gaseous and dusty mine. However, I must form an opinion of the cause from obtainable evidence.

As I previously stated, the mine, in my opinion, was in good and safe condition, and there was no accumulation of gas or dust. I will even say more, and that is if the most competent fire boss had examined the mine a minute previous to the explosion he would have proclaimed the mine to be perfectly safe and in a workable condition. By this I mean to say that our present mode of detection of danger is too crude and the danger line is much too high. We are aware that it is impossible to detect less than 2% of fire-damp in the atmosphere of a mine with the common Davy lamp, and generally our fire bosses can not detect less than 4% which in itself is nearly at the explosive point. Experiments prove that even less than 1% is very dangerous in a dusty atmosphere. Some experimenters claim that some kinds of dust, in the absence of any gas, are explosive, others doubt the phenomena. However, all experiments have proved beyond doubt that when both the above ingredients are in the ventilating current (fire-damp being less than 1%) it becomes highly explosive under certain conditions. With these remarks in view, let us consider the conditions existing in the Vulcan mine. Every person that has worked in the mine is well aware that great quantities of gas are constantly transpiring from the strata and that the coal is naturally dusty, and furthermore, explosions have occurred in this field which have been claimed to be due to dust alone. There is no doubt that the dust produced in the Wheeler seam is highly inflammable.

Now the question arises, How could the explosion occur? We admit that gas is emitted freely from the strata in an unknown quantity as to percentage in the air current, but not sufficient to be detected by the Davy lamp, and there must be some small quantity of minute particles of highly inflammable dust in suspension in the air. Such a mixture would be non-explosive in contact with a naked light, but highly explosive if detonated by a blown-out shot, ignition of loose powder,

or a small quantity of fire-damp. From the location of the bodies of Mr. Larrigan and Mr. Funke, and the course taken by the force of the explosion, I am of the opinion that the explosion originated in the right or west entry near one of the chutes between No. 7 and No. 10, shown on the map at points *M* and *N*. The timber from this point was evidently forced inwardly and outwardly. The inward force traversed the entry and forced its way to the parallel air course and backward, some of it going up the man-ways No. 15 and No. 16, at point *O* on map and over the top air course and out through the fan openings. It is evident, however, that in passing through the top air course and rooms, the force was not greatly augmented, because the air course was found in good shape, the only damage done being at the mouth of the fan openings. That the greatest force came through the main right entry is evident by the manner in which the timber was strewn. When the outward force arrived at the air bridge located across this entry at *D*, a weak point of resistance was found and the force expanded, some of it going up and down the main air course parallel to the slope and most of it in contact with the return air from the left entry. The force going up and down the main air course (and intake of the mine) did not get the necessary ingredients to augment its force; it only received a fresh supply of oxygen for the support of combustion. The force on getting in contact with the return air of the left entry received the inflammable ingredients necessary for augmentation, and went down the slope without doing much damage to the timber, etc., only one set of which was knocked out, and this at the entrance into the left entry, and five or six more at the double parting. It is evident that the force going down the air course preceded that going down the slope. This is proven from the fact that the stoppings in the cross-cuts were blown outwardly into the left entry, the most conspicuous being that of the regular stoppings between the left air course and the double parting at *P*. Evidence of great violence in the force traveling inwardly through the air-course and entry were found, and I am of the opinion that it was aided by explosions of powder which the miners had in readiness for their use. However, we could not find direct evidence to localize this any more than that the augmentation of the explosion was very great. At the face of the left air course a car was found, the ends and sides of which were smashed into kindling wood. The bodies found near the face of the main entry were badly mutilated. The forces coming in through the air course and the

main entry met at about No. 12, or at point *R*. This, I think, caused great commotion at this point. After expending all the elements of energy the reaction took place, and volumes of smoke came out leisurely through all the openings.

I have as yet omitted to explain how I think the explosion originated. Thomas Larrigan was supposed to examine every place in the mine previous to firing any shots. He was also supposed to fire the shots. Now, I have formed an opinion that one of the chutes in the right entry had become blocked, and in order to remove the stoppage it was necessary to put in a little powder to start the same, and in so doing the explosion occurred. I have no doubt that Mr. Larrigan examined the condition of the place and used his judgment as to the amount of powder, etc., but there may have been a small quantity of fire-damp existing in the chute at a point he could not reach or observe. It is probable that any practical man would have done the same thing he did. Now, assuming the above statement to be correct, I will endeavor to explain how the explosion originated. The explosive used may have been placed on the lump of coal blocking the chute and covered with a small quantity of dust or slack; from this the flame would elongate and set off the small quantity of gas that could not be observed and an explosion on a small scale would be the result, and the compression of the air current due to this would cause the air itself to become explosive, and the agency causing the compression would also ignite the mixture.

On Sunday, March 15, after all the bodies were recovered, we held a conference in the mine, consisting of the following practical miners, all of whom had been aiding in the explorations: M. M. Walsh, mining boss, Blossburg, N. M.; Robert O'Neill, mining boss, Starkville, Colo.; Ed Flynn, superintendent, Rockvale, Colo.; Joseph Fletcher, coal mine inspector, A., T. & S. F.; Robert Herricke, local superintendent; John P. Thomas, mining boss, Rockvale, Colo.; Harry John, fire boss, Rockvale, Colo.; Charles Grant, fire boss, Rockvale, Colo.; George Ward, local fire boss, Rockvale, Colo.; Humphrey Davies, fire boss at Newcastle mine.

Others were invited, but for some reason did not attend. The object of this conference was to try and localize the point of origin of the explosion, but no definite conclusion could be arrived at.

In examining the effect of the explosion, the reason why there were so many different opinions is made manifest. I will here state that my opinion is based upon the most plausible

cause from which it could have occurred. Many are under the impression that it originated from a blown-out shot because it was about firing time when the explosion occurred, but there is no evidence of any shots having been fired except the one fired by Mr. Larrigan in a dog-hole near the face of the left entry. There were several lamp keys found on the bodies, but not a single open lamp. Matches were found on some of the bodies, but there was no evidence found that anybody was lighting a lamp or attempting to smoke. On taking everything into consideration, I am of the opinion that the principal ingredients causing the disaster were dust and gas, but that the known line of danger was not perceptible, and that the cause or origin is only a matter of supposition at best, and will remain a mystery like many other similar disasters.

The effect of the explosion was so violent that I am of the opinion that every man in the mine died instantly, and that not one of them breathed any after-damp. Some of the bodies were burned, but I do not think the burning effects would have resulted in death. The fans located on the surface at *K K* were blown to pieces, and the three openings shown on the map were nearly closed. This was caused by the timbers being blown out and the dirt they sustained caving in. Every wooden stopping and door in the mine was broken except one door in the inside haulage cross-cut in the right entry at *S*. This was forced open and nearly off its hinges; the others were shattered like matchwood. Two stone stoppings were blown out, one between the slope and air course opposite the left entry at *V*, and one between the left main air course and left main entry on the double parting at *P*. Several stone stoppings between the slope and its parallel air course stood the severe test and thus aided us greatly in getting air through the workings after the explosion. On the curve coming out of the right entry nearly all the timber was blown out. Many sets in the inside withstood the violence, not a set being out on the double parting. The slope timbers were undisturbed with the exception of six sets at the mouth and one near the entrance to the left entry. Inside of the parting on the left entry and air course the force was most violent. Nearly every set of timber was blown out and heavy caves of coal had fallen, which greatly retarded the explorations.

