EIGHTH BIENNIAL REPORT

OF THE

Inspector of Coal Mines

OF THE

STATE OF COLORADO

1897-1898.

TO THE GOVERNOR.

DENVER, COLORADO.
THE SMITH-BROOKS PRINTING CO., STATE PRINTERS.
1899.

LETTER OF TRANSMITTAL.

To His Excellency,
ALVA ADAMS,
Governor of Colorado:

Sir—In compliance with section 17 of an act entitled "Coal Mines," I have the honor, as inspector of coal mines, to submit to you the eighth biennial report from this department.

I with pleasure thank the coal mine officials for their courtesies, especially for their promptness in complying with the law, and, in many instances, adopting measures for the safety and welfare of our miners, which are not specified by law.

For yourself, I beg that you will accept my sincere thanks for the courtesies extended to me, both as a servant and an individual. In return, I have conscientiously endeavored to fulfill my duty to the best of my ability.

I shall feel grateful if, in your message, you will mention the necessity of revising our present law on coal mining.

Wishing you personal success and prosperity and trusting that this, my report, will meet with your expectations and approval, I have the honor to be

Your obedient servant,

DAVID GRIFFITHS.

BIENNIAL REPORT

OF THE

INSPECTOR OF COAL MINES.

BRIEF STATISTICS.

	1897.	1898.
Number of mines in operation	106	107
Tons bituminous coal produced	1,752,059	2,075,034
Tons semi-bituminous coal produced	1,077,912	1,462,493
Tons lignite coal produced	671,592	577,679
Tons anthracite coal produced	64,097	48,831
Total tonnage of coal produced	3,565,660	4,174,037
Tons coke produced	320,738	445,925
Number of men employed at mines	7,018	7,425
Number of fatal accidents at mines	35	24
Number of non-fatal accidents at mines	54	72
Number of men employed for each fatality	200	309
Tons coal mined for each life lost	101,876	173,918
Number of men employed for each non-fatal accident	130	103
Tons of coal mined for each non-fatal accident	66,031	57,973

REVISION OF THE COAL MINING LAW.

Our present coal mining law is lax and incomplete, and much can be done by legislation that will benefit the general welfare of our coal miners. Since our present law governing coal mining was framed in 1883 the coal-producing capacity of the state has greatly increased, and we now have conditions to

cope with not then existing. Furthermore, elaborate scientific researches have been carried on, in the coal-producing countries of the world, tending to the prevention of coal mine accidents, and safety appliances devised, by the adoption and use of which mine accidents are minimized.

In my previous report I suggested that a board of commissioners be appointed comprising of any desirable number of coal miners and an equal number to represent the operators. Said board to make a complete revision of the mining law and adopt every known precautionary measure in vogue here and elsewhere tending to provide for the health and safety of our coal miners. The coal mine inspector and a constitutional lawyer, who should be a member of one of our legislative bodies, would be of great aid to such board. In this manner a law could be drafted that would be satisfactory to the operators and beneficial to the miners, and the same would undoubtedly be approved and passed by our honorable legislative bodies.

The statutory law governing coal mining calls for two thousand reports to be printed biennially for distribution to members of the legislature, mine owners, superintendents, and others interested in coal mines, but by a law enacted by the tenth general assembly this department is limited to two hundred and fifty copies. This number is entirely too small, and the statutory number ought to be printed for distribution.

COLORADO COAL.

The coal measures of Colorado are widely distributed and are underlying portions of at least twenty-two counties, but mining operations on an extensive scale are confined to a few of them. The coals of Colorado are variable in character and include lignite, bituminous, semi-bituminous, semi-anthracite and anthracite. In many instances a seam of coal gradually changes from bituminous or coking coal into a semi-bituminous character, and from being bituminous to semi-anthracite and anthracite. This alteration of character is mainly due to the influence of neighboring eruptive masses and the proximity of the measures to the eruptive centers. The lower coal seams in the Raton field in Colorado, around Trinidad and northward to Hastings, are bituminous in character, and produce a hard, compact coke. The same seams, at Aguilar, are slightly coking in their nature, but will not produce marketable coke. The same seams in their northward trend losing nearly all their coking

qualities at Santa Clara and Rouse. At Crested Butte, in Gunnison county, within a radius of five or six miles, there is bituminous, semi-bituminous and anthracite coal. This changeable characteristic is noticeable in all the mountainous regions. In the nothern Colorado lignite field, underlying the eastern prairie of the continental divide, these changeable conditions are not so pronounced; however, the coal on the tilted outcrop of the measures at Golden, in Jefferson county, contains less percentage of moisture and the product is better adapted for exportation. Lignite is worked in Arapahoe, Boulder, El Paso, Larimer and Weld counties exclusively. The most of the lignite production comes from Boulder county, and its proximity to the Denver market, with a short railroad haul, makes it a valuable commodity for steam and domestic use. Bituminous coal is produced in Las Animas, La Plata, Pitkin and Gunnison counties, Las Animas being by far the greatest producer. Semi-bituminous coal is mostly produced in Huerfano, Fremont, Garfield and Gunnison counties. The anthracite coal, now produced, is confined to Gunnison county, and is there only found in limited areas.

Various estimates have been made of the coal-bearing area, etc., of the Colorado coal fields and the figures widely differ. Prof. R. C. Hills has devoted much of his valuable time to this important subject, and is generally admitted to be the most accurate. In the History of Colorado, by Hall, he gives the following figures:

ESTIMATED AREA OF COLORADO COAL FIELDS.

	Square Miles.
Grand river field (Colorado portion)	6,950
Yampa field, including part of Wyoming field in Routt county	1,100
La Plata field (Colorado portion)	1,250
Raton field (Colorado portion)	1,300
Northern Colorado field	6,800
North Park field	300
South Park, Canon City and Tongue Mesa district	100
Dakota measures (Southwestern Colorado)	300
Total area (square miles)	18,100

ESTIMATED QUANTITY OF AVAILABLE COAL IN COLORADO FIELDS.

Location.	Square Miles Accessible Area.	Available Gross Tonnage.
Grand river field (in Colorado)	1,116	26,384,800,000
Yampa field	440	5,961,500,000
La Plata field (in Colorado)	300	3,387,200,000
Raton field (in Colorado)	473	4,490,200,000
Northern Colorado field	405	2,568,600,000
North Park field	80	1,806,500,000
Canon City, South Park and Tongue Mesa districts	49	429,000,000
Dakota cretaceous measures	50	169,300,000
Total	2,319	45,197,100,000
Total net tonnage or 75 per cent. of gross estimate		33,897,800,000

This enormous store of wealth is incomprehensible by looking at the figures given without some explanation. The total coal production of the world in 1898 will be between 500,000,000 and 600,000,000 tons, and at that rate of production Colorado has in store sufficient coal to supply the world for nearly sixty years. Assuming no increase of production in Colorado over the past year, it will take 8,500 years to extract the available coal from the Colorado coal fields. The coal production of Colorado at present forms one of its greatest industries, and is the solid basis of its future prosperity. No other industry within its boundaries puts so much money into the channels of trade. As an export commodity the prairie states pay us a handsome sum of money annually, and from no other source or industry do our railroads receive such revenue.

ELECTRICITY.

The use of this world-wide energy is in its infancy in and around our coal mines. At present there are a few plants in operation and others in course of construction.

At Sopris, in Las Animas county, there are two small plants in use for lighting purposes, one of them lighting the double parting in the mine and the machine shop, stables, etc., at the mouth of the mine, and the other lighting the washery.

etc., at the tipple. At Rouse, in Huerfano county, a 300-horse power plant is used for pumping and lighting.

Previous to adopting electricity, steam and compressed air had been used for pumping, but with all efforts made they were unable to cope with the great influx of water. Since the electric pumps have been in operation, the surplus water in the mine has been removed and slope sinking is now in progress. The electric pumps are a great success. Better results are obtained at a great reduction of expense. Capacity of pumps, 1,200 gallons per minute.

At the Walsen mine, Huerfano county, a 300-horse power plant is now in course of construction. The power generated will be used for pumping, mining and lighting the Walsen and Robinson mines.

At the Ruby mine, in Gunnison county, there is a small plant used for lighting the mine and the breaker.

The aforesaid plants are owned by The Colorado Fuel and Iron Company.

At the Keebler mine, in Gunnison county, a complete electric plant has been abandoned. It was erected with a view of lighting and mining the coal with machines, but the roof overlying the coal was too fragile to admit the required space for the mining machines to be unsupported with timber. Where the roof was good the machines gave good results.

At Lafayette, in Boulder county, the Northern Coal Company has a 100-horse power plant now in course of construction. The power will be used for lighting, mining and haulage at the Mitchell, Simpson and Excelsior mines.

COAL AND COKE PRODUCTION

FOR 1897.

COAL PRODUCTION OF COLORADO FOR 1897.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

ARAPAHOE COUNTY.

Name of mine	Scranton	Yearly Tonnage
Kind of opening	Slope	
Thickness of seam	7 ft. 0 in.	
Character of coal	Lignite	
December	413	413

COAL PRODUCTION OF COLORADO FOR 1897—Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

BOULDER COUNTY.

Name of mine	Acme	Caledonia	Spencer	Simpson	Excelsior	Gladstone	New Mitchell	Leader	Hecla No. 1
Kind of opening	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft
Thickness of seam	7 ft. o in.	6 ft. o in.	14 ft. o in.	14 ft. o in.	14 ft. o in.	14 ft. o in.	14 ft. o in.	6 ft. o in.	6 ft. to 9 ft.
Character of coal	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite
January	2,400	3,240	5,214	1,834	4,366	5,150	----------	3,966	3,151
February	1,500	3,400	4,041	1,650	5,354	3,589	3,127	2,436	2 093
March	1,400	1,800	3,601	1,543	4,222	3,500	2 966	2,268	4,935
April	1,160	1,502	8,618	3,352	1,961	3,970	2 917	2,563	4,413
May	995	1,430	4,892	2,096	1,989	4,161	2,147	1,524	3,220
June	420	2,245	3,664	1,287	1,642	4,245	2,628	2,121	942
July	Mine idle	2,796	1,861	----------	6,022	3 504	1,809	2 688	762
August		4,035	1,326	1,007	5,948	3 795	1,797	2,952	----------
September		4 567	2,225	1,229	5,231	4 777	4,121	2,894	----------
October		4,800	5,143	1,450	3,346	5,458	4,600	2,893	----------
November		5,315	5,454	2,017	3,465	5,670	5,400	3,565	1,443
December		5,506	5,845	2,273	3,053	4 395	5,391	4,235	3,317
Total tonnage	7,875	40,636	51,884	19,738	46,599	52 214	36,903	34,105	24,276

COAL PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION,

BOULDER

Name of mine	Rex	Hecla No. 2	Imperial	Otis
Kind of opening	Shaft	Shaft	Shaft	Shaft
Thickness of seam	11 ft. 0 in.	7 ft. 0 in.	6 ft. 0 in.	14 ft 0 in.
Character of coal	Lignite	Lignite	Lignite	Lignite
January	6,020	3,870	2,350	2,343
February	4,135	2 235	1,461	1,525
March	4,000	2,495	1,604	1,619
April	3,540	1,777	882	1,180
May	2,080	1,800	890	1,592
June	2,367	1,185	1,524	419
July	3,193	----------	1,330	1,650
August	1,006	----------	1,550	2,167
September	2,685	927	2,000	2,676
October	4,593	----------	1,104	1,486
November	8,081	----------	3,418	2,371
December	9 135	3,066	3,051	2,506
Total tonnage	50,835	17,355	21,164	21,554

COLORADO FOR 1897—Continued.

ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

COUNTY—Continued.

Marshall No. 2	Marshall No. 6	Lister	Industrial	Enterprise
Drift	Slope	Shaft	Shaft	Shaft
7 ft. 0 in.	9 ft. 0 in.	5 ft. 6 in.	6 ft. 0 in.	4 ft. 6 in.
Lignite	Lignite	Lignite	Lignite	Lignite
816	3.409	975	6,666	2,910
540	3,239	900	5,100	3,100
846	3,022	430	4,780	3.100
363	1,085	500	3,477	3,400
483	1,011	493	----------	1,208
494	2,061	449	678	1,580
470	3,519	585	2,100	650
620	2,269	590	3,440	1,450
473	2,439	699	3,824	1,380
604	2,164	958	3,670	1.600
137	4,052	1,390	4,000	2,200
211	3,979	2,010	4,550	5 000
6057	32,249	9,979	42,285	27,578

COAL PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION,

BOULDER

Name of mine	Pluto	Long's Peak	Garfield No. 1
Kind of opening	Slope	Shaft	Shaft
Thickness of seam	14 ft. 0 in.	6 ft. 0 in.	4 ft. 6 in.
Character of coal	Lignite	Lignite	Lignite
January	Mine idle	2,124	Estimated, mine finished
February		2,385	
March		2,523	
April	527	2,630	
May	1,170	2,265	
June	1,276	1,948	
July	1,248	1,986	
August	1,936	2,072	
September	2,171	2,074	
October	1,810	2,319	
November	721	3,099	
December		3,774	1,000
Total tonnage	10,850	29,199	1,000

COLORADO FOR 1897—Continued.

ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

COUNTY—Concluded.

Shanahan	Marfell	Rosser	Vaughan	Total Tonnage
Slope	Slope	Drift	Slope	
11 ft. 0 in.	14 ft. 0 in.	6 ft. 0 in.	13 ft. 6 in.	
Lignite	Lignite	Lignite	Lignite	
Yearly report	Yearly report	Yearly report	Yearly report	60,804
				51,810
				50,654
				49,817
				35,446
				33,166
				36,173
				37,980
				46,392
				47,998
				61,798
14,550	4,436	4,300	269	95,852
14,550	4,436	4,300	269	607,890

COAL PRODUCTION OF COLORADO FOR 1897—Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

EL PASO COUNTY.

Name of mine	Franceville	Newfield	Pine Grove	Monument Park	Monarch	Carlton	Total Tonnage
Kind of opening	Slope	Slope	Slope	Slope	Slope	Shaft	
Thickness of seam	6 ft. 0 in.	5 ft. 6 in.	3 ft. 0 in.	4 ft. 0 in.	3 ft. 4 in.	8 ft. 0 in.	
Character of coal	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	
January	1,700	Yearly report	Yearly report	Yearly report	Yearly report	Yearly report	1,700
February	1,385						1,385
March	1,062						1,062
April	1,424						1,424
May	771						771
June	767						767
July	1,139						1,139
August	707						707
Septeniber	1,100						1,100
October	1,170						1,170
November	1,662						1,662
December	2,630	575	5,100	1,150	2,000	3,564	15,019
Total tonnage	15,517	575	5,100	1,150	2,000	3,564	27,906

COAL PRODUCTION OF COLORADO FOR 1897—Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

FREMONT COUNTY.

Name of mine	Rockvale	Brookside	Freemont	Coal Creek No. 1
Kind of opening	Shaft	Slope	Shaft	Slope
Thickness of seam	3 ft. 6 in.	5½ to 6½ ft.	5 ft. 0 in.	3 ft. 6 in.
Character of coal	Semi-bitumin.	Semi-bitumin.	Semi-bitumin.	Semi-bitumin.
January	10,149	11,544	1,101	4,484
February	9,032	7,590	440	-----
March	4,622	6,006	1,842	-----
April	1,760	3,372	623	-----
May	2,451	2,574	-----	-----
June	148	2,113	1,094	-----
July	2,234	4,560	3,914	-----
August	2,396	3,356	3,457	-----
September	9,626	4,680	6,176	-----
October	15,100	16,153	6,789	-----
November	18,772	19,414	9,074	-----
December	20,437	21,378	9,093	-----
Total tonnage	96,727	102,740	43,603	4,484

Mine idle

NOTE—Semi-bituminous, or non-coking.

COAL PRODUCTION OF COLORADO FOR 1897—Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

FREMONT COUNTY—Concluded.

Name of mine	Coal Creek, No. 2	Chandler	Williamsburg	Wilson	Williams	Brewster	Bassick	Bluff Springs	Hayes	Price	Total Tonnage
Kind of opening	Slope	Shaft	Shaft	Shaft	Slope	Slope	Slope	Shaft	Slope	Slope	
Thickness of seam	3 ft. 6 in.	5 ft. 0 in.	5 ft. 0 in.	3 ft. 6 in.	4 ft. 6 in.	2 ft. 8 in.	4 ft. 0 in.	3 ft. 3 in.	2 veins, 3 ft. and 4 ft.	2 veins, 3 ft. and 4 ft.	
Character of coal	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	
January	6,441	---	---	---	---	257	---	---	---	---	33,976
February	7,807	---	---	---	---	409	---	---	---	---	25,278
March	8,331	---	---	---	---	776	---	---	---	---	21,577
April	5,262	---	---	---	---	448	---	---	---	---	11,465
May	3,315	---	---	---	---	468	---	---	---	---	8,808
June	2,211	---	---	---	---	499	---	---	---	---	6,065
July	---	---	---	---	---	533	---	---	---	---	11,241
August	---	---	---	---	---	533	---	---	---	---	9,742
September	---	---	---	---	---	587	---	---	---	---	21,069
October	---	---	---	---	---	1,240	---	---	---	---	39,282
November	4,793	---	---	---	---	1,915	---	---	---	---	53,968
December	7,954	1,689	3,638	676	3,225	2,055	700	350	2,275	3,700	77,170
Total tonnage	46,114	1,689	3,638	676	3,225	9,720	700	350	2,275	3,700	319,641

Mine idle

Yearly report

Yearly report, new mine

NOTE—Semi-bituminous, or non-coking.

COAL PRODUCTION OF COLORADO FOR 1897—Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

GUNNISON COUNTY.

Name of mine	Crested Butte	Anthracite	Ruby	Holly	Superior	Kubler	Alpine No. 1	Alpine No. 2
Kind of opening	Slope	Drift	Drifts	Drift	Drift	Drift	Shaft	Slope
Thickness of seam	7 to 11 ft.	5 ft. 6 in.	3 ft. 0 in.	5 ft. 0 in.	5 ft. 0 in.	6 ft. 0 in.	6 ft. 0 in.	6 ft. 6 in.
Character of coal	Bituminous	Anthracite	Anthracite	Semi-bituminous	Semi-bituminous	Semi-bituminous	Semi-bituminous	Semi-bitumin.
January	14,251	----	3,495	------	------	------	------	----
February	11,643	----	----	------	------	------	------	----
March	19,154	----	----	------	------	------	------	----
April	14,120	----	----	------	------	------	------	----
May	14,819	----	----	------	------	------	------	----
June	18,236	----	----	------	------	2,812	------	----
July	17,477	----	2,913	------	------	4,330	------	----
August	20,496	----	6,522	------	------	5,300	------	665
September	18,046	7,518	4,963	------	------	4,700	------	1,220
October	16,810	8,503	6,093	------	------	4,000	------	1,596
November	18,098	8,332	5,947	------	------	3,000	312	2,212
December	20,004	5,322	4,489	1,864	2,154	3,000	1,850	2,350
Total tonnage	203,154	29,675	34,422	1,864	2,154	27,142	2,162	8,043

Mine closed down

Yearly report

New mine

COAL PRODUCTION OF COLORADO FOR 1897—Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

GUNNISON COUNTY—Concluded.

Name of mine	Sunbeam	Black Diamond	Union	Total Tonnage
Kind of opening	Slope	Slope	Drift	
Thickness of seam	6 ft. o in.	5 ft. o in.	5 ft. o in.	
Character of coal	Semi-bitum.	Semi-bitum.	Semi-bitum.	
January	Estimated, mine abandoned	Estimated, mine abandoned	Yearly report	17,746
February				11,643
March				19,154
April				14,120
May				14,819
June				21,048
July				24,720
August				32,983
September				36,447
October				37,002
November				37,901
December	2,000	2,000	6,500	51,533
Total tonnage	2,000	2,000	6,500	319,116

COAL PRODUCTION OF COLORADO FOR 1897—Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

GARFIELD COUNTY.

Name of mine	Newcastle	Sunshine	Midland	Overland	Keystone	Elk Creek	Total Tonnage
Kind of opening	Shaft	Drifts	Drifts	Drift	Slope	Drift	
Thickness of seam	4 seams, aggregate 96 ft.	9 ft. o in.	6 ft. o in.	6 ft. o in.	3 ft. o in.	4 ft. o in.	
Character of coal	Semi-bitumin.	Semi-bitumin.	Semi-bitumin.	Semi-bitumin.	Semi-bitumin.	Semi-bitumin.	
January	14,075	3,385	----	748	----	----	18,208
February	11,513	3,392	----	700	----	----	15,605
March	15,044	2,903	----	----	----	----	17,947
April	12,962	2,344	----	----	----	----	15,306
May	11,350	1,307	----	----	----	----	12,657
June	12,803	966	----	----	----	----	13,769
July	8,835	2,407	----	----	----	----	11,242
August	977	3,665	----	----	----	----	4,642
September	11,544	2,816	----	440	----	----	14,800
October	15,915	3,144	----	400	----	----	19,459
November	22,300	4,485	----	200	----	----	26,985
December	17,991	5,614	19,945	607	21,500	1,000	66,657
Total tonnage	155,309	36,428	19,945	3,095	21,500	1,000	237,277

Not reported monthly — Mine idle — Not reported monthly — Estimated

COAL PRODUCTION OF COLORADO FOR 1897—Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

HUERFANO COUNTY.

Name of mine	Rouse	Pictou	Robinson	Walsen	Toltec	Maitland	Santa Clara	Sunshine	Total Tonnage
Kind of opening	Two slopes	Two slopes	Slope	Slope	Slope	Slope	Slope	Slope	
Thickness of seam	6 to 7 ft.	Two seams, 5 ft. and 4 ft.	7 ft. 0 in.	7 ft. 0 in.	4 ft. 0 in.	5 ft. 0 in.	Two seams, 4 ft. and 6 ft.	Two seams, 4 ft. and 5½ ft.	
Character of coal	Semi-bitumin.	Semi-bitumin.	Semi-bitumin.	Semi bitumin.	Semi-bitumin.	Semi-bitumin.	Semi-bitumin.	Semi-bitumin.	
January	9,363	16,184	.....	4,395	1,510	.....	.....	726	32,178
February	5,082	12,619	.....	2,502	865	.....	.....	1,716	22,784
March	5,096	10,449	.....	2,913	1,144	.....	.....	1,340	20,942
April	3,498	5,715	69	1,451	479	.....	.....	329	11,541
May	9,277	1,540	210	901	488	.....	.....	219	12,635
June	12,448	1,859	189	730	545	.....	.....	435	16,206
July	16,692	5,454	227	1,006	652	.....	.....	.....	24,031
August	14,387	7,484	197	953	883	.....	.....	1,429	25,333
September	11,966	10,346	177	2,441	788	822	.....	877	27,417
October	14,057	17,128	300	2,958	1,935	1,178	.....	1,704	39,260
November	15,622	21,863	1,954	11,609	2,300	2,740	1,700	1,791	59,579
December	13,499	21,148	6,356	12,621	2,750	4,262	6,668	2,492	69,796
Total tonnage	130,987	131,789	9,679	44,480	14,339	9,002	8,368	13,058	361,702

COAL PRODUCTION OF COLORADO FOR 1897—Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

JEFFERSON COUNTY.

Name of mine	Tindale	Mount Carbon	North White Ash	Tonnage
Kind of opening	Shaft	Drift	Shaft	
Thickness of seam	14 ft. 0 in.	Two seams, 3½ ft. each	4 ft. 0 in.	
Character of coal	Lignite	Lignite	Lignite	
Tonnage	1,000	1,000	5,650	7,650

COAL PRODUCTION OF COLORADO FOR 1897—Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

LAS ANIMAS COUNTY.

Name of mine	Victor No. 1	Victor No. 2	Gray Creek	Berwind
Kind of opening	Drift	Slope	Three drifts	Two drifts
Thickness of seam	7 ft. 0 in.	7 ft. 0 in.	6 to 14 ft.	6 ft. 0 in.
Character of coal	Bituminous	Bituminous	Bituminous	Bituminous
January	11,164	12,282	5,362	10,631
February	5,250	9,049	4,500	11,004
March	7,999	8,649	4,033	12,819
April	10,603	10,944	8,038	7,601
May	11,877	12,618	10,189	7,692
June	11,212	12,937	10,156	8,662
July	10,866	12,444	11,013	17,493
August	15,249	15,281	13,992	13,768
September	14,771	15,528	12,218	12,448
October	11,560	13,206	13,092	15,261
November	15,943	17,041	12,178	13,095
December	16,440	16,957	11,265	16,797
Total tonnage	142,934	156,936	116,036	147,271

COAL PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION,

LAS ANIMAS

Name of mine	Sopris	Engle	Starkville	Peerless
Kind of opening	Slope	Two drifts	Drift	Slope
Thickness of seam	4 to 7 ft.	6ft. o in.	5 to 7 ft.	6 ft. o in.
Character of coal	Bituminous	Bituminous	Bituminous	Semi-bitum.
January	19,464	15,071	20,710	3,500
February	15,314	10,994	19,445	2,192
March	21,403	14,100	23,186	2,100
April	17,115	10,428	22,512	2,612
May	16,465	8,387	23,090	750
June	17,856	8,647	19,364	600
July	19,193	13,411	32,802	1,350
August	21,861	19,023	19,658	3,990
September	23,440	18,616	17,375	3,472
October	18,170	24,714	25,414	2,100
November	26,776	34,075	43,820	3,950
December	26,086	26,581	40,915	4,620
Total tonnage	243,143	204,047	308,291	31,238

COLORADO FOR 1897—Continued.

ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

COUNTY—Concluded.

Gonzales Canon	Bloom	Rowland	Chicosa	Bald Mountain	Total Tonnage
Shaft	Drift	Drift	Drift	Drift	
6 ft. o in.	7 ft. o in.	8 to 9 ft.	8 ft. o in.	7 ft. o in.	
Semi-bitum.	Bituminous	Bituminous	Bituminous	Bituminous	
2,200	1,513	926	---- ----	---- ----	102,823
1,500	1,048	743	---- ----	---- ----	81,039
152	908	952	---- ----	---- ----	96,301
1,550	562	380	---- ----	---- ----	92,345
3,100	373	786	---- ----	---- ----	95,327
3,470	346	786	---- ----	---- ----	94,036
1,895	326	642	---- ----	---- ----	121,435
1,153	347	548	---- ----	---- ----	124,867
3,177	506	847	---- ----	---- ----	122,398
1,600	1,057	441	---- ----	---- ----	126,615
4,700	1,560	1,048	---- ----	---- ----	174,188
8,000	1,536	1,185	1,699 Yearly report	5,000 Estimated	175,081
30,494	10,082	9,284	1,699	5,000	1,406,455

COAL PRODUCTION OF COLORADO FOR 1897—Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

LA PLATA COUNTY.

Name of mine	Porter	Hesperus	San Juan	Ute	Champion	Total Tonnage
Kind of opening	Drift	Drift	Drift	Drift	Drift	
Thickness of seam	3 ft 6 in.	5 ft. 0 in.	2½ to 4½ ft.	5 ft. 0 in.	2½ to 3½ ft.	
Character of coal	Bituminous	Semi-bitumin.	Bituminous	Semi-bitumin	Bituminous	
January	2,955	1,300	1,493	520	----------	6,268
February	2,439	1,151	829	478	----------	4,897
March	3,058	1,274	1,018	428	----------	5,778
April	2,604	850	455	528	----------	4,437
May	2,710	607	322	337	----------	3,976
June	3,387	712	421	353	522	5,395
July	3,240	568	520	394	675	5,397
August	3,881	630	663	266	670	6,110
September	2,903	658	442	197	944	5,144
October	4,378	1,397	774	407	497	7,453
November	4,668	1,760	1,148	650	956	9,182
December	5,851	2,019	1,125	600	1,173	10,768
Total tonnage	42,074	12,926	9,410	5,158	5,423	74,805

COAL PRODUCTION OF COLORADO FOR 1897—Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

LARIMER COUNTY.

Name of mine	Indian Springs	
Kind of opening	Slope	Yearly report
Thickness of seam	7 ft. 0 in.	
Character of coal	Lignite	
Total tonnage	6,000	6,000

COAL PRODUCTION OF COLORADO FOR 1897—Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

MESA COUNTY.

Name of mine	Mt. Lincoln	Book Cliff	Palisade	Total Tonnage
Kind of opening	Drift	Drift	Drift	
Thickness of seam	3 ft. 6 in.	4 ft. 8 in.	4 to 5 ft.	
Character of coal	Semi-bitumin.	Semi-bitumin.	Semi-bitumin.	
January	Yearly report	1,025	Yearly report	1,025
February		1,127		1,127
March		1,147		1,147
April		787		787
May		193		193
June		123		123
July		115		115
August		125		125
September		257		257
October		592		592
November		1,090		1,090
December	11,400	1,130	8,500	21,030
Total tonnage	11,400	7,711	8,500	27,611

COAL PRODUCTION OF COLORADO FOR 1897—Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

PITKIN COUNTY.

Name of mine	Union	Spring Gulch	Total Tonnage
Kind of opening	Slope	Slope	
Thickness of seam	5 ft. 0 in.	4 ft. 6 in.	
Character of coal	Bituminous	Bituminous	
January	3,290	8,230	11,610
February	5,214	6,478	11,692
March	5,770	4,421	10,191
April	4,450	5,469	9,919
May	4,449	5,685	10,134
June	4,305	11,081	15,386
July	3,050	10,803	13,853
August	4,620	11,031	15,651
September	4,045	8,729	12,774
October	3,630	7,850	11,480
November	2,365	8,693	11,058
December	2,990	10,723	13,713
Total tonnage	48,178	99,283	147,461

COAL PRODUCTION OF COLORADO FOR 1897—Concluded.

SHOWING MONTHLY AND YEARLY PRODUCTION, ETC., OF EACH MINE IN TONS OF 2,000 POUNDS.

WELD COUNTY.

Name of mine	North Western	McKissic	Washington	Coal Draw	White House	Lincoln	Emerson	Wooley	Total Tonnage
Kind of opening	Shaft	Shaft	Shaft	.....	Shaft	Shaft	Shaft	Shaft	
Thickness of seam	4 ft. 6 in.	4 ft. o in.	5 ft. o in.	.....	3 ft. 6 in.	5 ft. o in.	6 ft. o in.	6 ft. o in.	
Character of coal	Lignite	Lignite	Lignite	.....	Lignite	Lignite	Lignite	Lignite	
January	Yearly report	Estimated, mine abandoned	Yearly report	Estimated	Yearly report	Yearly report	Yearly report	Yearly report	
February									
March									
April									
May									
June									
July									
August									
September									
October									
November									
December	2,500	3,000	5,710	1,000	1,068	1,840	1,374	5,241	21,733

COAL PRODUCTION FOR 1897.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH COUNTY.

ALL YEARLY REPORTS GROUPED IN THE MONTH OF DECEMBER.

County	January	February	March
Arapahoe	.....	.....	.....
Boulder	60,804	51,810	50,654
El Paso	1,700	1,385	1,062
Fremont	33,976	25,278	21,577
Gunnison	17,746	11,643	19,154
Garfield	18,208	15,605	17,947
Huerfano	32,178	22,784	20,943
Jefferson	.....	.....	.....
Las Animas	102,823	81,039	96,301
La Plata	6,268	4,897	5,778
Larimer	.....	.....	.....
Mesa	1,025	1,127	1,147
Pitkin	11,610	11,692	10,191
Weld	.....	.....	.....
Totals	286,338	227,260	244,753

COAL PRODUCTION

SHOWING MONTHLY AND YEARLY

ALL YEARLY REPORTS GROUPED

County	April	May	June	July
Arapahoe				
Boulder	49,817	35,446	33,166	36,173
El Paso	1,424	771	767	1,139
Fremont	11,465	8,808	6,065	11,241
Gunnison	14,120	14,819	21,048	24,720
Garfield	15,306	12,657	13 769	11,242
Huerfano	11,541	12,635	16,206	24,031
Jefferson				
Las Animas	92,345	95,327	94,036	121,435
La Plata	4,437	3,976	5,395	5,397
Larimer				
Mesa	787	193	123	115
Pitkin	9,919	10,134	15,386	13,853
Weld				
Totals	211,161	194,766	205,961	249,346

FOR 1897—Concluded.

PRODUCTION OF EACH COUNTY.

IN THE MONTH OF DECEMBER.

August	September	October	November	December	Total Tonnage
				413	413
37,980	46,392	47,998	61,798	95,852	607,890
707	1,100	1,170	1,662	15,019	27,906
9,742	21,069	39,282	53,968	77,170	319,641
32,983	36,447	37,002	37,901	51,553	319,116
4,642	14,800	19,459	26,985	66,657	237,277
25,333	27,417	39,260	59,579	69,796	361,702
				7,650	7,650
124,867	122,398	126,615	174,188	175,081	1,406,455
6,110	5,144	7,453	9,182	10,768	74,805
				6,000	6,000
125	257	592	1,090	21,030	27,611
15,651	12,774	11,480	11,058	13,713	147,461
				21,733	21,733
258,140	287,798	330,311	437,411	632,415	3,565,660

COAL PRODUCTION FOR 1897.

SHOWING MONTHLY AND YEARLY PRODUCTION OF THE DIFFERENT VARIETIES.

Character of Coal	January	February	March	April	May	June	July	August	September	October	November	December	Total
Semi-bituminous	92,907	70,115	65,567	44,639	39,087	44,110	55,166	51,843	76,967	109,693	158,208	269,610	1,077,912
Bituminous	127,432	103,950	127,470	115,281	119,462	127,918	153,955	161,088	150,858	156,854	201,464	206,327	1,752,059
Lignite	62,504	53,195	51,746	51,241	36,217	33,933	37,312	38,687	47,492	49,168	63,460	146,667	671,592
Anthracite	3,495	----------	----------	----------	----------	----------	2,913	6,522	12,481	14,596	14,279	9,811	64,097
Tonnage	286,338	227,260	244,753	211,161	194,766	205,961	249,346	258 140	287,798	330,311	437,411	632,415	3,565,660

NOTE—Semi-bituminous, or non-coking coal; bituminous, or coking coal.

COKE PRODUCTION, 1897.

Name of Operator	Location of Ovens	County	Number of Ovens	Tonnage	Remarks
Colorado Fuel and Iron Co	Sopris	Las Animas	222	65,295	
Colorado Fuel and Iron Co	El Moro	Las Animas	250	25,574	Coal supplied from Engle mine
Colorado Fuel and Iron Co	Starkville	Las Animas	138	40,230	
Victor Coal and Coke Co	Gray Creek	Las Animas	98	20,108	
Victor Coal and Coke Co	Hastings	Las Animas	100	37,558	
Colorado Fuel and Iron Co	Crested Butte	Gunnison	154	70,013	
Colorado Fuel and Iron Co	Cardiff	Garfield	214	51,185	Coal supplied from Spring Gulch mine
Omaha and Grant Smelting Co	Durango	La Plata	28	7,845	Coal supplied from Porter mine
Citizens' Coal and Coke Co	Denver	Arapahoe	36	2,930	Retorts
Totals			1,240	320,738	

COKE PRODUCTION BY COMPANIES AND COUNTIES, 1897.

Companies	Total Number of Ovens	Total Tonnage	Counties	Number of Ovens	Tonnage	Remarks
Colorado Fuel and Iron Co	978	252,297	Las Animas	808	188,765	
Victor Coal and Coke Co	198	57,666	Gunnison	154	70,013	
Omaha and Grant Smelting Co	28	7,845	Garfield	214	51,185	
Citizens' Coal and Coke Co	36	2,930	La Plata	28	7,845	
			Arapahoe	36	2,930	Retorts
Totals	1,240	320,738		1,240	320,738	

PRODUCTION BY COUNTIES.

SHOWING INCREASE AND DECREASE.

Counties	1896	1897	Increase	Decrease
Arapahoe	398	413	15	
Boulder	504,947	607,890	102,943	
Dolores	2,100	Not reported		2,100
El Paso	32,016	27,906		4,110
Fremont	282,459	319,641	37,182	
Gunnison	269 875	319,116	49,241	
Garfield	227,280	237,277	9,997	
Huerfano	365,648	361,702		3,946
Jefferson	18,105	7,650		10,455
Las Animas	1,331,115	1,406,455	75,340	
La Plata	99,116	74,805		24,311
Larimer		6,000	6,000	
Mesa	20,457	27,611	7,154	
Park	33,887			33,887
Pitkin	162,071	147,461		14,610
Weld	22,159	21,733		426
Totals	3,371,633	3,565,660		

TABLE

SHOWING THE TOTAL PRODUCTION OF DIFFERENT COMPANIES OPERATING TWO OR MORE MINES, FOR THE YEAR 1897.

Name of Company	Character of Coal and Number of Mines								Total in Tons of 2,000 Pounds
	Bituminous or Coking		Semi-Bituminous or Non-Coking		Lignite		Anthracite		
Colorado Fuel and Iron Co	6	1,205,189	11	802,340	----	----------	2	64,097	2,071,626
Victor Coal and Coke Co	3	416,906	1	9,002	----	----------	----	----------	425,908
United Coal Co	----	----------	----	----------	5	166,732	----	----------	166,732
Rex Coal Mining Co	----	----------	----	----------	2	68,190	----	----------	68,190
Porter Coal Co	1	42,074	1	12,926	----	----------	----	----------	55,000
Union Coal and Coke Co	1	48,178	1	3,095	----	----------	----	----------	51,273
Marshall Coal Co	----	----------	----	----------	2	38,306	----	----------	38,306
Alpine Coal Co	----	----------	2	10,205	----	----------	----	----------	10,205

LIST OF FATAL ACCIDENTS FOR 1897.

January 16, C. H. Perry, miner, was killed in room seven in the second north entry of the Sunshine mine, Huerfano county. We investigated the cause of the accident on the 18th. Deceased was working alone. A short time previous to the accident he had fired a shot in the coal, the smoke of which did not have sufficient time to clear before he reëntered his working place. It is supposed that he undertook to remove the broken coal without testing the roof, and that he could not have seen the danger owing to the smoke. The roof over the coal is generally very hard sandstone, but in this case a large slab of slate overlaid the coal removed by the shot, and when he removed the broken coal the slab fell with the aforesaid result. A good supply of timber was found lying in the room. The coroner investigated the cause of the accident, but held no inquest.

January 19, William Barron, night boss, received severe injuries by a top shot in H-1 entry of the Starkville mine, Las Animas county. In as much as the officials did not think that his injuries were of a fatal nature, we were not notified of the accident until after his death, on February 1, at the Pueblo hospital. From the deceased's own statements to the officials of the mine we gathered the following facts: On the night in question he had four shift men under his charge; two of them, Jas. Cameron and John O'Donell, he instructed to go to H-1 entry and blast down some rock near room 82 (this they had been doing for several nights previous), and the other two men were sent into a room in H-3 entry to raise rails. He furthermore told Cameron and O'Donell to put the drilling tools in a car and push the same to the foot of the seventh south entry after drilling their first hole, and the men engaged in pulling rails in H-3 entry were to come and get them and use them in another section of the mine after they would hear the shot going off. Soon after the departure of the men to their respective working places, he followed them into the mine, going in through C-1 entry and up the fourth south and to the men

engaged in H-3 entry, and from there down the seventh south, at this point passing the tool car which he had instructed to be left there. From this point he went back over H-1 entry against the air current under the shot which at this time had been ignited by Cameron and O'Donell, and when in the act of standing upright facing the hole it went off with the aforesaid result. Cameron and O'Donell were in a place of safety in the mouth of room 80, and they had no idea that any person would come out from the inside against the air current which was carrying inwardly the fumes of the ignited fuse. The deceased admitted the fact that he smelled the fumes of the fuse, but thought the hole had missed. On the second of February the county coroner held an inquest. Attached, see copy of the jury's verdict:

"That the said William Barron came to his death through and by the discharge of a shot in entry H-1 of the Starkville coal mine, and that no blame can be attached to any one. That his death was an accident.

"R. T. WOOTON,
"W. B. HAMMERSLOUGH,
"JAS. McBRIDE,
"D. B. WENGER,
"W. B. CUNNINGHAM,
"H. B. BROWN,
"Jurors.

"R. G. SIPE,
"Coroner of Las Animas County."

February 2, Juan M. Cruz, miner, was instantly killed by a fall of rock in room 15 in the ninth east entry of No. 1 mine, Hastings, Las Animas county. We investigated the cause of the accident on the following day. Swan Nelson, who was working with the deceased, testified, on being examined, that they had an ample supply of props in the room, and that they knew of the dangerous condition of their working place, but they desired to have a shot fired in the coal previous to putting up some props to sustain the roof. The reason or excuse for this was that the props would be blown out by the shot. If the place had been timbered the accident would have been avoided. Deceased was engaged in digging some bottom coal when the rock fell on him with the aforesaid result. The coroner examined the working place, and deemed it unnecessary to hold an inquest.

February 13, Andrew Vorghe, miner, was instantly killed at the mouth of No. 3 room, third east entry of the Sopris mine, Las Animas county. We investigated the cause of the accident on the fifteenth, accompanied to the scene of the accident by the pit boss and Alex. Struga, deceased's partner, who testified that they had been instructed to secure the mouth of their room by putting up some cross bars. This, at the time of the accident, they were endeavoring to do. The rock overhanging the switch was partially sustained by a prop placed in the angle formed by the room and the entry rails. Previous to putting up any cross bars or placing any other substitute to sustain the roof, they agreed to knock out the prop, and while Vorghe was in a stooping position, cleaning out a place for a leg, the rock fell without any warning, killing him instantly. The county coroner investigated the cause of the accident. No inquest held.

March 1, Frank Anselmo, miner, was instantly killed by a fall of rock at the mouth of an old room in the thirteenth north, off fifth east entry of the main south, Engleville mine, Las Animas county. We visited the scene of the accident and investigated the cause thereof on the third, and found that Anselmo and John Baraton were working together and engaged in drawing out some old pillars in the aforesaid section of the mine. At the time of the accident Anselmo and Baraton were standing at the mouth of an old room (outside of their working place), waiting for Thomas Wollcock, the driver, to pull out their loaded car, and they in turn to push in an empty car. While they were so situated, the driver with the mule team (two) came out of their working place, and on coming around a short curve, opposite the place they were standing, the lead mule shied and pulled the wheel mule with sufficient force against some timber so as to displace them, causing a great quantity of rock, which the timber sustained, to fall. The rock on falling came on Anselmo, killing him instantly, one of the mules being also killed. Fortunately, Wollcock and Baraton escaped with slight injuries. The county coroner investigated the cause of the accident and deemed it unnecessary to hold an inquest.

March 8, John Mount, miner, was instantly killed in room 3, off the main entry, Crested Butte, Gunnison county. We investigated the cause of the accident on the following day, and found that the deceased was engaged in driving a cross-cut from No. 3 to No. 4 room, and while undermining a large piece

of coal, which had been previously sheared into a slip, it fell on his head, fracturing his skull, causing instantaneous death. The county coroner investigated the cause of the accident. No inquest held.

March 21, John Lessetz, miner, was instantly killed in No. 1 room off the main entry, Crested Butte mine, Gunnison county. On investigating the cause of the accident on the following day, we found that the deceased, at the time of the accident, was engaged in cutting (shearing) through a slip of coal on the lower side of the room, when suddenly and unexpectedly a large piece of coal fell, crushing his skull against the rib, and killing him instantly. The county coroner investigated the cause of the accident. No inquest held.

March 24, Dario Vigil, miner, was killed in the eighth west entry of the Sopris mine, Las Animas county. On investigating the cause of the accident, on the following day, we found that the deceased, with two other miners, was engaged in drawing the eighth west entry pillars. On the date of investigation, the coal was badly crushed and the roof shattered, indicating a severe pressure from the super strata, which, from the evidence of Juan Mes (one of the deceased's partners), came on suddenly, causing a large piece of rock to fall between the edge of the pillar of coal and the props, the same falling on the deceased, causing severe internal injuries, from which he died in a few minutes after being extricated. Juan Mes stated that they were not aware of any danger, and that under ordinary conditions there were plenty of props in the working place to support the roof, but the sudden crush caused the accident. The coroner investigated the cause of the accident, but held no inquest.

March 26, Mike Pilatti, miner, was instantly killed by a trip of empty cars on the Brookside mine slope, Fremont county. On investigation of the cause of accident, the following day, we found that the deceased was engaged as a miner in one of the rooms off the second east entry. At the time of the accident he had quit work and was going out of the mine. On the double parting of the second east, the drivers (there waiting for a trip of empties) inquired of him the time of day, and Thomas Davis, one of them, who distinctly heard the trip coming down the slope, warned him of the fact. However, it appeared that he did not take heed to the warning, but deliberately walked out of the entry on to the slope, and meeting the incoming trip with

aforementioned results. At the point of accident, on the right side of the slope, there was sufficient room for a man to turn out of the way of the trip, and the roadway, even after the piling up of the cars, did not show any defects. The slope is provided with manholes every forty or fifty feet, and there are two manways, one on each side of the slope, kept in excellent condition for the men to walk into and out of the mine; yet, although these precautionary measures are taken, some of the men, in the absence of the mine officials, will persist in walking out on the slope. The coroner investigated the cause of the accident, but held no inquest.

May 18, Frank Lalli, miner, was instantly killed by a fall of top coal in room 48, east Allen seam, Newcastle mine, Garfield county. On investigation of the cause of accident the following day, Matt Zukelli and Joe Vallevo, partners of the deceased, testified that they were not aware of any danger existing in their working place, or if they had, they would have taken steps to secure the same. At the time of the accident deceased was engaged in removing some loose coal that had accumulated at the face of the room, when suddenly and without any warning a massive piece of top coal fell on him, with aforesaid result. The county coroner, after investigating the cause of the accident, deemed it unnecessary to hold an inquest.

June 9, John Palatini, timberman, was instantly killed by a fall of rock in the counter chute between the third and fourth levels of the Sunshine mine, Garfield county. We investigated the cause of accident on the following day, and found that the deceased had been engaged for more than a week in timbering and making general repairs in the counter chute aforementioned. The chute had previously been in a dangerous condition and the coal would not pass through. At the time of the accident all obstacles (to the coal) had been removed and the necessary repairs nearly finished. On the morning of the accident the deceased, in company with the mining boss, were making a final examination of the chute, when they discovered a piece of loose rock which was liable to fall if not secured. The mining boss instructed deceased to have the same secured by placing more props under it. The mining boss then going up through manway, parallel to the chute, and the deceased to do the work as instructed. In a few minutes the mining boss heard the fall and returned and found deceased under the rock. It is supposed that deceased had removed some of the props and that the rock fell on him without warning. The county

coroner investigated the cause of accident, and from the evidence deemed it unnecessary to hold an inquest.