There are some peculiarities in connection with this explosion which caused different opinions as to the ingredients which were predominant in the explosive mixture. It is the opinion of scientists and practical men that if fire-damp predominates

at the time of the explosion intense heat is developed, and that traces of this will be left on all material susceptible to fire, and if the dust in suspension in the air current predominates, that caking or coking results will be found in abundance after the explosion. In this case we have no traces of fire on any susceptible material, such as timber, canvas or brattice cloth. The steam pipes were covered with hay and then wrapped with shredded canvas, which was as dry as tinder and strewn all over, but even on this we could find no trace of fire, and with a very diligent search by myself and others we failed to find any trace of coked dust as a residue. Still, some of the bodies were burned in proximity to some of the susceptible material mentioned above. Such a statement may appear to be absurd, nevertheless, it is true. The only way I can account for these phenomena is that the elements in the explosive were not productive of a long-extended flame, but intense heat was created and the explosion passed through all the workings with lightning rapidity. That there was intense heat I have no doubt, but it must have been of very short duration. Some of the bodies were denuded and horribly mutilated, decapitated and disemboweled. Nearly all of them had to be identified by their wearing apparel or other appurtenances.

On the body of one of the men a watch was found that had evidently stopped instantly, owing to the violence of the explosion, at 11:27 a. m., so we concluded this to be the correct time of the explosion. I was notified of the explosion through the courtesy of Mr. J. A. Kebler, general manager of The Colorado Fuel and Iron Company, at 12:45 p. m., and at 2:05 p. m. received an official telegram from Mr. Herricke, the local superintendent.

In accordance with section 8, coal mines act, myself and my deputy boarded the first available train, and on board the cars we met Mr. Kebler and Mr. Willard, general superintendent of the coal agency of the Atchison, Topeka & Santa Fe, also Mr. Coughlin and Mr. McGourty, both of whom had sons in the ill-fated mine. We arrived at the scene of the disaster about 12:30 p. m. on the following day. At this time some bodies had been brought out of the mine and a fan was in operation. Great credit is due Mr. Herricke, local superintendent; Mr. Paul Blount, superintendent of the Newcastle mine, and his mechanic, Mr. Jas. Buchanan, for the expedition with which they erected this fan, which had to be transported from the Consolidated mine, engine erected, fan cased, etc., it being in opera-

tion in less than twenty-four hours after the explosion. Mr. Choate, the division superintendent of the Rio Grande, sent some carpenters to aid in its construction.

At this time all hopes of rescuing any of the miners alive had been given up, and we waited for the fan to clear out the foul atmosphere in the mine. During this time we held a conference as to how we were to proceed. In this conference were Mr. Kebler, Mr. Blount, Mr. Herricke and myself, and we decided to enter the mine at 2:40 p. m., and that from inside observations we could decide on the mode of action. At the appointed time, Mr. Herricke, Mr. Kebler, George Ward, John Evans, Humphrey Davies and myself entered the mine. George Ward, John Evans and Humphrey Davies were the heroes of the party. The first obstruction we met was the dilapidated air bridge across the right entry at *D*. Ward and Davies passed over the obstruction and penetrated into the right entry about 300 feet. On returning they reported that the narrow entry around the curve was in bad shape, but that the double parting was in good shape and that they had not seen any fire-damp, also that there was a good current of air passing. Evans, owing to an accident (a nail penetrating his foot), returned to the surface, and the remaining five of the party went down the slope as far as the entrance to the left entry. Here we found a set of timber blown out, and about 30′ in the left entry fire-damp was found. We then concluded to return to the surface and take immediate steps to remove the fire-damp from the left entry and at the same time have the air bridge over the right entry at *D* temporarily erected.

We had all the voluntary help we needed at this time, and the first work done was the placing of a temporary stopping on the crop entry; this carried all the air produced by the fan, about 40,000 cubic feet per minute, down to the air bridge and returned it through the slope. Then the air bridge proposition was considered and from the amount of work necessary to erect it and the greater number of bodies being in the left entry, it was decided to build a stopping on the entry and have the air down to the left entry as soon as possible.

During this preliminary work, Mr. Kebler acted as consulting engineer, and he coincided with our views and the men under his management were the volunteers. On Wednesday night, February 19, about midnight, Mr. Jos. Fletcher, Santa Fe mine inspector, and Dan. McLaughlin, superintendent of Starkville, arrived with a reinforcement of men, twenty in number, and some of them were immediately put to work building

stoppings, etc. As yet there had been no system adopted as to the hours of work. On Thursday night, February 20, Mr. C. J. Devlin, general manager of the Atchison, Topeka & Santa Fe coal properties, arrived on the scene. All the details then known as to the condition of the mine and mode of procedure were stated to him, and he was satisfied that everything had been done to the best advantage under the circumstances, and that the hours of labor were too long, and that in order to expedite the exploration it would be necessary to systematize the work. On the 22d of February the following notice appeared, signed by Mr. Devlin and approved by me:

NOTICE TO MINERS.

"In order to push the work with the greatest speed the following rules will govern:

"1. Shift bosses will each work six hours. Pay in accordance therewith.

"2. Others in mine will work three hours each.

"3. Pay for three hour shifts $2.75. Pay for shift bosses per shift, $3. Each man is requested to do his utmost so as to get the bodies out in the shortest possible time."

Previous to this notice the man had been working six hours at a shift and some dissatisfaction was exhibited, but not enough to delay the exploration work. Messrs. Fletcher, Herricke and myself selected eight shift bosses who were men of practical experience and acquainted with the mode of working, etc. They were George Ward, Henry John, John Evans, J. P. Thomas, Joseph Griffiths, William Doyle, Humphrey Davies and J. W. Smart. Two of these men were in charge of the work every six hours; their duty was to direct the men what to do and to watch the fire damp that we knew existed in the mine. When this system was enforced we found it difficult to obtain men for the work and many of the miners had to work six hours in order to keep the work going. If it had not been for The Colorado Fuel and Iron Company closing down their mine it would have been impossible to get the required number of men necessary to carry on the work. On the 23d of February, Mr. Ed. Flynn arrived with twenty-eight men from Rockvale. On the 25th, Mr. Robert O'Neill, of Starkville, arrived with five men, and M. M. Walsh, of Blossburg, N. M., brought seventeen men with him on the same date. We were now well reinforced and everything was done that was necessary to expedite the work. Mr. Devlin left after being there a few days and entrusted Mr. Joseph Fletcher with the

management of the exploration, with the instructions that he was not to consider expense, but to get the bodies out with all possible haste.

After removing some of the gas in the left entry we were able to explore the double parting up to the haulage cross-cut and did not find much obstruction, only a few sets of timbers being out. At the end of the parting we found that a great quantity of coal had fallen and had to be removed. The slope was cleared and the cars were put in motion to remove the fallen coal. The gas in the two parallel entries was removed by placing a temporary stopping in the cross-cuts as we advanced, and all the miners were taken into the intake air course until it was diluted. On the night of the 27th of February the main left entry was all cleared up and examined. During this time work was also carried on in the back entry, but from the fact that there was more coal to handle, etc., it took a few more days to get cleaned up, but some of the explorers went over the fallen coal and found the body of Robert Steiger, track layer, in the face of the back entry. During the time of cleaning up the entries, we knew that the man-ways, cross-cuts between rooms, and some faces, were full of inflammable gas, and this was constantly watched by one of the shift bosses in charge. Preparations for a greater supply of air had been made by repairing and erecting the double Murphy fan, and at 12:30 a. m., March 1, the fan was started and the air current turned up the inside rooms. While doing this a three-hour shift was laid off and only fire bosses allowed to be in the mine. The quantity of air had now been increased at the outlet from 38,000 cubic feet to 50,000 cubic feet per minute, but from the fact that all the stoppings were leaking, the quantity playing on the gas did not exceed 28,000 cubic feet. In removing the great quantity of gas from the rooms, great precaution was used in keeping all lights from the return air and also from the mouth of the slope. By the morning of March 5 all the standing gas had been removed from the left side of the workings and all places thoroughly examined.