August 6, John Starika, miner, was instantly killed by a fall of rock at the face of the main slope, Crested Butte mine, Gunnison county. We investigated the cause of the accident on the seventh, and found that deceased was engaged in driving the main slope, which was double shifted. The night shift men knew of the dangerous condition of the place, and in the morning took the precaution of warning Starika of the fact. The fire boss also warned him that there was a dangerous rock at the face of the slope, and instructed him to pull the same down before doing any work on the coal. The deceased's two partners, who were working with him at the time of the accident, stated that previous to commencing work on the coal they, in company with deceased, had examined and carefully tested the rock in the usual manner, and decided that it could not fall, as they supposed it was supported by the props. However, in a few minutes after they had commenced to work, the rock fell, crushing deceased's body on the edge of the car (which he had partially loaded), with aforementioned results. The rock measured twelve feet in length, four feet wide and two feet in thickness in the center, tapering to feather edges on both sides. The slope was about ten feet wide and timbered by a row of props on each side of the roadway, with about four and one-half feet of space between the cap pieces. It seemed strange that such a massive rock could fall under such conditions. However, after the accident it was evident that the rock was entirely unsupported by the props, the same falling longitudinal between them. The county coroner investigated the cause of accident, and, from the evidence obtained, deemed it unnecessary to hold an inquest.

August 8, Daniel McAllister, timberman, died in about thirty-five minutes after receiving severe internal injuries by a fall of coal and bony, near the mouth of No. 5 room, in the seventh east entry, No. 2 mine, Berwind, Las Animas county. We investigated the cause of the accident on the tenth, and found that the deceased, P. W. Morrison and others were endeaving to suppress a squeeze or crush that existed over the aforesaid section of the mine. P. W. Morrison stated the deceased was standing between the car and rib when suddenly, and without any warning, a large piece of coal and bony fell from the rib, crushing him against the edge of the car and afterwards to the ground. In a few minutes he was extricated, but he succumbed

to the severe injuries received before getting out of the mine. On being examined, Mr. Morrison testified that he did not know whereby the accident could have been avoided; that there was considerable squeeze all over, but that the point at which they were working was considered safe. The coroner held an inquest. Attached, see copy of jury's verdict:

"That the said Daniel McAllister met his death in the seventh east entry of No. 2 mine, in Berwind, Colorado. His death being caused by a fall of bony coal from the side, said fall we believe to have been unforeseen.

"ROB'T ARCHIBALD,
"S. C. BOX,
"ANDREW RIDDLE,
"SAM HUES,
"STEWART FORBES,
"D. O. PRITCHARD,
"Jurors.

"R. G. SIPE,
"Coroner of Las Animas County."

August 12, Jose Agrie, miner, was seriously injured by a fall of rock in his working place at the Peerless mine, Las Animas county, and on the eighteenth of September he died at the county hospital, Trinidad. From information gathered after his death we found that he was working in room 36, off the fourth west entry, and that on the day of the accident he was told to be careful and timber the face of his room. This he neglected to do. He had a supply of timber at hand for his use.

October 16, Frank Norden and John Pilone, miners, were instantly killed by a fall of top coal in room 4, off the main entry, Crested Butte mine, Gunnison county. We made an investigation as to the cause of the accident, etc., on the eighteenth, and found that Norden and Pilone, with four other miners, were engaged in taking down top coal in the aforesaid room. The bottom coal, about six feet in thickness, had been previously extracted and the room driven up to its destiny. At a point about sixty feet from the face of the room, operations were commenced on the top coal, which is about four feet six inches in thickness and about twenty-five feet lineal on the room, had been successfully taken down when the accident occurred. The roof was well secured up to the edge of the top coal that fell on them. John Bonomo, one of the miners working with them, made the following statement as to the condi-

tion of the place previous to the accident: The coal had been sheared or cut about six feet on the left hand rib, and the props removed from under it for the same distance; thus the coal was free on one side and unsupported. They all knew that the coal was about ready to fall of its own accord, and he remonstrated with them that it should be taken down rather than taking any more chances. However, they finally agreed to load the car; they had just got in, before taking it down, and while loading the car he (Bonomo) kept out of danger, Norden and Pilone ridiculing his cowardice. Norden and Pilone were under the edge of the top coal, throwing back the coal towards the car, which the other men were loading, when suddenly the whose mass fell, killing them both instantly, and a few minutes after the coal fell the overlying slate fell, which caused great delay in extricating their bodies. The county coroner investigated the cause of the accident. No inquest held.

October 27, Mike Cross, miner, was instantly killed by a fall of coal near the face of No. 43 room, in the west Wheeler entry, New Castle mine, Garfield county. We investigated the cause of the accident, etc., on the following day, and found that the deceased, Joe Calvi, Tony Picconi, Dominick Brack and Felix Moscat, who had worked Nos. 43 and 44 rooms up to their destiny, had been engaged to build a series of cribs near the face of the rooms. The purpose of these cribs is to strengthen the chain pillar and to maintain an air course and traveling way on the upper section of the workings. The pit boss, on giving instructions and engaging the men to build the cribs, warned them as to the dangerous condition of a piece of coal at the face of the room and told them to pull the same down previous to putting up any of the cribs. However, they disregarded the direct instructions given, and, while engaged in putting up the first crib in the series, it fell on the head and back of the deceased, with the aforesaid result. The county coroner deemed it unnecessary to hold an inquest.

November 1, Peter Breen, miner, was instantly killed by being crushed between the top of a car and the roof on the first south entry off the first east, Ruby mine, Gunnison county. We made an investigation as to the cause of the accident, etc., on the following day, and found that the deceased was engaged as a miner in the top room of the first south engine plane, and, in going to his work on this morning, he undertook to ride up the plane between the cars (knowing it to be against the rules to do so, and when up about fifty feet from the bottom of the plane his body was caught between the top of the last car and the roof, where his body was found after the trip had been stopped. The trip rider, Wm. Snyder, stated that he saw the deceased standing at the bottom of the plane, but had no idea that he intended riding up the plane. If he had seen him on the trip he would have stopped it and made him get off. The coroner investigated the cause of the accident. No inquest held.

November 2, Dominick Conrado, company hand, died instantly from injuries received on the fourth counter entry off the I plane air course, in the Rockvale mine, Fremont county. We were duly notified of the accident, and on the fourth we visited the scene and investigated the cause thereof. From information received we found that from eight to ten cars of rock had fallen during the night between Nos. 7 and 8 rooms on the aforesaid entry, and the deceased, Ed. T. Campion and Wm. McKinzie arranged to remove the same. In order to expedite its removal, Conrado suggested that they would work on both sides of the fall, and while he was ascending to the top of the fall, he in some manner stumbled and rolled down to the bottom, where Campion and McKinzie were standing. They immediately picked him up, and to their surprise found he was dead, and bleeding from small wounds in the forehead. Campion stated that he was standing at the bottom of the fall; he did not hear or see anything falling on the deceased, and from the fact that there were no visible contusions on the back of the head he supposed that the deceased slipped on the underlying rocks, and that his forehead came in contact with some sharp rocks, the same penetrating his brain and causing his death. The county coroner investigated the cause of the accident and deemed it unnecessary to hold an inquest.

November 10, Guiseppe Tortoriel, miner, received severe injuries by being crushed between a loaded car and the rib at the mouth of No. 2 room, in the first north entry, No. 3 mine, Rouse, Huerfano county. His injuries proved fatal in about four hours after the accident. We investigated the cause of the accident on the following day. From the evidence obtained we found that the deceased was engaged as a miner in No. 1 room in the same entry, but for some unknown reason he had left his working place and was standing at the mouth of No. 2 room, when Andrew Polletti, the driver, was coming down the entry with a loaded trip, and while the trip was passing one of the sprags caught the buffer of the loaded car there

standing, throwing the same against the side where the deceased stood, crushing his head between it and the rib. The county coroner deemed it necessary to hold an inquest. Attached, see copy of jury's verdict:

"We, the jury, duly empaneled, do find on our oath that the deceased, Guiseppe Tortoriel, now lying before us, met his death by being caught between a pit car and rib. And we further find that deceased met his death through his own carelessness, being in a place where he didn't belong, and that there is no one to blame for the accident.

"M. O'SHEA,
"WALTER BYERS,
"JOE. MORAN,
"C. BRUMELLI,
"MAT. MATIVA,
"D. E. WATERS,
"Jurors."

November 20, Mike T. McManamy, miner, was instantly killed by a fall of rock at the face of No. 2 room, in the first cross entry in the third north of No. 1 mine, Pictou, Huerfano county. We visited the scene of the accident and investigated the cause thereof on the twenty-third, and found that the deceased was engaged as a miner and working alone in the aforesaid room. On the day of the accident McManamy fired a shot on the upper side of his room; the same being too heavily powdered and the burden light, displaced some props that were supporting the roof. In a short time after the shot went off and before the smoke had time to clear away, the deceased returned to his working place to see the result, and while groping his way through the smoky atmosphere, presumably not knowing that any timber had been blown out, the roof that was sustained by them fell on his head and body, killing him instantly. The county coroner held an inquest, but we have failed to get a copy of the jury's verdict from him.

December 1, Frank Detado, miner, was instantly killed by a fall of rock at the face of No. 1 room, in the fourth north entry of the Canfield slope, Coal Creek, Fremont county. We visited the scene and investigated the cause of the accident on the following day, and found that Detado and his partner were engaged as miners in the aforesaid room. On the day in question, they fired a shot in the coal near the road head, the burden of

which was not removed, and the result was, in mining phrase, a "standing shot." After the smoke had cleared, Detado undertook to pick out the shattered slate that was intervening between the top of the coal and the roof, when suddenly and unexpectedly a massive rock (which was not supported by any timber and encircled by a smooth, invisible slip) fell on his body, killing him instantly. The rock was very large and treacherous, and his partner stated that they were not aware of its dangerous condition. The general conditions of the working place gave evidence of it being well timbered, and a supply of timber was close at hand. The county coroner investigated the cause of the accident, etc. No inquest held.

December 7, Jose L. Martinez was killed by a fall of rock in No. 33 room, second south entry of No. 1 mine, Pictou, Huerfano county. We visited the scene of the accident and investigated the cause thereof on the ninth, and found that the deceased and Lesario Himanas were working together in the aforesaid room, engaged in drawing back the pillar. Himanas, on being questioned, said: "At quitting time, on the night of the sixth, we fired a shot in the coal; it being too heavily powdered, blew out several props adjacent to the pillar end. On the following morning Martinez and I, not knowing its condition, entered our working place, and after looking over the situation and a little parleying, Martinez undertook to replace the props and I to load the car. In about five minutes after we had started to work the roof made a crackling noise which we both heard, and I advised Martinez to come back, but he did not think it would fall without giving us much more warning. In less than a minute after this brief dialogue the place caved without further warning, the outside edge of the cave catching Martinez on the legs and abdominal portion of the body." There was a supply of timber in the place, and the section outside of the fall was in a safe and workable condition. The coroner held an inquest. Attached, see copy of jury's verdict:

"That we, the jurors, find that deceased, Jose L. Martinez, did meet his death from a rock falling from the roof of the room in which he was working, said rock falling by the props having been blown out the night before by shots fired previous to leaving mine, and said Jose L. Martinez did die through carelessness in not replacing said props, and we hereby exonerate The

Colorado Fuel and Iron Company from all blame in said accident and death.

"J. M. STEELE,
"Foreman.
"SAM. BROWN,
"ALEX. LINDSEY,
"J. W. BOYD,
"T. E. GUFFS,
"W. C. HUNT,
"Jurors.
"DR. J. B. WRIGHT,
"Coroner."

SPECIAL REPORT ON THE SUNSHINE COAL MINE EXPLOSION.

To His Excellency,
ALVA ADAMS,
Governor of Colorado:

Dear Sir—In compliance with your wishes, I humbly submit to you my report on this sad disaster.

LOCATION OF MINE.

The Sunshine mine is situated about sixteen miles southeast of Glenwood Springs, the county seat of Garfield county, on a branch of the Colorado Midland railroad. Four-mile creek is flowing in an easterly direction through the mining village, bearing the same name as the mine.

OWNERS AND OPERATORS.

The Grand River Coal and Coke Company commenced operations on this property in 1887, and operated the mines continually up to the fall of 1892, when the property was transferred to its present owners, The Colorado Fuel and Iron Company. From the time of transfer up to the fall of 1895, very little mining was done on the property. In the fall of 1895, and up to June 1, 1897, the property was operated under a lease by Messrs. Renstrom & Ludlum, and since June 1, 1897, the mine is operated and managed by The Colorado Fuel and Iron Company.

MANAGEMENT OF THE MINE.

Mr. J. A. Kebler is second vice president and general manager of the company; Mr. W. P. Thompson, general superintendent; Mr. Harry J. Elliott, local superintendent, and Mr. B. L. Davies, mine foreman.

GEOLOGICAL FEATURES OF THE PROPERTY.

The coal-bearing measures at Sunshine are very thick, and belong to the Laramie series. They contain several workable seams of coal. A, B and C seams underlie the Sunshine seam, which is the fourth in geological order, and about nine feet in thickness. The measures dip westward about 40 degrees. Four-mile creek flows easterly, nearly at right angles to the strike. At the dumping location, the hills on the north rise abruptly to an elevation of 750 feet above the bed of the stream, a partial cross section of the coal-bearing measures being prominent. On the south side of the stream, the hills rise gradually and attain an elevation of about 1,100 vertical feet above the bed of the stream, the measures being entirely obscured by a varying thickness of debris and vesicular lava boulders. The present workings are confined to the south side of the stream.

CHARACTER OF COAL.

The coal of the Sunshine seam is hard and compact, lustrous in appearance, and a free-burning nature, and is considered the best coal in the series for domestic use, and during the winter months the product is in great demand.

ANALYSIS BY GEORGE C. TILDEN.

Water	3.40 per cent.
Volatile matter	40.32 per cent.
Fixed carbon	48.82 per cent.
Ash (light brown)	7.46 per cent.
	100.00 per cent.

No sulphur.

MODE OF WORKING, ETC.

At a point a little below the outcrop of the seam in the bed of the stream, a high trestle, spanning the cañon, has been constructed, from which the product is dumped into the railroad

cars. The No. 1 levels on the north and south sides are driven on the strike of the seam, and on the same plane as the trestle. A small range of coal has been worked from lower levels, called the slope levels, which, with Nos. 1 and 2 levels, have been worked out. The present operations are confined to Nos. 3 and 4 levels on the south side. The product is dropped down the brow of the hill by a gravity plane from No. 3 level to the same dumping location. The product of No. 4 level is dumped into a counter chute (No. 22 room in third level) and reloaded for further transit. The rooms are turned up the pitch about forty-three feet from center to center, and are driven narrow for about twenty feet; then the rooms are widened out to thirty feet, thus leaving about thirteen-foot pillars between rooms. About fifty feet of a chain pillar is left under each level. This pillar is penetrated by a narrow cross-cut as often as it becomes necessary to connect the levels for the better conduction of the air current.

VENTILATION OF THE MINE.

No artificial means of providing ventilation has been used in the upper workings of this seam. The current of air is produced by a difference of two hundred feet in the elevations of the levels; therefore, the direction of the current and the amount circulating through the workings is dependent on the natural conditions of the atmosphere. During the summer months, the air enters the upper level and comes out through the lower level. In the winter months the direction is reversed, and the amount circulating slightly increased. Average volume of air circulating, about twelve thousand cubic feet per minute. This quantity was passing through the mine the day after the explosion, and the natural conditions being the same, we have every reason to believe that the same amount was passing at the time of explosion. During our term of office the working places were never better supplied with air, which was not due to an increase of volume passing, but to the better conduction of the same.

GENERAL CONDITION OF THE MINE.

We made several inspections of this mine at the time it was operated under a lease by Messrs. Reustrom & Ludlum, and found the entries and rooms at all times well secured and in excellent condition. The air volume passing in and out of the mine was adequate to keep the working places in a sanitary condition, but they lacked in its conduction.

On the ninth of June, I made an inspection of the mine, and found the third level in a deplorable condition; timbers were broken in several places, other places were too narrow for the cars to pass, etc. Briefly, the entry was not safe for travel and haulage. Mr. Davies, mine foreman, informed me that he had only been in charge for a few days, and that he would have same secured with all possible haste. On arriving in Denver, I wrote Mr. H. J. Elliott, superintendent of the mine, a letter (copy of same in the records), asking him to give the matter his immediate attention. A few months previous to the expiration of their lease, Reustrom & Ludlum were aware that the company intended to operate the mine themselves. Thus the neglected condition of the mine is obvious—saving expenses.

On the third of August, John D. Jones, assistant inspector, made an inspection of the mine, and reported as follows: "The general condition of this mine has been greatly improved since our previous visit. The haulage roads have been retimbered and are now in good shape. The ventilation has received marked attention, as the air is conducted through the working faces and not allowed to escape through the old workings, as it usually did." So the dangers we knew to have existed had been rectified. In the slope level, on the north side, a small quantity of explosive gas was encountered near the fault. In all the levels on the south side, no explosive gas has ever been found, and if it existed, it would have been discovered transpiring through the holes used for blasting and set off by the naked lights used by the miners. Thus, I conclude that the mine was absolutely free of any accumulations of explosive gas. The dusty condition of the mine we never considered to be dangerous. No accumulations of dust were allowed on the entries and the room workings are naturally moist. If we classify the coal mines of Colorado into dust-producing and dust-suspending magnitudes, placing a very wet mine for a base with a maximum of ten for the most dusty, the Sunshine mine would be about the fifth magnitude. In the winter months the overlying hills are snow-clad, and the underlying strata is kept moist by the thaw; in the autumn months the mine is drier than at any other time. However, we had no cause to be alarmed of any existing danger from the dust in the mine, and I am satisfied that neither the miners working therein nor the management thereof had any idea of dangerous conditions existing in the mine. Mr. Davies, the mine foreman, is an experienced coal miner, having been in charge in or around the coal mines of this

field since operations commenced in 1887. If he had known of any dangerous conditions existing, I am sure he would have advocated precautionary measures to avoid an explosion, and I have every reason to believe that any measures advocated by him would be adopted by the company.

TIME OF THE EXPLOSION.

The explosion occurred about 5:45 p. m., September 3, 1897. The time allotted for firing all the shots in the mine was from 5:30 p. m. to 6 p. m. On this day the mine was not in actual operation. The miners working therein were engaged in getting coal ready for the next day's run, and the three company hands were engaged in repairing the entry. We were notified of the explosion by wire on the same evening, and on the Monday morning following the jury (six in number) accompanied myself and deputy to the scene of the accident, and we made a thorough examination of the mine, with a view of finding the cause of the explosion.

CAUSE OF THE EXPLOSION.

I have elsewhere stated that no explosive gas, C H 4, had ever been found in the seam on the south side of the cañon; therefore, it was not an explosion of gas. Some of the jury were inclined to believe that the explosion originated from a keg of powder, and if not thus originated, that it had been augmented by powder. This hypothesis was greatly strengthened by the testimony of the first explorers, stating that there was an unusual amount of powder smoke in the mine after the explosion. However, on careful examination of the entry, we could not find any evidence of a powder explosion. I have every reason to believe that if a keg, or even less powder, had exploded, that we could easily have localized the same. Furthermore, on close investigation, there was no powder missing in any of the working places. On examining all the working faces, we found that all the shots had been exploded and that their burden had been removed in the ordinary manner, with the exception of one shot in room 41. This had been exploded, but a portion of the hole, about two feet, was left in the solid; the burden was not too great to be removed. Therefore, I am of the opinion that the hole did not have sufficient powder. It was customary for the outside room men to have their shots fired in turn, the entry being last to fire. It will be observed that the air current going out through the third level was passing through the

room faces and coming into the entry at room 40. Previous to the morning of the explosion, the air entered the entry at room 38. During the day the manways in rooms 38 and 39 had been closed, thus confining the air current into room 40. Now, it is obvious that the shots exploded in the outside rooms agitated and produced dust. The same being cumulative, was carried in suspension into the entry by the air current. In our observations after the explosion, we found that intense heat had been created in the entry at room 41. This, in my opinion, was the initial point of explosion; through the agency of heat, chemical action took place, explosive ingredients were formed, and the dust in suspension from the outside shots augmented the same.

At no time during our term of office had the working places been so well ventilated, and I candidly believe that by putting the working places in a healthier condition, at the same time, explosive conditions were aggravated. This can be accounted for in the following manner: When the working places are not well ventilated, the air is contaminated by exhalation, powder fumes, burning of lights, etc. A great percentage of oxygen, the life and great supporting element of combustion, is absorbed, and carbonic acid gas is formed, in the presence of which a dust explosion is not liable to occur, if not rendering the same impossible.

EFFECT OF THE EXPLOSION.

The disastrous effect of the explosion was confined to the third level. All the rooms off this level were found in their normal condition, and no evidence of unusual commotion was found in the face of the entry. At room 41 the dust particles were slightly charred, the same having a glazed appearance under the microscope, and the chips on the "caps" were scorched. From this point outward we did not find the effect of heat on any of the timber, or any other susceptible materials. The first explorers state that the bodies found at room 30 were burned worse than those found near room 16, indicating that the heat, developed in the explosion, diminished in its outward course. The direction and intensity of the force of the explosion were easily obtained from the position of the bodies (when found) and the gatherings on cars, timber, etc. From room 38 to room 18, the gatherings on the timber increased perceptibly, and increased from there outward. Very little damage was done to the entry; a few sets of timber had been removed at the mouths of the abandoned rooms, thus leaving small quantities of slack

coal to slide on to the entry roadway. The timber that was removed did not have a great weight to sustain, and only on one place in the entry did a small fall of coal and slate occur. The force of the explosion was not very violent; if it had been, the damage to the entry would have been much greater. However, the force was sufficient to kill all the men who were on the entry, twelve in number, and from the position in which their bodies were found, their deaths must have been instantaneous.

NAMES AND OCCUPATIONS OF THE VICTIMS.

John Mattivi	Miner
Joe Cassagrande	Miner
John Andreatte	Miner
Emil Andreatte	Miner
Anton Eppich	Miner
John Joanning	Miner
Louis Rissi	Miner
Anton Martintoni	Miner
Louis Zaunin	Miner
Francis McCloud	Driver
Theodore Pallassi	Loader
Louis Andreatte	Timberman

PRECAUTIONARY MEASURES NOW ADOPTED.

A few days after the explosion, I had a consultation with Mr. J. A. Kebler, and Mr. W. P. Thompson, general officials of the company, and the following precautionary measures were outlined, and are now adopted in the mine:

First—Two men are appointed for shot firing, and all holes shall be drilled and charged under their direction.

Second—No men allowed in the mine at firing time, only those aforesaid appointed.

Third—Wood pulp to be used exclusively for tamping the holes.

Fourth—The "Atlantic flameless powder" is used in the entries; black powder to be used in rooms, and all coal to be mined.

Fifth—No more than the requisite amount of powder for use in one day to be kept in each working place.

The shot firers are specially warned that if excessive concussion is produced under the present regulations, they are to

report the same at once, and the officials of the company will have the shots fired by electricity.

All the precautions thus adopted are not covered by the present statute law governing coal mining in Colorado; therefore, it is obvious that the present law should be revised. The dangers encountered in coal mining are so diversified that too many precautions can not be taken for the protection of the health and life of our coal miners.

EXPLANATIONS ON MAP.

Arrow indicates direction of air current.
"O" indicates points where bodies were found.

CONCLUSION.

In this report I have endeavored to give you all the facts relating to the subject. If anything has been omitted that I can more fully explain, I will do so with pleasure, and be at your command.

I am,

Your obedient servant,

DAVID GRIFFITHS.

VERDICT.

Attached find verdict of jury:

"We, the undersigned, after hearing all of the evidence and making a personal examination of the mine, find that the said deaths were caused by an explosion, the origin or cause of which is to this jury unknown.

"T. W. THOMAS,
"J. R. DE REMER,
"F. M. PAGE,
"C. V. MESTICK,
"M. DEMASTRIO,
"FRED C. SCHRAM,
"Jurors."

NON-FATAL ACCIDENTS, 1897.

January 4, Frank Kendrick, miner, No. 6 Marshall mine, Marshall Coal Company, Boulder county; leg broken by a fall of coal.

January 5, John Sineart, miner, Enterprise mine, Enterprise Coal Company, Louisville, Boulder county; leg broken by a fall of rock.

January 7, John Campbell, loader, Sunshine mine, Renstrom Brothers, lessees, Garfield county; wrist sprained by a pit car.

January 13, Rafel Mouso, roadsman, No. 2 Victor mine, Victor Coal Company, Hastings, Las Animas county; back bruised by a pit car.

January 16, Wm. Calmet, mule-driver, No. 2 Coal Creek mine, Colorado Fuel and Iron Company, Fremont county; arm bruised, fell off pit car.

January 18, Francis McLeod, loader, Sunshine mine, Renstrom Brothers, lessees, Sunshine, Garfield county; thumb sprained by a pit car.

January 28, Angus McDonald, timberman, Sunshine mine, Renstrom Brothers, lessees, Sunshine, Garfield county; two fingers bruised by a pit car.

January 30, E. L. Renstrom, foreman, Sunshine mine, Renstrom Brothers, lessees, Sunshine, Garfield county; hip bruised by slipping on ice and falling.

February 6, John Berg, timberman, Sunshine mine, Renstrom Brothers, lessees, Sunshine, Garfield county; side bruised by a fall of coal.

February 12, Martin Bresvick, miner, Union mine, Union Coal Company, Spring Gulch, Pitkin county; side bruised by a fall of coal.

February 23, John A. Jones, mule-driver, Excelsior mine, United Coal Company, Lafayette, Boulder county; leg bruised by a pit car.

February 24, Elize Havrez, miner, Williamsburg mine, Williamsburg Coal Company, Williamsburg, Fremont county; leg bruised by a fall of rock.

March 7, W. A. Paget, clerk, Sunshine mine, Renstrom Brothers, lessees, Sunshine, Garfield county; hip bruised by slipping on ice and falling.

March 12, Peter Sanger, miner, No. 6 Marshall mine, Marshall Coal Company, Marshall, Boulder county; shoulder bruised by a fall of coal.

March 24, John Boyd, mine boss, Gonzales Cañon mine, Brodhead Brothers, Aguilar, Las Animas county; face and hands burned by an explosion of gas.

April 13, John Houser, miner, Gonzales Cañon mine, Brodhead Brothers, Aguilar, Las Animas county; face and hands burned by gas.

April 21, Eugene Zimmerman, miner, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; knee bruised by a fall of coal.

April 30, Beus Sclumot, miner, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; rib broken by a falling collar.

May 18, Henry Evans, mule-driver, New Castle mine, Colorado Fuel and Iron Company, New Castle, Garfield county; shoulder blade broken by a pit car.

May 19, Joseph Brock, miner, Union mine, Union Coal Company, Spring Gulch, Pitkin county; spine injured by a fall of coal.

May 27, Tucker Evans, miner, Rouse mine, Colorado Fuel and Iron Company, Rouse, Huerfano county; foot bruised by a fall of slate.

June 9, Fred Hecks, miner, Gladstone mine, Gladstone Coal Company, Lafayette, Boulder county; leg bruised by a fall of coal.

June 9, Frank Pidrone, miner, No. 2 Victor mine, Victor Coal Company, Hastings, Las Animas county; hands and face burned with gas.

July 2, Felix Zarlings, miner, New Castle mine, Colorado Fuel and Iron Company, New Castle, Garfield county; leg broken by a fall of top coal.

July 14, Jno. Boyd, mine boss, Gonzales Cañon mine, Brodhead Brothers, Aguilar, Las Animas county; small bone of leg broken by a fall of rock.

July 14, Richard Hughes, miner, Rockvale mine, Colorado Fuel and Iron Company, Rockvale, Fremont county; first joint of finger amputated by a fall of rock.

July 20, Batistia Rumponie, miner, Starkville mine, Colorado Fuel and Iron Company, Starkville, Las Animas county; leg broken by a fall of slate.

August 5, David Williams, miner, Crested Butte mine, Colorado Fuel and Iron Company, Crested Butte, Gunnison county; scalp wound by a piece of coal from shot.

August 26, Nelson Benson, miner, Gray Creek mine, Victor Coal and Coke Company, Gray Creek, Las Animas county; head and back bruised by a fall of top coal.

August 31, Louis Zambardie, miner, No. 1 Victor mine, Victor Coal and Coke Company, Hastings, Las Animas county; fracture of pubis by a fall of rock.

Suptember 20, A. F. Rasmissun, miner, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; body bruised and burned by premature explosion of a shot.

September 24, John Bossae, miner, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; body bruised by a fall of coal.

October 6, John Zang, miner, Crested Butte mine, Colorado Fuel and Iron Company, Crested Butte, Gunnison county; leg broken by a fall of rock.

October 12, Leano Lessers, miner, Starkville mine, Colorado Fuel and Iron Company, Starkville, Las Animas county; body bruised by a fall of slate.

October 18, John Molovick and Charles Pepper, coal dumpers, Crested Butte mine, Colorado Fuel and Iron Company, Crested Butte, Gunnison county; burned by an explosion of coal dust which had accumulated in tipple house and was exploded by upsetting a stove.

October 20, James McIntyre, oiler in breaker, Ruby mine, Colorado Fuel and Iron Company, Ruby, Gunnison county; arm broken by falling off chute while oiling.

October 22, Mike Gavino, miner, Fremont mine, Colorado Fuel and Iron Company, Williamsburg, Fremont county; leg broken and body bruised by the premature explosion of a shot.

October 30, Steve Chabohm, miner, Maitland mine, Victor Coal and Coke Company, Pictou, Huerfano county; leg bruised by a fall of rock.

November 4, Benjamin Davis, miner, Gladstone mine, Gladstone Coal Company, Lafayette, Boulder county; head and face bruised by a fall of top coal.

November 11, Modesta Fenola, car-dropper, New Castle mine, Colorado Fuel and Iron Company, New Castle, Garfield county; ankle sprained, struck by a piece of coal from chute.

November 15, Alex. Scott, miner, Ruby mine, Colorado Fuel and Iron Company, Ruby, Gunnison county; ankle bone broken by rope while standing on incline plane.

November 19, John Job, miner, Rockvale mine, Colorado Fuel and Iron Company, Rockvale, Fremont county; collar bone broken by a fall of rock.

November 19, Charles Leo, fireman, New Castle mine, Colorado Fuel and Iron Company, New Castle, Garfield county; face and hands burned by a steampipe flange breaking.

November 28, Thomas Caddell, miner, Pictou mine, Colorado Fuel and Iron Company, Pictou, Huerfano county; small bone of leg broken and body bruised by a fall of rock.

December 3, Bartolo Dolfoir, oiler, Brookside mine, Colorado Fuel and Iron Company, Brookside, Fremont county; body bruised, caught by pit cars on slope.

December 6, Bert Lloyd, boss driver, Sopris mine, Colorado Fuel and Iron Company, Las Animas county; injured internally, ran against prop by empty pit cars.

December 7, John Young, miner, Starkville mine, Colorado Fuel and Iron Company, Starkville, Las Animas county; leg broken at ankle by falling timber.

December 9, James McKenzie, slate picker, Brookside mine, Colorado Fuel and Iron Company, Brookside, Fremont county; leg broken by elevator shaft.

December 13, David Blyth, mule-driver, Brewster mine, Brewster Coal Company, Fremont county; knee bruised by a trip of cars.

December 18, Mike Chapman, timberman, Crested Butte mine, Colorado Fuel and Iron Company, Crested Butte, Gunnison county; leg bruised by a fall of rock.

December 20, Ray Perkins, mule-driver, No. 2 Alpine mine, Alpine Coal Company, Gunnison county; leg broken by pit cars on slope.

December 20, Louis Amedia, miner, Sunshine mine, Sunshine Coal Company, Huerfano county; leg bruised by a pit car.

December 28, Salvador Finds, laborer, No. 2 Victor mine, Victor Coal Company, Hastings, Las Animas county; skill fractured by a pit car wheel becoming detached and falling over scaffold.

NEW MINES AND CASUALTIES FOR 1897 AND 1898.

BOULDER COUNTY.

Gorham Mine—

This new mine is located near Marshall, in Boulder county. It is operated by The Gorham Coal Company. General manager, A. G. Gorham; general superintendent, George Ramsey, all of Denver.

The mine is opened by a slope driven on a 17 degree pitch through the underlying tilted measures, which are pitching 27 degrees at the outcrop. The slope is driven down six hundred feet on the aforesaid pitch, gradually crossing the measures. At the bottom, the roof of the seam is attained, the pitch of the seam being 6 degrees. From this point the slope will be driven in a straight course on the pitch of the seam. The parallel slope is driven upwards, on the pitch of the seam, to make connections with an air shaft. The equipment is first class, and the coal is about eight feet thick, of a superior lignite quality. Small quantities of coal were shipped in the latter part of December, the quality of which was not as good as it will be when the rooms are opened out.

Simpson Shaft House Fire—

About midnight of the thirteenth of November, 1897, the old buildings around the Simpson shaft were discovered to be on fire. The Lafayette fire department were promptly on the ground, and they saved the shaft timber and head gear from the flames. The engine house and boiler sheds, with their contents, were destroyed. The fire originated either by incendiary motives or by tramps lighting a fire in the old buildings. Damage about $3,500, partly covered with insurance.

Shanahan Mine—

Is located about five miles southeast of Boulder city, in Boulder county; is owned by The Shanahan Coal Company, and operated under lease by Cris Rosenbaum, of Lafayette.

Operations were commenced early in 1897, and by the latter part of the year the daily capacity was about one hundred tons. The mine is opened by a slope, driven on the pitch of the seam. The coal is lignitic in character and about eight feet in thickness. There is no railroad connection. Most of the coal is hauled by teams into Boulder city for domestic use.

Excelsior Mine Fire—

At 7:30 a. m., Sunday, March 27, 1898, smoke was discovered coming out of the Excelsior shaft, indicating that the subterranean fire (known to exist in the abandoned section of the mine) had broken out into the air current. There were seven mules in the underground stable at the time, and an effort was made to save them, but on arriving there, all of them had died from the inhalation of the irrespirable gases given off by the fire. After some difficulty the seat of the fire was located at the mouth of No. 24 room, in the third southwest entry, and by this time had made considerable headway on the entry in the direction of the air current. The management, on taking in the situation, decided to suffocate the fire by its own fumes, and in a few hours the entries were bratticed up with wooden stoppings, the fire enclosed within. On the sixth of April the stoppings were taken down and the fire was completely out. On the previous Saturday evening the pit boss examined all the brattices in the mine and found every one of them in good condition and no signs of fire any where. During the night the watchman did not observe any smoke coming out of the shaft. So it is reasonably assumed that the fire broke out between 6 and 7 a. m., and supposed to have been caused by a heavy fall of rock in the interior of the abandoned workings, bursting out the brattice at the mouth of the aforesaid room. The mine was idle at the time, so there was no loss of production. Loss of mules and damage to mine, about $300.

EL PASO COUNTY.

Carlton Mine—

This mine is situated about five miles north of Colorado Springs, on the Rio Grande railroad. Drilling and shaft sinking were commenced on the property in the latter part of 1896, and on January 1, 1897, coal was struck in the shaft. During the year the mine has been systematically developed. A neat engine, boiler and sheds have been erected. In August a short branch of the Rio Grande road was built to give them shipping facilities. Most of the coal is shipped to Colorado Springs. Depth of shaft, 176 feet; thickness of seam, about eight feet, with a variable thickness of bony in the middle. The coal is lignitic in character. General manager and superintendent, Geo. R. Elliott, Colorado Springs.

FREMONT COUNTY.

Hayes Mine—

This small mine is situated about two miles south of Cañon City, on the northwestern tilted outcrop of the Canñon City coal field. The mine is opened by a slope driven on the pitch of the seam, which is pitching about 51 degrees. The slope is driven on the four-foot seam, another seam underlying which is three feet six inches in thickness; both seams are worked. The intervening measures between the seams are about eight feet in thickness. During the year an engine and boiler house has been erected, thus increasing their mine capacity. The product of the mine is sold in Cañon City and vicinity. No railroad facilities. The coal is semi-bituminous in character and a good fuel for domestic or steam purposes. Name of manager, D. H. Hayes, Cañon City, Colorado.

Price Mine—

This small mine is situated about one-fourth of a mile south of the Hayes mine, and the same seams are worked. The mine is opened by a slope driven diagonally across the pitch on the four-foot seam. During the year a 25-horse power engine and steam plant have been erected, which materially facilitated the development work and increased the capacity. The product of the mine is all sold for local consumption and is a good fuel for domestic or steam purposes. Manager, Thomas Price, Chandler, Fremont county, Colorado.

HUERFANO COUNTY.

Santa Clara Mine—

This new mine is located about three miles south of Rouse, in Huerfano county; is owned and operated by The Santa Clara Coal Company. The same company is operating (under a different name) the Overland mine in Garfield county and the Union mine in Pitkin county. General manager, W. R. Harp, Denver; local superintendent, Chas. Beuchat, Rouse postoffice, Colorado.

Improvements on the property were commenced in June, and early in November they were shipping their product. Considering the time and money expended, the equipment is good and the production surprising. In the latter end of December (by working night and day) the production was nearly three hundred tons per day. The tipple is situated on the old Santa Clara branch of the Rio Grande road, and there are about three thousand feet from the tipple to the mouth of the mine, connected by a tramway, over which a small locomotive is used to haul the coal. The mine is opened by a slope, driven on a gentle gradient, through the overlying debris and measures of the lower seam in the series, locally termed the Cameron seam. About one hundred feet from the mouth of the slope the Cameron seam is encountered and the main entry is driven in a straight line, which is nearly on the strike of the seam, a few feet below where the seam is struck. A cross-cut is driven to make connections with air shaft and parallel entry. On driving the cross-cut a dislocating fault, about twenty feet in thickness, was penetrated, and the Walsen seam was found on the other side on the same plane as the Cameron, indicating a downthrow of about thirty feet. The parallel entry to the mine is driven on the Walsen seam and connections are made through the fault. For present emergency, rooms are worked at right angles to the entries, making the room workings on the butts of the coal. During the coming summer cross entries will be driven, and the rooms will be worked on the faces. By adopting this method the mine can be better ventilated, and the percentage of lump coal will be increased.

GUNNISON COUNTY.

Alpine Mine No. 2—

This new mine is located on Ohio creek, about one mile west of Baldwin, Gunnison county. It is owned and operated by The Alpine Coal Company. General Manager, H. Van Mater, Denver; local superintendent, Joseph C. Watson, Baldwin.

Operations were commenced on this property in August, and by the latter part of December the shipments were about one hundred tons per day. The mine is opened by a three-compartment shaft, 153 feet deep. Size in the clear, seven feet two inches by fourteen feet two inches. Two compartments are used for hoisting and one, three feet by seven feet two inches, is used for pumping (and ventilating at present). The general equipment is good, the ropes and cages being rather light for

the load handled. In the spring another shaft will be sunk for the purpose of ventilation, etc. The interior of the mine is in excellent condition, and it is opened out in a systematic manner. The seam is six feet in thickness; dip about 5 degrees northwest; semi-bituminous in quality, a good fuel for steam or domestic purposes. Railroad facilities have been obtained by a branch of the Denver, Leadville and Gunnison, three and one-half miles long, built on the banks of Ohio creek from Castleton to the mine. Neat and substantial frame residences have been built near the mine, to be occupied by the men employed.

Alpine Mine No. 1—

This new mine is located about a mile southwest of Baldwin. Is owned, operated and managed by the same parties as Alpine No. 2. Operations were commenced in June, and in July some coal was shipped. The mine is opened by a slope on the eastern outcrop of the property. The seam is seven feet thick, of a good quality. There are no railroad facilities. The coal is hauled about three-quarters of a mile to Cooper's spur of the Denver, Leadville and Gunnison, on Carbon creek. It is the intention of the management to abandon this mine when they can supply the demand for the product from the shaft workings.

GARFIELD COUNTY.

New Castle Mine Fire, Etc.—

At 11:30 p. m., July 20, 1897, a fire started in No. 59 upraise of the east Allen entry, originating from a defective fuse setting off a small quantity of gas given off by small feeders; this in turn setting fire to the coal and the entry timbers. Although immediately discovered, the fire made rapid progress and all efforts to retard the same were unsuccessful, and the officials of the company decided on flooding the mine. Preparations for emergency of this kind had been made in the past, and on the morning of the twenty-first a large irrigating ditch was turned into one of the mine outlets. By 6 o'clock p. m. there were twenty-five feet three inches of water in the main shaft, and by 11 o'clock p. m. of the twenty-third there were eighty feet of water in the shaft. In as much as the seat of the fire was confined to the entry and upraise which was not connected with the air course above, this amount of water in the main shaft was figured to have the seat of the fire completely inundated. During the time the mine was filling preparations

were made to have the same hoisted out. The water was hoisted out of the shaft by placing large tanks (with automatic valves) on the cages, and before midnight of the twenty-third the water was hoisted out of the shaft at the rate of sixty tanks per hour, each tank's capacity being eight feet three inches by four feet three and one-half inches by four feet three inches on the inside, equals 1,125.64 gallons. Making full allowance for leakage, etc., about 850 gallons for each tank; 850 by 60 equals 51,000 gallons per hour. On the morning of the thirty-first the automatic discharging valves were enlarged, thus enabling the engineer to make ninety tanks per hour. However, from this date until the water was out there was considerable delay owing to breakages in shaft, etc., but due to increase of speed in the latter part of the draining operation; if anything, there was more water hoisted in the same time than previous. For the sake of conservative computation will use a minimum of sixty tanks per hour during the twenty-nine days of water hoisting. Tank contents, 850 gallons by 60, equals 51,000 gallons per hour; 51,000 by 24 equals 1,224,000 gallons per day, and 1,224,000 by 29 equals 35,496,000 gallons in all. Expressed in pounds and tons, 35,496,000 by 8.33 equals 295,681,680 pounds, or 147,840 tons, in twenty-nine days. This great accomplishment reflects credit on the management, and shows the reserve strength and capacity of the hoisting appliances. On the twenty-first of August the tanks were abandoned, about two and one-half feet of water being then at the bottom of the shaft. In this water, preparations were made to have the pump in operation, and after considerable work and worry, the pump was put in operation and the remaining water was soon pumped out. In flooding the mine the water was running through an opening having about 50 degrees pitch. This made a great amount of mud, etc., which mostly settled at the bottom of the shaft. To clear up the debris, timber, etc., it took them until the thirtieth of August. On this day, and ever since, the mine has been running under ordinary conditions. The amount of damage done by the fire was very limited. The expenditure of flooding and draining the mine is estimated at $2,500, not including loss of production.

LA PLATA COUNTY.

Hesperus Mine Fire—

At 3:30 a. m., January 19, the trestle and chute of the Hesperus coal mine, La Plata county, owned and operated by The Porter Fuel Company, of Durango, was discovered to be on

fire. At the time of discovery the fire had made considerable headway, the structure being very dry and the water scarce. The united efforts of the residents to retard the flames were fruitless, and the whole structure was destroyed before sunrise. The trestle and the mouth of the mine were connected by a snow-shed; the air entering into the mine carried the flames inwardly, setting the timbers therein on fire, and those in turn set the coal seam on fire. As soon as possible the two openings were closed and the fire checked. On Monday morning, January 24, the mouth of the mine was opened and the timber and coal then smoldering were under control before night. On Thursday morning the lest vestige of fire was removed from the interior of the mine. Incendiary is supposed to be the origin of the fire. The damage to trestle and mine is estimated at $5,000, the same being partially covered by insurance. Fortunately, there were no persons in the mine at the time of the fire. However, on reopening the mine and fighting the fire therein, some of the men suffered greatly from the heat and dense smoke, but soon recovered. Reconstruction of the trestle and chute and the repairing of the mine opening were commenced as soon as possible, and on February 5 usual operations were resumed.

LARIMER COUNTY.

Indian Springs—

This mine is located about twenty-one miles northeast of Fort Collins; is owned and operated by The Indian Springs Coal Company, of Fort Collins.

Some prospecting was done in 1896, and during 1897 the slope has been driven on the pitch of the seam, under a shallow cover, for nine hundred feet, the coal being very soft and fragile. In two hundred feet more the slope will gain about fifty feet more cover, and it is a feasible proposition to say that the coal will be much harder in texture and better in quality with a gain of cover. The coal is a soft lignite and mostly used by the neighboring farmers and the residents of Fort Collins. Superintendent, J. W. McGiuly, Fort Collins.

LAS ANIMAS COUNTY.

Nichols & Woods Mine—

This small mine is located in the northern extremity of Las Animas county. Manager, H. C. Nichols, Trinidad, Colorado. The mine is opened in a systematic manner. The main

entry is driven in about 280 feet to prove the coal, and preparations are made to sink an air shaft, from the bottom of which a parallel entry (to the main) will be driven for the purpose of ventilating the workings. The coal is six feet in thickness, with small impurities in the middle of the seam. Preparations are made to erect a screen at the mouth of the mine, and will be ready to ship their product about February 1. Coal will have to be hauled in wagons to Bunker Hill switch, on the Gulf road. Distance to haul, about one and one-half miles.

Electric Mine—

This mine is located between Erie and Lafayette, in Boulder county. It is owned and operated by The Equitable Coal Mining and Manufacturing Company, of Denver. Operations were commenced on the property early in the summer of 1898, and the plant is not yet completed. The main shaft is 190 feet deep, in three separate compartments. Preparations are made for a second opening. The production for this year will be small, but developments are made with a view of making the mine a large producer. The seam now worked is about six feet thick, and is a good grade of lignite coal. The product, at present, is hauled in wagons to the railroad. Railroad facilities to the mine are now in progress. Mr. Wm. H. Haywood is the president and general manager of the company.

Maitland Mine—

This new mine is situated about three miles northwest of Walsenburg, in Huerfano county, and is the most northerly mine in the Raton field. It is operated by The Victor Coal and Coke Company. The coal-bearing land is by them leased from the state land commissioners. Operations were commenced on the property in the summer of 1897, and during same year the coal production was small. During 1898, considerable development work has been made with a view of making the mine a large producer. The equipment is modern and substantial. Several commodious residences have been erected near the mouth of the mine. The coal is semi-bituminous in character; a good fuel for steam or domestic use.

Coryell Mine—

This mine is situated between the New Castle mine and the old Vulcan mine, in Garfield county. It is opened on a small tract of land lying between the aforesaid properties. It is owned and operated by Mr. Perry Coryell, of New Castle. The

mine is opened by a slope driven on the Wheeler seam. The production for this year will be small. The coal now taken out is obtained by slope sinking.

Diamond Mine—

This mine is situated about six miles southwest of Glenwood Springs, and about three-quarters of a mile west of the Cardiff and Spring Gulch branch of the Colorado Midland railway. It is owned and operated by The Northern Coal Company, of Denver. The mine is opened by a rock tunnel driven through the underlying measures, and is now in about 750 feet. At present four seams of coal, with an aggregate thickness of about thirty feet, have been passed through. Development is now confined to the inner seam, which is about ten feet thick. The measures dip about 52 degrees from the horizon. It was late in the fall when operations on the coal were commenced and the output for this year will be small. It is the intention of the company to develop the mine as rapidly as possible and make the same a large producer.

During the past two years several small mines have been opened on the outcrop of the lignite field lying north and northeast of Colorado Springs. The seam varies in thickness from four to twelve feet. The coal is a fair quality of lignite; the percentage of carbon being low and the moisture very high. The product of those mines will be locally used in Colorado Springs and the adjacent towns. The Carlton mine is the only one having railroad connections.