On Friday morning, March 6, operations were started on the right entry. While the greatest force of men were working on the left entry, preparations were made for getting into the right in order to be able to split the air current. By doing this the quantity of air in the left entry was greatly reduced. However, enough air was kept there to dilute all the gas that was given off. It is evident that some air had been going through nearly all the workings in the right entry or we would

have found more standing gas than we did. The only place where standing gas was found was at the top slate air course and at the top of No. 8 room at 0. We found things in a much better condition here than we expected, the worst caved place being around the curve outside of the double parting. On the double parting an accumulation of water had taken place, and to remove this it was necessary to have a pump located near it. A pump was already on the ground, and in less than forty-eight hours the water was pumped out and the cleaning up of the entry resumed. On Sunday morning, March 15, the body of Robert Allier was brought to the surface, and this completed the number as reported on the official list. During the exploration work some of the shift bosses resigned and other men were appointed to fill the vacancies; they were Messrs. Thomas Neeson, James Daniels, Charles Grant and George Bunn.

Great credit is due Messrs. Jones, deputy inspector; Herricke, Fletcher, McLaughlin, Flynn, O'Neill and Walsh for the general overseeing of the work and to the shift bosses for their diligence. However, the greatest credit is due the miners who were actually doing the work.

To give the details of the exploration would cause this article to be too voluminous. Suffice to say that the work was very perilous and the surroundings unpleasant. We were fortunate not to have any serious accident to any of the explorers.

Before resuming work at the mine with the full force of men, I recommended Mr. Herricke, local superintendent, to make the following changes:

Have rock stoppings built in all cross-cuts between all parallel entries, and in placing doors on the gangways have them packed or tightened with cement, lime mortar or some other material not liable to fire. Have a fan or fans capable of producing, say 60,000 cubic feet of air per minute, to be distributed to the right and left entries in separate currents and in proportion to requirements. Have the air distributed through the working places the same as it was previous to the explosion. I recommended an exhaust fan as giving better results than a compressive or blower fan. In connection with the use of safety lamps, I am of the opinion that the Mueseler lamp now in use is as good as any. In relighting the lamps in the mines, I recommended that no man be allowed to have a key except the fire boss, and that all lamps be opened in the intake air course. I also recommended that the watering system be kept in good order and in shape to sprinkle all the working places; that such timbering as was

necessary to put the entries in good order be immediately set, and to allow no blasting except at stated periods, when all the men except those actually needed to fire the shots are out of the mine. I also recommended an electric bell or gong in the steam engine house for the purpose of signaling. In case they continued to use steam for pumping purposes I recommended that the present steam pipe covering be removed, and, if the pipes must be covered to keep down condensation, to have them covered with an asbestos composition. I also suggested the use of compressed air for pumping purposes. I requested Mr. Herricke when ready to resume work and the aforesaid improvements were made, to notify me so that I might examine the general condition of the mine.

Our present mode of the detection of gas is too crude, and as there is now on the market a reliable and very sensitive mechanical instrument by which small percentages of gas in air may be detected (namely Shaw's Gas Testing Machine), I think the Mine Inspector should possess one so as to enable him to find the percentage of gas in the air currents of our gaseous mines and have the air currents regulated accordingly. Furthermore, every superintendent of a gaseous mine should have one of these machines so that daily tests can be made of the return air currents and a record thereof be kept in the local office.

In regard to the use of explosives I would recommend the following rules for use in dusty and gaseous mines:

First—The powder should be of that brand known as the least productive of flame.

Second—All holes should be drilled under the supervision of a competent person.

Third—All holes should be charged, tamped and fired by men selected for that purpose. The charge should be in accordance with the burden of the hole, etc., and the tamping should be of material not productive of flame. Before firing the surroundings should be carefully examined as to the presence of dust and gas.

Fourth—No shots to be fired or powder detonated anywhere in the mine except at a specified time, and all men to be out of the mine except those actually required for the purpose of firing.

LIST OF KILLED AT EXPLOSION AT VULCAN MINE.

No. 1. Ed. Welsh, aged 24; occupation, rope rider; nationality, American; hurt February 18, 1896, at 11:30 a. m.; died 1:45 p. m., February 18,

1896; married, no children; had a fractured skull, bled from both ears, burned about face and head; buried, New Castle; wife, two brothers and two sisters.

No. 2. Joe Dore, aged about 20; occupation, bell-boy; nationality, American; single; killed February 18, 1896, 11:30 a. m.; recovered February 19, 1896, 2:30 a. m.; buried, New Castle.

No. 3. Frank Simonsic, aged about 35; occupation carpenter; nationality, Prussian; single; killed February 18, 1896, 11:30 a. m.; recovered February 19, 1896, 3:30 a. m.; buried, New Castle.

No. 4. Able Dore, Jr., aged about 17; occupation, rustler; nationality, American; single; killed February 18,1896, 11:30 a. m.; recovered February 19,1896, 9:30 a. m.; buried, New Castle.

No. 5. Nick Ross, aged about 28; occupation, rustler; nationality, Italian; single; killed February 18, 1896, 11:30 a. m.; recovered February 20,1896, 7:00 a. m.; buried New Castle.

No. 6. Wm. Dore, aged about 15; occupation trapper; nationality, American; single; killed February 18, 1896, 11:30 a. m.; recovered February 20, 1896, 7:00 a. m.; buried New Castle.

No. 7. Emile Funke, aged 13; occupation, trapper; nationality, American, German descent; single; killed February 18, 1896, 11:30 a. m.; recovered February 20, 1896, 7:00 a. m.; body shipped to Frontinac, Kansas.

No. 8. Robert Cottle, aged 21; occupation, miner; nationality, American; single; killed February 18, 1896, 11:30 a. m.; recovered February 20, 1896, 7:00 a. m.; body shipped to McAllister, Indian Territory. His father worked in the mine.

No. 9. James Harrison, aged 38; occupation, pit boss; nationality, English; married, leaves a wife and four children, two boys and two girls between ages of 12 and infancy; killed February 18, 1896, 11:30 a. m.; recovered February 20, 1896, 3 p. m.; body shipped to Rockvale, Colo. Was a Mason, Odd Fellow and K. of P.

No. 10. Toney Tapro, aged 23; occupation, loader; nationality, Italian; single; killed February 18, 1896, 11:30 a. m.; recovered February 20, 1896, 3:00 p. m.; buried New Castle. Has a mother here; belonged to Sons of Columbus.

No. 11. Jno. Gumbord, aged 30; occupation, loader; nationality, Austrian; single; killed February 18, 1896, 11:30 a. m.; recovered February 20, 1896, 3:00 p. m.; buried, New Castle.

No. 12. Chas. Merchant, aged 24; occupation, loader; nationality, American; single; killed February 18, 1896, 11:30 a. m.; recovered February 20, 1896, 3:00 p. m.; buried, New Castle. Father and mother in Rosaland, B. C., a placer camp.

No. 13. Christ. Brugger, aged 30; occupation, driver; nationality, German; married, leaves widow, no children; killed February 18, 1896, 11:30 a. m.; recovered February 21, 1896, 6:00 a. m.; buried New Castle. Was an Odd Fellow. Owned a ranch between New Castle and Glenwood Springs.

No. 14. Peter Becker, aged 25; occupation, loader; nationality, German; single; killed February 18, 1896, 11:30 a. m.; recovered February 23, 1896, 6:30 a. m.; buried New Castle.

No. 15. Anton Martino, aged 52; occupation miner; nationality, Austrian; single; killed February 18, 1896, 11:30 a. m.; recovered February 25, 1896, 9:45 a. m.; buried New Castle. Found snuff-box and menthol inhaler.