A PECULIAR EXPLOSION.

On Monday afternoon, October 18, 1897, at 3:55 o'clock, a trip of ten loaded cars ran away from the top of the Crested Butte engine plane. The plane is 1,150 feet long from the mouth of the mine to the tipple trestle, the grade varying from five per cent. at the middle to twenty per cent. at the top and bottom. In some manner the indicator on the slope hoister became disarranged, and the consequence was that the engineer pulled the trip over the plane knuckle before the rope runner had time to attach the plane rope, and the trip descended the plane at an accelerating velocity, seven of the cars going over the tipple trestle and out of shed at "A," landing on the railroad track below at "B," three of them tumbling off the trestle

at "C," landing on the ground at "D," on the west side of the trestle. The runaway cars, on passing through the tipple shed over trestle and slack bin, made an unusual commotion, a great quantity of dust was set in motion from their own contents, and the commotion caused the coal dust to arise from the bin and the dust particles adhering to the structure were also set in motion. At a point, "E," close to the scale, a platform is built over the empty track on the same plane as the loaded track. On this platform a stove was situated and used on cold days for the comfort of the dumpers. On the day in question it was moderately warm and no coal had been put on the fire since 10 o'clock a. m.; therefore, we can reasonably assume that the fire in the stove at the time of the runaway was not in a blazing condition, but we know from the character of the coal, etc., that if disturbed in any manner it would instantly produce a blaze. In some unknown manner the stove was toppled over and smoldering embers were scattered over the trestle. This being the only source from which the explosion could possibly originate, I unhesitatingly say that if a naked light (lamp) had been in the building at the time of the commotion, the result would have been similar. The stove fire (in my opinion), under the aforesaid conditions, could not be of a greater intensity than the flame of the naked light.

Charles Pepper and John Molovich, two of the dumpers, were standing on the platform, at "E," when they saw the trip coming at "F," one of them making his escape on to the empty track under the platform and the other climbing up on the ceiling joists that extend from plate to plate of the building, and while they were so situated a section of the runaway trip passed through the tipple shed, and the explosion occurred simultaneously. Both of the men were severely burned around their faces and hands. This proves that the intense heat generated completely filled the building. The weigh boss, who was standing at "G," in full view of the south end of the tipple, stated that instantaneously with the trip passing into the shed, a cloud of dense smoke and flame extended fully thirty-five feet above the crown of the building on the south end. John McCann (coal miner working at the mine), who was standing in full view of the north end, stated that instantly the cars fell on the ground, at "B," the smoke and flame came out in a dense cloud at "A." I was in the mine at the time of the explosion, and I arrived at the tipple about an hour later, so I had a good opportunity to examine and investigate the whole affair. In several places the structure had taken fire, but it was easily

put out, and the only visible residue was a blackened and sooty appearance of the dust and building. I carefully inquired if they were oiling the cars on the tipple, and whether they stored inflammable materials in the shed, such as powder, black oil, etc. From the visible evidence, and the statements of the officials and others, neither did they oil the cars on the tipple, nor were there any combustible materials stored therein. Therefore, I and the management of the mine unanimously agree that the explosion was due to coal dust, and that the fire in the stove was the initiatory source of it.

Analysis of coal taken from the old mine on the same seam as is now worked by Mr. R. C. Hills:

Fixed carbon	70.07
Volatile com	27.25
Moisture	.78
Ash	1.90
	100.00

Specific gravity, 1.288.

From the foregoing statements, I think that we can reasonably deduce the following:

First—That the dust of Crested Butte coal contains highly inflammable ingredients.

Second—That certain coal dust, under certain conditions, is explosive in the absence of carburetted hydrogen, CH_4.

Third—That very little compression of the inflammable ingredients will bring the same to an explosive point.

Fourth—That pure atmospheric air is not a preventive, but a necessity to produce an explosion of coal dust.

Fifth—That the flame of a naked light or lamp is of sufficient intensity to set off an explosive mixture.

Sixth—That the sudden expansion would have been terrific if confined to narrow workings in the interior of a mine, especially if a new supply of dust was obtained.

Seventh—That the dust particles give off their explosive constituents with less heat than generally admitted.

Eighth—That an explosion of coal dust can take place without the intervention of shot-firing.

Ninth—That under ordinary conditions met in coal mines explosive conditions may be brought about by rapid transit of

cars through narrow and dustry entries or by usual compression and commotion produced by successive shot-firing, etc.

Tenth—That explosive conditions are aggravated by runaway trips, heavy falls in old workings, etc.

There are many skeptical as to the possibility of a dust explosion occurring in the absence of inflammable gas, and I freely admit that in past years I was among the many; but since the Sunshine explosion, I am fully convinced of such a possibility, and the explosion on a tipple in the open air cleared my mind from all doubt.

(Signed) DAVID GRIFFITHS.

COAL AND COKE PRODUCTION

FOR 1898.

PRODUCTION OF ARAPAHOE COUNTY, 1898.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING MONTHLY REPORTS.

Name of mine	Scranton	Total Tonnage
Thickness of vein	7 ft. 0 in.	
Kind of opening	Slope	
Character of coal	Lignite	
December	514	
Yearly report	514	514

PRODUCTION OF

BOULDER COUNTY, 1898.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING MONTHLY REPORTS.

Name of mine	Caledonia	Spencer	Excelsior	Gladstone	Mitchell	Leader	Hecla No. 1	Rex No. 1	Rex No. 2	Imperial
Thickness of vein	6 ft. o in.	14 ft. o in.	14 ft o in	14 ft. o in.	14 ft. o in.	6 ft. o in.	6 to 9 ft.	11 ft. o in.	7ft. o in.	6 ft. o in.
Kind of opening	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft
Character of coal	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite
January	2,599	3,075	2,876	3,053	1,930	2,752	2,200	3,741	1,592	2,306
February	4,021	4,522	2,036	3,073	1,393	2,891	1,846	4,045	1,408	1,956
March	4,164	----------	193	5,088	742	3,494	3,751	7,755	---- ----	3,563
April	3,164	91	---- ----	60	2,200	2,727	2,027	5,872	---- Mine idle ----	717
May	582	29	---- ----	30	2,189	2,580	1,947	9,750	---- ----	---- ----
June	189	----------	---- Mine idle ----	30	461	462	144	1,356	---- ----	---- ----
July	---- ----	3,228	---- ----	30	----------	40	----------	----------	---- ----	---- Closed down ----
August	---- ----	----------	---- ----	855	3,700	1,200	315	3,084	313	---- ----
September	---- Mine idle ----	2,251	---- ----	4,625	4,100	3,118	1,719	6,045	2,050	---- ----
October	---- ----	539	200	5,784	5,965	4,000	3,222	9,069	2,952	---- ----
November	---- ----	5,373	241	6,280	6,538	4,406	4,160	15,000	3,000	---- ----
December	---- ----	15,000	250	6,000	7,000	4,500	3,880	13,000	3,000	---- ----
Total tonnage	14,719	34,108	5,796	34,908	36,218	32,170	25,211	78,717	14,315	8,542

PRODUCTION OF BOULDER COUNTY, 1898—Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING MONTHLY REPORTS.

Name of mine	Otis	Marshall No. 6	Gorham	Lister	Industrial	Enterprise	Long's Peak	Shanahan
Thickness of vein	14 ft. 0 in.	9 ft. 0 in.	10 ft. 0 in.	5 ft. 6 in.	6 ft. 0 in.	4 ft. 6 in.	6 ft. 0 in.	11 ft. 0 in.
Kind of opening	Shaft	Slope	Slope	Shaft	Shaft	Shaft	Shaft	Slope
Character of coal	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite
January	2,075	3,457	605	1,439	2,950	4,100	2,670	2,000
February	1,666	3,608	1,632	2,286	2,680	4,600	3,240	1,900
March	1,605	5,443	2,155	2,395	2,980	3,508	2,466	1,600
April	2,570	3,866	1,921	1,256	1,758	3,844	2,338	555
May	1,752	3,435	1,829	938	2,025	3,000	2,005	584
June	Closed down	452	491	214	325	1,550	----------	781
July	Closed down	1,492	2,131	190	1,222	----------	1,500	810
August	Closed down	4,758	3,148	499	700	450	1,584	949
September	Closed down	4,608	2,239	1,165	2,843	----------	2,445	1,650
October	Closed down	3,165	2,418	1,749	3,360	----------	2,845	1,995
November	Closed down	3,997	2,894	2,411	5,082	----------	3,171	1,680
December	Closed down	4,000	3,500	2,100	6,000	----------	3,000	2,500
Total tonnage	9,668	42,281	24,963	16,642	31,925	21,052	27,264	17,004

PRODUCTION OF BOULDER COUNTY, 1898—Concluded.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING MONTHLY REPORTS.

Name of mine	Marfell	Vaughan	Rosser	Pluto	Acme	Electric	Caryl	Total Tonnage
Thickness of vein	14 ft. 0 in.	13 ft. 6 in	6 ft. 0 in.	14 ft. 0 in.	7 ft. 0 in.	5 ft. 6 in.	5 ft. 0 in.	
Kind of opening	Slope	Slope	Drift	Slope	Shaft	Shaft	Shaft	
Character of coal	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	
January	----	----	----	----	----	----	----	45,420
February	----	----	----	----	----	----	----	48,803
March	----	----	----	----	----	----	----	50,902
April	----	----	----	----	----	----	----	34,966
May	----	----	----	----	----	----	----	32,675
June	----	----	----	----	----	----	----	6,455
July	----	----	----	----	----	----	----	10,643
August	----	----	----	----	----	----	----	21,555
September	----	----	----	----	----	----	----	38,858
October	----	----	----	----	----	----	----	47,263
November	----	----	----	----	----	----	----	64,233
December	4,000	2,000	5,000	----	----	4,000	1,000	89,730
Total tonnage	4,000	2,000	5,000	----	----	4,000	1,000	491,503

Yearly report — Shut down — Shut down — Yearly report — Yearly report

PRODUCTION OF EL PASO COUNTY, 1898.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING MONTHLY REPORTS.

Name of mine	Franceville	Carlton	Williamsville	Curtis	Danville	Boulder	Newfield	Pine Grove, Mountain View, Monument Park and Antlers mines abandoned	Total Tonnage
Thickness of vein	6 ft. 0 in.	8 ft. 0 in.	6 ft. 0 in.	8 ft. 0 in.	8 ft. 0 in.	4 ft. 6 in.	5 ft. 6 in.		
Kind of opening	Slope	Shaft	Slope	Shaft	Slope	Slope	Slope		
Character of coal	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite		
January	2,885	1,843	----	----	----	----	----		4,728
February	2,835	1,261	----	----	----	----	----		4,096
March	2,262	1,436	----	----	----	----	----		3,698
April	1,561	123	----	----	----	----	----		1,684
May	866	----	----	----	----	----	----		866
June	----	304	----	----	----	----	----		304
July	----	1,557	----	----	----	----	----		1,557
August	----	491	----	----	----	----	----		491
September	----	935	----	----	----	----	----		935
October	----	1,246	----	----	----	----	----		1,246
November	----	1,920	----	----	----	----	----		1,920
December	----	2,000	15,412	4,251	3,200	1,000	1,000		26,863
Total tonnage	10,409	13,116	15,412	4,251	3,200	1,000	1,000		48,388

Abandoned — Yearly report — New mine, yearly report — New mine, yearly report — New mine, yearly report — Yearly report

PRODUCTION OF FREMONT COUNTY, 1898.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING MONTHLY REPORTS.

Name of mine	Coal Creek No. 1	Coal Creek No. 2	Fremont	Rockvale
Thickness of vein	3 ft. 6 in.	3 ft. 6 in.	5 ft. 0 in.	3 ft. 6 in.
Kind of opening	Slope	Slope	Shaft	Shaft
Character of coal	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.
January	---- ----	5,828	7,633	16,518
February	---- ----	1,929	4,764	7,930
March	---- ----	---- ----	6,681	6,595
April	---- ----	---- ----	6,338	7,087
May	---- ----	---- ----	4,623	2,782
June	---- ----	---- ----	4,231	1,832
July	---- ----	---- ----	3,154	2,182
August	---- ----	---- ----	4,733	4,621
September	---- ----	---- ----	7,855	13,938
October	---- ----	---- ----	9,995	12,839
November	---- ----	4,415	11,917	23,934
December	---- ----	6,000	12,000	23,650
Total tonnage	----------	18,172	83,924	123,908

Mine idle — Mine idle

PRODUCTION OF FREMONT COUNTY, 1898—Concluded.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING MONTHLY REPORTS.

Name of mine	Brookside	Chandler	Brewster	Williamsburg	Williams	Hayes	Price	Bluff Springs	Total Tonnage
Thickness of vein	5 to 7 ft.	5 ft. 0 in.	2 ft. 8 in.	5 ft. 0 in.	4 ft. 6 in.	Two veins, 3 and 4 ft.	Two veins, 3 and 4 ft.	3 ft. 3 in.	
Kind of opening	Slope	Shaft	Slope	Shaft	Slope	Slope	Slope	Shaft	
Character of coal	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	
January	19,883	----------	1,699	----	----	----	----	----	51,561
February	10,758	----------	836	----	----	----	----	----	26,217
March	10,152	145	1,097	----	----	----	----	----	24,670
April	5,918	1,186	642	----	----	----	----	----	21,171
May	4,160	1,245	769	----	----	----	----	----	13,579
June	8,163	800	180	----	----	----	----	----	15,206
July	8,395	1,812	622	----	----	----	----	----	16,165
August	11,288	1,320	870	----	----	----	----	----	22,832
September	16,066	3,000	523	----	----	----	----	----	41,382
October	17,491	6,246	666	----	----	----	----	----	47,237
November	23,103	6,726	935	----	----	----	----	----	71,030
December	23,935	6,900	600	Estimated 1,000	Yearly report 3,331	Yearly report 3,620	Estimated 4,000	Estimated 1,000	86,036
Total tonnage	159,312	29,380	9,439	1,000	3,331	3,620	4,000	1,000	437,086

PRODUCTION OF GUN

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Crested Butte	Anthracite	Ruby
Thickness of vein	11 ft. 0 in.	5 ft. 6 in.	3 ft. 0 in.
Kind of opening	Slope	Drift	Drifts
Character of coal	Bituminous	Anthracite	Anthracite
January	19,931	----------	1,528
February	18,464	----------	583
March	22,190	----------	1,389
April	19,577	1,285	37
May	19,238	317	30
June	18,245	----------	5,177
July	18,489	----------	6,515
August	18,470	----------	5,598
September	18,187	3,660	---- Mine idle ----
October	18,343	6,733	---- ----
November	22,531	7,839	---- ----
December	20,241	8,140	---- ----
Total tonnage	233,906	27,974	20,857

NISON COUNTY, 1898.

OF EACH MINE MAKING MONTHLY REPORTS.

Alpine No. 1	Alpine No. 2	Kubler	Union	Black Diamond	Total Tonnage
6 ft. 6 in.	6 ft. 6 in.	6 ft. 0 in.	5 ft. 0 in.	5 ft. 0 in.	
Slope	Shaft	Drift	Drift	Slope	
Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	
1,759	2,128	3,600	700	---- ----	29 646
894	1,217	2,963	500	---- ----	24,621
---- ----	976	530	240	---- ----	25,325
---- ----	1,830	1,744	268	---- ----	24,741
---- ----	2,360	750	268	---- Estimated ----	22,963
---- Mine abandoned ----	4,720	190	269	---- ----	28 601
---- ----	4,694	940	180	---- ----	30,818
---- ----	6,231	1,790	500	---- ----	32,589
---- ----	5,910	600	300	---- ----	28,657
---- ----	5,054	1,475	300	---- ----	31,905
---- ----	6,396	2,500	600	---- ----	39,866
---- ----	7,000	3,500	500	2,000	41,381
2 653	48,516	20,582	4,625	2,000	361,113

NOTE—Star, Holly, Sunbeam and Superior mines abandoned.

PRODUCTION OF GAR

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Newcastle	Sunshine	Overland
Thickness of vein	4 seams, 96 ft.	9 ft. 0 in.	6 ft. 0 in.
Kind of opening	Shaft	Drifts	Drift
Character of coal	Semi-bitum.	Semi bitum.	Semi-bitum.
January	19,663	3,157	----
February	17,090	2,479	----
March	14,687	2,081	----
April	14,028	1,688	----
May	15,103	2,640	----
June	11,983	1,075	----
July	14,963	1,244	----
August	14,958	1,120	----
September	15,582	5,060	----
October	18,691	2,813	----
November	17,522	2,779	----
December	18,000	3,000	5,000
Total tonnage	192,270	29,136	5,000

Estimated

FIELD COUNTY, 1898.

OF EACH MINE MAKING MONTHLY REPORTS.

Keystone	Diamond	Coryell	Marion	Midland	Total Tonnage
3 ft. 0 in.	10 ft. 0 in.	48 ft.	8 ft. 0 in.	6 ft. 0 in.	
Slope	Drift	Slope	Drift	Drift	
Semi-bitum.	Semi-bitum.	Semi bitum.	Semi bitum.	Semi-bitum.	
----	----	----	----	----	22,820
----	----	----	----	----	19,569
----	----	----	----	----	16,768
----	----	----	----	----	15,716
----	----	----	----	----	17,743
----	----	----	----	----	13,058
----	----	----	----	----	16,207
----	----	----	----	----	16,078
----	----	----	----	----	20,642
----	----	----	----	----	21,504
----	----	----	----	----	20,301
7,200	4,000	1,000	1,375	1,000	40,575
7,200	4,000	1,000	1,375	1,000	240,981

Yearly report

New mine, yearly report

New mine, estimated

Old mine reopened, yearly report

Mine abandoned, estimated

PRODUCTION OF HUERFANO COUNTY, 1898.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING MONTHLY REPORTS.

Name of mine	Pictou	Robinson	Walsen	Rouse	Maitland	Sunshine	Santa Clara	Toltec	Total Tonnage
Thickness of vein	Three seams, 5, 4 and 6 ft.	7 ft. o in.	7 ft. o in.	6 to 7 ft.	5 ft. o in.	Two seams, 4 ft. and 5½ ft.	Two seams, 4 ft. and 6 ft.	4 ft o in.	
Kind of opening	Two slopes	Slope	Slope	Slope	Slope	Slope	Slope	Slope	
Character of coal	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	Semi-bitum.	
January	20,239	6,472	8 040	14,824	4,969	2,215	5,396	2,650	64,805
February	9,085	679	2,903	10,065	2,700	2 410	2,653	1,503	31,998
March	8,282	23	2,211	13,263	1,571	773	4,650	1,420	32,193
April	6,313	---- ----	1,023	13,478	1,802	----------	3,730	1,500	27,846
May	2,702	---- ----	1,289	17,052	2,025	891	3,210	1,850	29,019
June	2,670	---- ----	7,764	14,228	2,476	1,280	4,285	2,500	35,203
July	4,006	---- ----	10,666	14,167	1,778	1,338	4,562	2,915	39,432
August	12,191	---- ----	11,338	13,236	1,145	1,510	5,040	2,605	47,065
September	16,911	---- ----	11,694	11,822	2,512	1,390	4,773	4,200	53,302
October	15,087	1,723	12,134	11,425	2,538	2,045	4,775	6,400	56,127
November	15,446	5,635	11,408	13,269	4,507	2,391	6,126	6,600	65,382
December	17,095	5,829	11,400	14,000	5,000	3,000	7,500	7,000	70,824
Total tonnage	130,027	20,361	91,870	160,829	33,023	19,243	56,700	41,143	553,196

Mine idle

PRODUCTION OF JEFFERSON COUNTY, 1898.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING REPORTS TO THIS OFFICE.

Name of mine	Mt. Carbon	Ralston Springs	North White Ash	Independence	Total Tonnage
Thickness of vein	3 ft. 0 in.	7 ft. 0 in.	4 ft. 0 in.	9 ft. 0 in.	
Kind of opening	Drift	Shaft	Shaft	Shaft	
Character of coal	Lignite	Lignite	Lignite	Lignite	
January	---	---	---	---	
February	---	---	---	---	
March	---	---	---	---	
April	---	---	---	---	
May	--- Yearly report ---	--- Yearly report ---	--- Yearly report ---	--- Yearly report ---	
June	---	---	---	---	
July	---	---	---	---	
August	---	---	---	---	
September	---	---	---	---	
October	---	---	---	---	
November	---	---	---	---	
December	1,050	6,200	2,825	1,850	11,925

PRODUCTION OF MESA COUNTY, 1898.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING REPORTS TO THIS OFFICE.

Name of mine	Mount Lincoln	Palasade	Book Cliff	Total Tonnage
Thickness of vein	3 ft. 6 in.	4 ft. 8 in.	4 ft. 8 in.	
Kind of opening	Drift	Drift	Drift	
Character of coal	Semi-bitum.	Semi-bitum	Semi-bitum.	
January	----	----	----	
February	----	----	----	
March	----	----	----	
April	----	----	----	
May	---- Estimated ----	---- Estimated ----	---- Yearly report ----	
June	----	----	----	
July	----	----	----	
August	----	----	----	
September	----	----	----	
October	----	----	----	
November	----	----	----	
December	5,000	5 000	9,167	19,167

PRODUCTION OF LARIMER COUNTY, 1898.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING MONTHLY REPORTS TO THIS OFFICE.

Name of mine	Indian Springs	Total Tonnage
Thickness of vein	7 ft. o in	
Kind of opening	Slope	
Character of coal	Lignite	
January	-----	
February	-----	
March	-----	
April	-----	
May	-----	
June	-----	
July	-----	
August	-----	
September	-----	
October	-----	
November	-----	
December	2,843	2,843

Yearly report

PRODUCTION OF LAS ANIMAS COUNTY, 1898.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING MONTHLY REPORTS TO THIS OFFICE.

Name of mine	Starkville	Sopris	Engle
Thickness of vein	5 to 7 ft.	4 to 7 ft.	6 ft. o in.
Kind of opening	Drift	Slope	Two drifts
Character of coal	Bituminous	Bituminous	Bituminous
January	28,172	23,690	22,292
February	23,767	24,009	15,743
March	26,697	26,173	14,490
April	27,202	26,722	13,435
May	29,888	25,478	21,717
June	23,145	25,428	16,237
July	22,121	24,410	10,207
August	25,008	26,317	22,424
September	31,300	25,426	31,717
October	39,944	26,189	31,905
November	40,076	27,218	38,933
December	43,000	26,500	45,000
Total tonnage	360,322	307,760	284,100

PRODUCTION OF LAS ANIMAS

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Berwind	Victor No. 1	Victor No. 2
Thickness of vein	6 ft. 0 in.	7 ft. 0 in.	7 ft 0 in.
Kind of opening	Two drifts	Drift	Slope
Character of coal	Bituminous	Bituminous	Bituminous
January	14 520	15,979	15,304
February	8,623	10,978	12,378
March	9,821	12,108	12,108
April	11,726	11,326	10,481
May	6,902	9,773	10,664
June	9,965	11,972	12,447
July	16,168	13,845	14,409
August	18,495	17,343	16,992
September	12,276	14,862	14,834
October	17,537	10 580	16,113
November	17,368	15,469	17,745
December	17,368	15,500	18,000
Total tonnage	160,769	159,735	171,535

COUNTY, 1898 — Continued.

OF EACH MINE MAKING MONTHLY REPORTS.

Gray Creek	Peerless	Rowland	Blooms	Gonzales Canon	Rugby
6 to 14 ft.	6 ft. 0 in.	8 ft. 0 in.	7 ft. 0 in.	6 ft. 0 in.	5 ft. 0 in.
Three drifts	Slope	Drift	Drift	Shaft	Drift
Bituminous	Semi-bitum.	Bituminous	Bituminous	Semi-bitum.	Semi-bitum.
9,849	5,585	782	1,249	4,800	-----
7,793	4,644	818	734	775	-----
6,853	5,000	553	897	3,500	-----
6,053	5,901	626	662	430	-----
9,083	7,400	225	515	220	-----
7,360	9,500	729	551	----------	-----
7,414	8,986	843	453	470	-----
6,857	11,300	555	662	----------	-----
9,268	----------	670	848	275	500
13,048	3,650	624	1,373	300	1,500
13,020	7,970	550	2,334	----------	2,600
13,500	12,000	600	1,905	----------	3,000
110,098	81,936	7,575	12,183	10,770	7,600

New mine, yearly report

PRODUCTION OF LAS ANIMAS COUNTY,
1898—Concluded.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING MONTHLY REPORTS TO THIS OFFICE.

Name of mine	Chicosa	Bunker Hill	Total Tonnage
Thickness of vein	6 ft. o in.	6 ft. o in.	
Kind of opening	Drift	Drift	
Character of coal	Bituminous	Semi-bitumin.	
January	-----	-----	142,282
February	-----	-----	110,262
March	-----	1,128	119,328
April	-----	250	114,814
May	-----	262	122,127
June	-----	281	117,615
July	-----	33	119,359
August	-----	376	146,529
September	-----	416	142,392
October	-----	870	163,635
November	-----	1,684	184,967
December	2,000	2,500	200,873
Total tonnage	2,000	7,800	1,684,183

Estimated

PRODUCTION OF LA PLATA COUNTY, 1898.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING MONTHLY REPORTS TO THIS OFFICE.

Name of mine	Porter	Hesperus	Champion	San Juan	Ute	City	Total Tonnage
Thickness of vein	3 ft. 6 in.	5 ft. o in.	3 ft. o in.	2½ to 4½ ft.	5 ft. o in.	4 ft. o in.	
Kind of opening	Drift	Drift	Drift	Drift	Drift	Drift	
Character of coal	Bituminous	Semi-bitum.	Bituminous	Bituminous	Semi-bitum.	Bituminous	
January	5,532	1,093	717	1,254	579	2,500	11,675
February	3,679	1,068	-----	924	572	2,250	8,493
March	4,045	1,294	-----	613	147	2,300	8,399
April	3,386	1,301	-----	519	381	2,000	7,587
May	3,059	1,437	-----	461	412	1,700	7,069
June	3,810	1,514	-----	394	602	1,500	7,730
July	3,392	960	-----	293	307	1,400	6,352
August	3,601	1,236	-----	415	526	1,475	7,253
September	3,876	1,189	-----	387	577	1,650	7,679
October	4,366	2,140	-----	739	516	2,265	10,026
November	5,339	2,931	-----	772	799	2,250	12,091
December	6,000	3,200	-----	850	800	2,500	13,351
Total tonnage	50,085	19,363	717	7,532	6,218	23,790	107,705

Mine abandoned

PRODUCTION OF PITKIN COUNTY, 1898.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING MONTHLY REPORTS TO THIS OFFICE.

Name of mine	Spring Gulch	Union	Total Tonnage
Thickness of vein	4 ft. 6 in.	5 ft. o in.	
Kind of opening	Slope	Slope	
Character of coal	Bituminous	Bituminous	
January	11,435	2,405	13,840
February	10,839	2,390	13,229
March	11,683	2,910	14,593
April	13,011	2,550	15,561
May	12,480	3,035	15,515
June	9,616	3,180	12,796
July	9,098	3,193	12,291
August	9,707	2,761	12,468
September	12,469	3,580	16,049
October	12,555	3,575	16,130
November	14,955	2,945	17,900
December	18,500	4,055	22,555
Total tonnage	146,348	36,579	182,927

PRODUCTION OF WELD COUNTY, 1898.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH MINE MAKING MONTHLY REPORTS TO THIS OFFICE.

Name of mine	North Western	McKissic	Washington	White House	Lincoln	Emerson	Wooley	Cold Draw	Total Tonnage
Thickness of vein	4 ft. 6 in.	4 ft. o in.	5 ft. o in.	3 ft. 6 in.	5 ft. o in.	6 ft. o in.	6 ft. o in.	.....	
Kind of opening	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	.....	
Character of coal	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	.....	
January	...	...	...	...	...	...	...	...	
February	...	...	...	...	...	...	...	...	
March	...	...	...	...	...	...	...	...	
April	...	...	...	...	...	...	...	...	
May	...	...	...	...	...	...	...	...	
June	...	...	...	...	...	...	...	...	
July	...	...	...	...	...	...	...	...	
August	...	...	...	...	...	...	...	...	
September	...	...	...	...	...	...	...	...	
October	...	...	...	...	...	...	...	...	
November	...	...	...	...	...	...	...	...	
December	3,000	.....	4,488	2,618	2,000	1,400	8,000	1,000	22,506

Estimated — Abandoned — Yearly report — Estimated — Yearly report — Yearly report — Yearly report — Estimated

COAL PRODUCTION FOR 1898.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH COUNTY.

ALL YEARLY REPORTS GROUPED IN THE MONTH OF DECEMBER.

Counties	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
Arapahoe	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	514	514
Boulder	45,420	48,803	50,902	34 966	32,675	6,455	10,643	21,555	38,858	47,263	64,233	89.730	491,503
El Paso	4.728	4,096	3,698	1,684	866	304	1,557	491	935	1,246	1,920	26,863	48,388
Fremont	51,561	26,217	24,670	21,171	13,579	15,206	16,165	22,832	41,382	47,237	71,030	86,036	437,086
Gunnison	29,646	24,621	25 325	24,741	22,963	28,601	30,818	32,589	28,657	31,905	39,866	41,381	361,113
Garfield	22,820	19,569	16,768	15,716	17,743	13,058	16,207	16,078	20,642	21,504	20,301	40,575	240.981
Huerfano	64,805	31,998	32,193	27,846	29,019	35,203	39,432	47,065	53,302	56,127	65,382	70,824	553,196
Jefferson	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11,925	11,925
Las Animas	142,282	110,262	119,328	114,814	122,127	117,615	119,359	146,529	142,392	163,635	184,967	200,873	1,684,183
La Plata	11,675	8,493	8,399	7.587	7,069	7,730	6,352	7,253	7,679	10,026	12,091	13,351	107,705
Larimer	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,843	2,843
Mesa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19.167	19,167
Pitkin	10,840	13,229	14,593	15.561	15.515	12,796	12,291	12,468	16,049	16,130	17,900	22.555	182.927
Weld	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22.506	22.506
Totals	386,777	287,288	295,876	264.086	261.556	236,968	252.824	306 860	349,896	395 073	477.690	649.143	4,164,037

COAL PRODUCTION FOR 1898.

SHOWING MONTHLY AND YEARLY PRODUCTION OF THE DIFFERENT VARIETIES.

Character of Coal	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total Tonnage
Semi-bituminous	159,430	90,417	86.446	76,838	73,450	80,543	88,374	107.934	125,093	140,673	182,193	251.102	1,462,493
Bituminous	175,671	143,389	153,441	149,276	154,218	144,489	145,735	171,282	181,350	199,158	221,505	235,520	2,075,034
Lignite	50,148	52,899	54,600	36.650	33.541	6,759	12,200	22,046	39.793	48.509	66,153	154,381	577,679
Anthracite	1,528	583	1,389	1,322	347	5.177	6,515	5,598	3,660	6,733	7,839	8,140	48,831
Total tonnage	386,777	287,288	295,876	264.086	261,556	236,968	252 824	306,860	349,896	395 073	477,690	649,143	4,164,037

NOTE—Semi-bituminous, or non coking; bituminous, or coking.

COKE PRODUCTION, 1898.

Name of Operator	Location of Ovens	County	Number of Ovens	Tonnage	Remarks
Colorado Fuel and Iron Co	Sopris	Las Animas	222	104,968	
Colorado Fuel and Iron Co	El Moro	Las Animas	268	71,772	Coal supplied from Engle mine—18 new ovens.
Colorado Fuel and Iron Co	Starkville	Las Animas	138	56,484	
Victor Coal and Coke Co	Gray Creek	Las Animas	98	16,339	
Victor Coal and Coke Co	Hastings	Las Animas	100	36,846	
Colorado Fuel and Iron Co	Crested Butte	Gunnison	154	71,547	
Colorado Fuel and Iron Co	Cardiff	Garfield	214	73,969	Coal supplied from Spring Gulch
Omaha and Grant Smelting Co	Durango	La Plata	28	11,000	Coal supplied from Porter mine
Citizens' Coal and Coke Co	Denver	Arapahoe	36	3,000	Retorts (estimated)
Totals			1,258	445,925	

COKE PRODUCTION, 1898.

BY COMPANIES AND COUNTIES.

Companies	Total Number of Ovens	Total Tonnage	Counties	Number of Ovens	Tonnage	Remarks
Colorado Fuel and Iron Co	996	378,740	Las Animas	826	286,409	
Victor Coal and Coke Co	198	53,185	Gunnison	154	71,547	
Omaha and Grant Smelting Co	28	11,000	Garfield	214	73,969	
Citizens' Coal and Coke Co	36	3,000	La Plata	28	11,000	
			Arapahoe	36	3,000	
Totals	1,258	445,925		1,258	445,925	

PRODUCTION BY COUNTIES.

SHOWING INCREASE AND DECREASE.

Counties	1897	1898	Increase	Decrease
Arapahoe	413	514	101	
Boulder	607,890	491,503		116,387
El Paso	27,906	48,388	20,482	
Fremont	319,641	437,086	117,445	
Gunnison	319,116	361,113	41,997	
Garfield	237,277	240,981	3,704	
Huerfano	361,702	553,196	191,494	
Jefferson	7,650	11,925	4,275	
Las Animas	1,406,455	1,684,183	277,728	
La Plata	74,805	107,705	32,900	
Larimer	6,000	2,843		3,157
Mesa	27,611	19,167		8,444
Pitkin	147,461	182,927	35,466	
Weld	21,733	22,506	773	
Small mines, estimated		10,000	10,000	
Totals	3,565,660	4,174,037		

TABLE

SHOWING THE TOTAL PRODUCTION OF THE DIFFERENT COMPANIES OPERATING TWO OR MORE MINES FOR THE YEAR 1898.

Name of Company	Character of Coal and Number of Mines										Total in Tons of 2,000 Pounds
	Number of Mines	Bituminous or Coking	Number of Mines	Semi-Bituminous or Non-Coking	Number of Mines	Lignite	Number of Mines	Anthracite	
Colorado Fuel and Iron Co	6	1,493,205	11	1,011,184	-------	----------	2	48,831	2,553,220
Victor Coal and Coke Co	3	441,368	2	62,403	-------	----------	-------	----------	503,771
United Coal Co	-------	----------	-------	----------	3	54,623	-------	----------	54,623
*Northern Coal Co	-------	----------	3	127,079	10	263,847	-------	----------	390,926
Porter Coal Co	1	50,085	1	19,363	-------	----------	-------	----------	69,448
Union Coal and Coke Co	1	36,579	1	56,700	-------	----------	-------	----------	93,279
Marshall Coal Co	-------	----------	-------	----------	2	67,244	-------	----------	67,244
Alpine Coal Co	-------	----------	2	51,169	-------	----------	-------	----------	51,169

*The Northern Coal Co. controls several mines which are not in operation, and the most of the mines reported by them became their property during this year.

SUMMARY OF COAL PRODUCTION

FROM 1873 TO 1898, INCLUSIVE.

Year	Tons	Year	Tons
1873	69,977	1886	1,436,211
1874	87,372	1887	1,791,735
1875	98,838	1888	2,185,477
1876	117,666	1889	2,400,629
1877	160,000	1890	3,075,781
1878	200,630	1891	3,512,632
1879	322,732	1892	3,771,234
1880	375,000	1893	3,947,056
1881	706,744	1894	3,021,028
1882	1,161,479	1895	3,339,495
1883	1,220,593	1896	3,371,633
1884	1,130,024	1897	3,565,660
1885	1,398,796	1898	4,174,037

LIST OF FATAL ACCIDENTS FOR 1898.

January 3, Otto Johnson, miner, died from injuries received December 30, 1897, in room 14 off the first cross entry, in the City mine, Durango, La Plata county. Several days after the accident we investigated the cause thereof, and found that the deceased had only worked in this mine for about three weeks. At the time of the accident he was engaged in turning the room aforesaid, which was not yet opened out. The narrow work was in about twenty feet, and at the face of the coal a large iron-stone boulder was known to be dangerous. The night previous Chas. Senings told deceased to take it down, but it appears that he did not want to take it down before he would have place to stow it in the gob. If he had done as he was advised by his fellow miner, the accident would have been avoided, or if he had taken the precaution of putting up some timber to sustain the same until such time as he could have place to stow it into the gob, it would have been avoided. It appears that deceased would have done one or the other of the aforesaid propositions if he had been a practical miner. Timber, of suitable length, was available for his use. The coroner of the county investigated the cause of the accident. No inquest held. Deceased was a single man; nationality, Swedish; age, thirty-one years.

January 6, Scipio Chavez, dumper, was instantly killed on the Sopris tipple, Las Animas county. We investigated the cause of the accident on the eighth, and found that the deceased had been engaged on the tipple for over six years, and that he was an unusually careful man in his capacity. The deceased, at the time of the accident, was engaged in detaching the front car from the incoming trip. (This was his usual custom.) Another employé at the same time was detaching the main rope from the front of the trip. In some mysterious manner the bridle of the main rope got under the wheels of the front car, causing it to stop suddenly and unexpectedly. Chavez's head being between the cars, the successive bumping of each car

of the incoming trip crushed his head, so that he fell lifeless by the side of the cars. Coroner investigated the cause of the accident. No inquest. Deceased was a married man, leaving widow and three children; nationality, Mexican; age, twenty-eight years.

January 17, William Knowley, miner, was killed at the Sopris mine, Las Animas county, in the pillar between Nos. 11 and 12 rooms, in the eighth west entry. We investigated the cause of the accident on the nineteenth, and found a large fall of rock in the working place. The roof had caved very high and broke off on the edge of the coal. From the existing condition, we could not say whether the place was properly timbered or not. Outside of the fall in the narrow work (the pillar had been split) it was well timbered and in a safe condition. Deceased, and his two partners, were engaged in loading a car at the time of the accident, the roof caving and discharging all the props without any warning, causing the death of Knowley and slight bruises to his partners. Fred Bell, a partner of the deceased, stated that had worked with Knowley in the pillars for the past eight months; that he was a practical and careful miner, and that they had been selected to extract pillars for this reason. In the morning, a few hours previous to the accident, there was a wreck on the tramway, causing about three hours' delay in the mine, during which time deceased and Bell laid at the face of their working place. If they had considered it dangerous, they would have gone out to a safe place on the entry. When asked as to how the place was timbered, etc., Bell stated that the working place, to all appearance, was in a safer condition that it had been since they had commenced to withdraw this pillar, and could not explain how such a large fall could come down without giving them ample warning to retreat. As to timber, there was no restriction, plenty supplied in a convenient place for their use, and an ample supply on hand at the time of the accident. Coroner investigated the cause of accident. No inquest held. Deceased was a married man, leaving widow and three children; a member of the Red Men and Knights of Phythias lodges, well respected by all; nationality, English; age, thirty-nine years.

February 11, Albert L. Hayes, part owner and superintendent of the Hayes mine, near Cañon City, Fremont county, received severe injuiries on the slope, from the effects of which he died in about three hours afterwards. We were notified of the accident on the same date, and on the following day we

made an investigation as to the cause, etc. The slope is driven down on the pitch of the seam about three hundred feet, on an average inclination of 51 degrees. The slope hoisting plant is adapted to hoist one car at a trip; therefore, there were no couplings used in the mine. On this day an extra mine car was needed below, so the deceased and the weigh boss, John G. McAdams, agreed to couple the extra car with baling wire, and in this manner to have it lowered into the mine. When the two cars were thus lowered, the front car in some manner was derailed about ten feet from the mouth of the slope, and the deceased ventured to go in front of the trip in order to place the car on the track, and while struggling to do so the baling wire broke, and the car then dashed down the slope with terrible violence, rolling and mangling his body and limbs in a fearful manner. When found he was about seventy feet from the bottom of the slope, with his arm entangled with the signal wire; his right leg was broken in several places, and the severe internal injuries received proved fatal in a few hours, as aforesaid. In compliance with section 8 of the mining law, the county coroner should have been notified. This, in their sorrow, was neglected. The accident, in my opinion, was due to the misconception of the deceased as to the strength of the frail material used to couple the cars. Deceased was a married man, leaving widow and three children; nationality, American; age, thirty-eight years.

March 3, Tony Walden, or Waldron, timberman, was instantly killed by a fall of bony in room 18, off the second east entry of the No. 2 mine, Berwind, Las Animas county. We made an investigation as to the cause of the accident on the following day, and found that the deceased, with D. O. Pritchard, and two other company men, were engaged in ripping and cribbing the aforesaid roadway. The adjacent section of the mine is, and has been for a long time, disturbed by a heavy pressure of the super-strata, causing great difficulties to maintain the haulage ways and air courses in a safe condition. So the roadway thus being made was for the purpose of obviating the difficult conditions existing on the old haulage ways. In all the room workings about two feet of bony is kept up for roof, but this being too low for a permanent haulage way, the bony had to be ripped up to the slate, the cribs then being placed on the roadside under the bony. The deceased at the time of the accident was on his knees at the road side, building in some rock between the upper layers of timber in the crib,

which was partly built, when a piece of the overhanging bony fell on his neck, breaking his back bone in two places. D. O. Pritchard, on being questioned, stated that he was not aware of any danger, and if his attention had not been called to another section of the roadway where the other two men were working, very probably he would have been working at the same place as the deceased was killed. Under ordinary conditions, the bony in question is very tenacious and difficult to pull down, but in this case it was relieved by two slips forming a right angle, the same not being supported by any timber. The deceased had been engaged as a company hand at the Berwind mine for over three years and was considered to be a judicious and careful man for his capacity. The county coroner investigated the cause of the accident, and from the evidence obtained deemed it unnecessary to hold an inquest. Deceased was single and had no relatives in the camp; nationality, Italian; age, twenty-eight years.

March 16, William Kerr, tramway cleaner, received severe injuries by a trip of empty cars on the Crested Butte engine plane, which resulted in his death March 22. We were notified of the accident after his death, and on the twenty-fifth we investigated the cause thereof. We found that the deceased had been engaged on the tramway for several years. He was rather careless in getting off the track when the trip was in motion. On several occasions the superintendent and others had cautioned him about it. However, he had got so familiar with his duties that any suggestions given regarding his safety were not heeded. On the sixteenth of March he was cleaning a roller near the bottom of the plane, where he could see the empty trip starting from the trestle. As usual, he did not get out of the way until the trip was close on to him, and on stepping to one side his foot slipped on some ice (that accumulated there from the drippings off the snow shed), and before he could regain his foothold the trip caught him and dragged him along for a considerable distance, bruising his legs and lacerating his head in several places. The injuiries received were not of a fatal nature, but erysipelas set in and was the direct cause of his death. In as much as the nature of the injuries were not considered to be serious, and that he was injured through his own carelessness, the officials did not notify the county coroner. Deceased was a married man, leaving a widow and three children; nationality, Scotch; age, forty-four years.

June 7, Theodore Peters, miner, died in a few minutes after being extricated from under a fall of coal in No. 5 room, off the sixth entry of the Hesperus mine, Durango, La Plata county. We visited the scene and investigated the cause of the accident on the tenth, and found that Thomas Lewis and the deceased were working together in the aforesaid room. At the time of the accident, Lewis was at the road head making a place for a set of timber, and the deceased was undermining a slip of coal on the upper side of the room, when, suddenly and unexpectedly, a large chunk of coal fell on his head, crushing his skull with the aforesaid result. The coal in this mine is unusually hard, compact and resisting; that it has to be undermined and then blasted down, and at no time is it deemed necessary to sprag it, but in this case an invisible slip (or rider), running at right angles to the regular slips and parallel to the free end, relieved the chunk which fell on the deceased. The county coroner, after investigating the cause of the accident, deemed it necessary to hold an inquest. Deceased was a widower, with no children; nationality, Swiss; age, thirty-five years. Copy of jury's verdict:

"That the said Theodore Peters came to his death while working in room 5 of entry No. 6 of The Porter Fuel Company mine, at Hesperus, Colorado, by coal falling on right side of his head while mining under, and we further find that it was purely accidental.

"G. LACOMB,
"J. ANDERSON,
"G. L. CAEN,
"JAS. CURTIS,
"J. W. STRAYER,
"JAS. LAIRD,
"Jurors.
"T. E. PETERSON,
"Coroner."

June 25, Sam Goffatt, miner, was instantly killed by a fall of rock at the face of No. 13 room, in the tenth west entry of the Sopris mine, Las Animas county. We visited the scene of the accident and investigated the cause thereof on the twenty-seventh, and found that the deceased and John Carlson were working together in the aforesaid room. Carlson, on being questioned, said that a few minutes previous to the accident Goffatt had tested the roof with his pick, and from the sound thereof

they both thought it was safe and secure. Goffatt then proceeded to dig off the coal, when suddenly a comparatively small fragment of the roof fell on him, with the aforesaid result. The room was exceptionally well timbered from the mouth to the face, which was evidence of care and attention on the part of the miners working therein. The county coroner investigated the cause of the accident and deemed it unnecessary to hold an inquest. Deceased was married, leaving a widow and one child; nationality, English; age, forty-eight years.

July 5, Charles Ross, or Carlo Rossa, miner, died in about ten minutes after being severely injured by a fall of coal at the face of No. 64 room, east Allen entry of the New Castle mine, Garfield county. We visited the scene of the accident on the seventh, and found that Gerardi Casper and Thomas Green were working with the deceased and were eye witnesses of the accident. Casper and Green, on being questioned, said that Ross, at the time of the accident, was picking off some coal that was slightly projecting from a nearly even face, and was adhering to the bottom of the top coal. They were all aware of it being loose, but they had no idea of it being so large and treacherous. Ross, while picking off the coal, was naturally leaning backward (seam pitching about 50 degrees), and the coal on falling caught him square on the forehead and face, causing severe injuries, from which he died a few minutes later. Deceased was a married man, leaving a widow and a full-grown daughter residing in Italy; nationality, Italian; age, fifty years.

July 12, John Podbosick, miner, at Union mine, Pitkin county, died very suddenly. We were notified of his death by the mine officials, and a few days later we investigated the cause of death, etc., and found that Podbosick and Max Lorizani worked together in room 13, off the south entry of the aforesaid mine. On the evening of the tenth (Sunday), after leaving the mine, washing and changing his clothes, Podbosick was suddenly taken very sick, and while in a delirious state of mind told Phillip Wolff that he had fallen down the tramway into the entry on the previous day. This was the only evidence we could obtain showing that death was due to accident in the mine. Max Lorizani, on being questioned, said that on the ninth and tenth (Saturday and Sunday), they both worked together and accomplished the usual amount of work, and the deceased did not tell him anything about falling from the manway; neither did he complain of being sick. Podbosick did not

tell anybody in or around the mine that he had been injured, neither did he complain to his wife or family. The physician said that there was no external evidence to show that he had been injured in the mine, and that death was due to a rupture of the intestines, the cause of which was to him unknown. The county coroner was not notified of his death. From the evidence we obtained, we are of the opinion that it can not be termed a mine accident, and that death was due to natural causes.