No. 16. Wm. Webb, aged 23; occupation, miner; nationality, American; married, leaves widow, no children; killed February 18, 1896, 11:30 a. m.; recovered February 25, 1896, 2:00 p. m.; buried, New Castle. Sam. Walters, his father-in-law, has charge of his effects.

No. 17. Sampson Jones, aged 38; occupation, pipeman; nationality, English; married, leaves widow and two infant children; killed February

18, 1896, 11:30 a. m.; recovered February 25, 1896, 2:00 p. m.; body shipped to Harvard, Illinois. Found one lamp key; watch found in Leadville, Colo.; "S. J." on back.

No. 18. Fred. Seigmund, aged 35; occupation, miner; nationality, German; single; killed February 18, 1896, 11:30 a. m.; recovered February 25, 1896, 3:00 p. m.; buried New Castle. Body badly mutilated.

No. 19. Daniel Morris, aged 34; occupation, miner; nationality, Welch; single; killed February 18, 1896, 11:30 a. m.; recovered February 25, 1896, 3:00 p. m.; buried New Castle. Wm. Trimble, of New Castle, appointed administrator of his estate; has brother in Wales.

No. 20. Jack Jenkins, aged 27; occupation, miner; nationality, American; single; killed February 18, 1896, 11:30 a. m.; recovered February 25, 1896, 3:00 p. m.; body shipped to Carbonado, Washington. J. W. Smart, New Castle, has charge of his effects.

No. 21. Fred. Rodensky, aged 40; occupation, miner; nationality, German; married, leaves widow and nine children in Gilchrist, Ills.; killed February 18, 1896, 11:30 a. m.; recovered February 25, 1896, 3:00 p. m.; buried, New Castle.

No. 22. Alex. Scaife, aged 17; occupation, miner; nationality, American; single; killed February 18, 1896, 11:30 a. m.; recovered February 26, 1896, 5:30 a. m.; buried New Castle.

No. 23. Angelo Petrie, aged 26; occupation loader; nationality, Italian; single; killed February 18, 1896, 11:30 a. m.; recovered February 26, 1896, 5:30 a. m.; buried New Castle.

No. 24. Robt. Steiger, aged 42; occupation, trackman; nationality, German; married, no children; killed February 18, 1896, 11:30 a. m.; recovered February 28, 1896, 3:00 p.p m.; buried New Castle. Nick-named "Bicycle Bob." Found silver watch and $130.

No. 25. August Mateve, aged 35; occupation, miner; nationality, Italian; married, old country; killed February 18, 1896, 11:30 a. m.; recovered March 1, 1896, 9:00 a. m.; buried New Castle. Belonged to American Order of Foresters; brother in Spring Gulch, Colo., named John; found $7.00 in coin.

No. 26. Tim. Carney, aged 36; occupation, miner; nationality, Irish; single; killed February 18, 1896, 11:30 a. m.; recovered March 1, 1896, 9:00 a. m.; buried New Castle. Has brother, Peter Carney, at Cripple Creek, Colo.

No. 27. Andy Rolando, aged 30; occupation, miner; nationality, Italian; single; killed February 18, 1896, 11:30 a. m.; recovered March 1, 1896, 3:30 p. m.; buried New Castle. Belonged to Sons of Columbus.

No. 28. Jas. Ferineo, aged 35; occupation, miner; nationality, Italian; married, old country; killed February 18, 1896, 11:30 a. m.; recovered March 2, 1896, 9:00 a. m.; buried New Castle. Belonged to Sons of Columbus. Cousin, Peter Farineo, lives at New Castle.

No. 29. Louis Cinotto, aged 40; occupation, miner; nationality, Italian; married, old country; killed February 18, 1896, 11:30 a. m.; recovered March 3, 1896, 11:00 a. m.; buried New Castle. Belonged to Odd Fellows; found on body, lamp-key, $26.00; trunk and effects in charge of Odd Fellows' Lodge at New Castle.

No. 30. Anton Petrico, aged 28; occupation, miner; nationality, Italian; wife and four children in Italy; killed February 18, 1896, 11:30 a. m.; recovered March 3, 1896, 3:00 p. m.; buried, New Castle. Has mother in New Castle; effects in charge of his cousin, James Gleese, New Castle.

No. 31. Joe. Otteno, aged 40; occupation, miner; nationality, Italian; married, wife and five children in New Castle; killed February 18, 1896, 11:30 a. m.; recovered March 3, 1896, 3:00 p. m.; buried New Castle.

Product and Character of Colorado Coal Mines in 1896.

NAME OF MINE	COUNTY	NAME OF OPERATORS AND POSTOFFICE ADDRESS	Name of General Superintendent	Name of Local Superintendent	Kind of Opening	Character of Coal	Thickness of Coal Seam in feet and inches	Number of Employes	Mine Ventilated by	Volume of Air Current in cubic feet per minute	Has Explosive Gas been detected in your mine	Production of Lump Coal in tons of 2,000 lbs.	Production of Nut Coal	Production of Slack Coal	Total Production of all Coals in tons of 2,000 lbs.	RAILROAD CONNECTING MINES	REMARKS
Scranton	Arapahoe	Colorado Eastern Railway and Coal Company, Denver	R McDowell		Slope	Lignite	7 feet	2	Natural	5,000	No				398	Colorado Eastern	
Baker	Boulder	Peoples Coal Company Denver			Slope	Lignite	12 feet		Furnace	5,000	No					Burlington & Missouri	Not in operation
Stewart	Boulder	Peoples Coal Company, Denver			Shaft	Lignite					No						Not in operation
McGregor	Boulder	Peoples Coal Company, Denver			Shaft	Lignite	5 feet				No						Not in operation
Acme	Boulder	United Coal Company, Denver	John McNeil, M E, Receiver	Wm Beman	Shaft	Lignite	10 feet	45	Fan	31,500	No	18,333		3,732	24,565	Union Pacific, Denver & Gulf	
Caledonia	Boulder	United Coal Company, Denver	John McNeil, M E, Receiver	Daniel McNeil	Shaft	Lignite	7 feet	40	Fan	21,000	No	14,180		3,998	18,186	Union Pacific, Denver & Gulf	Working under vein
Spencer	Boulder	United Coal Company Denver	John McNeil, M E, Receiver	John B Williams	Shaft	Lignite	14 feet	75	Fan	27,000	No	26,917		19,923	46,840	Union Pacific, Denver & Gulf and B. & M. R.	
Simpson	Boulder	United Coal Company, Denver	John McNeil, M E, Receiver	John B Williams	Shaft	Lignite	14 feet	25	Fan	27,000	No	6,000		2,000	8,000	Union Pacific, Denver & Gulf and B & M R	
Excelsior	Boulder	United Coal Company, Denver	John McNeil, M E, Receiver	David Allen	Shaft	Lignite	14 feet	63	Fan	24,000	No	31,400		21,108	52,508	Union Pacific, Denver & Gulf and B & M. R	
Gladstone	Boulder	Gladstone Coal Company, Denver	Wm Padfield	L. S Jones	Shaft	Lignite	14 feet	50	Fan	14,000	No	28,192		13,133	41,325	Union Pacific, Denver & Gulf and B & M. R	
New Mitchell	Boulder	Rocky Mountain Coal Company, Denver	J. Mitchell	J. Morrison	Shaft	Lignite	14 feet	63	Fan	15,000	No	31,658		14,360	46,018	Union Pacific, Denver & Gulf	
Leader	Boulder	Leader Coal Company, Denver	J H Connell	D Lawrence	Shaft	Lignite	5 feet and 6 feet	32	Fan	8,000	No	24,972		6,225	31,197	Union Pacific, Denver & Gulf	
Hecla No 1	Boulder	Citizens Coal Company Denver	W H Brown	Wm. Henderson	Shaft	Lignite	9 feet	112	Fan	19,000	No	44,601		15,247	59,848	Union Pacific, Denver & Gulf	
Rex	Boulder	Rex Coal Company, Denver	L. E. Andrews	John Hutchinson	Shaft	Lignite	10 feet	77	Furnace	13,000	No	28,137		11,773	39,910	Union Pacific, Denver & Gulf	
Hecla No 2	Boulder	Rex Coal Company Denver	L E Andrews	John Hutchinson	Shaft	Lignite	7 feet	50	Fan	18,000	No	13,002		3,538	17,440	Union Pacific, Denver & Gulf	
Imperial	Boulder	Imperial Coal Company, Louisville	J C. Williams	J C. Williams	Shaft	Lignite	6 feet	28	Furnace	8,000	No	7,400		2,500	9,900	Union Pacific, Denver & Gulf	
Otis	Boulder	Smokeless Coal Company, Denver	C S Otis	E Nisbet	Shaft	Lignite	14 feet	6	Fan	18,000	No	2,700		500	3,200	Union Pacific, Denver & Gulf and B & M R	
Marshall No 2	Boulder	Marshall Coal Company, Denver	A G Gorham	Ralph Merton	Drift	Lignite	7 feet	32	Natural	4,000	No	13,843		7,218	21,063	Union Pacific, Denver & Gulf	
Marshall No 6	Boulder	Marshall Coal Company Denver	A G Gorham	Ralph Merton	Slope	Lignite	9 feet	52	Natural	8,000	No	12,489		5,457	17,937	Union Pacific, Denver & Gulf	
Garfield No 1	Boulder	Pallott Coal Company, Erie	James Pallott	James Pallott	Shaft	Lignite	4 feet	7	Furnace	5,000	No	2,125		1,198	3,323	Union Pacific, Denver & Gulf	
Standard	Boulder				Shaft	Lignite					No					Union Pacific, Denver & Gulf	Not in operation
Allen Bond	Boulder				Shaft	Lignite	6 feet		Natural	4,000	No					Union Pacific, Denver & Gulf	Shut down
Lister	Boulder	Lister Coal Company, Erie	A Stevens	A Mason	Shaft	Lignite	4 feet 6 inches	20	Fan	10,000	No	4,000		2,100	6,100	Union Pacific, Denver & Gulf	
Industrial	Boulder	Industrial Coal Company, Louisville	J H Hood	W Ramsey	Shaft	Lignite	6 feet	43	Fan	15,000	No	17,500		6,000	23,500	Union Pacific, Denver & Gulf	
Enterprise	Boulder	Enterprise Coal Company, Louisville	George Fruth	George Fruth	Shaft	Lignite	4 feet 6 inches	42	Natural	6,000	No	3,623		1,230	4,933		
Pluto	Boulder	Pluto Coal Company, Denver	J. F Hopkins	J. F Hopkins	Slope	Lignite	14 feet	34	Natural	6,000	No	4,498		2,342	6,840		
Long's Peak	Boulder	Long's Peak Coal Company, Erie	Wm Nicholson	Wm. Nicholson	Slope	Lignite	6 feet	40	Fan	18,000	No	16,156		3,700	19,956	Union Pacific	
Grand View	Dolores	Grandview Coal Company, Rico			Drift	Semi-Bituminous	2 feet 6 inches	1	Natural	1,000	No	1,000			1,000	No railroad	Estimated
Pasadena	Dolores	Pasadena Coal Company, Rico	J. V. Broughton	J V Broughton	Drift	Semi-Bituminous	2 feet 4 inches	3	Natural	1,000	No	600			600	No railroad	
Broughton	Dolores	Broughton Coal Company, Rico			Drift	Semi-Bituminous	2 feet 4 inches	3	Natural	1,000	No	500			500	No railroad	Estimated
Pine Grove	El Paso	Pine Grove Coal Company, Colorado Springs	L. M Weaver	L. M Weaver	Slope	Lignite	3 feet	13	Furnace	3,000	No	2,094		590	2,684		New mine
Oak Grove	El Paso	Fuller & Eaton, Colorado City	James Fuller	James Fuller	Slope	Lignite	3 feet	6	Natural	1,000	No	600		200	800		New mine
Cardiff	El Paso	Cardiff Coal Company, Colorado Springs	D J. Williams	D J. Williams	Drift	Lignite	2 feet 6 inches	9	Furnace	2,000	No	1,000			1,000		New mine
McFerran	El Paso	Western Coal Company, Colorado Springs	J. F Beattie	J. F. Beattie	Shaft	Lignite	7 feet	48	Fan	18,000	No	6,154		2,290	8,424	Union Pacific, Denver & Gulf	Mine abandoned in July
Franceville	El Paso	Union Ice and Coal Company, Colorado Springs	Thomas E. Thomas	Thomas E. Thomas	Slope	Lignite	7 feet	31	Fan	14,000	No	11,869		4,546	16,415	Union Pacific, Denver & Gulf	
Mountain View	El Paso	Mountain View Coal Company, Colorado Springs	John McGovern	James McGovern	Slope	Lignite	3 feet	8	Natural	1,000	No	270		90	360		New mine
Monument Park	El Paso	Monument Park Coal Company, Colorado Springs	A. C. Sloan	C. Ottenheimer	Slope	Lignite	3 feet	6	Natural	1,000	No	900			900		New mine