August 31, Oscar Stephens, miner, was instantly killed by a fall of rock in room 12, off the sixth east entry, Walsen mine, Huerfano county. We visited the scene of the accident on September 1, and found that Stephens and J. L. Brennen were working together and engaged in drawing back the pillar of the aforesaid room. Brennen, on being questioned, admitted that the space between the props and the pillar end was unusually large, and that another row of props should have been put up, and that they had timber lying in the room for that purpose. However, on testing the roof in the usual manner, they did not think there was any immediate danger. The rock that fell on the deceased was nearly circular in form, about eight feet in diameter, and about two feet thick. This falling on his head, killed him instantly. Deceased had not been working long at Walsen, and no one knew anything about his relatives. Coroner held an inquest, but we could not obtain a copy of the jury's verdict.

September 15, George Callen, miner, at Engleville mine, Las Animas county, was injured by a fall of rock and died from the effects on the eighteenth. We investigated and visited the scene of the accident on the twenty-first, and found that the deceased and Thomas Escott were engaged in drawing pillars in the sixth east entry off the main south. On the night of the fifteenth they were starting to split a pillar off the entry. Previous to starting they thoroughly examined the roof, and, in their opinion, it was safe and secure, but after loading a couple of cars of coal off the side of the entry, a small slab of rock fell on the deceased, crushing his body to the floor. Callen was taken out of the mine as soon as possible and his injuries were not considered to be serious, neither did the physician think that his injuries would be fatal, but subsequent developments proved him to be internally injured, and he died on the eighteenth. Callen had been a miner all his life and had been

working at Engleville for the past ten years. The county coroner deemed it unnecessary to hold an inquest. Deceased was married, leaving widow and six children; nationality, English; age, forty-two years.

September 17, Antonio Biotti, miner, was instantly killed by a fall of rock at the face of No. 1 room, off left J entry, Rockvale mine, Fremont county. We investigated and visited the scene of the accident on the following day, and found that Biotti, Pete Boggo and Mike Minincach were working together in the aforesaid room. Boggo, on being questioned, said that they knew the rock to be dangerous and that Biotti intended to put a prop under the same, and that they had a supply of props for that purpose. He furthermore said that the deceased, at the time of the accident, was in a kneeling position, picking off some coal near the roof, when the rock fell on his head and body, killing him instantly. The rock was very treacherous, entirely surrounded by a smooth slip, and termed in mining pharseology "a pot-hole," conical in form, about four and one-half feet in diameter at base, and about three feet in altitude. Pot-holes are occasionally encountered in this section of the mine. Deceased had worked at Rockvale for many years; leaves a widow with four children; nationality, Italian; age, thirty-five years. No inquest held.

October 1, Robert Milliken, superintendent of Rockvale mine, Fremont county, received severe injuries by being run over by empty cars on the main south tail-rope haulage road, and he died in about thirty minutes after being extricated. We were at the scene of the accident the same evening, and found that Milliken and J. P. Thomas, mine boss, were going into the interior of the mine together, and rather than walk they ventured in the trip over the main south. They boarded a car about the middle of the trip, and when the trip was near the old G plane double parting, the car preceding the one they rode in was in some manner derailed. J. P. Thomas stood up in the car and signaled the engineer to stop, and while grabbing for the signal wires, he noticed that Milliken was very excited; he advised him to stay still, but he either jumped off to the side or slipped in between the cars in attempting to go back to the rear end through the empties. After the trip had stopped, Thomas and John Shields, the trip rider, found the deceased lying under the third car from the rear end of the trip. After being extricated he was taken to the surface, and in a few minutes afterward he expired. The tail-rope haulage road is about

2,800 feet long, and in excellent condition in every respect. Trips travel to and fro at a high rate of speed. Riding on cars hauled by machinery is strictly prohibited by the mine officials. Notices to this effect are posted above and below at this mine. The county coroner investigated the cause of the accident and deemed it unnecessary to hold an inquest. Deceased was married, leaving widow and a number of full grown children; nationality, Scotch; age, fifty-two years.

October 10, David Owens, miner, was instantly killed by a fall of rock in room 54, off the first north entry, No. 2 mine, Pictou, Huerfano county. We visited the scene of the accident on the twelfth, and found that the deceased was engaged in drawing the pillar and working alone in the aforesaid room. Richard Trembath, a miner working in the next room, on being questioned, said that a few minutes after they had commenced to work he heard something falling in Owens' working place. He several times halloed to him and received no reply. He then went to Owens' working place, and there found him lifeless under a rock that had fallen close to the pillar end. The rock was not very large, but on falling it dislocated his neck. Deceased was an experienced miner, and had worked in the coal mines of the southern district for a number of years. Deceased was a married man, leaving a family residing in Wales; nationality, Welsh; age, about forty years. The county coroner held an inquest on the remains. Copy of jury's verdict:

"We, the jury, regularly impaneled and sworn to well and truly inquire into the cause of the death of the deceased, David Owen, now lying before us, do find upon our oath that said David Owen came to his death by his own carelessness, and that no company or corporation should be blamed, and he could have been avoided if he would.

"A. H. EDWERSTEN,
"WILLARD SEFTON,
"F. M. OWENSBY,
"A. D. VALDEZ,
"JUAN G. BUSTOS,
"J. E. MARTINEZ,
"Jurors."

October 10, John James, alias John Wilson, miner, died from injuries received by a fall of rock at the face of No. 1 room, off the first east entry, Maitland seam, Sunshine mine, Huerfano county. We visited the scene of the accident on the

twelfth, and found that the deceased worked alone in the aforesaid room. Emmet Toal, driver, was the last man to see him alive and the first to discover the accident. About 10 o'clock a. m. he took him an empty car, and about forty-five minutes later he went to see if it was loaded, and after calling on the deceased several times and receiving no reply, he went up the room to the face and there saw his body partly covered with a fall of rock. He immediately gave the alarm, and in a few minutes the body was extricated, but life was extinct. The room was well timbered from the mouth to the face, and there was a supply of timber lying in the room. From the evidence obtained there was no one aware of any dangerous conditions existing in the room previous to the accident. However, the roof of the Maitland seam is fragile and very treacherous. Deceased was a single man, about thirty-eight years of age; nationality, Welsh. The county coroner held an inquest, but we could not obtain a copy of the verdict.

October 12, Mike Ferenz, miner, was instantly killed by a fall of rock on the side of the main entry, about two hundred feet from the mouth of the Santa Clara mine, Huerfano county. We visited the scene of the accident on the following day, and found that Ferenz was on this day engaged as a company hand to take a strip of coal off the side of the main entry for the purpose of making room for a double parting. Thomas J. Brewer, mine boss, L. C. Bogart, driver, and Andy Todd, miner, were within a few feet of the deceased when the accident occurred, and a few seconds previous Brewer drew his attention to the dangerous condition of the overhanging rock, and told him to put up props to sustain the same, and while Ferenz was in the act of saying that he would do so the rock fell with the aforesaid result. Andy Todd said that he had told Ferenz to put some props up before Brewer did. Props of suitable length were lying on the side close at hand. Deceased was single; nationality, Slavish; age, thirty-five years. Coroner held inquest, but we could not obtain the verdict of the jury.

October 21, Hayden John, driver, at Rockvale mine, Fremont county, received severe injuries by being run over by a loaded car on the main south entry, and he died from the effect of his injuries a few hours later. We visited the scene of the accident on the twenty-fourth, and the evidence obtained as to how the accident happened was indefinite. The deceased, on the day of the accident (as was his custom), was riding on the front car and bringing a trip of two cars out over the main

south entry to the I plane double parting, and when at a point about one hundred feet from the parting the trip suddenly stopped. This was unusual, and a trapper who was close by gave the alarm. Daniel Lewis, co-driver, and Wm. Newcomb, boss driver, soon arrived on the scene and found John's body under the front car, apparently lifeless. At the point where the accident occurred the entry is eight feet wide and over six feet high, and practically flat. The roadway was in good condition and the mule driven by him was quiet and obedient. Lewis and Newcomb were of the opinion that the deceased must have lost his footing and slipped under the car while the trip was in motion, and from our personal observation of the existing conditions we concurred with their opinion. The county coroner, after obtaining evidence, deemed it unnecessary to hold an inquest. Deceased was single, of Welsh parentage; age, eighteen years.

October 23, Carlo Ficço, miner, was instantly killed by the falling of loose coal in room 56, west Wheeler entry of the New Castle mine, Garfield county. We visited the scene of the accident and investigated the cause thereof on the twenty-sixth, and the information obtained as to how the accident occurred was vague. Ficco was on this day engaged as chute starter and No. 56 room was known to be choked (or in other words, the loose coal in the room had wedged itself in such a manner that it would not run into the chute of its own accord, and it was Ficco's duty to start the same. From the condition of the place and the location of deceased's body, it is generally assumed that Ficco went up the manway a few feet above the air course and removed some of the boards from the manway side and entered into the room to start the coal, and that it suddenly and violently rushed down the room, catching him before he could retreat into the manway. John Wells, fire boss, on passing the aforesaid chute, noticed an unusual flow of water coming out of the chute, this indicating that the water supply pipe had burst from some cause. He then, knowing that Ficco was engaged in starting the coal in the room, went up to see what was the matter, and found the air course closed with coal and the lower sections of the manway caved in. He then halloed to Ficco and received no reply. On returning to the entry he summoned the loaders to take the coal out of the chute, and after taking twenty cars of coal therefrom, Ficco's body was found in a mangled condition, suggesting that his death was instantaneous. Deceased was a married man, leav-

ing a widow with no children; nationality, Italian; age, thirty-four years. The county coroner held an inquest. See copy of jury's verdict below:

"We, the jury, find that Carlo Ficco came to his death in the New Castle mine of The Colorado Fuel and Iron Company at 9:30 a. m., October 23, 1898, and that his death was accidental.

"S. W. STOUT,
"Foreman.
"E. G. CLIFF,
"B. A. MITCHELL,
"J. C. GROVES,
"ROBT. ROBERTS,
"C. W. VLIET,
"Jurors.
"L. G. CLARK,
"Coroner, Garfield County, Colorado."

November 9, George Sasito, miner, was severely injured by being crushed between the cage and the shaft timber at Fremont mine, Fremont county. We visited the scene of the accident on the eleventh, and obtained the following evidence: About 5:45 p. m. Sasito and about fifteen or twenty other miners were at the pit bottom waiting for the cage when orders were given to hoist men. Myers, one of the cagers, selected ten men in their turn to go up on the cage, Sasito being among them. Jas. Wilson, another cager, gave the usual signal by ringing three bells, and just as soon as the men saw the cage starting from the bottom they rushed in, thinking that the cage would stop in accordance to the signal six inches from the bottom. Isaac Williams and another miner succeeded in getting inside of the cage while it was in motion, and Sasito was caught between the edge of the cage and the shaft timber, and was so severely injured that he died in about three hours after the accident. The "Everhart pneumatic signal gong and speaking tube, combined," is used for signalling between top and bottom, and it has given perfect satisfaction since in operation. On the day of investigation we made several tests of the signals, and the bell responded at the top and bottom to every test made. In the engine house and at the pit bottom a signal code is posted for the use of the engineer and the cagers.

SIGNAL CODE.

1 Bell signifies hoist from the bottom.
1 Bell when in motion signifies stop.
2 Bells, lower cage.
3 Bells signify hoist cage six inches from bottom for men to enter cage. After they have entered 1 bell signifies hoist men.

Positively no person allowed to enter cage until it is moved the required six inches from bottom, and no more than ten men allowed on cage at one time.

The method of signalling is commendable, and the code to be observed is simple, and if they had been obeyed the accident would not have occurred. Joseph Lynn, the engineer on duty, positively stated that the bell only rung one in the engine house. The cagers and several miners that were below are equally positive that Wilson rang three bells, and from the evidence obtained and the tests made on the signal bell I am inclined to believe that three bells were given and that the engineer made a mistake; however, the miners should not have gone on the cage while it was in motion. The engineer bears a good reputation as being careful, attentive and a competent man. Sasito was about twenty-nine years of age, with no relatives in the camp; nationality, Austrian. The county coroner was notified of the accident. No inquest held.

December 3, Thomas Humphries, miner, was seriously injured by a fall of top coal in room 72, east Allen entry, New Castle mine, Garfield county. On the twenty-first Mr. Paul Blount, superintendent, notified us that Humphrey died on the previous night from the effect of his injuries. At this late hour we did not deem it advisable to investigate the cause of the accident.

December 6, Steve Schifra, miner, was severely injured by a fall of coal at the face of No. 7 room, in the second east entry, Brookside mine, Fremont county. We visited the scene of the accident on the eighth, and found that the deceased and Joe Wagner were working together in the aforesaid room. On the day of the accident, previous to going to eat their dinner, they fired a shot partly on the solid. The same was powdered too light, and the result was a "standing shot." On returning to work, Schifra, in a lying position, undertook to mine it off, without putting up "sprags" against the coal, and after he had undermined it clear into the powder-made crevice, a large chunk of coal fell on his head and the upper portion of his body,

crushing him so severely that he never regained consciousness, and he died in about an hour after the accident. The room was well timbered and in a safe condition, which was evidence of their being careful miners. Deceased was about thirty years of age, and had a wife and three children residing in the old country; nationality, Slav. The county coroner held an inquest.

December 12, Antonio Tessari and his son, Dominico, were killed at the face of No. 1 room, in the A-8 entry of the Starkville mine, Las Animas county. We visited the scene of the accident on the thirteenth, and found that Antonio Tessari and his two sons, Dominico and Jacob, were working together in the aforesaid room. At the time of the accident, Dominico and Jacob were loading a car and the father was digging off some coal on the east side of the room, when suddenly a large rock fell on the father and the youngest boy. The boy was instantly killed and the father only lived about two hours after the accident. The room was exceptionally well timbered from the mouth to the face, and the surroundings were evidence of Tessari being a careful miner. He had been working at Starkville for fourteen years. Tessari was an Austrian by birth; age, fifty years; son's age, fourteen years. The county coroner investigated the cause of the accident and deemed it unnecessary to hold on inquest.

December 22, Giovanni Fillipone, miner, was severely injured by a fall of rock at the face of No. 9 room, first cross entry off the fifth north, No. 2 mine, Hastings, Las Animas county. We visited the scene and investigated the cause of the accident on the following day, and found that the deceased and his brother, Mariano, were working together in the aforesaid room. A couple of days previous to the accident the room broke through into an abandoned room, and Mr. G. R. Hill, the superintendent, instructed them not to remove any more of the coal, as he wanted it to remain there to sustain the roof. Mr. Hill, at the same time, marked off a place for them to work in; however, the coal being loose at the face of their working place, they kept on removing it contrary to orders. The place in general was well timbered, but being that they were about to quit the place they neglected putting up props at the face. The rock falling on deceased was not very massive, but his injuries were so severe that he died in about an hour after the accident. Deceased was a married man, with a wife and one child on their journey to this country from Italy. Age, thirty-two years. Coroner investigated the cause of the accident and deemed it unnecessary to hold an inquest.

TABLE

SHOWING YEARLY FATALITIES.

Year	Number of Employees	Tonnage	Number of Fatalities	Lives Lost per 1,000 Employed	Tonnage Extracted for Each Life Lost	Remarks When Fatalities are Exceptionally High
1884	2,122	1,130,624	64	30.1	17,656	Crested Butte explosion, 59 lives
1885	2,154	1,398,796	9	4.1	155,422	
1886	2,085	1,436,211	6	2.9	239,369	
1887	3,138	1,791,735	12	3.8	149,311	
1888	5,570	2,185,477	29	5.2	75,361	Four minor explosions, 8 lives
1889	5,690	2,400,629	23	4.0	104,375	White Ash inundation, 10 lives
1890	7,052	3,075,781	16	2.2	192,236	
1891	6,822	3,512,632	30	4.4	117,088	
1892	7,578	3,771,234	34	4.4	110,918	
1893	7,286	3,947,056	46	6.3	85,805	Como explosion, 24 lives
1894	6,212	3,021,028	19	3.0	159,001	
1895	7,349	3,339,495	23	3.1	145,195	
1896	6,754	3,371,633	68	10.0	49,583	Vulcan explosion, 49 lives
1897	7,016	3,565,660	35	4.9	101,876	Sunshine dust explosion, 12 lives
1898	7,425	4,174,037	24	3.2	173,918	

NON-FATAL ACCIDENTS, 1898.

January 3, Pedro N. Vigil, miner, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; leg broken by a fall of coal.

January 6, Frank Castlick, miner, Rockvale mine, Colorado Fuel and Iron Company, Rockvale, Fremont county; collar bone broken and head injured by a fall of coal.

January 8, Mike Washett, loader, No. 2 Rex mine, Rex Coal Company, Louisville, Boulder county; leg broken by a fall of rock.

January 8, Batista Bussalo, miner, Gray Creek mine, Victor Coal and Coke Company, Gray Creek, Las Animas county; back injured by a fall of top coal.

January 8, Dan Williams, mule-driver, Gonzales Cañon mine, Gonzales Cañon Coal Company, Aguilar, Las Animas county; burned by an explosion of gas.

January 8, T. Kavanaugh, pumpman, Gonzales Cañon mine, Gonzales Cañon Coal Company, Aguilar, Las Animas county; burned by an explosion of gas.

January 14, Henry Savage, mule-driver, Rouse mine, Colorado Fuel and Iron Company, Rouse, Huerfano county; both knee caps broken; fell while getting away from a kicking mule.

January 15, Victor Peternakey, miner, Santa Clara mine, Santa Clara Coal Company, Pryor, Huerfano county; leg broken by a fall of rock.

February 2, Jas. Schmimandle, engineer, Starkville mine, Colorado Fuel and Iron Company, Starkville, Las Animas county; foot crushed; caught in set screw of shaft.

February 8, Henry Brun, Jr., trapper, No. 2 Victor mine, Voctor Coal and Coke Company, Hastings, Las Animas county; leg broken; went to sleep at the door and was caught by a trip of cars.

February 11, Robert Cairney, miner, Brewster mine, Brewster Coal Company, Florence, Fremont county; leg bruised by a fall of rock.

February 12, John Markinson, loader, Otis mine, Otis Coal Company, Lafayette, Boulder county; hip bruised by a fall of coal.

February 17, P. L. Snodgrass, mule-driver, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; rib fractured; caught between car and coal rib.

February 21, W. L. Sly, weighman, Franceville mine, Union Ice and Coal Company, Franceville, El Paso county; thumb bruised by a pit car wheel.

February 26, Thos. Howell, mule-driver, Franceville mine, Union Ice and Coal Company, Franceville, El Paso county; leg bruised by a kick from a mule.

March 21, Michael Strainer, Jr., miner, Fremont mine, Colorado Fuel and Iron Company, Williamsburg, Fremont county; head injured by a fall of rock.

March 21, Jake Koiborer, miner, Crested Butte mine, Colorado Fuel and Iron Company, Crested Butte, Gunnison county; scalp wound by a fall of coal.

April 2, Thomas Foltz, miner, Santa Clara mine, Union Coal and Coke Company, Pryor, Huerfano county; hand bruised by a fall of coal.

April 4, Joe Bergano, miner, Starkville mine, Colorado Fuel and Iron Company, Starkville, Las Animas county; arm broken by a fall of rock.

April 6, J. T. Riley, driver, Spring Gulch mine, Colorado Fuel and Iron Company, Spring Gulch, Pitkin county; back and hip bruised; caught between car and chute.

April 9, Joe Martine, miner, Brookside mine, Colorado Fuel and Iron Company, Brookside, Fremont county; left hip injured by a fall of rock.

April 12, John Neilson, miner, Mitchell mine, Northern Coal Company, Lafayette, Boulder county; leg broken by a fall of rock.

April 27, Silva Linzim, miner, Rouse mine, Colorado Fuel and Iron Company, Rouse, Huerfano county; leg broken by a fall of pillar coal.

May 16, V. McKervich, miner, Rouse mine, Colorado Fuel and Iron Company, Rouse, Huerfano county; leg broken by a fall of coal.

May 26, Walter Bugg, miner, Sunshine mine, Sunshine Fuel Company, Walsenburg county; leg broken by a fall of rock.

June 9, Geo. Hoyland, miner, Crested Butte mine, Colorado Fuel and Iron Company, Crested Butte, Gunnison county; leg broken by a fall of coal.

June 18, Joe Flami, miner, Spring Gulch mine, Colorado Fuel and Iron Company, Spring Gulch, Pitkin county; collar bone fractured by a fall of coal.

June 23, Andrew Ferqueson, miner, Rockvale mine, Colorado Fuel and Iron Company, Rockvale, Fremont county; kidneys injured by a fall of rock.

June 24, Sam Mickelson, miner, Ruby mine, Colorado Fuel and Iron Company, Ruby, Gunnison county; leg fractured by a fall of rock.

June 25, Thos. Rowhead, driver, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; finger broken by a pit car.

June 30, Frank Masaglia, miner, No. 2 Victor mine, Victor Coal and Coke Company, Hastings, Las Animas county; slightly burned by gas.

July 2, Wm. Kissell, carpenter, New Castle, Colorado Fuel and Iron Company, New Castle, Garfield county; leg broken by a lump of coal falling from chute.

July 8, John Minuri, miner, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; head, neck and side injured by a premature blast.

July 18, F. O. Douglas, coke oven foreman, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; leg fractured; run over by waste car at washing plant.

July 28, Joe Certesi, miner, No. 2 Victor mine, Victor Coal and Coke Company, Hastings, Las Animas county; leg and arm broken by a fall of rock.

July 29, Lester Lantis, hooker-on, No. 6 Marshall mine, Gorham Coal Company, Marshall, Boulder county; leg broken by coal falling from moving pit cars.

July 30, Geo. Pitcue, miner, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; leg broken by a fall of top coal.

August 8, Antoni Palover, miner, Crested Butte mine, Colorado Fuel and Iron Company, Crested Butte, Gunnison county; nose injured by a falling rock.

August 8, Stefano Cicolino, miner, Engle mine, Colorado Fuel and Iron Company, Engleville, Las Animas county; hip joint dislocated by a pit car.

August 24, F. Bartagnolli, miner, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; ankle bruised by a fall of coal.

August 27, Lewis Dyke, timberman, Rockvale mine, Colorado Fuel and Iron Company, Rockvale, Fremont county; ankle dislocated by a fall of rock.

September 2, David Miller, mining boss, Fremont mine, Colorado Fuel and Iron Company, Williamsburg, Fremont county; body bruised by pit cage.

September 4, Bendigo Williams, miner, Starkville mine, Colorado Fuel and Iron Company, Starkville, Las Animas county; back hurt.

September 6, E. A. Harvey, driver, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; head bruised and ear taken off between roof and loaded car.

September 10, John Brinten, miner, No. 2 Alpine mine, Alpine Coal Company, Baldwin, Gunnison county; leg broken by a fall of coal.

September 15, Dominick Leberto, miner, No. 2 Victor mine, Victor Coal and Coke Company, Hastings, Las Animas county; leg broken; fell between moving cars.

September 15, W. J. Jones, miner, Rockvale mine, Colorado Fuel and Iron Company, Rockvale, Fremont county; foot bruised by a fall of rock.

September 16, John Goduskie, miner, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; body bruised by a fall of rock.

September 21, Brown Polito, miner, No. 2 Alpine mine, Alpine Coal Co, Baldwin, Gunnison county; head and face injured by a premature shot.

September 21, Wm. Wood, miner, Lister mine, Lister Coal Company, Erie, Boulder county; leg bruised by a fall of coal.

September 21, J. W. Gall, miner, Spring Gulch mine, Colorado Fuel and Iron Company, Spring Gulch, Pitkin county; collar bone fractured by a fall of coal.

October 3, M. Dusarte, driver, Peerless mine, Northern Coal Company, Aguilar, Las Animas county; leg bruised by a pit car.