Midway	El Paso	Midway Coal Company, Colorado Springs	Zack Billings	Zack Billings	Slope	Lignite	3 feet	5	Natural	1,000	No	935			935		New mine
Glenyrie	El Paso	Glenyrie Coal Company, Colorado Springs	Isaac Tucker	Isaac Tucker	Slope	Lignite	2 feet 6 inches	6	Natural	1,000	No	500			500		New mine
Rockvale No 1	Fremont	Colorado Fuel and Iron Company, Denver	W P Thompson	Robt Milliken	Shaft	Semi-Bituminous	3 feet 6 inches	425	Fans	65,000	Yes	64,429	7,403	7,996	79,932	Atchison, Topeka & Santa Fe	This property passed into the hands of C. F. & I. Co in August, formerly C. C. C. Co.
Rockvale No 4	Fremont	Colorado Fuel and Iron Company, Denver	W. P. Thompson	Robt. Milliken	Shaft	Semi-Bituminous	3 feet 6 inches				Yes					Atchison, Topeka & Santa Fe	Not in operation
Rockvale No 5	Fremont	Colorado Fuel and Iron Company, Denver	W. P. Thompson	Robt. Milliken	Shaft	Semi-Bituminous	3 feet 6 inches				Yes					Atchison, Topeka & Santa Fe	Not in operation
Brookside No 7	Fremont	Colorado Fuel and Iron Company, Denver	W P Thompson	Thos. Pattison	Slope	Semi-Bituminous	5 feet 6 inches to 8 feet	165	Fan	27,000	Yes	56,355	2,685	10,882	69,922	Atchison, Topeka & Santa Fe	This property passed into the hands of C F & I. Co. in August, formerly C. C. C. Co
Fremont	Fremont	Colorado Fuel and Iron Company, Denver	W. P. Thompson	Thos. Pattison	Shaft	Semi-Bituminous	3 feet	113	Fan	36,000	Yes				28,825	Atchison, Topeka & Santa Fe	Formerly Oak Creek
Coal Creek No 1	Fremont	Colorado Fuel and Iron Company, Denver	W. P Thompson	Robt. Milliken	Slope	Semi-Bituminous	3 feet 6 inches	410	Fan	14,300	Yes				81,977	Denver & Rio Grande	United Coal Co., now Colorado Fuel & Iron Co. since June.
Coal Creek No 2	Fremont	Colorado Fuel and Iron Company, Denver	W P Thompson	Robt. Milliken	Slope	Semi-Bituminous	3 feet 6 inches		Fan	25,200	Yes					Denver & Rio Grande	
Chandler	Fremont	Colorado Fuel and Iron Company, Denver	W P Thompson	Thos. Pattison	Shaft	Semi-Bituminous	5 feet 6 inches	40	Fan	10,000	Yes				6,420	Denver & Rio Grande	In operation for five months
Williamsburg	Fremont	Williamsburg Coal Company, Denver	L. E. Andrews	Wm. Wilson	Shaft	Semi-Bituminous	3 feet	35	Fan	10,000	No	6,940	1,323	2,225	10,388	Denver & Rio Grande	
Wilson	Fremont	Wilson Coal Company, Williamsburg		Wm Wilson	Shaft	Semi-Bituminous	4 feet	10	Natural	3,000	No	1,000			1,000	No railroad	
Williams	Fremont	Williams Coal Company, Williamsburg	W. D Williams	W D. Williams	Slope	Semi-Bituminous	3 feet 6 inches	4	Natural	4,000	No	1,000			1,000	No railroad	Estimated
Brewster	Fremont	Brewster Coal Company, Williamsburg	W S. Stratton	Chas. Cowan	Drift	Semi-Bituminous	3 feet 6 inches	16	Natural	1,600	No	3,000			3,000	No railroad	
Mellor	Fremont					Semi-Bituminous											
Crested Butte	Gunnison	Colorado Fuel and Iron Company, Denver	W P Thompson	Joe Ball	Drift	Bituminous	5 feet 6 inches	335	Fan	53,000	Yes	77,553		97,026	174,578	Denver & Rio Grande	250,440 tons coke
Anthracite	Gunnison	Colorado Fuel and Iron Company, Denver	W. P Thompson	John Evans	Drift	Anthracite	4 feet to 6 feet	75	Fan	31,500	No				42,137	Denver & Rio Grande	All sizes, 1, 2, 3, 5 and 6
Ruby	Gunnison	Colorado Fuel and Iron Company, Denver	W. P Thompson	Chas Myers	Drift	Anthracite	3 feet to 4 feet	100	Natural	29,750	No				17,469	Denver & Rio Grande	In operation since September
Black Diamond	Gunnison	Black Diamond Coal Company, Baldwin	Wm Hogan	Wm. Hogan	Slope	Semi-Bituminous	6 feet	24	Furnace	5,000	No				6,573	No railroad	
Baldwin Star	Gunnison	B. Star Coal Company, Baldwin	G. I Bently	G I Bently	Drift	Semi-Bituminous	8 feet 6 inches	20	Furnace	4,000	No				7,100	No railroad	In operation eight months
Sunbeam	Gunnison	Sunbeam Coal Company, Baldwin	Thos. Nisbet	Thos Nisbet	Slope	Semi-Bituminous	8 feet	33	Furnace	3,000	No				12,725	No railroad	
Kubler	Gunnison	Kubler Coal Company, Baldwin	And. Dahlman	Aud. Dahlman	Drift	Semi-Bituminous	6 feet	10	Natural	2,000	No				6,000	No railroad	Not reported
Holly	Gunnison	Holly Coal Company, Baldwin	M. Quin	M. Quin	Drift	Semi-Bituminous	6 feet	6	Natural	2,000	No				2,000	No railroad	Not reported
Superior	Gunnison	Superior Coal Company, Baldwin	Alex Waugh	Alex Waugh	Drift	Semi-Bituminous	4 feet 6 inches	4	Natural	1,000	No				1,000	No railroad	Not reported
Elk Creek	Garfield	Elk Creek Coal Company, Newcastle	D S. Llewellyn	D S Llewellyn	Drift	Semi-Bituminous	4 feet	4	Natural	1,000	No	2,750		400	3,150	No railroad	
Newcastle	Garfield	Colorado Fuel and Iron Company, Denver	W P. Thompson	Paul Blount	Shaft	Semi-Bituminous	56 feet, 4 veins	160	Two Fans	125,000	Yes				146,925	Denver & Rio Grande and Colorado Midland	
Vulcan	Garfield	Colorado Fuel and Iron Company, Denver			Slope	Semi-Bituminous	47 feet		Two Fans		Yes				84,333	Denver & Rio Grande and Colorado Midland	Abandoned since explosion
Sunshine	Garfield	Renstrom Coal Company, Carlin	John Renstrom	John Renstrom	Drift	Semi-Bituminous	9 feet	67	Natural	10,000	No	11,938	6,753		18,691	Denver & Rio Grande and Colorado Midland	
Midland	Garfield	Midland Coal Company, Newcastle	T W Thomas	T W Thomas	Drift	Semi-Bituminous	7 feet	31	Natural		No	29,831			29,831	Denver & Rio Grande and Colorado Midland	
Keystone	Garfield	Keystone Coal Company, Newcastle	A Cohn	A Cohn	Drift	Semi-Bituminous	3 feet	10	Natural	1,000	No	2,000	100		2,100	No railroad	
Overland	Garfield	Union Coal and Coke Company, Denver	W R. Harp	Joe Negro	Drift	Semi-Bituminous	4 feet	52	Natural	3,000	No	10,000		3,000	13,000	No railroad	Partly estimated
Sunshine	Huerfano	Sunshine Fuel Company, 1529 Curtis Street, Denver	Perry Kilbaugh		Slope	Semi-Bituminous	4 feet and 6 feet	72	Natural	3,000	No	6,362	1,450	1,538	9,350	Denver & Rio Grande	New mine
House	Huerfano	Colorado Fuel and Iron Company, Denver	W P Thompson	John Kebler	Slope	Semi-Bituminous	4 feet 6 inches to 7 feet	270	Fan	32,000	Yes	63,417	11,916	31,988	107,321	Denver & Rio Grande	
Victor	Huerfano	Colorado Fuel and Iron Company, Denver	W P Thompson	Robt Peart	Slope	Semi-Bituminous	4 feet 10 inches and 3 feet 10 in.	225	Two Fans	105,000	Yes	69,502	16,091	34,054	129,647	Denver & Rio Grande	
Robinson	Huerfano	Colorado Fuel and Iron Company, Denver	W. P Thompson	J W Breene	Slope	Semi-Bituminous	7 feet	17	Fan	37,000	Yes	5,900	1,548	3,062	10,410	Denver & Rio Grande	
Walsen	Huerfano	Colorado Fuel and Iron Company, Denver	W. P Thompson	J. W Breene	Slope	Semi-Bituminous	8 feet	147	Fan	45,900	Yes	56,158	2,344	18,929	83,024	Denver & Rio Grande	
Toltec	Huerfano	Toltec Coal Company, Denver	P P Sharp	Jas Calderhead	Slope	Semi-Bituminous	4 feet	42	Fan	10,000	No	12,350	2,361	3,100	17,811	Denver & Rio Grande	
Solar	Huerfano															Denver & Rio Grande	Not in operation
Bright	Huerfano	Cameron Coal Company, Walsenburg	M R Bright	J P McDonald	Drift	Semi-Bituminous	3 feet	13	Furnace			2,205		1,000	3,205	No railroad	
Tindal	Jefferson	Denver Coal Company, Limited, Denver	James H Miller	John Nichols	Shaft	Lignite	14 feet and 7 feet	22	Fan	8,000	No	11,111	3,333	1,560	16,030	U. P., Denver & Gulf and D., Lakewood & Golden	
Mount Carbon	Jefferson	Mt Carbon Coal Company Morrison	Ben Prince	Ben Prince	Drift	Lignite	3 feet and 4 feet	5	Natural	500	No	375	100	50	925	No railroad	
Ralston Springs	Jefferson	Goldsworthy & Mathews, Golden	G H Goldsworthy	J Mathews	Shaft	Lignite	12 feet	15	Natural	4,000	No	900		250	1,150	No railroad	New mine
Sopris	Las Animas	Colorado Fuel and Iron Company, Denver	W P Thompson	W. J Murray	Drift	Bituminous	4 feet 6 inches to 7 feet	415	Fan	58,000	Yes				443,034	Union Pacific, Denver & Gulf	611,150 tons coke
Berwind	Las Animas	Colorado Fuel and Iron Company, Denver	W. P. Thompson	W. E Maltby	Drift	Bituminous	5 feet 6 inches	238	Fan	36,000	Yes	93,932	18,127	30,724	137,783	Union Pacific, Denver & Gulf	
Engle	Las Animas	Colorado Fuel and Iron Company, Denver	W P. Thompson	J. S Jones	Drift	Bituminous	6 feet	300	Fan	59,200	No	143,356		97,280	240,236	Denver & Rio Grande	62,607 tons coke
Starkville	Las Animas	Colorado Fuel and Iron Company, Denver	W P. Thompson	D. McLaughlin	Drift	Bituminous	5 feet 6 inches	485	Fan	37,000	Yes	218,707		156,962	375,669	Atchison, Topeka & Santa Fe	49,731 tons coke
Chicosa Nos 1 and 2	Las Animas	Trinidad Fuel Company, Trinidad	G M Forbes	Joe Cox	Drift	Bituminous	6 feet	17	Fan	26,000	No				3,342	Union Pacific, Denver & Gulf	Closed down for nine months
Victor No 1	Las Animas	Victor Coal and Coke Company, Trinidad	John Cameron	Alex. Pollock	Drift	Bituminous	7 feet	150	Furnace	16,000	No				143,208	Union Pacific, Denver & Gulf	
Victor No 2	Las Animas	Victor Coal and Coke Company, Trinidad	John Cameron	G R Hill	Slope	Bituminous	7 feet	130	Fan	16,000	Yes				111 913	Union Pacific, Denver & Gulf	16,000 tons coke
Gray Creek	Las Animas	Victor Coal and Coke Company, Trinidad	John Cameron	Jas. Lamb	Drift	Bituminous	13 feet	130	Furnace	13,000	Yes				23,603	Union Pacific, Denver & Gulf	5,603 tons coke, in operation for three months
Peerless	Las Animas	Liebig Coal Company, Denver	John McNeil, M E, Receiver	Wm M Neil	Slope	Bituminous	7 feet	150	Fan	32,000	No	18,731	3,811	16,657	38,209	Union Pacific, Denver & Gulf	
Blooms	Las Animas	Jeffreys Coal Company, Trinidad	Geo Jeffreys	Geo Jeffreys	Drift	Bituminous	7 feet	12	Natural	1,000	No	6,520		2,238	8,758	No railroad	
Rowland	Las Animas	H C Nicholls & Company, Trinidad	H C Nicholls	H C Nicholls	Drift	Bituminous	7 feet	10	Natural	1,000	No	10,048			10,048	No railroad	
Gonzales Canon	Las Animas	Broadhead Brothers, Aguilar	Robt Broadhead	D O Pritchard	Shaft	Bituminous	4 feet 6 inches	66	Fan	20,000	Yes	9,522	6,700	14,170	30,392	Union Pacific, Denver & Gulf	
Belmont	Las Animas	Consolidated Fuel Company, Denver	C E. Guy	J E McKelvy	Drift	Bituminous	9 feet	35	Furnace	8,000	No	14,000	3,000	3,000	20,000	Union Pacific Denver & Gulf	
Porter	La Plata	Porter Coal Company, Durango	S E Herr	Thomas Mason	Drift	Bituminous	4 feet	65	Natural	15,000	No	23,548	7,475	16,811	47,834	Rio Grande Southern	2,951 tons coke
Iresperus	La Plata	Porter Coal Company, Durango	S E Herr	Thomas Mason	Drift	Semi Bituminous	5 feet	40	Natural	10,000	N	16,026	2,001	6,221	24,248	Rio Grande Southern	
San Juan	La Plata	San Juan Coal Company, Durango	J. H Ward	P L McCartney	Drift	Bituminous	4 feet	30	Natural	3,000	No	8,231		2,000	10,231	Rio Grande Southern	
Black Hawk	La Plata	Champion Coal Company, Durango	G A Adrianson	G A Adrianson	Shaft	Bituminous	3 feet 6 inches	14	Natural	5,000	No	4,000	2,049	3,001	9,049	No railroad	
Ute	La Plata	Ute Coal Company, Durango	L. C. Jakway	L C Jakway	Drift	Semi Bituminous	5 feet	17	Furnace	8,000	No	3,730	2,297	1,779	7,806	Rio Grande Southern	
Book Cliff	Mesa	Book Cliff Railway and Coal Company, Grand Junction	W L Carpenter	W L Carpenter	Drift	Semi Bituminous	5 feet	24	Natural	2,000	No	5,182	1,573	1,134	7,847	Little Book Cliff	
Mount Lincoln	Mesa	Mt Lincoln Coal Company, Palisade	W L Cross	W L Cross	Drift	Semi-Bituminous	3 feet	36	Natural	3,000	No	7,975	400	2,685	10,460	Denver & Rio Grande	
Palisade	Mesa	Palisade Coal Company Palisade	George Bailey	George Bailey	Drift	Semi-Bituminous	4 feet	9	Natural	1,000	No	1,800	300		2,100	No railroad	
Camo	Park	Park Coal Company, King	D O. Clark	Joe Watson	Slope	Semi-Bituminous	6 feet	106	Fan	36,000	Yes	24,245		8,442	33,867	Denver, Leadville & Gunnison	Shut up and abandoned in November
Spring Gulch	Pitkin	Colorado Fuel and Iron Company, Denver	W. P Thompson	Harry Elliott	Slope	Bituminous	6 feet	133	Fan	36,960	No				134 421	Colorado Midland	76,312 tons coke
Union	Pitkin	Union Coal and Coke Company, Denver	W R Harp	James Dalrymple	Drift	Bituminous	5 feet	47	Natural	10,000	No	26,000	600	1,050	27,650	Colorado Midland	
Northwestern	Weld	Northwestern Coal Company, Erie	T. G Reese	L. G Reese	Shaft	Lignite	7 feet	18	Fan	10,000	No	2,452		773	3,225	Union Pacific	Idle for eight months
Garfield No 2	Weld	Peoples Coal Company, Denver		Wm Shields	Shaft	Lignite	6 feet	16	Fan	10,000	No	1,644		628	2,272	Union Pacific	Idle for ten months
McKinnie	Weld	McKinnie Coal Company, Erie	Chas Davis	Chas Davis	Shaft	Lignite	5 feet	17	Fan	10,000	No	4,501		1,500	6,000	Union Pacific	Not reported
Washington	Weld	Brimble & McDermot, Erie	David Brimble	David Brimble	Shaft	Lignite	5 feet	11	Natural	3,000		3,294	1,697		4,991	Union Pacific	
Coal Draw	Weld	Robt Rodgers, Eaton	Robt Rodgers	Robt Rodgers	Shaft	Lignite	5 feet	3	Natural	500					1,000	No railroad	Estimated
White House No 2	Weld	Robt. Johnson, Platteville	Robt. Johnson	Robt Johnson	Shaft	Lignite	5 feet 8 inches	7	Natural	2,000		1,410	858		1,671	No railroad	
Lincoln	Weld	John Plavell, Erie	John Plavell	John Plavell	Shaft	Lignite	5 feet	7		3,000		2,000		1,000	3,000	No railroad	New mine