October 4, Jos. Pico, miner, Rockvale mine, Colorado Fuel and Iron Company, Rockvale, Fremont county; leg broken by a fall of coal.

October 4, David Hansen, miner, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; leg fractured by a fall of coal.

October 7, George Givens, driver, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; finger broken by a pit car.

October 8, Gabriel Garcia, miner, Engle mine, Colorado Fuel and Iron Company, Engleville, Las Animas county; leg broken by a fall of coal.

October 15, Alex. West, miner, Bookcliff mines, Bookcliff Coal Company, Bookcliff, Mesa county; ankle bruised by a fall of rock.

October 16, Chas. Manipace, miner, Pictou mine, Colorado Fuel and Iron Company, Pictou, Huerfano county; collar bone broken; fell off moving pit car.

October 17, Thos. Llewellyn, miner, New Castle mine, Colorado Fuel and Iron Company, New Castle, Garfield county; shoulder bruised by a fall of coal.

October 22, Bert Cox, miner, San Juan mine, San Juan Coal Company, Durango, La Plata county; head and neck bruised by a fall of rock.

October 26, Geo. Johnson, trip rider, Anthracite mine, Colorado Fuel and Iron Company, Anthracite, Gunnison county; body bruised; caught between pit cars.

October 29, E. Petrie, miner, Sopris mine, Colorado Fuel and Iron Company, Sopris, Las Animas county; eye injured by a piece of coal while mining.

October 29, John Lynch, miner, Pictou mine, Colorado Fuel and Iron Company, Pictou, Huerfano county; fracture of spinal column by a fall of rock.

November 3, Arthur Schnider, miner, Maitland mine, Victor Coal and Coke Company, Maitland, Huerfano county; face and hands burned by an explosion of powder.

November 3, Wm. Griffiths, driver, Walsen mine, Colorado Fuel and Iron Company, Walsenburg, Huerfano county; toe bruised by a pit car that jumped the track.

November 11, Frank Shubick, miner, Walsen mine, Colorado Fuel and Iron Company, Walsenburg, Huerfano county; leg broken by fall of top coal.

November 19, Hugh Duffy, miner, Brookside mine, Colorado Fuel and Iron Company, Brookside, Fremont county; leg bruised; kick from a mule.

November 19, Andrew Bilske, miner, Maitland mine, Victor Coal and Coke Company, Maitland, Huerfano county; foot bruised by a fall of coal.

November 21, Henry Dahl, miner, Alpine mine, Alpine Coal Company, Baldwin, Gunnison county; leg broken by a fall of coal.

November 21, John Shelt, fireman, Crested Butte mine, Colorado Fuel and Iron Company, Crested Butte, Gunnison county; leg broken by fall of damper weight.

November 22, T. E. Valdez, slate picker, Pictou mine, Colorado Fuel and Iron Company, Pictou, Huerfano county; lost two fingers; caught in cog wheels.

November 29, Baidolo Rossie, miner, Gray Creek mine, Victor Coal and Coke Company, Gray Creek, Las Animas county; head bruised by falling coal.

PRODUCT AND CHARACTER

OF

COLORADO COAL MINES

IN 1897-8.

ARAPAHOE COUNTY.

Name of Mine	Operator's Name and Postoffice Address	General Superintendent	Local Superintendent	Number of Employees	Mode of Ventilation	Volume of air in cubic feet per minute	Daily Capacity	Railroad Connections
Scranton	Colorado Eastern R. R. Co., Boston bldg., Denver	R. McDowell	R. McDowell	2	Natural	4,000		Colorado Eastern

BOULDER COUNTY.

Name of Mine	Operator's Name and Postoffice Address	General Superintendent	Local Superintendent	Number of Employees	Mode of Ventilation	Volume of air in cubic feet per minute	Daily Capacity	Railroad Connections	Remarks
Acme	United Coal Co., John McNeil, receiver, Equitable bldg., Denver			2	Fan	25,000	500	Union Pacific, Denver & Gulf	Closed down in 1898
Caledonia	United Coal Co., John McNeil, receiver, Equitable bldg., Denver	David Allan, Jr.		75	Fan	24,000	400	Union Pacific, Denver & Gulf	Closed last half of 1898
Simpson	United Coal Co., John McNeil, receiver, Equitable bldg., Denver	David Allan, Sr.	Robt. Allan	200	Fan	125,000	750	U. P., D. & G. and B. & M.	Men on strike for 6 months
Excelsior	United Coal Co., John McNeil, receiver, Equitable bldg., Denver	David Allan, Sr.	John McNeil, Jr.	75	Fan	25,000	500	U. P., D. & G. and B. & M.	Men on strike for 6 months
Gladstone	Northern Coal Co., Jas. Cannon, Jr., prest., Peoples Bank bldg., Denver	C. S. Otis	L. S. Jones	70	Fan	30,000	500	U. P., D. & G. and B. & M.	
New Mitchell	Northern Coal Co., Jas. Cannon, Jr., prest., Peoples Bank bldg., Denver	C. S. Otis	J. Morrison	75	Fan	30,000	500	Burlington & Missouri	
Leader	Northern Coal Co., Jas. Cannon, Jr., prest., Peoples Bank bldg., Denver	J. C. Williams	J. H. Connell	55	Fan	20,000	300	U. P., D. & G	
Rex No. 1	Northern Coal Co., Jas. Cannon, Jr., prest., Peoples Bank bldg., Denver	J. C. Williams	Wm. Atkins	150	Fan	35,000	600	U. P., D. & G	
Rex No. 2	Northern Coal Co., Jas. Cannon, Jr., prest., Peoples Bank bldg., Denver	J. C. Williams	Geo. Fruith	40	Fan	15,000	600	U. P., D. & G	Formerly Hecla No. 2
Imperial	Northern Coal Co., Jas. Cannon, Jr., prest., Peoples Bank bldg., Denver	J. C. Williams	Milsom Phipps	46	Fan	20,000	200	U. P., D. & G	Closed down for 8 months
Industrial	Northern Coal Co., Jas. Cannon, Jr., prest., Peoples Bank bldg., Denver	J. Hood	Wm. Ramsey	60	Fan	20,000	600	U. P., D. & G	
Enterprise	Northern Coal Co., Jas. Cannon, Jr., prest., Peoples Bank bldg., Denver	Geo. Fruith	Geo. Fruith	65	Fan	30,000	200	U. P., D. & G	Closed down for 5 months
Pluto	Northern Coal Co., Jas. Cannon, Jr., prest., Peoples Bank bldg., Denver	P. J. Donnelly	P. J. Donnelly	...	...	...	...	U. P., D. & G	Closed down all year
Marfell	Northern Coal Co., Jas. Cannon, Jr., prest., Peoples Bank bldg., Denver		A. Marfell	6	Furnace	8,000	30	No railroad	
Vaughn	Northern Coal Co., Jas. Cannon, Jr., prest., Peoples Bank bldg., Denver		T. Vaughn	4	Natural	4,000	30	Burlington & Missouri	
Hecla	Citizens' Coal and Coke Co., Mining Exchange, Denver	W. H. Brown	W. H. Brown	68	Fan	18,000	400	Union Pacific, Denver & Gulf	
Otis	Otis Coal Co., Lafayette	C. S. Otis	E. Nisbet	32	Fan	25,000	150	U. P., D. & G. and B. & M.	Abandoned
Marshall No. 6	A. G. Gorham, lessee, Boston bldg., Denver	A. G. Gorham	R. Morton	61	Natural	10,000	250	U. P., D. & G	
Gorham	A. G. Gorham, lessee, Boston bldg., Denver	A. G. Gorham	R. Morton	59	Natural	10,000	200	U. P., D. & G	

BOULDER COUNTY—Continued.

Name of Mine	Operator's Name and Postoffice Address	General Superintendent	Local Superintendent	Number of Employees	Mode of Ventilation	Volume of air in cubic feet per minute	Daily Capacity	Railroad Connections	Remarks
Marshall No. 2	A. G. Gorham, lessee, Boston bldg., Denver	A. G. Gorham	R. Morton	-----	----------	--------	------	----------	Abandoned
Garfield No. 1	Pallett Coal Co., Erie	----------	Jas. Pallett	-----	----------	--------	------	----------	Abandoned
Lister	Lister Coal Co., Erie	----------	Felix McKenna	32	Fan	10,000	150	Union Pacific	----------
Long's Peak	Long's Peak Coal Co., Erie	Wm. Nicholson	Wm. Nicholson	60	Fan	20,000	300	Union Pacific	----------
Shanahan	Shanahan Coal Co., Boulder	W. M. Henderson	----------	25	Natural	5,000	50	No railroad	----------
Rosser	Rosser Coal Co., Marshall	Wm. Rosser	----------	7	Natural	3,000	25	No railroad	----------
Caryl	Caryl Coal Mining Co., Boston bldg., Denver	----------	Jas. Pallett	7	Steam	2,500	50	No railroad	----------
Electric	Equitable Coal Mining Co., 1945 19th st., Denver	Wm. Haywood	----------	21	Natural	5,000	50	No railroad	----------
Garfield No. 2	----------	John Simpson	----------	-----	----------	--------	------	----------	Abandoned mine, reopened

EL PASO COUNTY.

Name of Mine	Operator's Name and Postoffice Address	General Superintendent	Local Superintendent	Number of Employees	Mode of Ventilation	Volume of air in cubic feet per minute	Daily Capacity	Railroad Connections	Remarks
Newfield	John Bickerton, Franceville Junc.	John Bickerton		4	Natural	1,000	25	No railroad	
Pine Grove									Abandoned
Mountain View									Not in operation
Monument Park									Not in operation
Monarch									Not in operation
Carlton	Carlton Mining and Mercantile Co., Colorado Springs	G. R. Eliott		30	Steam jet	6,000	150	Denver & Rio Grande	
Williamsville	Consolidated Coal Co., Colorado Springs	C. E. Doge	— Weaver	49	Furnace	8,000	100	No railroad	
Antlers									Not in operation
Curtis	Curtis Coal Co., Colorado Springs	C. H. Curtis	R. Wootton	20	Steam	7,000	100	No railroad	New mine
Danville	Danville Coal Co., Colorado Springs	Dan Williams		15	Natural	6,000	100	No railroad	New mine
Boulder	L. E. Thomas Coal Co., Colorado Springs	L. E. Thomas		15	Natural	2,000		No railroad	New mine
Franceville	Union Coal and Ice Co., Colorado Springs			28	Fan	12,000	150	Union Pac., Den. & Gulf	Abandoned

FREMONT COUNTY.

Name of Mine	Operator's Name and Postoffice Address	General Superintendent	Local Superintendent	Number of Employees	Mode of Ventilation	Volume of air in cubic feet per minute	Daily Capacity	Railroad Connections	Remarks
Coal Creek No. 1	Colorado Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	W. P. Thompson							Not in operation
Coal Creek No. 2	Colorado Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	W. P. Thompson	J. P. Thomas	154	Fan	30,960	350	Denver & Rio Grande	
Fremont	Colorado Fuel and Iron Co., J. A. Kebler, prest , Boston bldg., Denver	W. P. Thompson	R. O'Neil	190	Fan	38,400	600	Denver & Rio Grande	
Rockvale	Colorado Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	W. P. Thompson	J. P. Thomas	376	Fan	39,525	1,000	Santa Fe	
Brookside	Colorado Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	W. P. Thompson	T. Tinsley	302	Fan	32,600	1,000	Santa Fe	
Chandler	Victor Coal and Coke Co., D. A. Chappell, prest., People's Bank bldg., Denver	John Cameron	J. Williams	160	Fan	24,300	500	Denver & Rio Grande	
Brewester	Brewester Coal Co., Florence	P. Kreis		25	Steam	3,070	40	No railroad	
Williamsburg	Williamsburg Coal Co., Williamsburg	A. Wilson		4	Fan	8,000	50	Denver & Rio Grande	
Williams	Williams Coal Co., Williamsburg	D. Williams		22	Natural	5,000	30	No railroad	
Hays	D. H. Hays Coal Co., Canon City	D. H. Hays		10	Natural	4,000	20	No railroad	
Price	Price Coal Co., Chandler	W. R. Price		9	Natural	4,000	50	No railroad	
Bluff Springs	Bluff Springs Coal Co., Cripple Creek	W. Barrett		4	Natural	2,000		No railroad	

GUNNISON COUNTY.

Name of Mine	Operator's Name and Postoffice Address	General Superintendent	Local Superintendent	Number of Employees	Mode of Ventilation	Volume of air in cubic feet per minute	Daily Capacity	Railroad Connections	Remarks
Crested Butte	Colorado Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	J. T. Kebler	A. Alexander	311	Fan	36,876	1,000	Denver & Rio Grande	
Anthracite	Colorado Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	J. T. Kebler	John Evans	84	Fan	32,400	300	Denver & Rio Grande	
Ruby	Colorado Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	J. T. Kebler	T. McLaughlin	69	Fan	17,640	300	Denver & Rio Grande	
Alpine	Alpine Coal Co., Baldwin	Van Matter	Joe Watson	102	Fan	20,000	150	Leadville & Gunnison	
Kubler	Kubler Coal Co., Baldwin	M. Quin		46	Furnace	8,000	100	Leadville & Gunnison	
Star									Not in operation
Union	Union Coal Co., Baldwin	H. Perrier		8	Natural	3,000	50	Leadville & Gunnison	
Holly									Not in operation
Superior									Not in operation
Black Diamond	Black Diamond Coal Co., Baldwin	D. Perrins		4	Natural	1,000	20	No railroad	

GARFIELD COUNTY.

Name of Mine	Operator's Name and Postoffice Address	General Superintendent	Local Superintendent	Number of Employees	Mode of Ventilation	Volume of air in cubic feet per minute	Daily Capacity	Railroad Connections	Remarks
Newcastle	Colo. Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	J. T. Kebler	Paul Blount	180	Fans	90,000	700	D. & R. G. and Colorado Midland	
Sunshine	Colo. Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	J. T. Kebler	B. L. Davis	42	Natural	6,000	80	Colorado Midland	
Marion	Colo. Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	J. T. Kebler	H. Eliott	10	Natural	4,000	50	No railroad	
Overland	Overland Coal Co., Denver			4	Natural	2,000	15	No railroad	
Midland	Northern Coal Co., Jas. Cannon, Jr., prest., People's Bank bldg., Denver			4	Natural	3,000	50	Colorado Midland	Purchased by N. Coal Co
Keyston	Keyston Coal Co., Newcastle	W. F. Cross		12	Natural	4,000	20	Denver & Rio Grande	
Diamond	Northern Coal Co., Jas. Cannon, Jr., prest., Denver	J. Dalrymple		80	Blower	10,000	1,000	Colorado Midland	New mine
Coryell	Coryell Coal Co., Newcastle	P. C. Coryell		10	Natural	4,000	20		New mine
Elk Creek									Not in operation

HUERFANO COUNTY.

Name of Mine	Operator's Name and Postoffice Address	General Superintendent	Local Superintendent	Number of Employees	Mode of Ventilation	Volume of air in cubic feet per minute	Daily Capacity	Railroad Connections	Remarks
Pictou	Colorado Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	W. P. Thompson	G. Peart	176	Fan	97,220	1,200	Denver & Rio Grande	
Robinson	Colorado Fuel and Iron Co., J. A Kebler, prest., Boston bldg., Denver	W. P. Thompson	J. P. Breun	68	Fan	30,000	500	Denver & Rio Grande	
Walsen	Colorado Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	W. P. Thompson	J. P. Breun	120	Fan	52,650	700	Denver & Rio Grande	
Rouse	Colorado Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	W. P. Thompson	A. French	210	Fan	30,960	800	Denver & Rio Grande and U. P., D. & G	
Maitland	Victor Coal Co, D. A. Chappell, prest., People's Bank bldg., Denver	John Cameron	A. Pollock	50	Fan	20,500	400	Denver & Rio Grande	
Sunshine	Sunshine Fuel Co., Pictou	Perry Kilbaugh	H. Tennant	40	Furnace	10,000	100	Denver & Rio Grande	
Santa Clara	Union Coal Co., W. R. Harp, prest., Boston bldg., Denver	W. R. Harp	C. Beuchat	125	Furnace	15,500	500	Denver & Rio Grande	
Toltec	Northern Coal Co., Jas Cannon, Jr., People's Bank bldg., Denver	R. Lawther	R. Hunter	110	Fan	30,000	500	Denver & Rio Grande	

JEFFERSON COUNTY.

Name of Mine	Operator's Name and Postoffice Address	General Superintendent	Local Superintendent	Number of Employees	Mode of Ventilation	Volume of air in cubic feet per minute	Daily Capacity	Railroad Connections
Mount Carbon	Mount Carbon Coal Co . Morrison	B. Prince		3	Natural	2,000	10	No railroad
Ralston Springs	Ralston Springs Coal Co., Golden	Wm. Prout		15	Natural	4,000	10	No railroad
North White Ash	North White Ash Coal Co., Golden	J. H. Williams		13	Fan	4,500	20	No railroad
Independence	Independence Coal Co., Golden	W. Williams		5	Natural	1,000	10	No railroad

LARIMER COUNTY.

Name of Mine	Operator's Name and Postoffice Address	General Superintendent	Local Superintendent	Number of Employees	Mode of Ventilation	Volume of air in cubic feet per minute	Daily Capacity	Railroad Connections
Indian Springs	Indian Springs Coal Co., Fort Collins	C. C. Enigh		7	Natural	2,500	20	No railroad

LAS ANIMAS COUNTY.

Name of Mine	Operator's Name and Postoffice Address	General Superintendent	Local Superintendent	Number of Employees	Mode of Ventilation	Volume of air in cubic feet per minute	Daily Capacity	Railroad Connections	Remarks
Starkville	Colorado Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	W. P. Thompson	D. McLaughlin	484	Fans	65,000	1,700	Santa Fe	
Sopris	Colorado Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	W. P. Thompson	T. Patterson	461	Fan	57,000	1,200	Union Pac., Den. & Gulf	
Engle	Colorado Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	W. P. Thompson	J. S. Jones	390	Fan	50,400	1,200	Denver & Rio Grande	
Berwind	Colorado Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	W. P. Thompson	W. E. Maltly	236	Fan	32,800	900	Union Pac., Den. & Gulf	
Victor No. 1	Victor Coal and Coke Co., D. A. Chappell, prest., Peoples Bank bldg., Denver	John Cameron	G. R. Hill	185	Fan	25,700	600	Union Pac., Den & Gulf	
Victor No. 2	Victor Coal and Coke Co., D. A. Chappell, prest., Peoples Bank bldg., Denver	John Cameron	G. R. Hill	176	Fan	25,000	600	Union Pac., Den. & Gulf	
Gray Creek	Victor Coal and Coke Co., D. A. Chappell, prest., Peoples Bank bldg., Denver	John Cameron	J. Lamb	181	Natural	20,500	600	Union Pac., Den. & Gulf	
Peerless	Northern Coal Co., Jas. Cannon, Jr., Peoples Bank bldg., Denver	William McNeil	J. Calderhead	125	Fan	40,500	1,000	Union Pac., Den. & Gulf	
Rowland	H. C. Nichols, Trinidad	H. C. Nichols		8	Natural	3,000	50	No railroad	
Bunker Hill	H. C. Nichols, Trinidad	H. C. Nichols		16	Natural	8,500	100	No railroad	
Blooms	George Jefferys, Trinidad	George Jefferys		15	Natural	6,000	50	No railroad	
Gonzales	Gonzales Canon Coal Co., Aguilar	A. Broadhead		50	Fan	20,000	300	Union Pac., Den. & Gulf	
Rugby	Teachers' Mining Co., 705 Seventeenth street, Denver	P. Brennan		30	Natural	10,000	100	No railroad	
Belmont									Not in operation
Chicosa	Chicosa Coal Co., Denver	H. Humphry		2	Natural	1,000	20	No railroad	

LA PLATA COUNTY.

Name of Mine	Operator's Name and Postoffice Address	General Superintendent	Local Superintendent	Number of Employees	Mode of Ventilation	Volume of air in cubic feet per minute	Daily Capacity	Railroad Connections	Remarks
Porter	Porter Fuel Co., J. A. Porter, prest., Boston bldg., Denver	S. E. Herr	T. Mason	60	Natural	15,000	400	Rio Grande So	
Hesperus	Porter Fuel Co., J. A. Porter, prest., Boston bldg., Denver	S. E. Herr	Wm. Mason	31	Natural	10,000	150	Rio Grande So	
Champion	Champion Coal Co., Durango	A. Adrianson		15	Natural	4,000	20	No railroad	Aband'ed
San Juan	San Juan Coal Co., Durango	A. Vinyard		25	Natural	6,000	50	Rio Grande So	
Ute	Ute Coal Co., Durango	L. C. Jakaway		15	Furnace	4,000	20	Rio Grande So	
City	City Coal Co., Durango	D. M. Logan		18	Natural	6,000	30	No railroad	

MESA COUNTY.

Name of Mine	Operator's Name and Postoffice Address	General Superintendent	Local Superintendent	Number of Employees	Mode of Ventilation	Volume of air in cubic feet per minute	Daily Capacity	Railroad Connections
Mount Lincoln	Mount Lincoln Coal Co., Palasade	Geo. Smith		10	Natural	4,000	20	Denver & Rio Grande
Palasade	Palasade Coal Co., Palasade	O. Belmy		8	Natural	3,500	10	No railroad
Book Cliff	Book Cliff Coal Co., Grand Junction			22	Natural	8,000	30	Book Cliff railroad

PITKIN COUNTY.

Name of Mine	Operator's Name and Postoffice Address	General Superintendent	Local Superintendent	Number of Employees	Mode of Ventilation	Volume of air in cubic feet per minute	Daily Capacity	Railroad Connections
Spring Gulch	Colo. Fuel and Iron Co., J. A. Kebler, prest., Boston bldg., Denver	J. T. Kebler	H. Elliott	117	Fan	29,890	500	Colorado Midland
Union	Union Coal and Coke Co., W. R. Harp, prest, Boston bldg., Denver	W. R. Harp	R. Dalrymple	60	Furnace	10,250	200	Colorado Midland

WELD COUNTY.

Name of Mine	Operator's Name and Postoffice Address	General Superintendent	Local Superintendent	Number of Employees	Mode of Ventilation	Volume of air in cubic feet per minute	Daily Capacity	Railroad Connections	Remarks
North Western	T. G. Reese, Erie	T. G. Reese		12	Fan	10,000	100	Union Pacific	
McKissic									Abandon'd
Washington	Washington Coal Co., Erie	D. Brimble		7	Natural	2,000	50	Union Pacific	
White House	Robert Johnston Coal Co., Platteville	R. Johnston		4	Natural	1,000	20	No railroad	
Lincoln	Lincoln Coal Co., Erie	John Flavell		4	Natural	1,000	20	No railroad	
Emerson	Wm. Parkin, Fort Lupton	Wm. Parkin		6	Natural	1,000	20	No railroad	
Woolley	Woolley Coal Co., Erie	T. Woolley		24	Natural	5,000	50	No railroad	
Cold Draw	Cold Draw Coal Co., Evans	A. Rodgers		6	Natural	1,000	20	No railroad	

APPENDIX.

THE STATUTE LAWS OF COLORADO IN RELATION TO COAL MINES.

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 shall 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 continguous 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 enginer 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 department of the state. All instruments, plans, books, memoranda, notes, etc., pertaining to the office, shall be the property of the state, and shall be delivered to their successors in office.

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

Sec. 16. No person acting as manager or agent of any coal mine, or as a mining engineer for any coal mining company, or to be interested in operating any coal mine, shall at the some 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 then 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 of 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 of 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, shall make daily inspection of ropes, chains, cages and other hoisting appliances, guides and shaft timbers, and make a record of such daily inspection in a book, kept at the office 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.