No. 32. Gabriel Gleese, aged 34; occupation, miner; nationality, Italian; single, killed February 18, 1896, 11:30 a. m.; recovered March 3, 1896, 3:00 p. m.; buried New Castle. Found on the body, Vulcan pay check, $63.58.

No. 33. Babtiste Chowkett, aged 28; occupation, miner; nationality, Italian; married, old country; killed February 18, 1896, 11:30 a. m.; recovered March 4, 1896, 5:30 p. m.; buried New Castle. Father in New Castle.

No. 34. Frank Russia, aged 30; occupation, miner; nationality, Italian; single; killed February 18, 1896, 11:30 a. m.; recovered March 4, 1896, 6:00 p. m.

No. 35. Dominic Ozzello, aged 24; occupation, loader; nationality, Italian; single; killed February 18, 1896, 11:30 a. m.; recovered March 3, 1896, 11:00 p. m.; buried New Castle. Found on his body, finger-ring and pocket-knife.

No. 36. Philip Recla, aged 28; occupation, miner; nationality, Austrian; single; killed February 18, 1896, 11:30 a. m.; recovered March 7, 1896, 4:00 p. m.; buried New Castle. Found on his person, Vulcan Fuel Co.'s statement for month of January, 1896; has brother at Sheppton, Pa., named R. Recla, general merchant.

No. 37. Jno Scaife, aged 45; occupation, miner; nationality, Welch; married, leaves widow and two children; killed February 18, 1896, 11:30 a. m.; recovered March 7, 1896, 10:00 p. m.; buried New Castle. Found silver watch and pocket knife.

No. 38. Peter Patrico, aged 35; occupation, miner; nationality, Italian; married; wife in Italy, one son and one daughter in New York, just landed; killed February 18, 1896, 11:30 a. m.; recovered March 8, 1896, 7:30 a. m.; buried, New Castle. Found on his person, one pocket book, filled with papers, and a lamp key; effects in charge of Jas. Gleese, at New Castle, his cousin.

No. 39. John Funke, aged 42; occupation, assistant pit boss; nationality, German; married, leaves wife and five children, two boys and three girls. Killed February 18, 1896, 11:30 a. m.; recovered, March 11, 1896, 5 a. m. Body shipped to Frontinac, Kan., care Henry Shurman.

No. 40. Dom. Rosetti, aged 24; occupation, loader; nationality, Italian; single. Killed February 18, 1896, 11:30 a. m.; recovered March 11, 1896, 5 a. m.; buried, New Castle. Sister, Mrs. Thos. Borghetti, at New Castle.

No. 41. Thos. Larrigan, aged ; occupation, fire boss; nationality, Scotch; married, leaves widow and two children at New Castle. Killed February 18, 1896, 11:30 a. m.; recovered March 11, 1896, 5 a. m.; buried, New Castle.

No. 42. Frank McGourty, aged 22; occupation, loader; nationality, American; single. Killed February 18, 1896, 11:30 a. m.; recovered March 11, 1896, 5 a. m.; buried, New Castle.

No. 43. David P. Davis, aged 28; occupation, loader; nationality, Welch; single. Killed February 18, 1896, 11:30 a. m.; recovered March 11, 1896, 5 a. m.; buried, New Castle. Has brother living in Wales. Effects in charge of Belonged to Odd Fellows.

No. 44. Thos. Addison, aged 25; occupation, loader; nationality, English; single. Killed February 18, 1896, 11:30 a. m.; recovered March 11, 1896, 9:15 p. m.; buried, New Castle. Belonged to Knights of Pythias. Myras Stephenson, Rouse, Colo., his brother-in-law.

No. 45. John Coughlin, aged 22; occupation, driver; nationality, American; single. Killed February 18, 1896, 11:30 a. m.; recovered March 11, 1896, 9:15 p. m.; buried, New Castle. Belonged to Knights of Pythias.

No. 46. Alphonse Baldis, aged 24; occupation, miner; nationality, Austrian; single. Killed February 18, 1896, 11:30 a. m.; recovered March 12, 1896, 4 a. m.; buried, New Castle.

No. 47. Peter Tapro, aged 30; occupation, loader; nationality, Italian; single; killed February 18, 1896, 11:30 a. m.; recovered March 12, 1896, 9:30 a. m.; buried, New Castle.

No. 48. Wm. Haggerty, aged 40; occupation, miner; nationality, Irish; married, leaves widow and two children, living on ranch a couple of miles northwest of New Castle; killed February 18, 1896, 11:30 a. m.; recovered March 15, 1896, 5 a. m.; buried, New Castle.

No. 49. Alex. Reno, aged —; occupation, miner; nationality, French; single; killed February 18, 1896, 11:30 a. m.; recovered March 15, 1896, 10 a. m.; buried, New Castle.

COAL MINES.

The Statute Law of Colorado in Relation to Coal Mines, as passed in 1883, and Acts Amendatory Thereto.

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 shaft 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 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, to 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 colliery 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 or 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 willfully 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 actions.

Sec. 12. For any injury to person or property occasioned by any violation of this act, or any willful 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 time, 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 we 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 depart-

ment 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 minng 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, and his deputy, shall devote the whole of their time to the duties of their office. It shall be the duty of the Inspector, or his deputy, 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, or his deputy, or both, 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 any 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 two thousand copies of said biennial report, at the expense of the State, for distribution to Members of the Legislature, mine owners, superintendents, 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 a deputy inspector, and such clerical assistance as may be required in his office, whose salaries shall not exceed two thousand (2,000) 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; and the said Inspector shall be allowed the further sum of ten cents per mile mileage for all distances actually traveled by him, or his deputy, in the active discharge of their official duties, but the total sum of such mileage allowed for the mileage expenses of both such inspector and his deputy shall not exceed the sum of two thousand five hundred dollars in any one year. It is further hereby enacted that any balance of the above appropriation which may remain after paying the salary of the deputy inspector and his mileage, as hereinbefore provided, shall be applied to the hire of clerical assistance for the Inspector and for necessary office expenses.

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 twenty 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 twenty-five feet apart and to a like depth, also that it shall not be lawful for any owner or agent operating vertical coal veins, to mine or extract coal from levels under any portion of said mine or adjoining mines where water exists, without first having pumped out such water. All veins pitching over seventy degrees shall be understood as vertical veins under this act. 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 bituminous and lignite coal mines coming under the provisions of this act, the State Inspector of Coal Mines shall have the authority to compel the owners, agents or lessee of coal mines to remove any or all fine coal or slack which may accumulate in the working places or gobs, and 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 or another competent

person, and if an increase in temperature be localized in any part of the gobs or other places, 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 build suitable stoppings of double walls of a concave shape, and at least two feet apart, with ends top and bottom, built into cuttings made into the coal or rock, and the center between the walls to be filled in with sand or other fine earthy matter, which shall be 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 air. Should combustion still be suspected to be going on, then steam, where practicable, shall be injected towards the fire from pipes in connection with boilers, and passing through said walls or stoppings, or to flood with water the site of the fire; and that in all coal mines known to generate explosive gas, that the owner or agent shall provide and adopt a system by which water under pressure or otherwise shall be sprinkled and make damp all accumulations of fine coal dust from time to time that may accumulate on any haulage road, rooms, stopes or any other working place. Also, that no owner or agent shall use any part of the underground workings of such coal mines as a magazine for the storage of gunpowder or any other kind of blasting agent; on all underground roads where coal is hauled by machinery, and where the grade will average more than six (6) feet to the hundred (100), and which are used for traveling ways for men, double draw-bars shall be attached to the bottom or other parts of every car, so that two separate couplings may be used to connect each and every car lowered or hoisted on any road coming under this act, and that the hooks which connect with the draw-bar of the car shall be so 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 ropes; *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, s' all make daily inspection of ropes, chains, cages and other hoist-

ing appliances, guides and shaft timbers, and make a record of such daily inspection in a book, kept at the office in 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.